# Packaging Specification

**Note the following details of the code protection feature on Microchip devices:**

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.



**Trademarks**



QUALITY MANAGEMENT SYSTEM
CERTIFIED BY DNV
ISO/TS 16949:2002

*Microchip received ISO/TS-16949:2002 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company's quality system processes and procedures are for its PIC® MCUs and dsPIC® DSCs, KEELOQ® code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001:2000 certified.*

# Packaging Index

## CERAMIC SIDE-BRAZED DUAL IN-LINE FAMILY



## CERAMIC DUAL IN-LINE (CERDIP) FAMILY



## CERAMIC CHIP CARRIER (CERQUAD) FAMILY



## SMALL-OUTLINE TRANSISTOR FAMILY

# Packaging Index

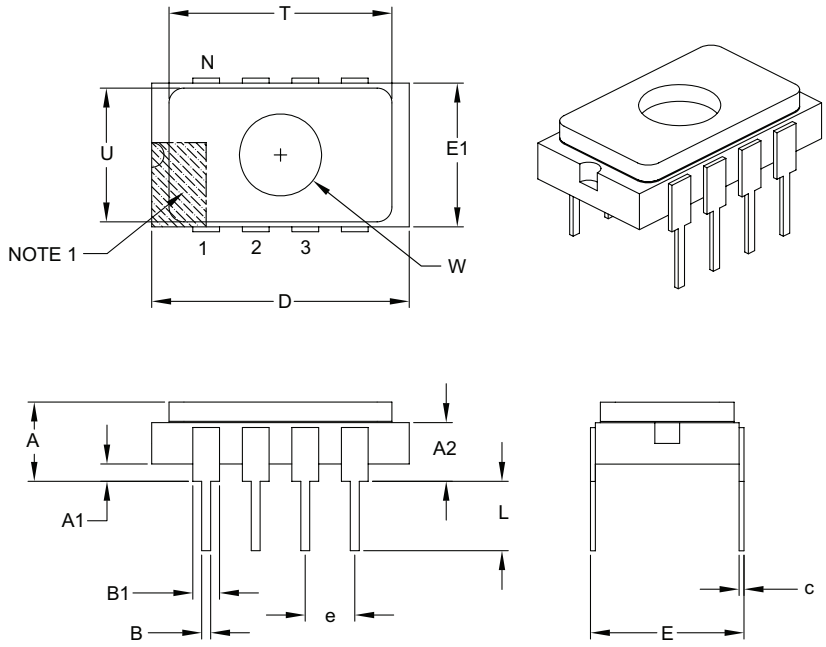
# Packaging Index

# Packaging Index

# Packaging Diagrams and Parameters

## 8-Lead Ceramic Side Brazed Dual In-Line with Window (JW) – .300" Body

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | .085 | – | .200 |
| Top of Body to Seating Plane | A2 | .103 | – | .143 |
| Standoff | A1 | .025 | – | .070 |
| Package Width | E1 | .280 | – | .310 |
| Overall Length | D | .500 | – | .540 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | B1 | .045 | – | .065 |
| Lower Lead Width | B | .015 | – | .022 |
| Overall Row Spacing § | E | .300 | – | .325 |
| Window Diameter | W | .161 | – | .171 |
| Lid Length | T | .440 | – | .460 |
| Lid Width | U | .260 | – | .280 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include burrs and/or projections of package material. These particles shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

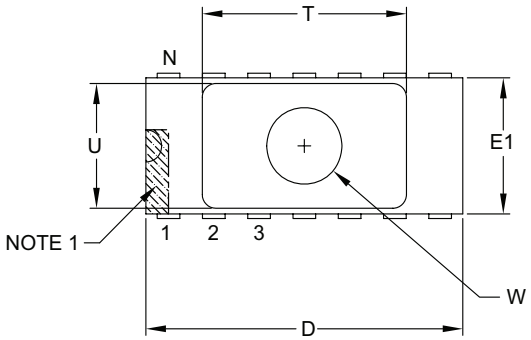
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

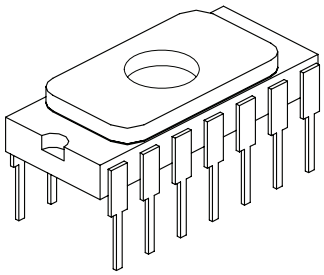
Microchip Technology Drawing C04-083B

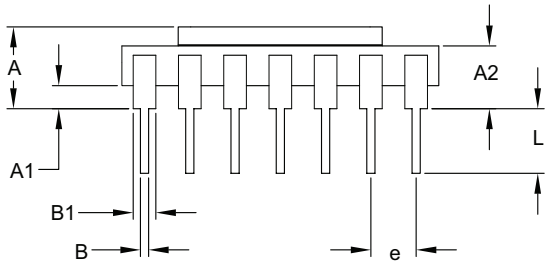
# Packaging Diagrams and Parameters

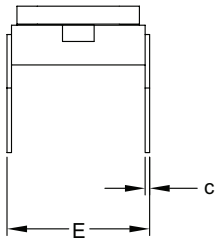
## 14-Lead Ceramic Side Brazed Dual In-Line with Window (JW) – .300" Body

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging






| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 14 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | .085 | – | .200 |
| Top of Body to Seating Plane | A2 | .100 | – | .140 |
| Standoff | A1 | .025 | – | .070 |
| Package Width | E1 | .280 | – | .310 |
| Overall Length | D | .693 | – | .770 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | B1 | .045 | – | .065 |
| Lower Lead Width | B | .015 | – | .022 |
| Overall Row Spacing § | E | .300 | – | .325 |
| Window Diameter | W | .161 | – | .171 |
| Lid Length | T | .440 | – | .460 |
| Lid Width | U | .260 | – | .280 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include burrs and/or projections of package material. These particles shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

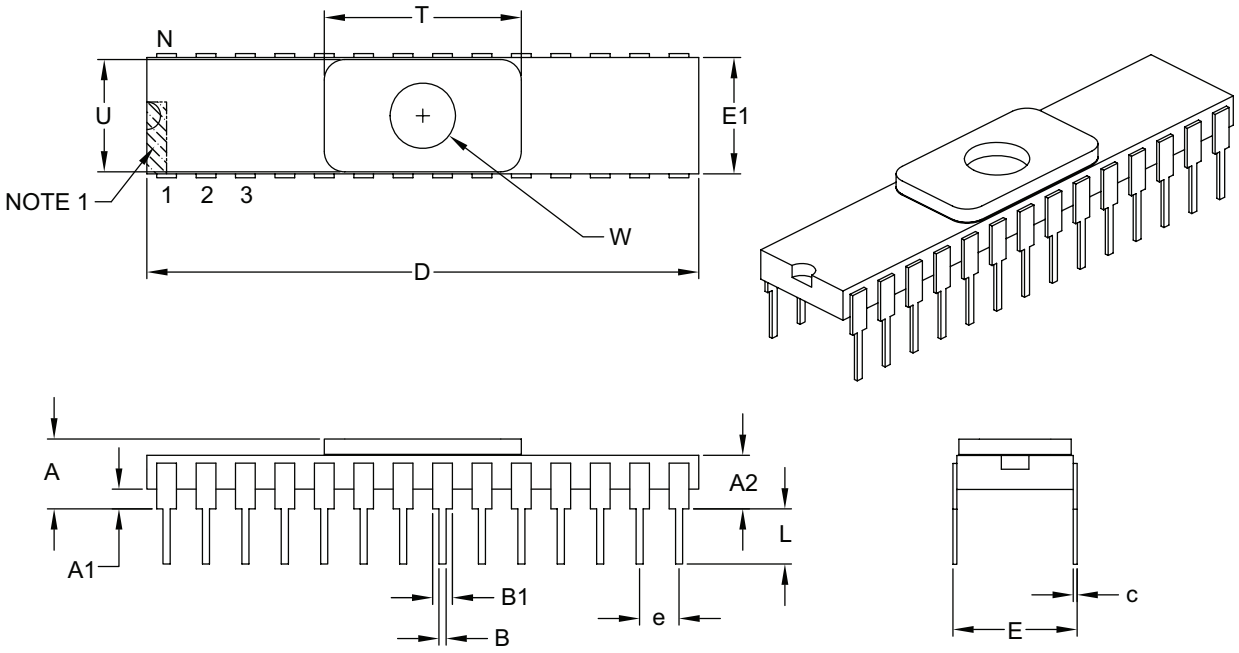
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-107B

# Packaging Diagrams and Parameters

## 28-Lead Ceramic Side Brazed Dual In-Line with Window (JW) – .300" Body

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | .085 | – | .200 |
| Top of Body to Seating Plane | A2 | .115 | – | .155 |
| Standoff | A1 | .025 | – | .070 |
| Package Width | E1 | .280 | – | .310 |
| Overall Length | D | 1.380 | – | 1.420 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | B1 | .045 | – | .065 |
| Lower Lead Width | B | .015 | – | .022 |
| Overall Row Spacing § | E | .300 | – | .325 |
| Window Diameter | W | .161 | – | .171 |
| Lid Length | T | .490 | – | .510 |
| Lid Width | U | .275 | – | .295 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include burrs and/or projections of package material. These particles shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-084B

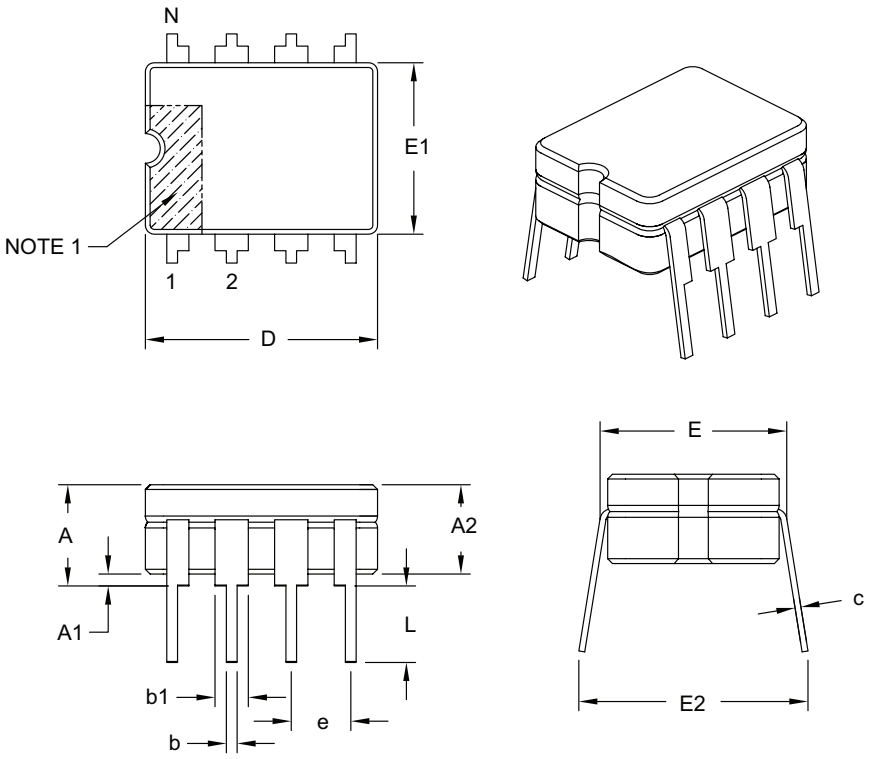
# Packaging Diagrams and Parameters

**NOTES:**

# Packaging Diagrams and Parameters

## 8-Lead Ceramic Dual In-Line (JA) – .300" Body [CERDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .200 |
| Standoff § | A1 | .015 | – | – |
| Ceramic Package Height | A2 | .140 | – | .175 |
| Shoulder to Shoulder Width | E | .290 | – | .320 |
| Ceramic Package Width | E1 | .230 | .248 | .300 |
| Overall Length | D | .370 | .380 | .400 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .045 | – | .065 |
| Lower Lead Width | b | .015 | – | .023 |
| Overall Row Spacing | E2 | .314 | – | .410 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensioning and tolerancing per ASME Y14.5M.

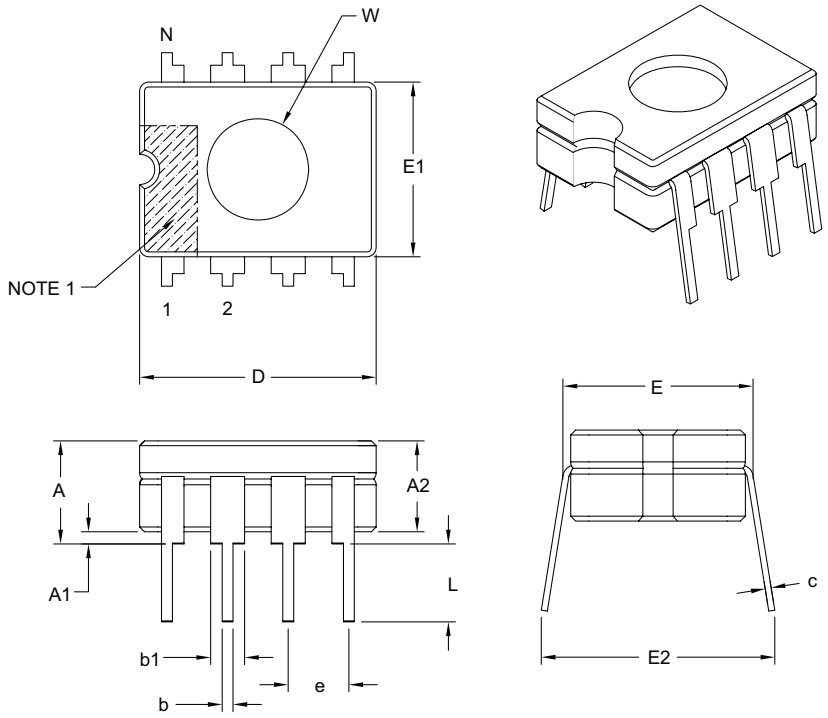
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-001B

# Packaging Diagrams and Parameters

## 8-Lead Ceramic Dual In-Line with Window (JW) – .300" Body [CERDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .200 |
| Standoff § | A1 | .015 | – | – |
| Ceramic Package Height | A2 | .140 | – | .175 |
| Shoulder to Shoulder Width | E | .290 | – | .320 |
| Ceramic Package Width | E1 | .230 | .248 | .300 |
| Overall Length | D | .370 | .380 | .400 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .045 | – | .065 |
| Lower Lead Width | b | .015 | – | .023 |
| Overall Row Spacing | E2 | .314 | – | .410 |
| Window Diameter | W | .267 | .270 | .273 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensioning and tolerancing per ASME Y14.5M.

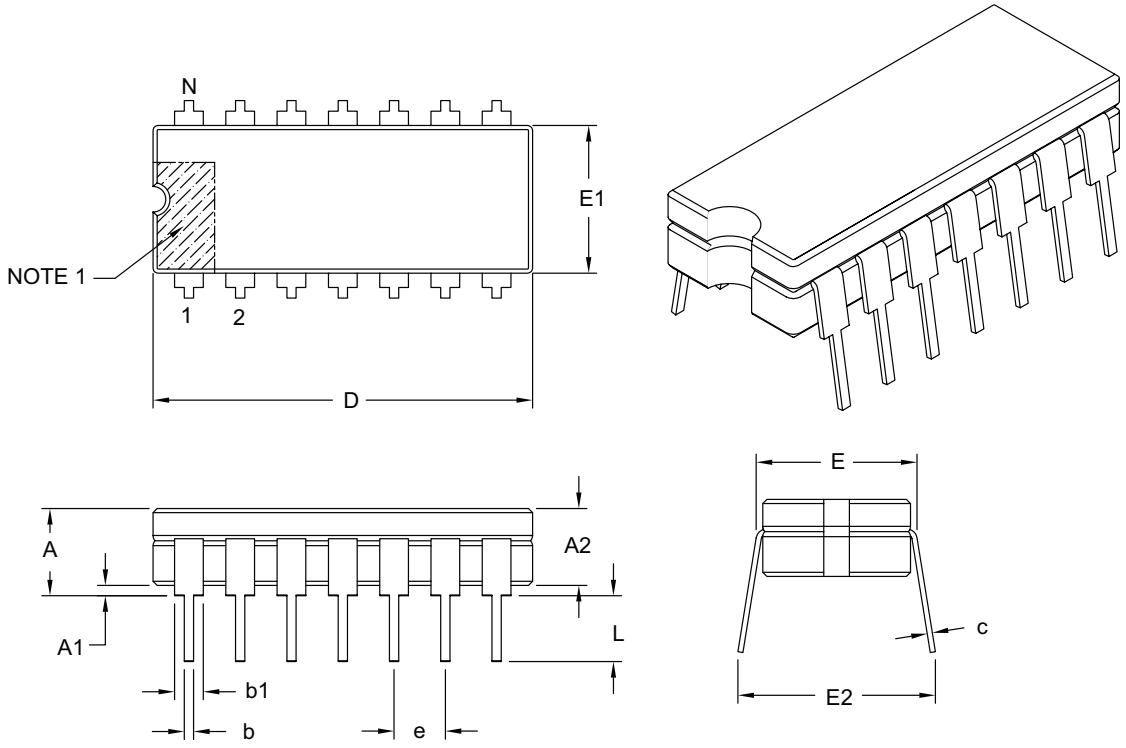
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-027B

# Packaging Diagrams and Parameters

## 14-Lead Ceramic Dual In-Line (JD) – .300" Body [CERDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 14 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .200 |
| Standoff § | A1 | .015 | – | – |
| Ceramic Package Height | A2 | .140 | – | .175 |
| Shoulder to Shoulder Width | E | .290 | – | .325 |
| Ceramic Package Width | E1 | .230 | .288 | .300 |
| Overall Length | D | .740 | .760 | .780 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .045 | – | .065 |
| Lower Lead Width | b | .015 | – | .023 |
| Overall Row Spacing | E2 | .320 | – | .410 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensioning and tolerancing per ASME Y14.5M.

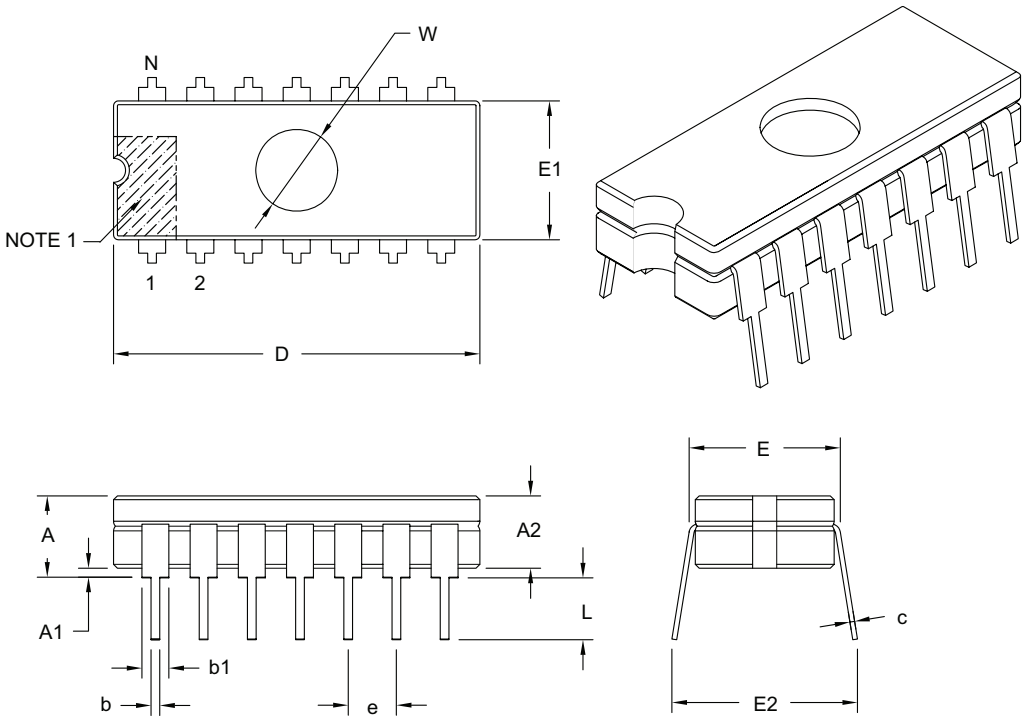
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-002B

# Packaging Diagrams and Parameters

## 14-Lead Ceramic Dual In-Line with Window (JW) – .300" Body [CERDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 14 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .200 |
| Standoff § | A1 | .015 | – | – |
| Ceramic Package Height | A2 | .140 | – | .175 |
| Shoulder to Shoulder Width | E | .290 | – | .325 |
| Ceramic Package Width | E1 | .230 | .288 | .300 |
| Overall Length | D | .740 | .760 | .780 |
| Window Diameter | W | .125 | .170 | .210 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .045 | – | .065 |
| Lower Lead Width | b | .015 | – | .023 |
| Overall Row Spacing | E2 | .320 | – | .410 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensioning and tolerancing per ASME Y14.5M.

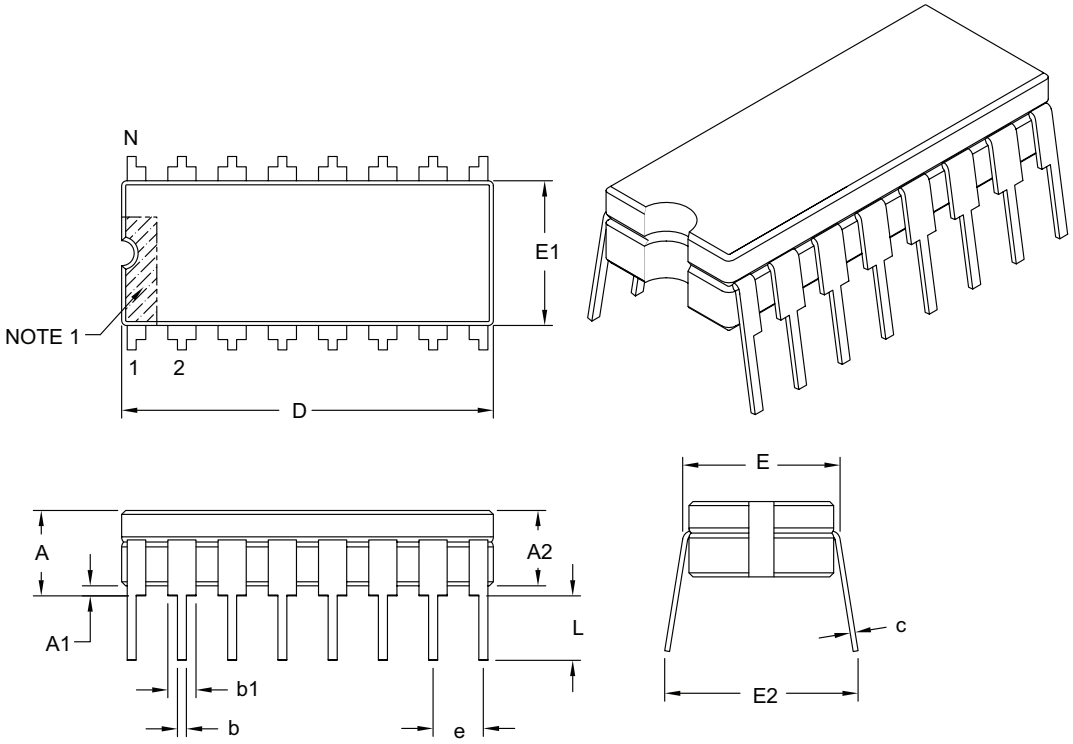
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-099B

# Packaging Diagrams and Parameters

## 16-Lead Ceramic Dual In-Line (JE) – .300" Body [CERDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 16 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .200 |
| Standoff § | A1 | .015 | – | – |
| Ceramic Package Height | A2 | .140 | – | .175 |
| Shoulder to Shoulder Width | E | .290 | – | .325 |
| Ceramic Package Width | E1 | .245 | .288 | .300 |
| Overall Length | D | .740 | .760 | .780 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .045 | – | .065 |
| Lower Lead Width | b | .015 | – | .023 |
| Overall Row Spacing | E2 | .320 | – | .410 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensioning and tolerancing per ASME Y14.5M.

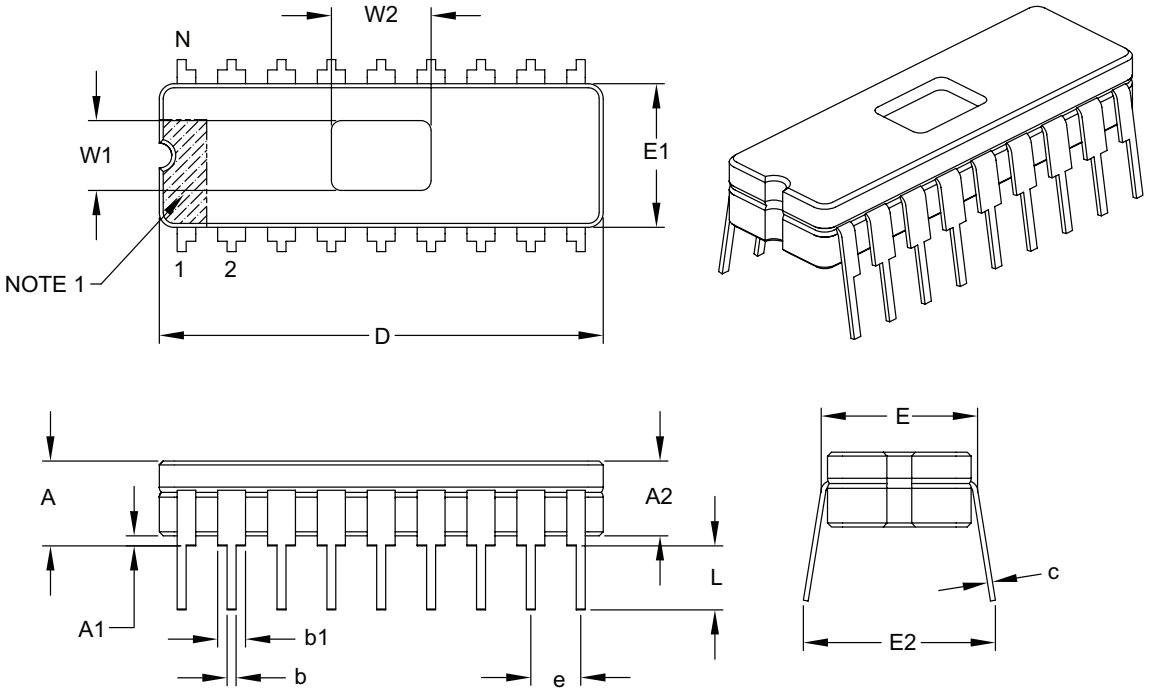
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-003B

# Packaging Diagrams and Parameters

## 18-Lead Ceramic Dual In-Line with Window (JW) – .300" Body [CERDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 18 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .200 |
| Ceramic Package Height | A2 | .140 | – | .175 |
| Standoff § | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .308 | – | .325 |
| Ceramic Package Width | E1 | .280 | .288 | .296 |
| Overall Length | D | .882 | .890 | .910 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .014 |
| Upper Lead Width | b1 | .045 | – | .065 |
| Lower Lead Width | b | .015 | – | .023 |
| Overall Row Spacing | E2 | .325 | – | .410 |
| Window Width | W1 | .130 | .140 | .150 |
| Window Length | W2 | .190 | .200 | .210 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensioning and tolerancing per ASME Y14.5M.

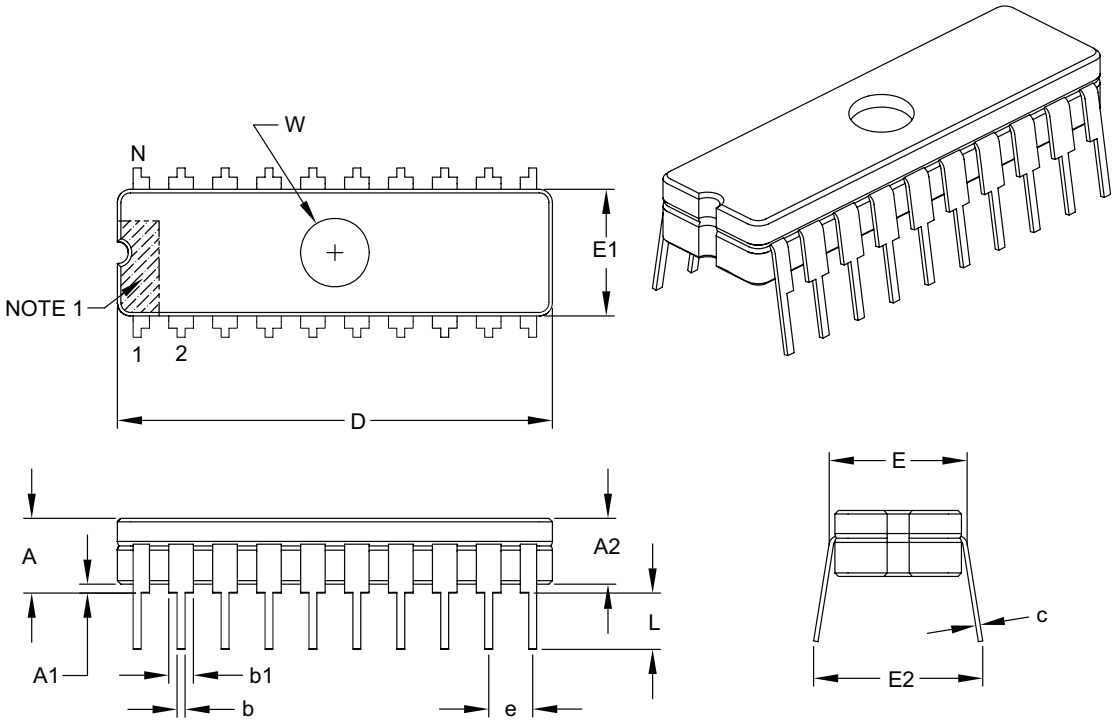
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-010B

# Packaging Diagrams and Parameters

## 20-Lead Ceramic Dual In-Line with Window (JW) – .300" Body [CERDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 20 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .200 |
| Ceramic Package Height | A2 | .140 | – | .175 |
| Standoff § | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .308 | – | .325 |
| Ceramic Package Width | E1 | .280 | .288 | .296 |
| Overall Length | D | .942 | .950 | .970 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .014 |
| Upper Lead Width | b1 | .045 | – | .065 |
| Lower Lead Width | b | .015 | – | .023 |
| Overall Row Spacing | E2 | .325 | – | .410 |
| Window Diameter | W | .167 | .170 | .173 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensioning and tolerancing per ASME Y14.5M.

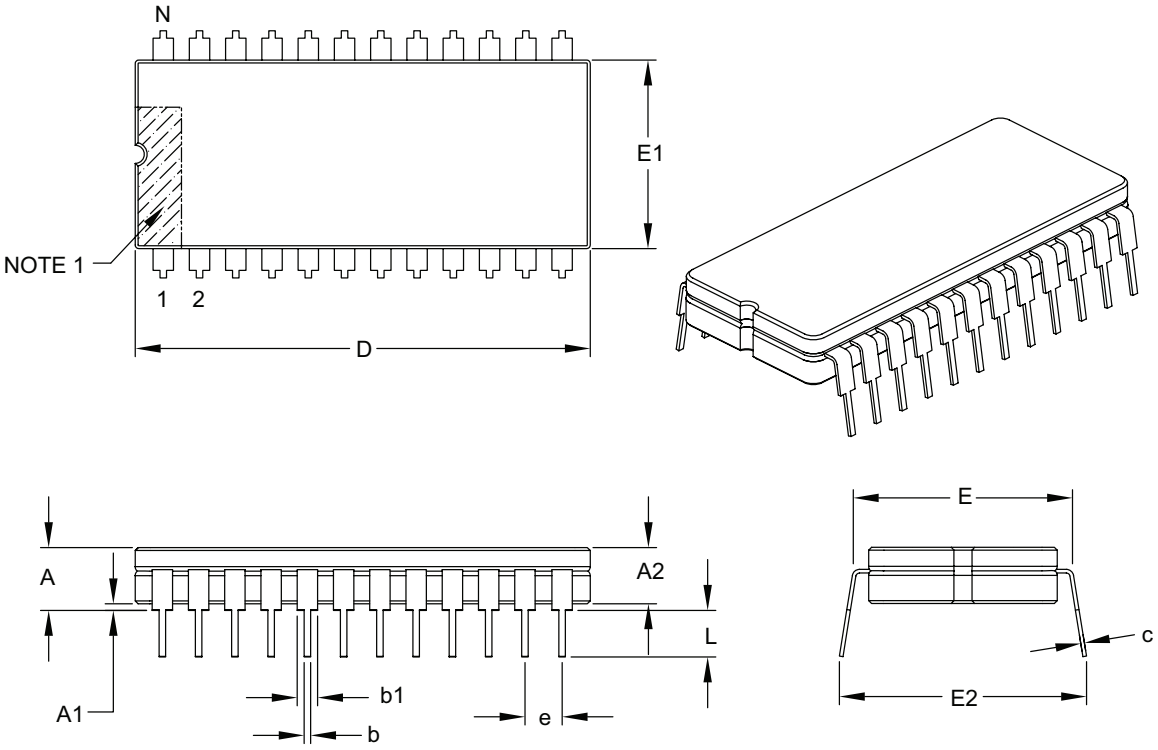
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-115B

# Packaging Diagrams and Parameters

## 24-Lead Ceramic Dual In-Line (JG) – .600" Body [CERDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 24 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .225 |
| Ceramic Package Height | A2 | .140 | – | .175 |
| Standoff § | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .590 | – | .625 |
| Ceramic Package Width | E1 | .510 | .520 | .540 |
| Overall Length | D | 1.240 | 1.250 | 1.270 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .045 | – | .065 |
| Lower Lead Width | b | .015 | – | .023 |
| Overall Row Spacing | E2 | .620 | – | .710 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensioning and tolerancing per ASME Y14.5M.

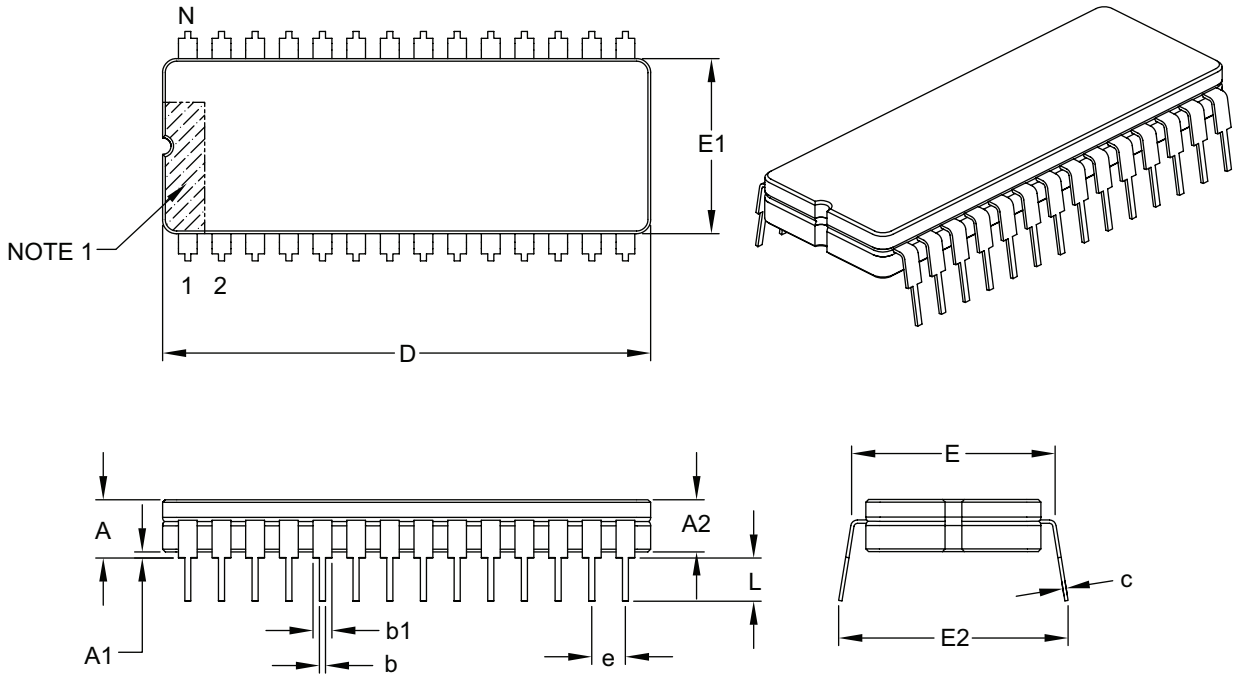
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-004B

# Packaging Diagrams and Parameters

## 28-Lead Ceramic Dual In-Line (JN) – .600" Body [CERDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .225 |
| Ceramic Package Height | A2 | .140 | – | .175 |
| Standoff § | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .590 | – | .625 |
| Ceramic Package Width | E1 | .510 | .520 | .540 |
| Overall Length | D | 1.440 | 1.450 | 1.470 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .045 | – | .065 |
| Lower Lead Width | b | .015 | – | .023 |
| Overall Row Spacing | E2 | .620 | – | .710 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensioning and tolerancing per ASME Y14.5M.

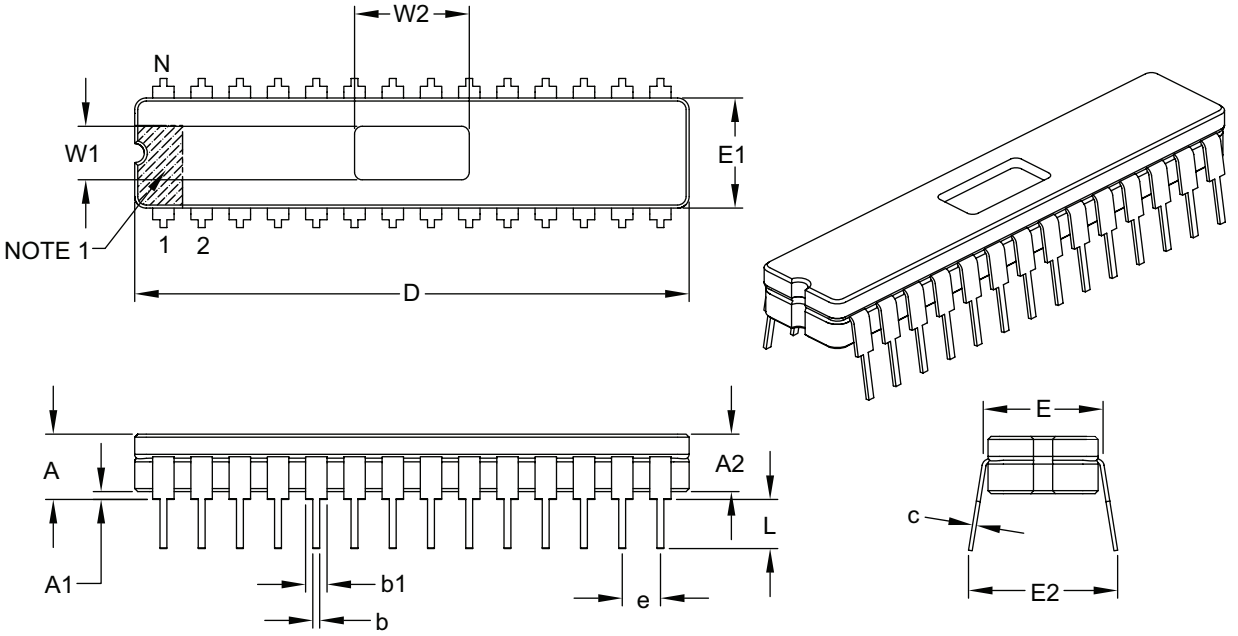
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-006B

# Packaging Diagrams and Parameters

## 28-Lead Ceramic Dual In-Line with Window (JW) – .300" Body [CERDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .200 |
| Ceramic Package Height | A2 | .140 | – | .175 |
| Standoff § | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .308 | – | .325 |
| Ceramic Package Width | E1 | .280 | .288 | .296 |
| Overall Length | D | 1.442 | 1.450 | 1.470 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .014 |
| Upper Lead Width | b1 | .045 | – | .065 |
| Lower Lead Width | b | .015 | – | .023 |
| Overall Row Spacing | E2 | .325 | – | .410 |
| Window Width | W1 | .130 | .140 | .150 |
| Window Length | W2 | .290 | .300 | .310 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensioning and tolerancing per ASME Y14.5M.

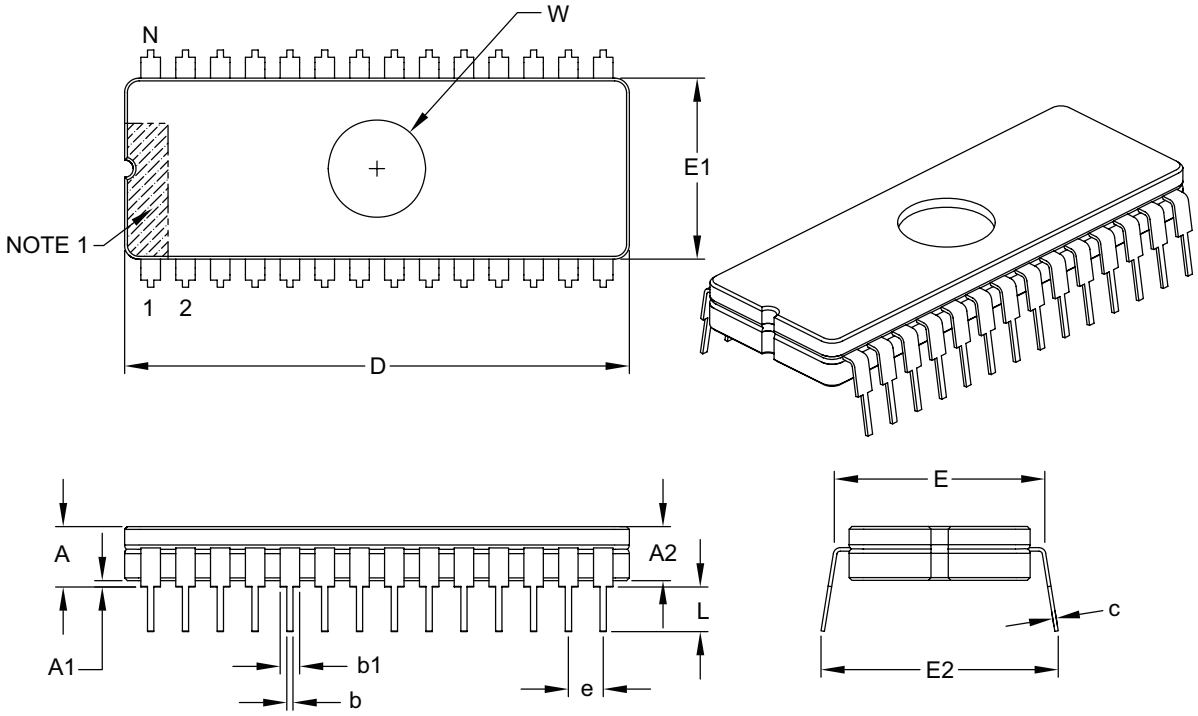
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-080B

# Packaging Diagrams and Parameters

## 28-Lead Ceramic Dual In-Line with Window (JW) – .600" Body [CERDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .225 |
| Ceramic Package Height | A2 | .140 | – | .175 |
| Standoff § | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .590 | – | .625 |
| Ceramic Package Width | E1 | .510 | .520 | .540 |
| Overall Length | D | 1.440 | 1.450 | 1.470 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .045 | – | .065 |
| Lower Lead Width | b | .015 | – | .023 |
| Overall Row Spacing | E2 | .620 | – | .710 |
| Window Diameter | W | .270 | .280 | .290 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensioning and tolerancing per ASME Y14.5M.

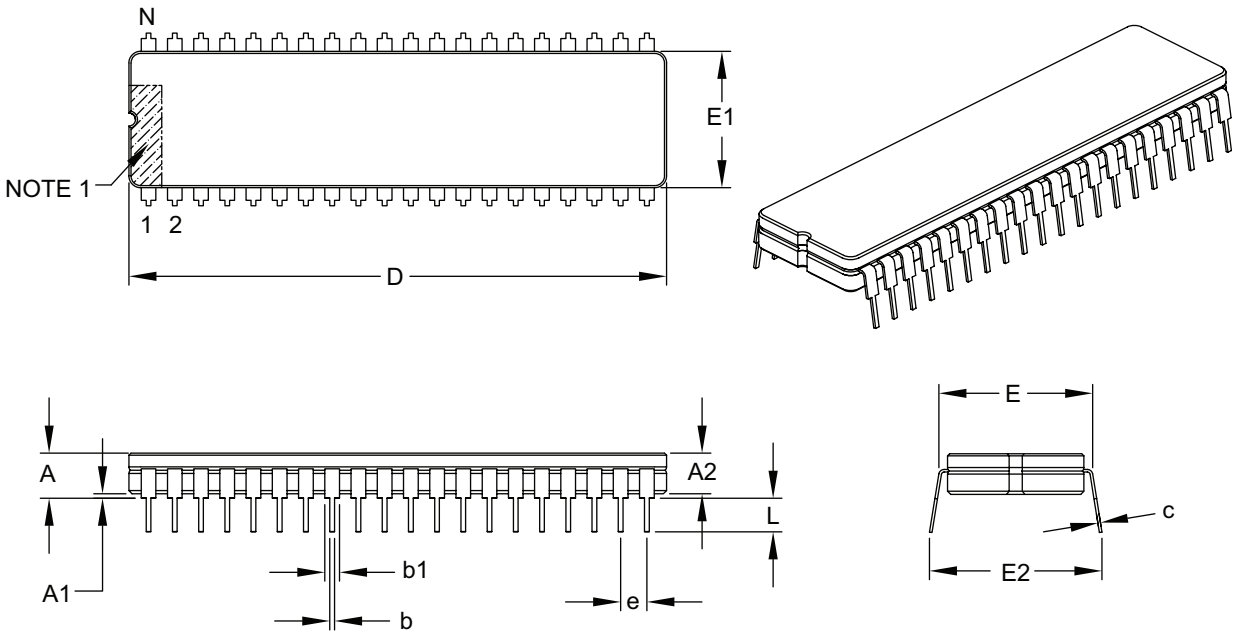
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-013B

# Packaging Diagrams and Parameters

## 40-Lead Ceramic Dual In-Line (JK) – .600" Body [CERDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 40 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .225 |
| Ceramic Package Height | A2 | .140 | – | .175 |
| Standoff § | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .590 | – | .625 |
| Ceramic Package Width | E1 | .510 | .520 | .540 |
| Overall Length | D | 2.030 | 2.050 | 2.070 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .045 | – | .065 |
| Lower Lead Width | b | .015 | – | .023 |
| Overall Row Spacing | E2 | .620 | – | .710 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensioning and tolerancing per ASME Y14.5M.

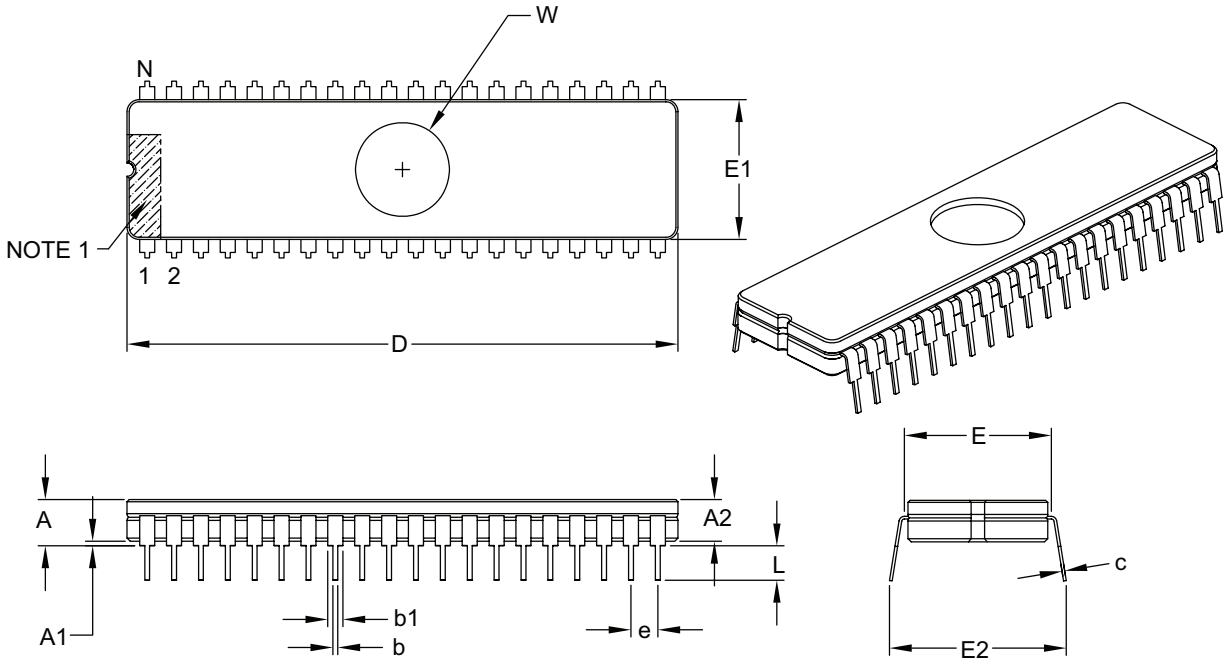
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-008B

# Packaging Diagrams and Parameters

## 40-Lead Ceramic Dual In-Line with Window (JW) – .600" Body [CERDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 40 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .225 |
| Ceramic Package Height | A2 | .140 | – | .175 |
| Standoff § | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .590 | – | .625 |
| Ceramic Package Width | E1 | .510 | .520 | .583 |
| Overall Length | D | 2.030 | 2.050 | 2.070 |
| Tip to Seating Plane | L | .125 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .045 | – | .065 |
| Lower Lead Width | b | .015 | – | .023 |
| Overall Row Spacing | E2 | .620 | – | .710 |
| Window Diameter | W | .340 | .350 | .360 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-014C

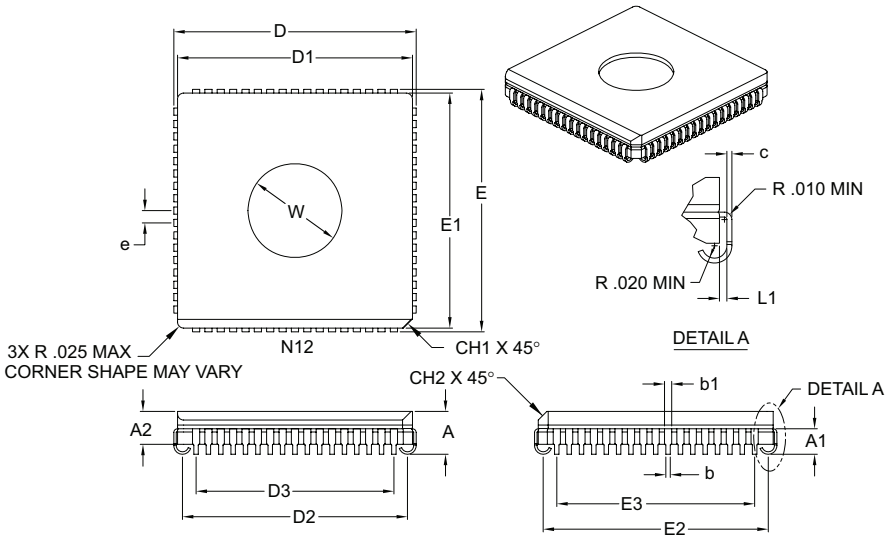
# Packaging Diagrams and Parameters

**NOTES:**

# Packaging Diagrams and Parameters

## 68-Lead Ceramic Leaded (CL) Chip Carrier with Window – Square [CERQUAD]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 68 | |
| Pitch | e | | .050 BSC | |
| Overall Height | A | .155 | .172 | .190 |
| Package Thickness | A2 | | .132 REF | |
| Lead Height | A1 | 0.90 | .100 | .120 |
| Side Chamfer | CH2 | | .035 REF | |
| Corner Chamfer | CH1 | | .040 REF | |
| Overall Package Width | E | .985 | .990 | .995 |
| Overall Package Length | D | .985 | .990 | .995 |
| Ceramic Package Width | E1 | .930 | .950 | .965 |
| Ceramic Package Length | D1 | .930 | .950 | .965 |
| Overall Lead Centers | E3 | | .800 REF | |
| Overall Lead Centers | D3 | | .800 REF | |
| Footprint Width | E2 | .880 | .910 | .940 |
| Footprint Length | D2 | .880 | .910 | .940 |
| Lead Length | L1 | .006 | – | – |
| Lead Thickness | c | .006 | .007 | .010 |
| Upper Lead Width | b1 | .026 | .029 | .032 |
| Lower Lead Width | b | .017 | .019 | .021 |
| Window Diameter | W | .370 | .380 | .390 |

**Notes:**

1. Dimensions D1 and E1 do not include glass protrusion. These protrusions shall not exceed .005" per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

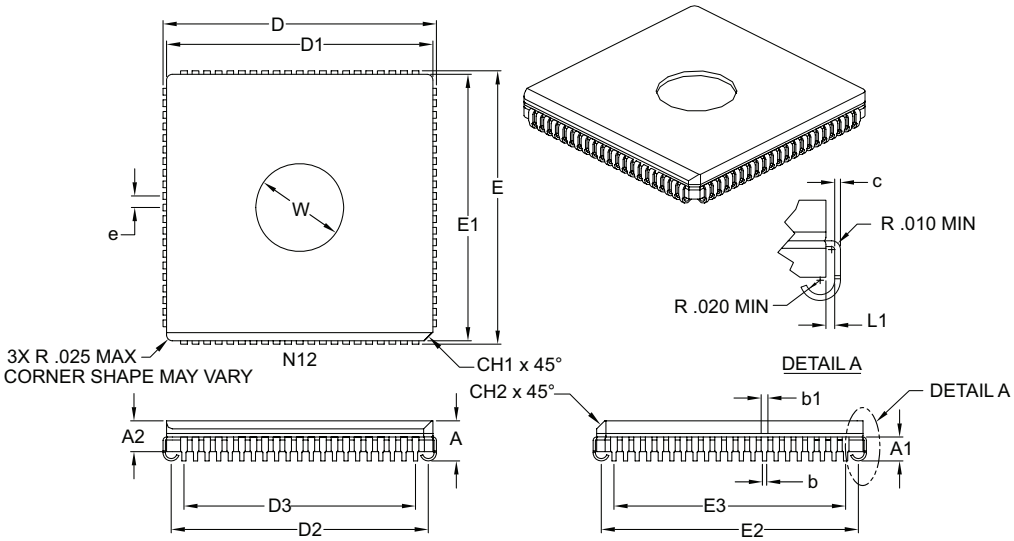
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-097B

# Packaging Diagrams and Parameters

## 84-Lead Ceramic Leaded (CL) Chip Carrier with Window – Square [CERQUAD]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 84 | |
| Pitch | e | | .050 BSC | |
| Overall Height | A | .155 | .172 | .190 |
| Package Thickness | A2 | | .132 REF | |
| Lead Height | A1 | 0.90 | .100 | .120 |
| Side Chamfer | CH2 | | .035 REF | |
| Corner Chamfer | CH1 | | .040 REF | |
| Overall Package Width | E | 1.185 | 1.190 | 1.195 |
| Overall Package Length | D | 1.185 | 1.190 | 1.195 |
| Ceramic Package Width | E1 | 1.130 | 1.150 | 1.165 |
| Ceramic Package Length | D1 | 1.130 | 1.150 | 1.165 |
| Overall Lead Centers | E3 | | 1.00 REF | |
| Overall Lead Centers | D3 | | 1.00 REF | |
| Footprint Width | E2 | 1.080 | 1.110 | 1.140 |
| Footprint Length | D2 | 1.080 | 1.110 | 1.140 |
| Lead Length | L1 | .006 | – | – |
| Lead Thickness | c | .006 | .007 | .010 |
| Lower Lead Width | b | .017 | .019 | .021 |
| Upper Lead Width | b1 | .026 | .029 | .032 |
| Window Diameter | W | .395 | .400 | .405 |

**Notes:**

1. Dimensions D1 and E1 do not include glass protrusion. These protrusions shall not exceed .005" per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

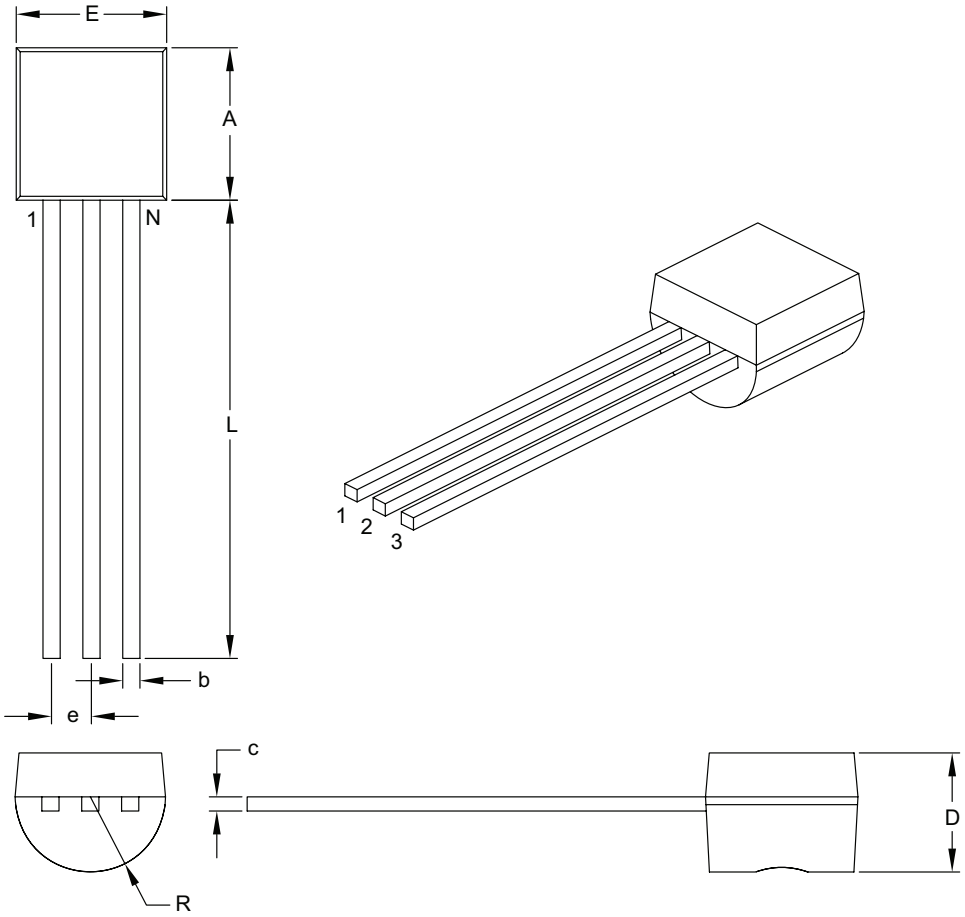
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-112B

# Packaging Diagrams and Parameters

## 3-Lead Plastic Transistor Outline (TO) [TO-92]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | |
|---|---|---|---|
| Dimension Limits | | MIN | MAX |
| Number of Pins | N | 3 | |
| Pitch | e | .050 BSC | |
| Bottom to Package Flat | D | .125 | .165 |
| Overall Width | E | .175 | .205 |
| Overall Length | A | .170 | .210 |
| Molded Package Radius | R | .080 | .105 |
| Tip to Seating Plane | L | .500 | – |
| Lead Thickness | c | .014 | .021 |
| Lead Width | b | .014 | .022 |

**Notes:**

1. Dimensions A and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

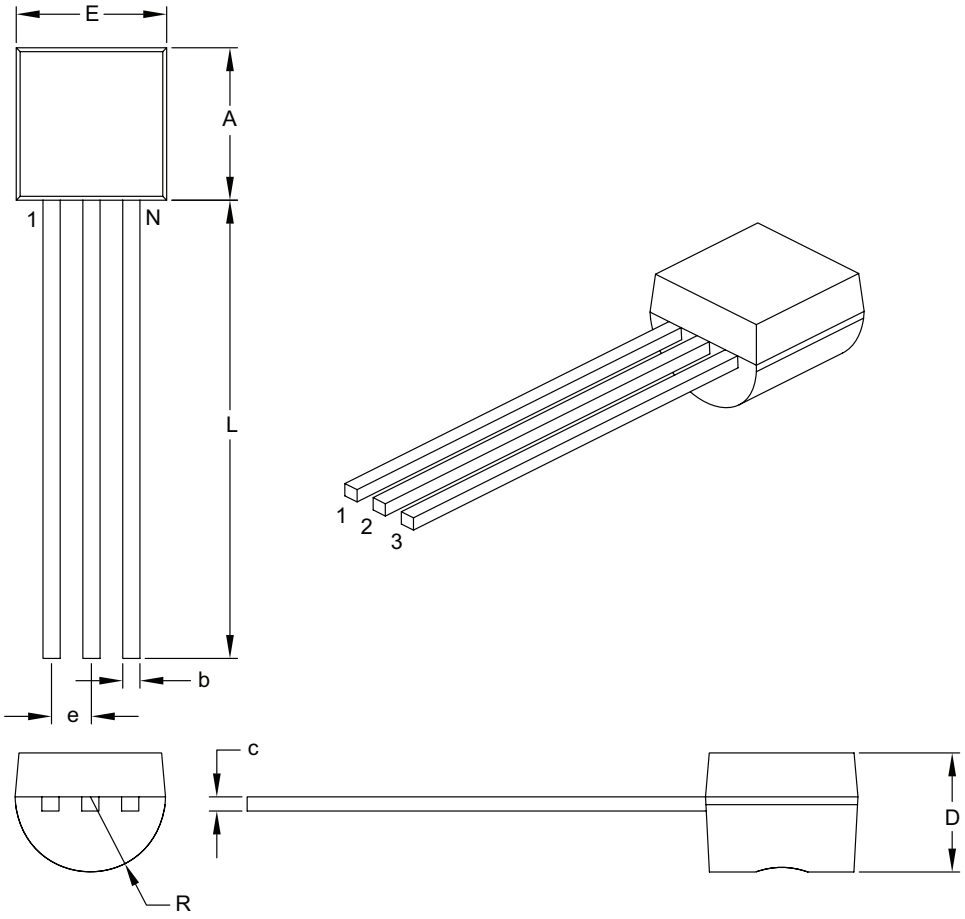
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-101B

# Packaging Diagrams and Parameters

## 3-Lead Plastic Transistor Outline (ZB) [TO-92]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | |
|---|---|---|---|
| Dimension Limits | | MIN | MAX |
| Number of Pins | N | 3 | |
| Pitch | e | .050 BSC | |
| Bottom to Package Flat | D | .125 | .165 |
| Overall Width | E | .175 | .205 |
| Overall Length | A | .170 | .210 |
| Molded Package Radius | R | .080 | .105 |
| Tip to Seating Plane | L | .500 | – |
| Lead Thickness | c | .014 | .021 |
| Lead Width | b | .014 | .022 |

**Notes:**

1. Dimensions A and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

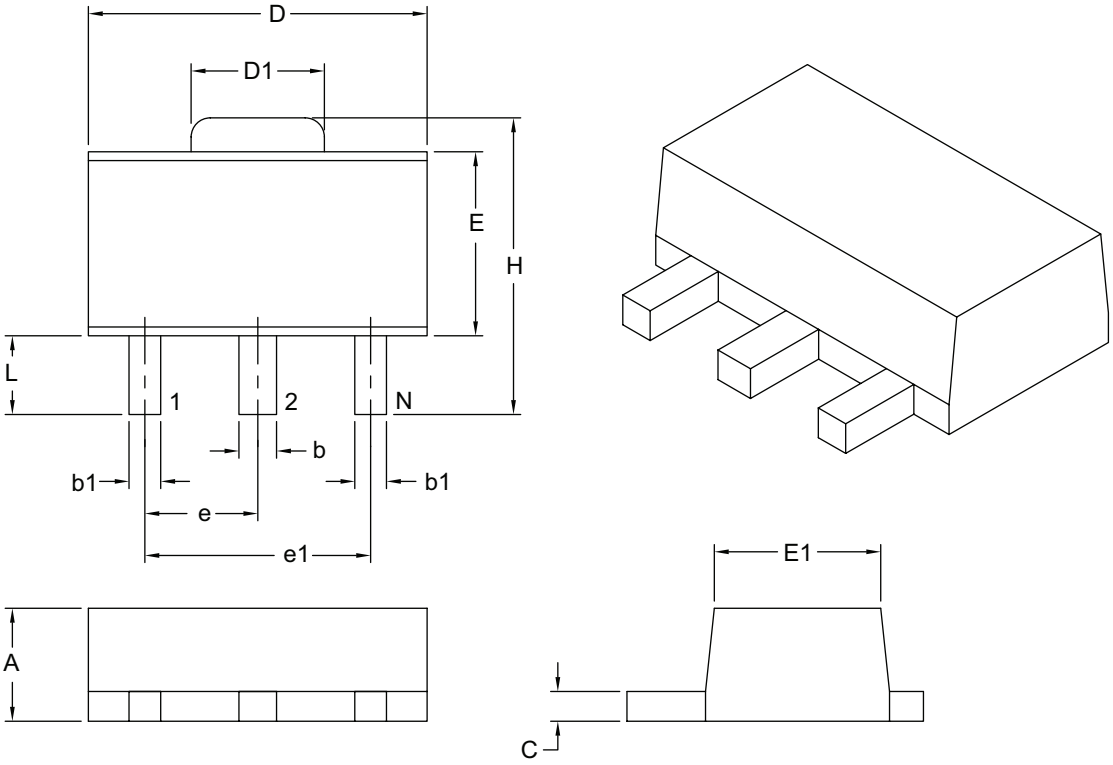
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-101B

# Packaging Diagrams and Parameters

## 3-Lead Plastic Small Outline Transistor Header (MB) [SOT-89]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | |
|---|---|---|---|
| Dimension Limits | | MIN | MAX |
| Number of Leads | N | 3 | |
| Pitch | e | 1.50 BSC | |
| Outside Lead Pitch | e1 | 3.00 BSC | |
| Overall Height | A | 1.40 | 1.60 |
| Overall Width | H | 3.94 | 4.25 |
| Molded Package Width at Base | E | 2.29 | 2.60 |
| Molded Package Width at Top | E1 | 2.13 | 2.29 |
| Overall Length | D | 4.39 | 4.60 |
| Tab Length | D1 | 1.40 | 1.83 |
| Foot Length | L | 0.79 | 1.20 |
| Lead Thickness | c | 0.35 | 0.44 |
| Lead 2 Width | b | 0.41 | 0.56 |
| Leads 1 & 3 Width | b1 | 0.36 | 0.48 |

**Notes:**

1. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

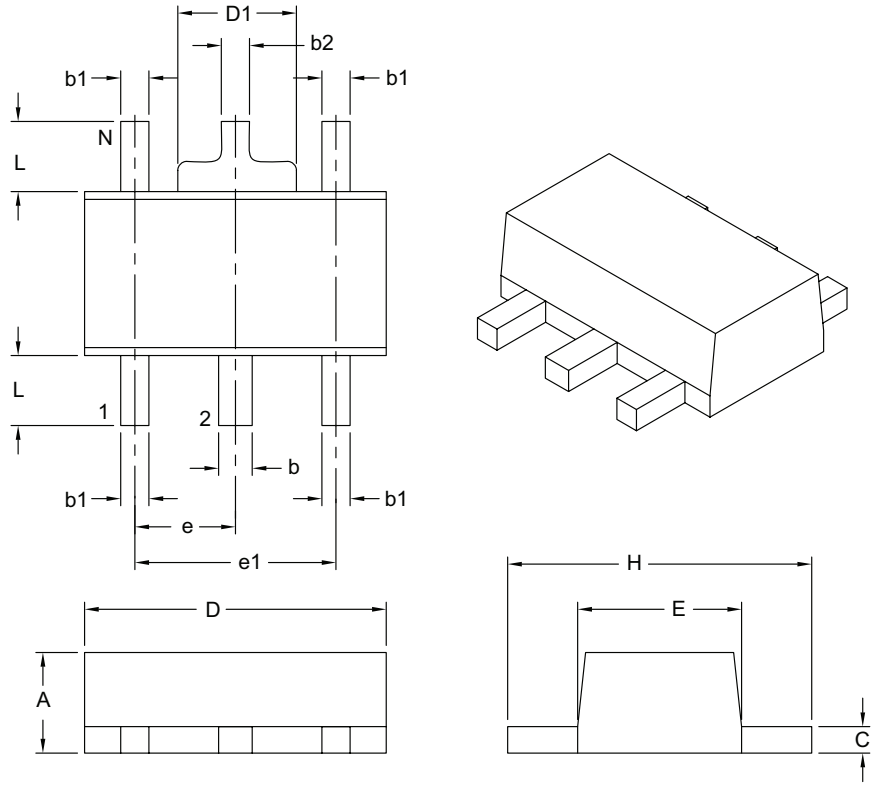
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-029B

# Packaging Diagrams and Parameters

## 5-Lead Plastic Small Outline Transistor Header (MT) [SOT-89]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | |
|---|---|---|---|
| Dimension Limits | | MIN | MAX |
| Number of Leads | N | 5 | |
| Lead Pitch | e | 1.50 BSC | |
| Outside Lead Pitch | e1 | 3.00 BSC | |
| Overall Height | A | 1.40 | 1.60 |
| Overall Width | H | 3.94 | 4.50 |
| Molded Package Width | E | 2.29 | 2.60 |
| Overall Length | D | 4.40 | 4.60 |
| Tab Width | D1 | 1.40 | 1.83 |
| Foot Length | L | 0.80 | 1.20 |
| Lead Thickness | c | 0.35 | 0.44 |
| Lead 2 Width | b | 0.41 | 0.56 |
| Leads 1, 3, 4 & 5 Width | b1 | 0.36 | 0.48 |
| Tab Lead Width | b2 | 0.32 | 0.48 |

**Notes:**

1. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

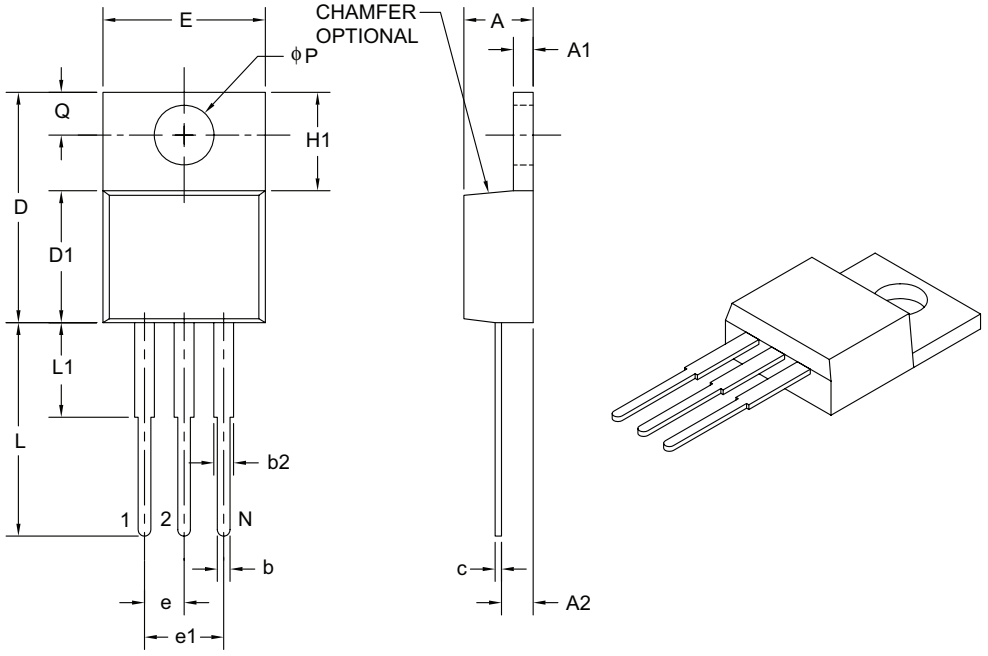
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-030B

# Packaging Diagrams and Parameters

## 3-Lead Plastic Transistor Outline (AB) [TO-220]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 3 | |
| Pitch | e | | .100 BSC | |
| Overall Pin Pitch | e1 | | .200 BSC | |
| Overall Height | A | .140 | – | .190 |
| Tab Thickness | A1 | .020 | – | .055 |
| Base to Lead | A2 | .080 | – | .115 |
| Overall Width | E | .357 | – | .420 |
| Mounting Hole Center | Q | .100 | – | .120 |
| Overall Length | D | .560 | – | .650 |
| Molded Package Length | D1 | .330 | – | .355 |
| Tab Length | H1 | .230 | – | .270 |
| Mounting Hole Diameter | ϕP | .139 | – | .156 |
| Lead Length | L | .500 | – | .580 |
| Lead Shoulder | L1 | – | – | .250 |
| Lead Thickness | c | .012 | – | .024 |
| Lead Width | b | .015 | .027 | .040 |
| Shoulder Width | b2 | .045 | .057 | .070 |

**Notes:**

1. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

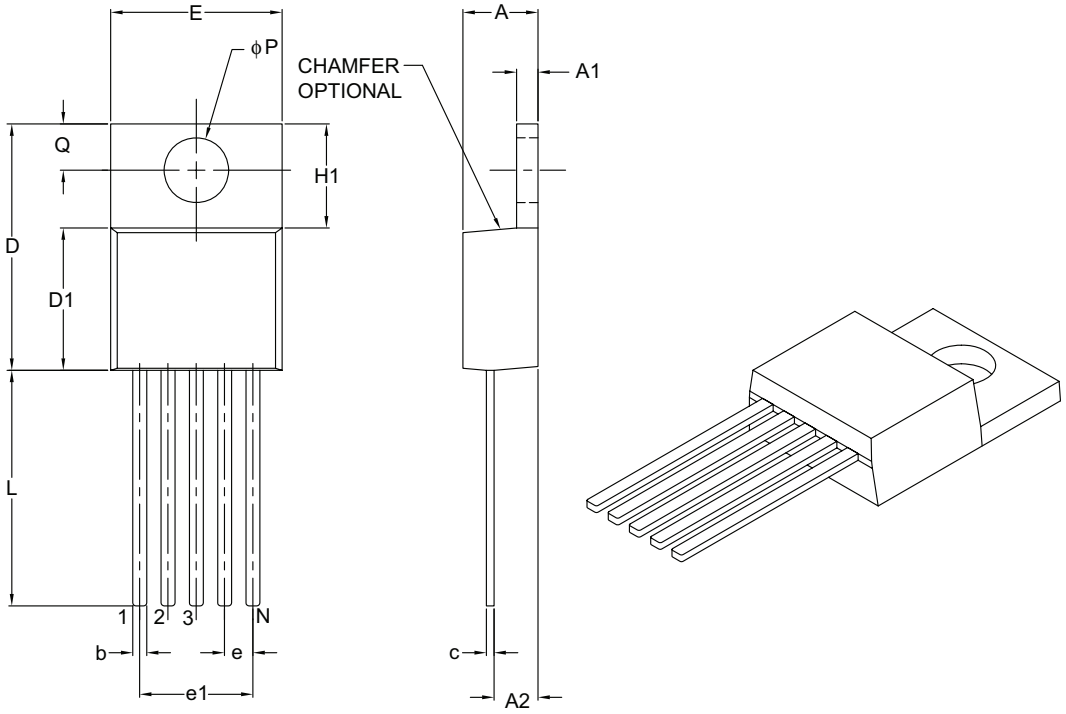
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-034B

# Packaging Diagrams and Parameters

## 5-Lead Plastic Transistor Outline (AT) [TO-220]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 5 | |
| Pitch | e | | .067 BSC | |
| Overall Pin Pitch | e1 | | .268 BSC | |
| Overall Height | A | .140 | – | .190 |
| Overall Width | E | .380 | – | .420 |
| Overall Length | D | .560 | – | .650 |
| Molded Package Length | D1 | .330 | – | .355 |
| Tab Length | H1 | .204 | – | .293 |
| Tab Thickness | A1 | .020 | – | .055 |
| Mounting Hole Center | Q | .100 | – | .120 |
| Mounting Hole Diameter | ϕP | .139 | – | .156 |
| Lead Length | L | .482 | – | .590 |
| Base to Bottom of Lead | A2 | .080 | – | .115 |
| Lead Thickness | c | .012 | – | .025 |
| Lead Width | b | .015 | .027 | .040 |

**Notes:**

1. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

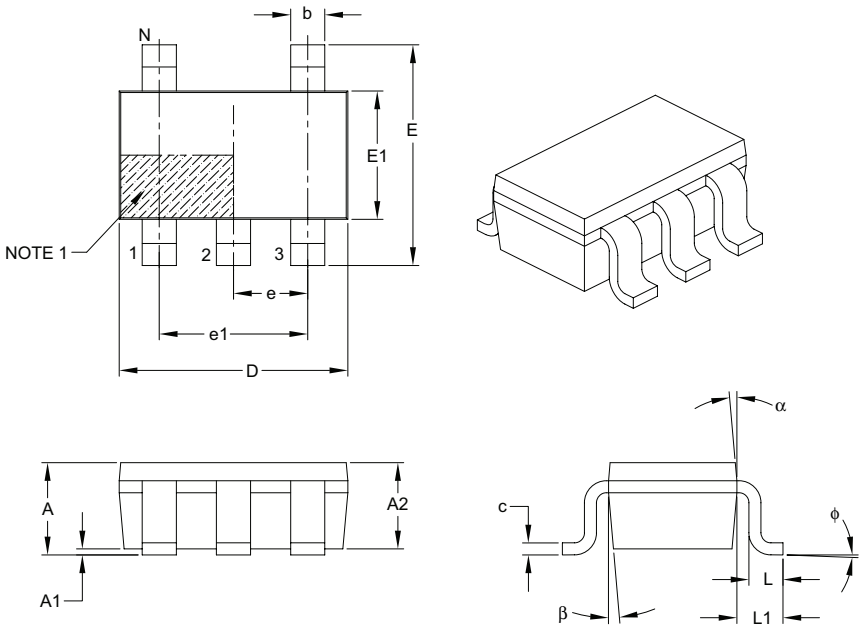
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-036B

# Packaging Diagrams and Parameters

## 5-Lead Plastic Thin Small Outline Transistor (OS) [TSOT]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 5 | |
| Lead Pitch | e | | 0.95 BSC | |
| Outside Lead Pitch | e1 | | 1.90 BSC | |
| Overall Height | A | – | – | 1.10 |
| Molded Package Thickness | A2 | 0.70 | 0.90 | 1.00 |
| Standoff | A1 | 0.00 | – | 0.10 |
| Overall Width | E | | 2.80 BSC | |
| Molded Package Width | E1 | | 1.60 BSC | |
| Overall Length | D | | 2.90 BSC | |
| Foot Length | L | 0.30 | 0.45 | 0.60 |
| Footprint | L1 | | 0.60 REF | |
| Foot Angle | ϕ | 0° | 4° | 8° |
| Lead Thickness | c | 0.08 | – | 0.20 |
| Lead Width | b | 0.30 | – | 0.50 |
| Mold Draft Angle Top | α | 4° | 10° | 12° |
| Mold Draft Angle Bottom | β | 4° | 10° | 12° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

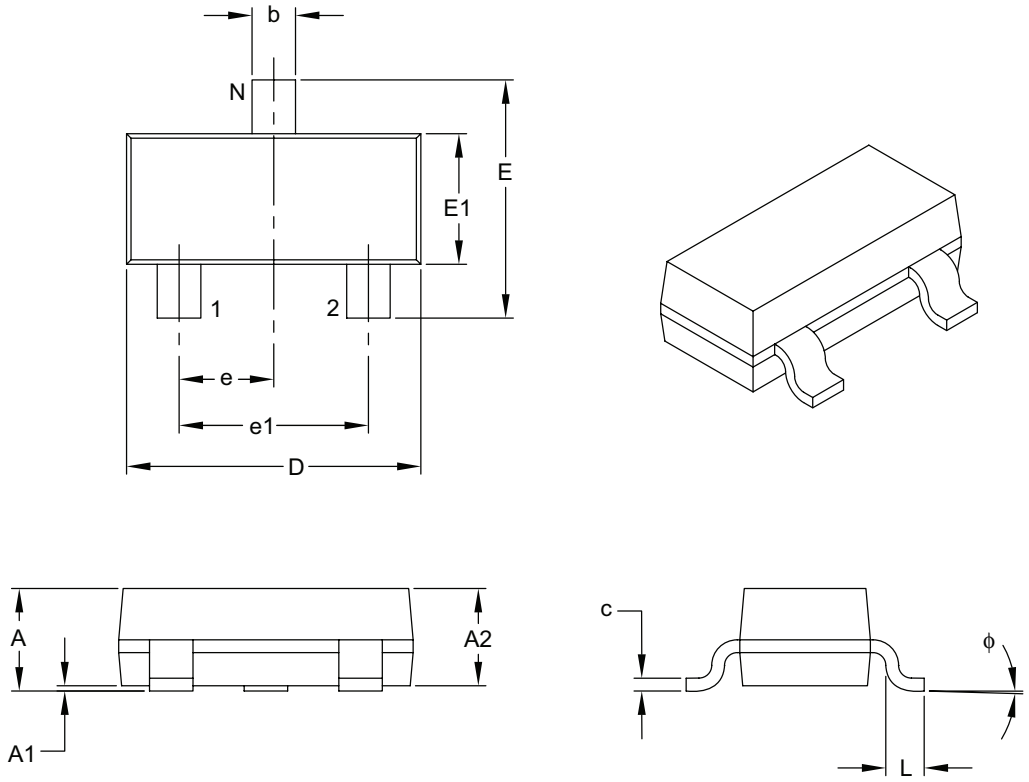
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-128B

# Packaging Diagrams and Parameters

## 3-Lead Plastic Small Outline Transistor (TT) [SOT-23]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 3 | |
| Lead Pitch | e | | 0.95 BSC | |
| Outside Lead Pitch | e1 | | 1.90 BSC | |
| Overall Height | A | 0.89 | – | 1.12 |
| Molded Package Thickness | A2 | 0.79 | 0.95 | 1.02 |
| Standoff | A1 | 0.01 | – | 0.10 |
| Overall Width | E | 2.10 | – | 2.64 |
| Molded Package Width | E1 | 1.16 | 1.30 | 1.40 |
| Overall Length | D | 2.67 | 2.90 | 3.05 |
| Foot Length | L | 0.13 | 0.50 | 0.60 |
| Foot Angle | ϕ | 0° | – | 10° |
| Lead Thickness | c | 0.08 | – | 0.20 |
| Lead Width | b | 0.30 | – | 0.54 |

**Notes:**

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

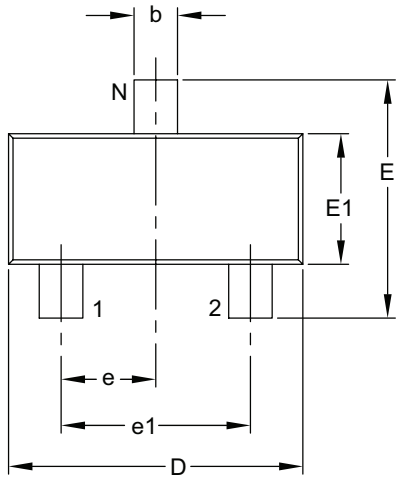
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

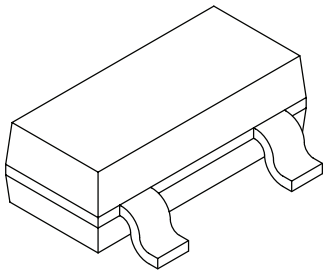
Microchip Technology Drawing C04-104B

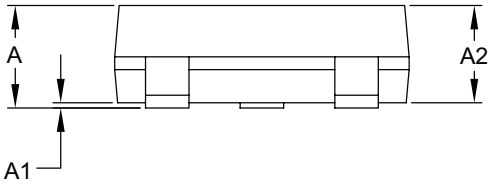
# Packaging Diagrams and Parameters

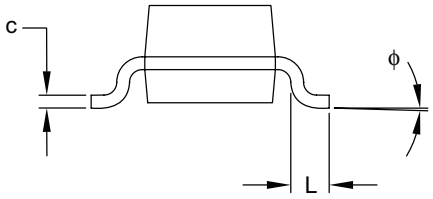
## 3-Lead Plastic Small Outline Transistor (NB) [SOT-23]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging






| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 3 | |
| Lead Pitch | e | | 0.95 BSC | |
| Outside Lead Pitch | e1 | | 1.90 BSC | |
| Overall Height | A | 0.89 | – | 1.12 |
| Molded Package Thickness | A2 | 0.79 | 0.95 | 1.02 |
| Standoff | A1 | 0.01 | – | 0.10 |
| Overall Width | E | 2.10 | – | 2.64 |
| Molded Package Width | E1 | 1.16 | 1.30 | 1.40 |
| Overall Length | D | 2.67 | 2.90 | 3.05 |
| Foot Length | L | 0.13 | 0.50 | 0.60 |
| Foot Angle | ϕ | 0° | – | 10° |
| Lead Thickness | c | 0.08 | – | 0.20 |
| Lead Width | b | 0.30 | – | 0.54 |

**Notes:**

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

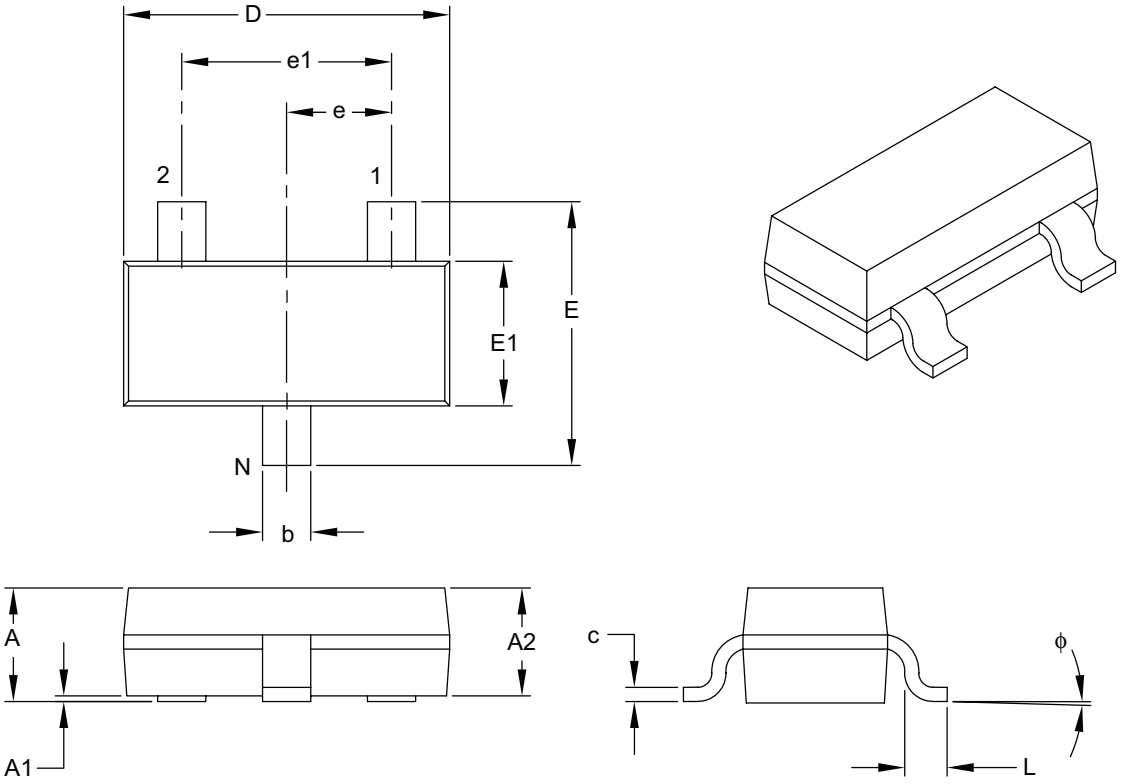
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-104B

# Packaging Diagrams and Parameters

## 3-Lead Plastic Small Outline Transistor (CB) [SOT-23A]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 3 | |
| Lead Pitch | e | | 0.95 BSC | |
| Outside Lead Pitch | e1 | | 1.90 BSC | |
| Overall Height | A | 0.89 | – | 1.45 |
| Molded Package Thickness | A2 | 0.90 | – | 1.30 |
| Standoff | A1 | 0.00 | – | 0.15 |
| Overall Width | E | 2.10 | – | 3.00 |
| Molded Package Width | E1 | 1.20 | – | 1.80 |
| Overall Length | D | 2.70 | – | 3.10 |
| Foot Length | L | 0.15 | – | 0.60 |
| Foot Angle | ϕ | 0° | – | 30° |
| Lead Thickness | c | 0.09 | – | 0.26 |
| Lead Width | b | 0.30 | – | 0.51 |

**Notes:**

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

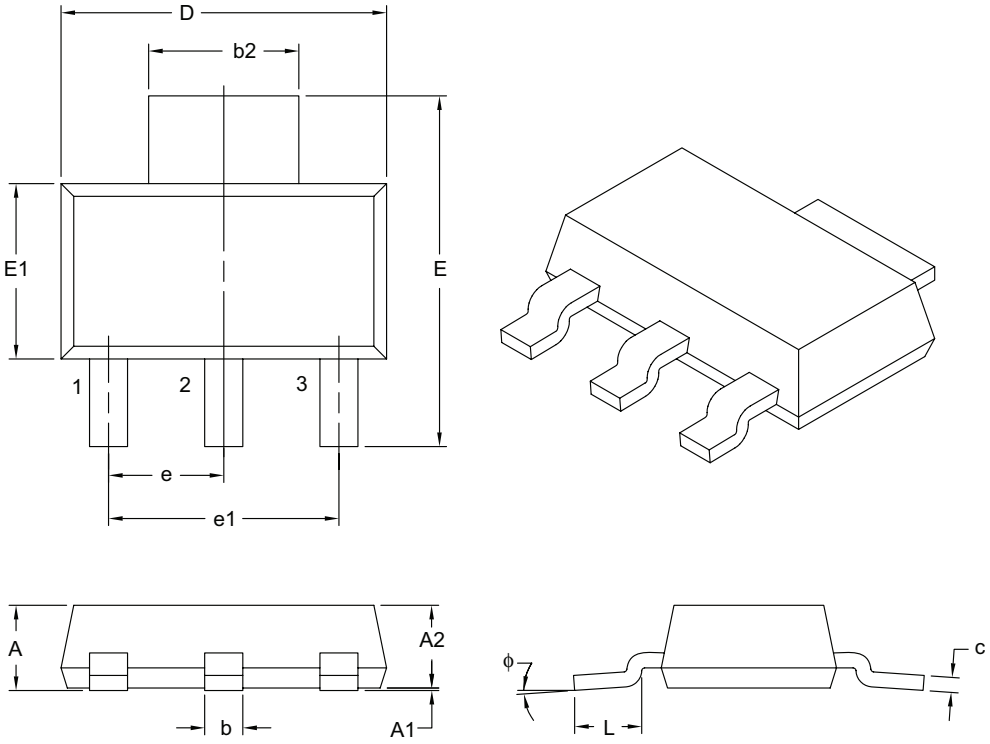
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-130B

# Packaging Diagrams and Parameters

## 3-Lead Plastic Small Outline Transistor (DB) [SOT-223]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 3 | |
| Lead Pitch | e | | 2.30 BSC | |
| Outside Lead Pitch | e1 | | 4.60 BSC | |
| Overall Height | A | – | – | 1.80 |
| Standoff | A1 | 0.02 | – | 0.10 |
| Molded Package Height | A2 | 1.50 | 1.60 | 1.70 |
| Overall Width | E | 6.70 | 7.00 | 7.30 |
| Molded Package Width | E1 | 3.30 | 3.50 | 3.70 |
| Overall Length | D | 6.30 | 6.50 | 6.70 |
| Lead Thickness | c | 0.23 | 0.30 | 0.35 |
| Lead Width | b | 0.60 | 0.76 | 0.84 |
| Tab Lead Width | b2 | 2.90 | 3.00 | 3.10 |
| Foot Length | L | 0.75 | – | – |
| Lead Angle | ϕ | 0° | – | 10° |

**Notes:**

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

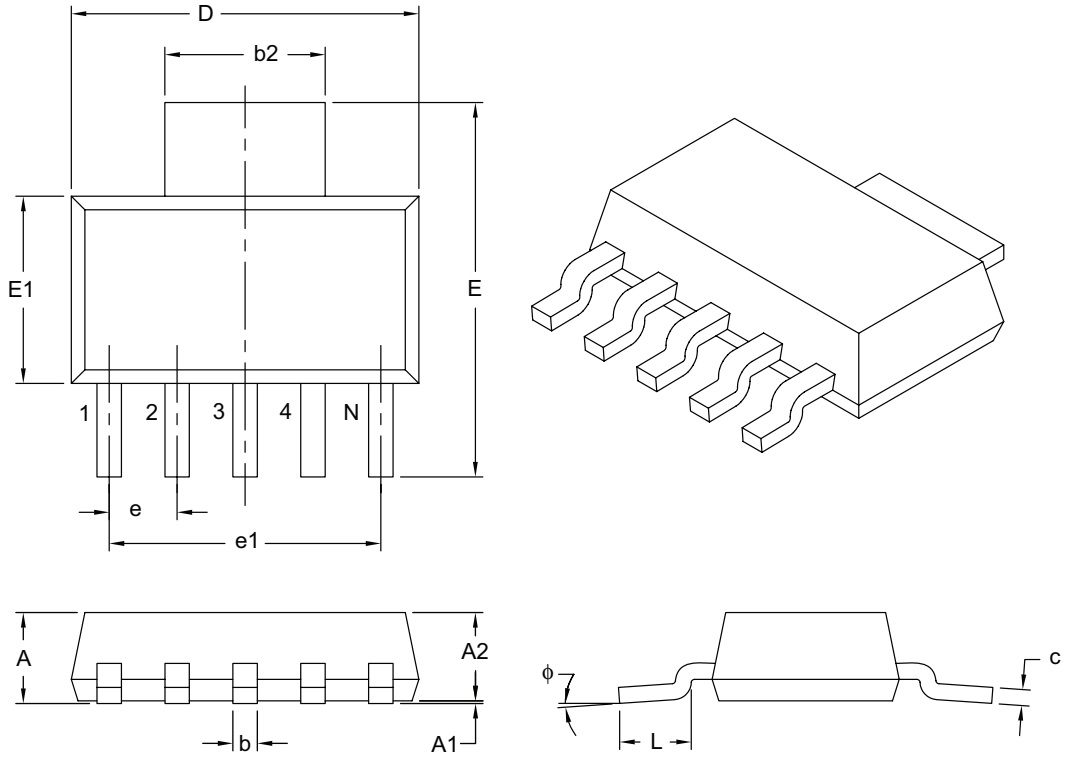
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-032B

# Packaging Diagrams and Parameters

## 5-Lead Plastic Small Outline Transistor (DC) [SOT-223]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 5 | |
| Lead Pitch | e | | 1.27 BSC | |
| Outside Lead Pitch | e1 | | 5.08 BSC | |
| Overall Height | A | – | – | 1.80 |
| Standoff | A1 | 0.02 | 0.06 | 0.10 |
| Molded Package Height | A2 | 1.55 | 1.60 | 1.65 |
| Overall Width | E | 6.86 | 7.00 | 7.26 |
| Molded Package Width | E1 | 3.45 | 3.50 | 3.55 |
| Overall Length | D | 6.45 | 6.50 | 6.55 |
| Lead Thickness | c | 0.24 | 0.28 | 0.32 |
| Lead Width | b | 0.41 | 0.457 | 0.51 |
| Tab Lead Width | b2 | 2.95 | 3.00 | 3.05 |
| Foot Length | L | 0.91 | – | 1.14 |
| Lead Angle | ϕ | 0° | 4° | 8° |

**Notes:**

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

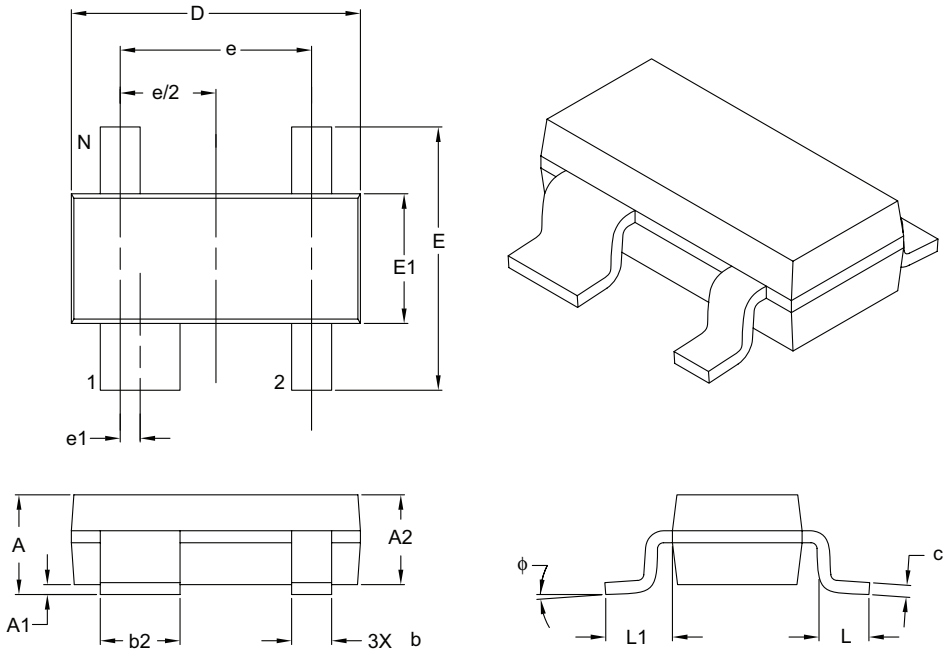
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-137B

# Packaging Diagrams and Parameters

## 4-Lead Plastic Small Outline Transistor (RC) [SOT-143]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 4 | |
| Pitch | e | | 1.92 BSC | |
| Lead 1 Offset | e1 | | 0.20 BSC | |
| Overall Height | A | 0.80 | – | 1.22 |
| Molded Package Thickness | A2 | 0.75 | 0.90 | 1.07 |
| Standoff § | A1 | 0.01 | – | 0.15 |
| Overall Width | E | 2.10 | – | 2.64 |
| Molded Package Width | E1 | 1.20 | 1.30 | 1.40 |
| Overall Length | D | 2.67 | 2.90 | 3.05 |
| Foot Length | L | 0.13 | 0.50 | 0.60 |
| Footprint | L1 | | 0.54 REF | |
| Foot Angle | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.08 | – | 0.20 |
| Lead 1 Width | b1 | 0.76 | – | 0.94 |
| Leads 2, 3 & 4 Width | b | 0.30 | – | 0.54 |

**Notes:**

1. § Significant Characteristic.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

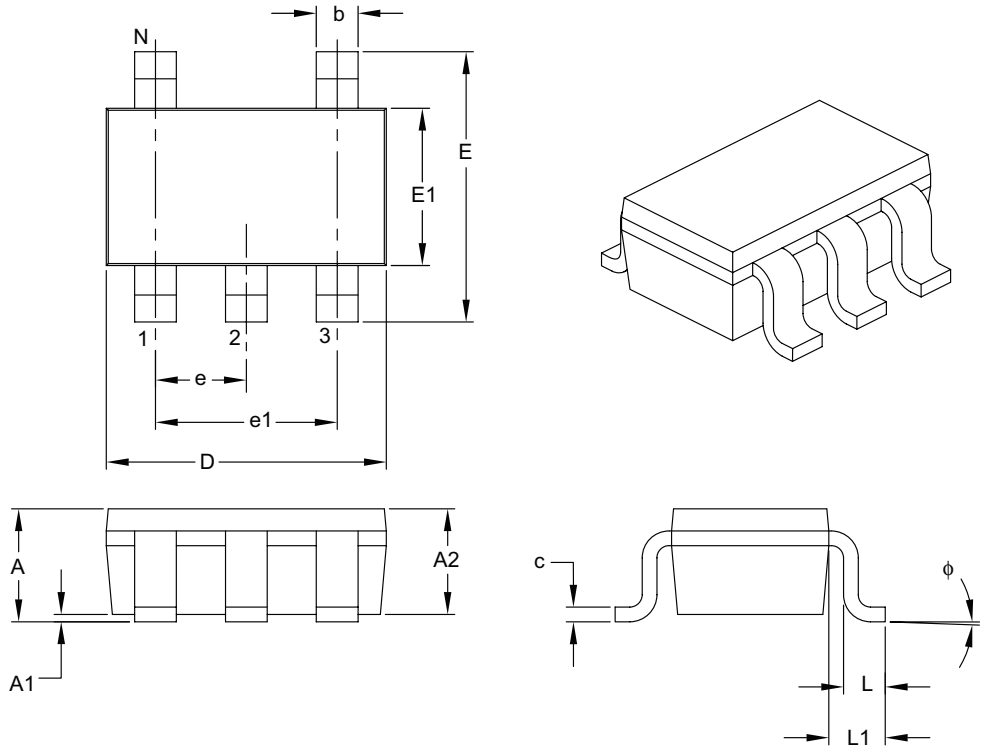
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-031B

# Packaging Diagrams and Parameters

## 5-Lead Plastic Small Outline Transistor (OT) [SOT-23]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 5 | |
| Lead Pitch | e | | 0.95 BSC | |
| Outside Lead Pitch | e1 | | 1.90 BSC | |
| Overall Height | A | 0.90 | – | 1.45 |
| Molded Package Thickness | A2 | 0.89 | – | 1.30 |
| Standoff | A1 | 0.00 | – | 0.15 |
| Overall Width | E | 2.20 | – | 3.20 |
| Molded Package Width | E1 | 1.30 | – | 1.80 |
| Overall Length | D | 2.70 | – | 3.10 |
| Foot Length | L | 0.10 | – | 0.60 |
| Footprint | L1 | 0.35 | – | 0.80 |
| Foot Angle | ϕ | 0° | – | 30° |
| Lead Thickness | c | 0.08 | – | 0.26 |
| Lead Width | b | 0.20 | – | 0.51 |

**Notes:**

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

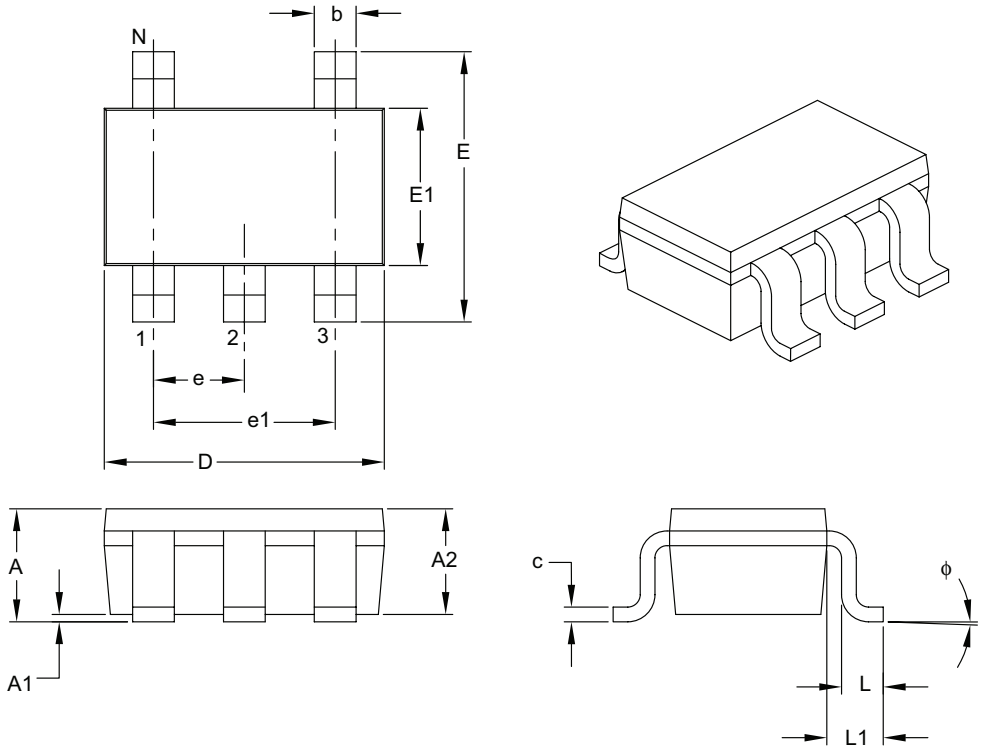
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-091B

# Packaging Diagrams and Parameters

## 5-Lead Plastic Small Outline Transistor (CT) [SOT-23]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 5 | |
| Lead Pitch | e | | 0.95 BSC | |
| Outside Lead Pitch | e1 | | 1.90 BSC | |
| Overall Height | A | 0.90 | – | 1.45 |
| Molded Package Thickness | A2 | 0.89 | – | 1.30 |
| Standoff | A1 | 0.00 | – | 0.15 |
| Overall Width | E | 2.20 | – | 3.20 |
| Molded Package Width | E1 | 1.30 | – | 1.80 |
| Overall Length | D | 2.70 | – | 3.10 |
| Foot Length | L | 0.10 | – | 0.60 |
| Footprint | L1 | 0.35 | – | 0.80 |
| Foot Angle | ϕ | 0° | – | 30° |
| Lead Thickness | c | 0.08 | – | 0.26 |
| Lead Width | b | 0.20 | – | 0.51 |

**Notes:**

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

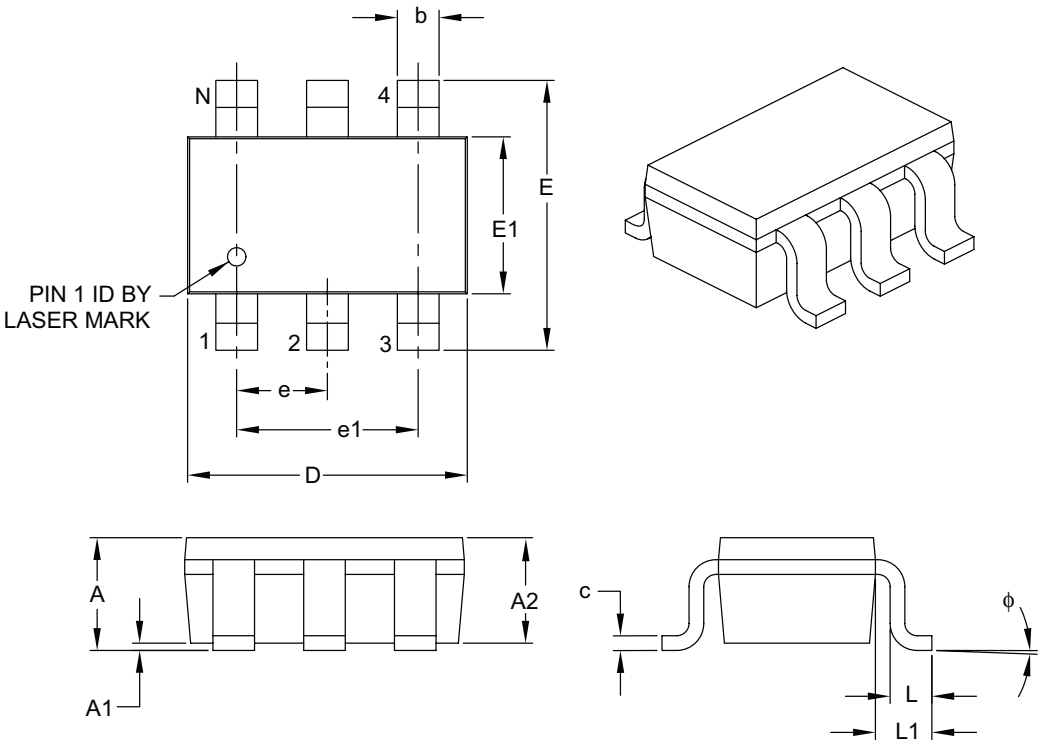
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-091B

# Packaging Diagrams and Parameters

## 6-Lead Plastic Small Outline Transistor (CH) [SOT-23]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 6 | |
| Pitch | e | | 0.95 BSC | |
| Outside Lead Pitch | e1 | | 1.90 BSC | |
| Overall Height | A | 0.90 | – | 1.45 |
| Molded Package Thickness | A2 | 0.89 | – | 1.30 |
| Standoff | A1 | 0.00 | – | 0.15 |
| Overall Width | E | 2.20 | – | 3.20 |
| Molded Package Width | E1 | 1.30 | – | 1.80 |
| Overall Length | D | 2.70 | – | 3.10 |
| Foot Length | L | 0.10 | – | 0.60 |
| Footprint | L1 | 0.35 | – | 0.80 |
| Foot Angle | ϕ | 0° | – | 30° |
| Lead Thickness | c | 0.08 | – | 0.26 |
| Lead Width | b | 0.20 | – | 0.51 |

**Notes:**

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

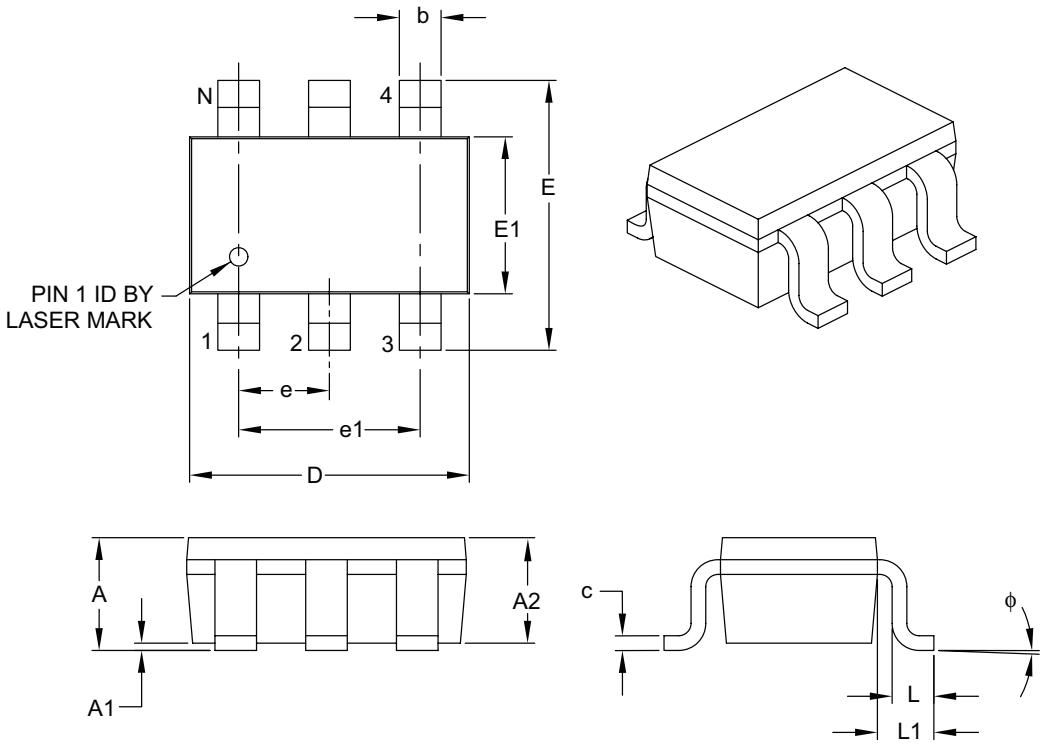
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-028B

# Packaging Diagrams and Parameters

## 6-Lead Plastic Small Outline Transistor (OT) [SOT-23]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 6 | |
| Pitch | e | | 0.95 BSC | |
| Outside Lead Pitch | e1 | | 1.90 BSC | |
| Overall Height | A | 0.90 | – | 1.45 |
| Molded Package Thickness | A2 | 0.89 | – | 1.30 |
| Standoff | A1 | 0.00 | – | 0.15 |
| Overall Width | E | 2.20 | – | 3.20 |
| Molded Package Width | E1 | 1.30 | – | 1.80 |
| Overall Length | D | 2.70 | – | 3.10 |
| Foot Length | L | 0.10 | – | 0.60 |
| Footprint | L1 | 0.35 | – | 0.80 |
| Foot Angle | ϕ | 0° | – | 30° |
| Lead Thickness | c | 0.08 | – | 0.26 |
| Lead Width | b | 0.20 | – | 0.51 |

**Notes:**

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

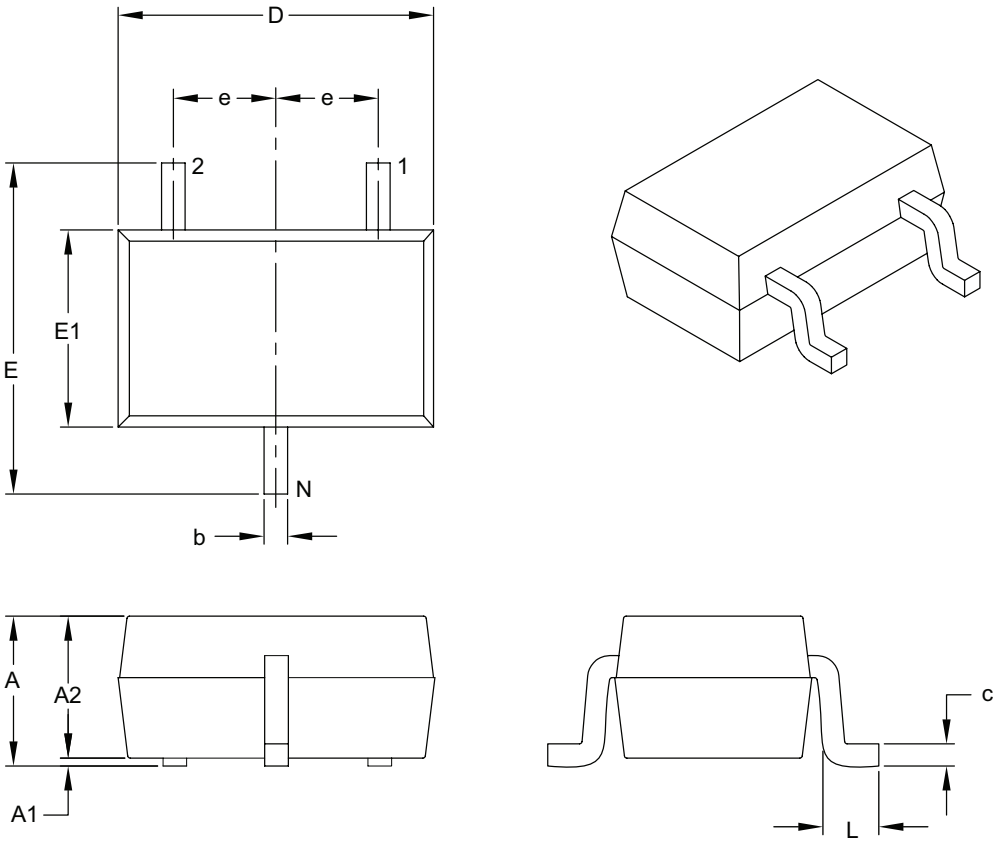
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-028B

# Packaging Diagrams and Parameters

## 3-Lead Plastic Small Outline Transistor (LB) [SC70]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 3 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | 0.80 | – | 1.10 |
| Molded Package Thickness | A2 | 0.80 | – | 1.00 |
| Standoff | A1 | 0.00 | – | 0.10 |
| Overall Width | E | 1.80 | 2.10 | 2.40 |
| Molded Package Width | E1 | 1.15 | 1.25 | 1.35 |
| Overall Length | D | 1.80 | 2.00 | 2.25 |
| Foot Length | L | 0.10 | 0.20 | 0.46 |
| Lead Thickness | c | 0.08 | – | 0.26 |
| Lead Width | b | 0.15 | – | 0.40 |

**Notes:**

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

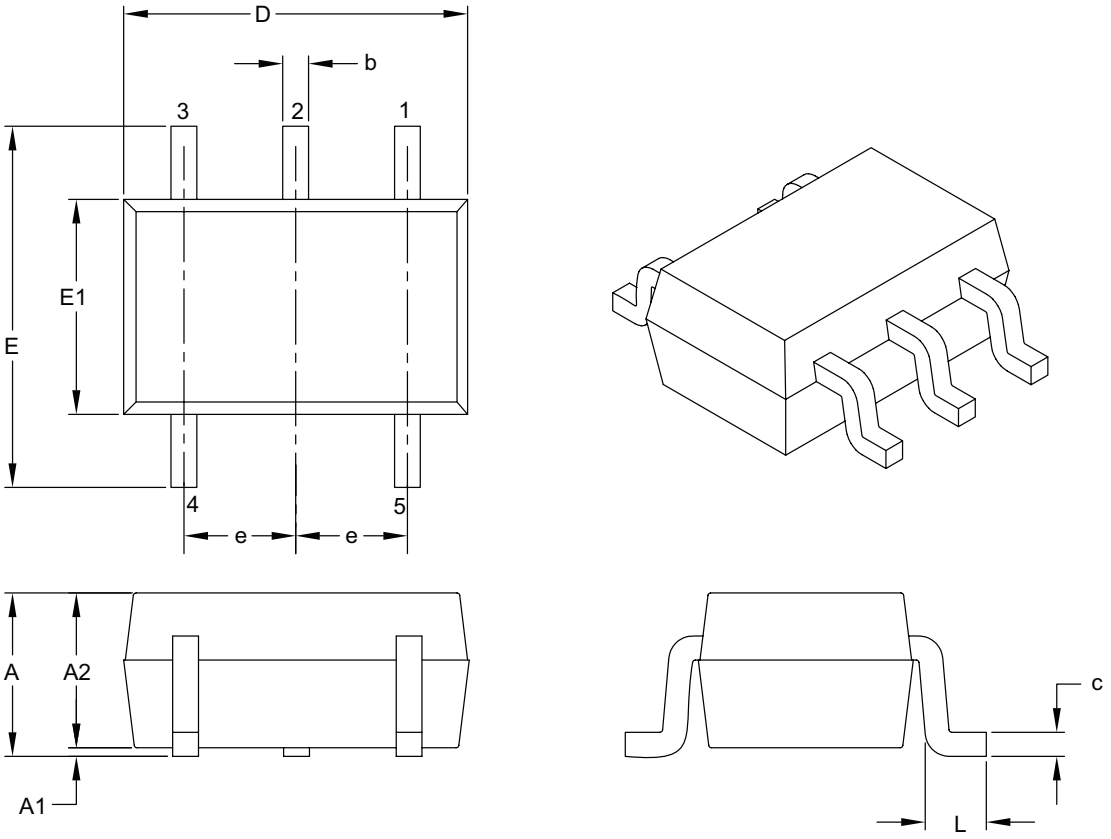
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-060B

# Packaging Diagrams and Parameters

## 5-Lead Plastic Small Outline Transistor (LT) [SC70]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 5 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | 0.80 | – | 1.10 |
| Molded Package Thickness | A2 | 0.80 | – | 1.00 |
| Standoff | A1 | 0.00 | – | 0.10 |
| Overall Width | E | 1.80 | 2.10 | 2.40 |
| Molded Package Width | E1 | 1.15 | 1.25 | 1.35 |
| Overall Length | D | 1.80 | 2.00 | 2.25 |
| Foot Length | L | 0.10 | 0.20 | 0.46 |
| Lead Thickness | c | 0.08 | – | 0.26 |
| Lead Width | b | 0.15 | – | 0.40 |

**Notes:**

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

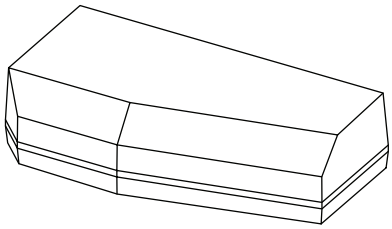
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

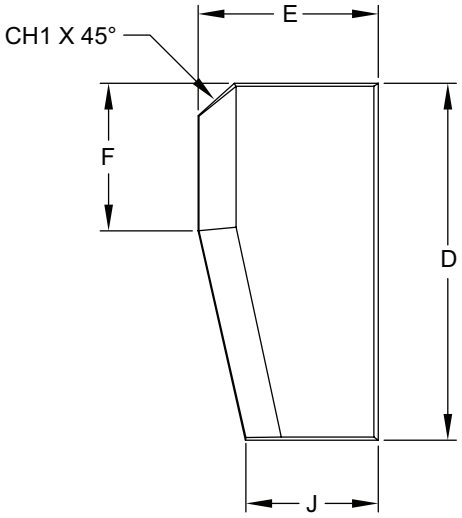
Microchip Technology Drawing C04-061B

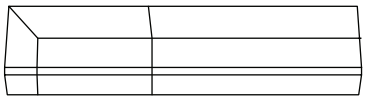
# Packaging Diagrams and Parameters

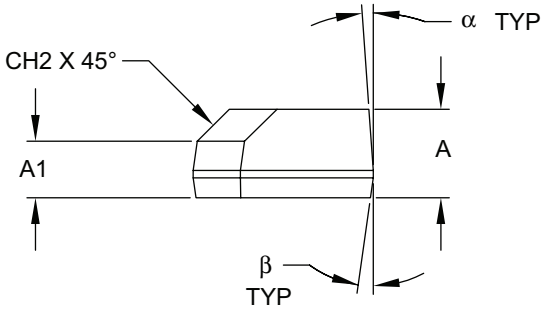
## Leadless Wedge Module Plastic Small Outline Transistor (WM) [SOT-385]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging








| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Overall Height | A | 2.90 | 3.00 | 3.05 |
| Bottom of Package to Chamfer | A1 | 1.90 | 2.00 | 2.10 |
| Overall Width | E | 6.00 | 6.10 | 6.20 |
| Overall Length | D | 12.00 | 12.10 | 12.20 |
| Width at Tapered End | J | 4.40 | 4.50 | 4.60 |
| Length of Flat | F | 4.90 | 5.00 | 5.10 |
| Chamfer Distance, Horizontal | CH1 | 1.00 | 1.10 | 1.20 |
| Chamfer Distance, Vertical | CH2 | 1.00 | 1.10 | 1.20 |
| Mold Draft Angle Top | α | 4° | 6° | 8° |
| Mold Draft Angle Bottom | β | 4° | 6° | 8° |

**Note:**

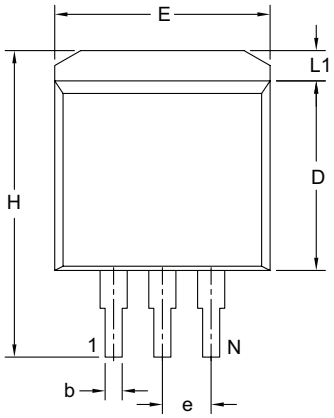
1. Dimensions D, E, F and J do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.

Microchip Technology Drawing C04-109B

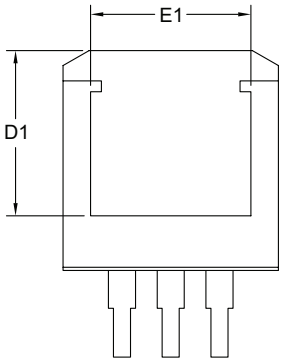
# Packaging Diagrams and Parameters

## 3-Lead Plastic (EB) [DDPAK]

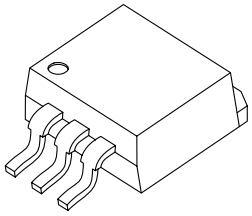
**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

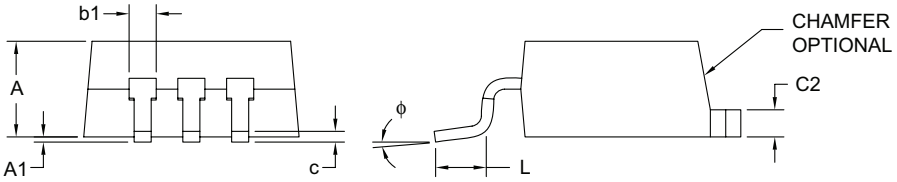



TOP VIEW




BOTTOM VIEW






| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 3 | |
| Pitch | e | | .100 BSC | |
| Overall Height | A | .160 | – | .190 |
| Standoff § | A1 | .000 | – | .010 |
| Overall Width | E | .380 | – | .420 |
| Exposed Pad Width | E1 | .245 | – | – |
| Molded Package Length | D | .330 | – | .380 |
| Overall Length | H | .549 | – | .625 |
| Exposed Pad Length | D1 | .270 | – | – |
| Lead Thickness | c | .014 | – | .029 |
| Pad Thickness | C2 | .045 | – | .065 |
| Lower Lead Width | b | .020 | – | .039 |
| Upper Lead Width | b1 | .045 | – | .070 |
| Foot Length | L | .068 | – | .110 |
| Pad Length | L1 | – | – | .067 |
| Foot Angle | ϕ | 0° | – | 8° |

**Notes:**

1. § Significant Characteristic.
2. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

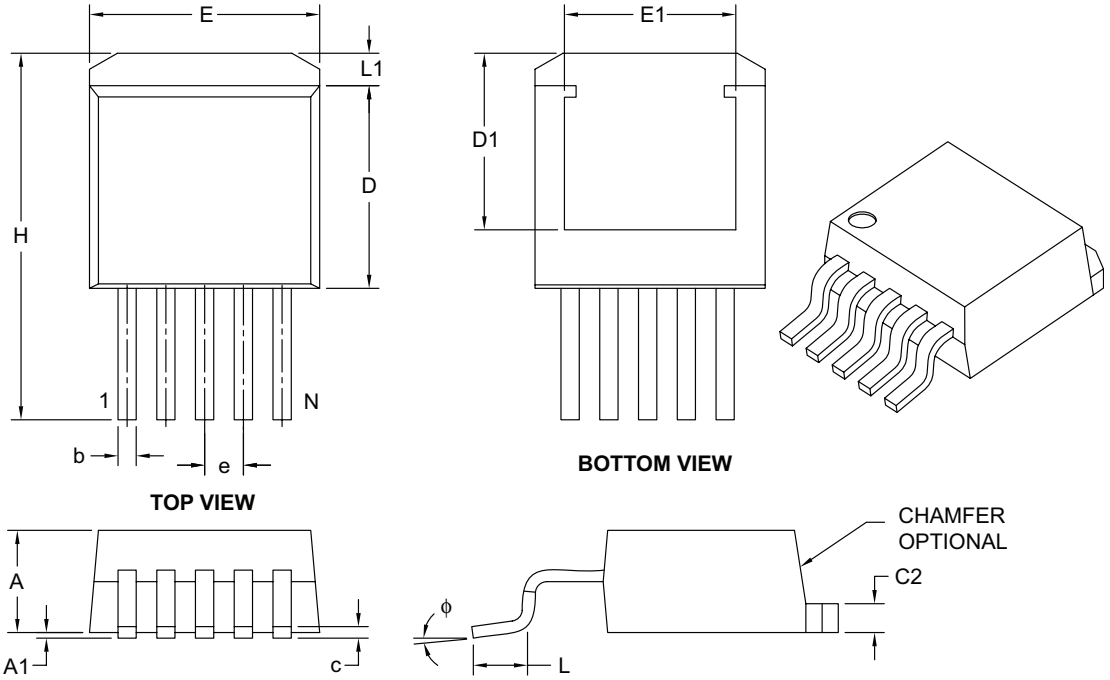
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-011B

# Packaging Diagrams and Parameters

## 5-Lead Plastic (ET) [DDPAK]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 5 | |
| Pitch | e | | .067 BSC | |
| Overall Height | A | .160 | – | .190 |
| Standoff § | A1 | .000 | – | .010 |
| Overall Width | E | .380 | – | .420 |
| Exposed Pad Width | E1 | .245 | – | – |
| Molded Package Length | D | .330 | – | .380 |
| Overall Length | H | .549 | – | .625 |
| Exposed Pad Length | D1 | .270 | – | – |
| Lead Thickness | c | .014 | – | .029 |
| Pad Thickness | C2 | .045 | – | .065 |
| Lead Width | b | .020 | – | .039 |
| Foot Length | L | .068 | – | .110 |
| Pad Length | L1 | – | – | .067 |
| Foot Angle | ϕ | 0° | – | 8° |

**Notes:**

1. § Significant Characteristic.
2. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

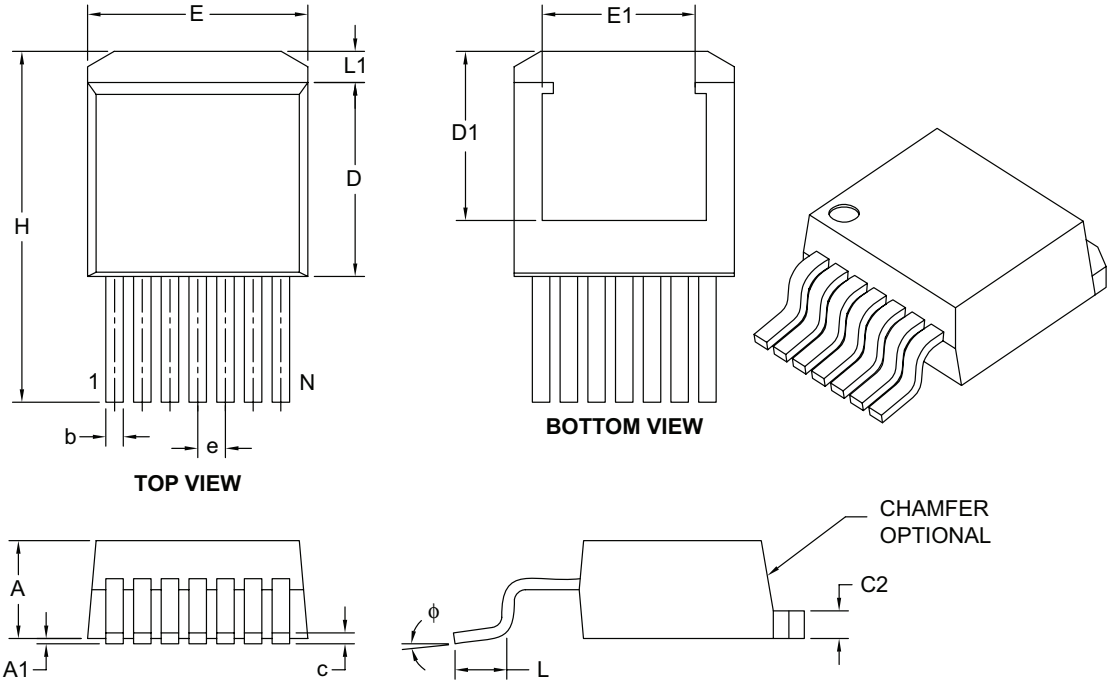
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-012B

# Packaging Diagrams and Parameters

## 7-Lead Plastic (EK) [DDPAK]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 7 | |
| Pitch | e | | .050 BSC | |
| Overall Height | A | .160 | – | .190 |
| Standoff § | A1 | .000 | – | .010 |
| Overall Width | E | .380 | – | .420 |
| Exposed Pad Width | E1 | .245 | – | – |
| Molded Package Length | D | .330 | – | .380 |
| Overall Length | H | .549 | – | .625 |
| Exposed Pad Length | D1 | .270 | – | – |
| Lead Thickness | c | .014 | – | .029 |
| Pad Thickness | C2 | .045 | – | .065 |
| Lead Width | b | .020 | – | .037 |
| Foot Length | L | .068 | – | .110 |
| Pad Length | L1 | – | – | .067 |
| Foot Angle | ϕ | 0° | – | 8° |

**Notes:**

1. § Significant Characteristic.
2. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-015B

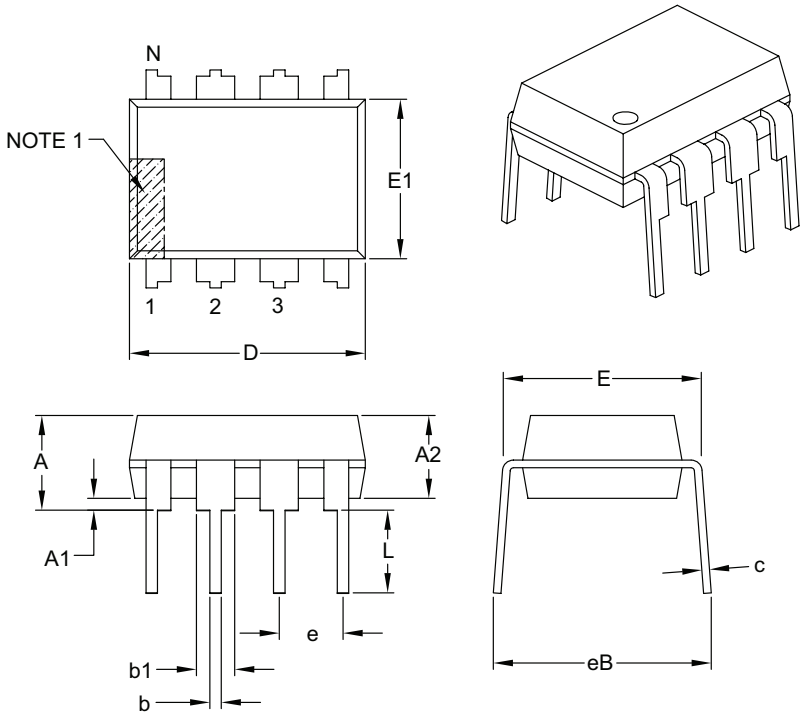
# Packaging Diagrams and Parameters

**NOTES:**

# Packaging Diagrams and Parameters

## 8-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .210 |
| Molded Package Thickness | A2 | .115 | .130 | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .290 | .310 | .325 |
| Molded Package Width | E1 | .240 | .250 | .280 |
| Overall Length | D | .348 | .365 | .400 |
| Tip to Seating Plane | L | .115 | .130 | .150 |
| Lead Thickness | c | .008 | .010 | .015 |
| Upper Lead Width | b1 | .040 | .060 | .070 |
| Lower Lead Width | b | .014 | .018 | .022 |
| Overall Row Spacing § | eB | – | – | .430 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located with the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

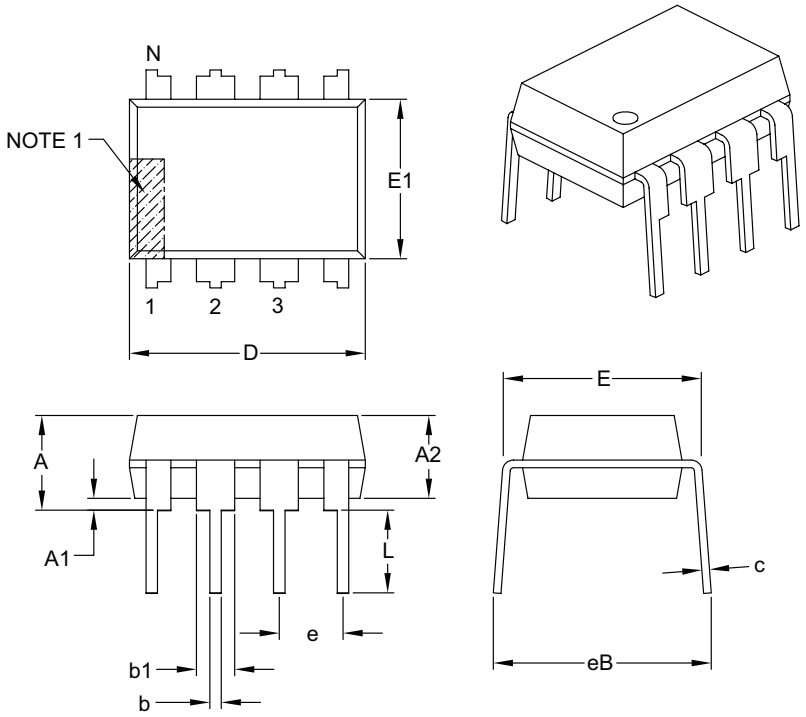
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-018B

# Packaging Diagrams and Parameters

## 8-Lead Plastic Dual In-Line (PA) – 300 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .210 |
| Molded Package Thickness | A2 | .115 | .130 | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .290 | .310 | .325 |
| Molded Package Width | E1 | .240 | .250 | .280 |
| Overall Length | D | .348 | .365 | .400 |
| Tip to Seating Plane | L | .115 | .130 | .150 |
| Lead Thickness | c | .008 | .010 | .015 |
| Upper Lead Width | b1 | .040 | .060 | .070 |
| Lower Lead Width | b | .014 | .018 | .022 |
| Overall Row Spacing § | eB | – | – | .430 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located with the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

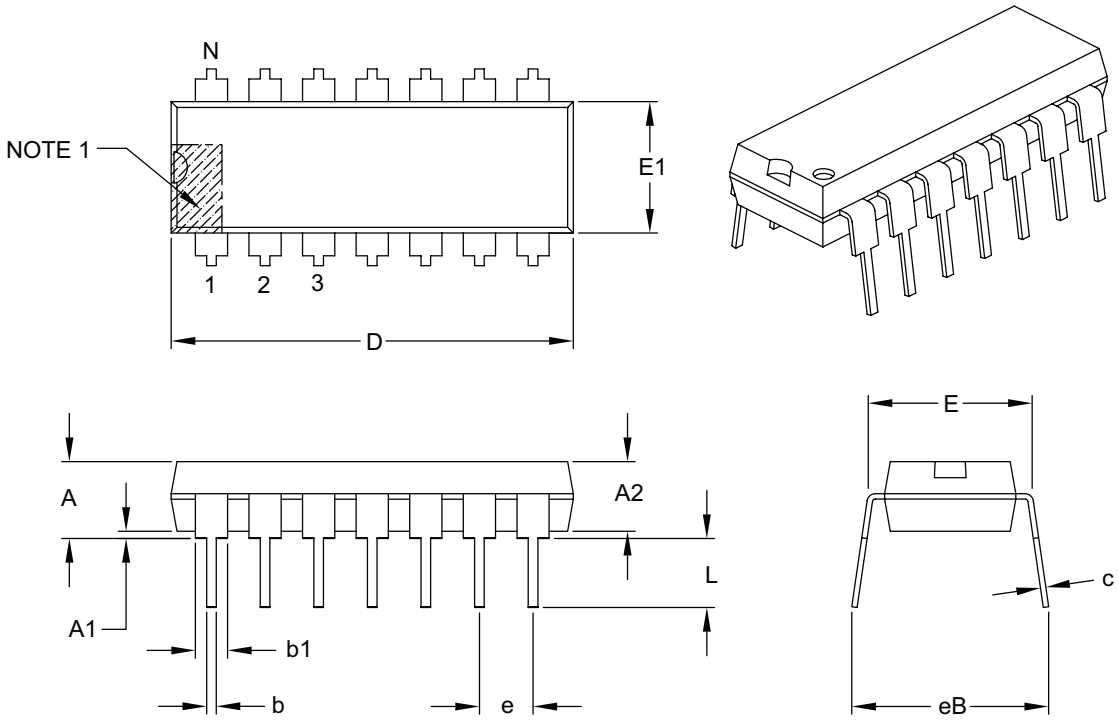
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-018B

# Packaging Diagrams and Parameters

## 14-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 14 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .210 |
| Molded Package Thickness | A2 | .115 | .130 | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .290 | .310 | .325 |
| Molded Package Width | E1 | .240 | .250 | .280 |
| Overall Length | D | .735 | .750 | .775 |
| Tip to Seating Plane | L | .115 | .130 | .150 |
| Lead Thickness | c | .008 | .010 | .015 |
| Upper Lead Width | b1 | .045 | .060 | .070 |
| Lower Lead Width | b | .014 | .018 | .022 |
| Overall Row Spacing § | eB | – | – | .430 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located with the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

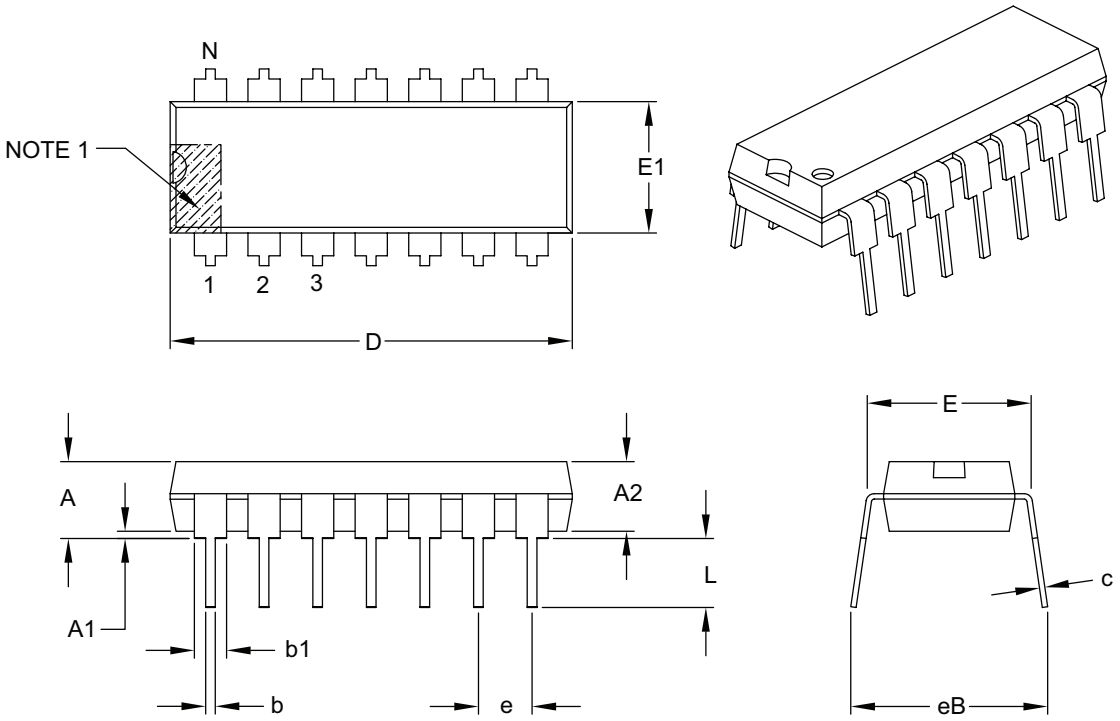
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-005B

# Packaging Diagrams and Parameters

## 14-Lead Plastic Dual In-Line (PD) – 300 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 14 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .210 |
| Molded Package Thickness | A2 | .115 | .130 | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .290 | .310 | .325 |
| Molded Package Width | E1 | .240 | .250 | .280 |
| Overall Length | D | .735 | .750 | .775 |
| Tip to Seating Plane | L | .115 | .130 | .150 |
| Lead Thickness | c | .008 | .010 | .015 |
| Upper Lead Width | b1 | .045 | .060 | .070 |
| Lower Lead Width | b | .014 | .018 | .022 |
| Overall Row Spacing § | eB | – | – | .430 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located with the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

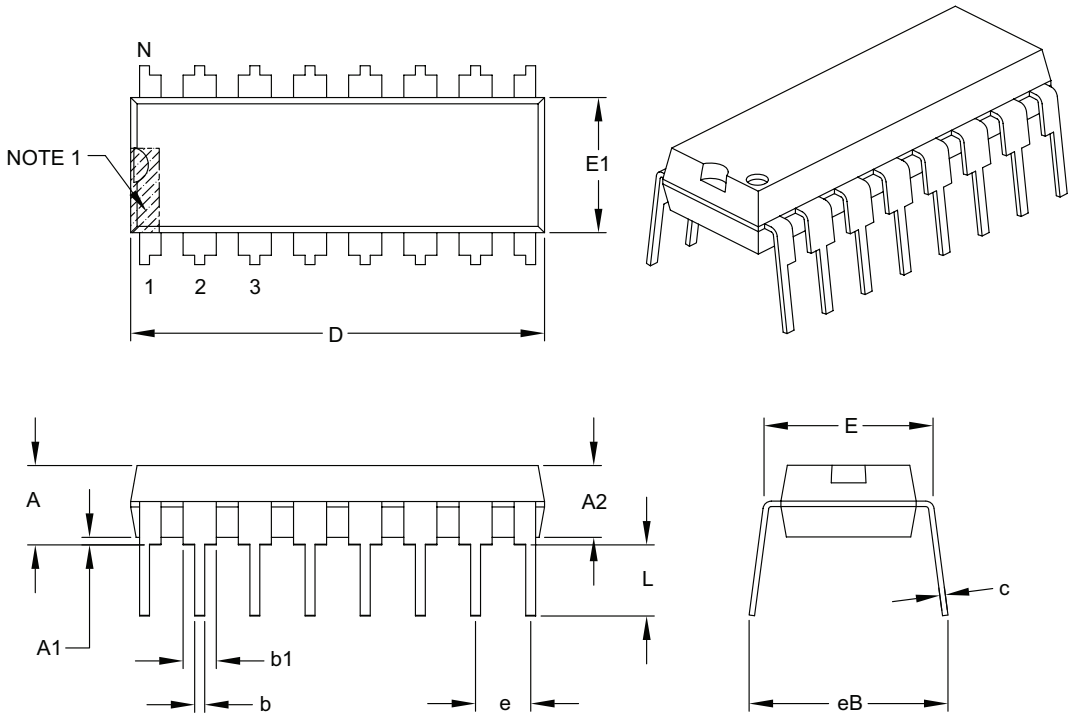
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-005B

# Packaging Diagrams and Parameters

## 16-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 16 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .210 |
| Molded Package Thickness | A2 | .115 | .130 | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .290 | .310 | .325 |
| Molded Package Width | E1 | .240 | .250 | .280 |
| Overall Length | D | .735 | .755 | .775 |
| Tip to Seating Plane | L | .115 | .130 | .150 |
| Lead Thickness | c | .008 | .010 | .015 |
| Upper Lead Width | b1 | .045 | .060 | .070 |
| Lower Lead Width | b | .014 | .018 | .022 |
| Overall Row Spacing § | eB | – | – | .430 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

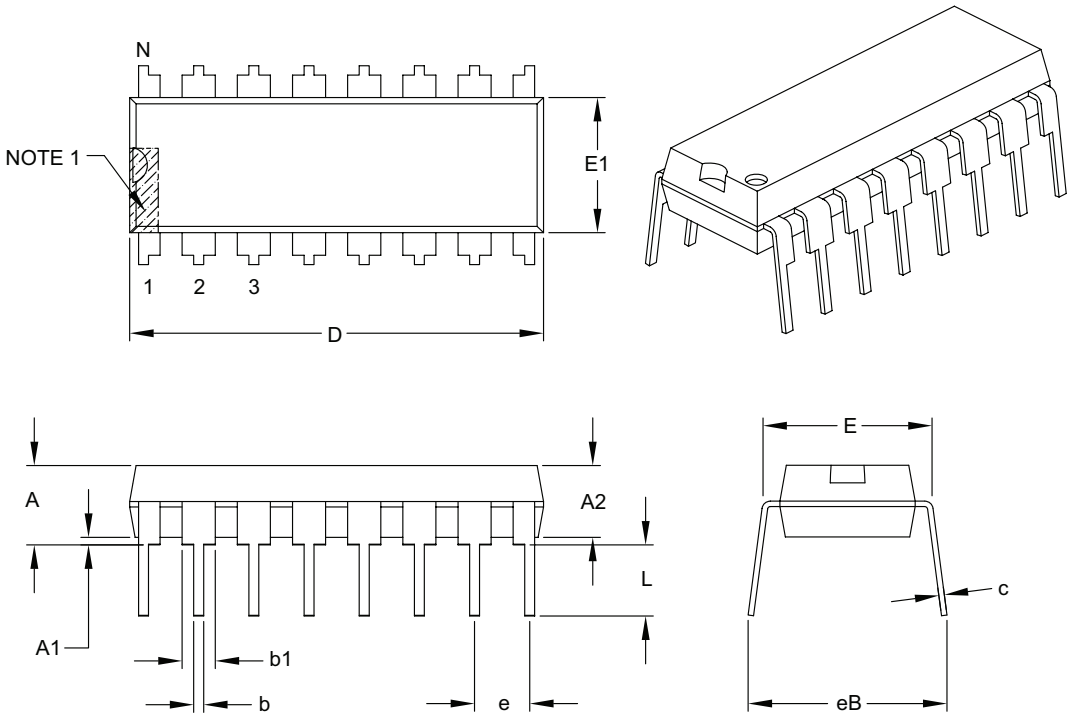
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-017B

# Packaging Diagrams and Parameters

## 16-Lead Plastic Dual In-Line (PE) – 300 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 16 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .210 |
| Molded Package Thickness | A2 | .115 | .130 | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .290 | .310 | .325 |
| Molded Package Width | E1 | .240 | .250 | .280 |
| Overall Length | D | .735 | .755 | .775 |
| Tip to Seating Plane | L | .115 | .130 | .150 |
| Lead Thickness | c | .008 | .010 | .015 |
| Upper Lead Width | b1 | .045 | .060 | .070 |
| Lower Lead Width | b | .014 | .018 | .022 |
| Overall Row Spacing § | eB | – | – | .430 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

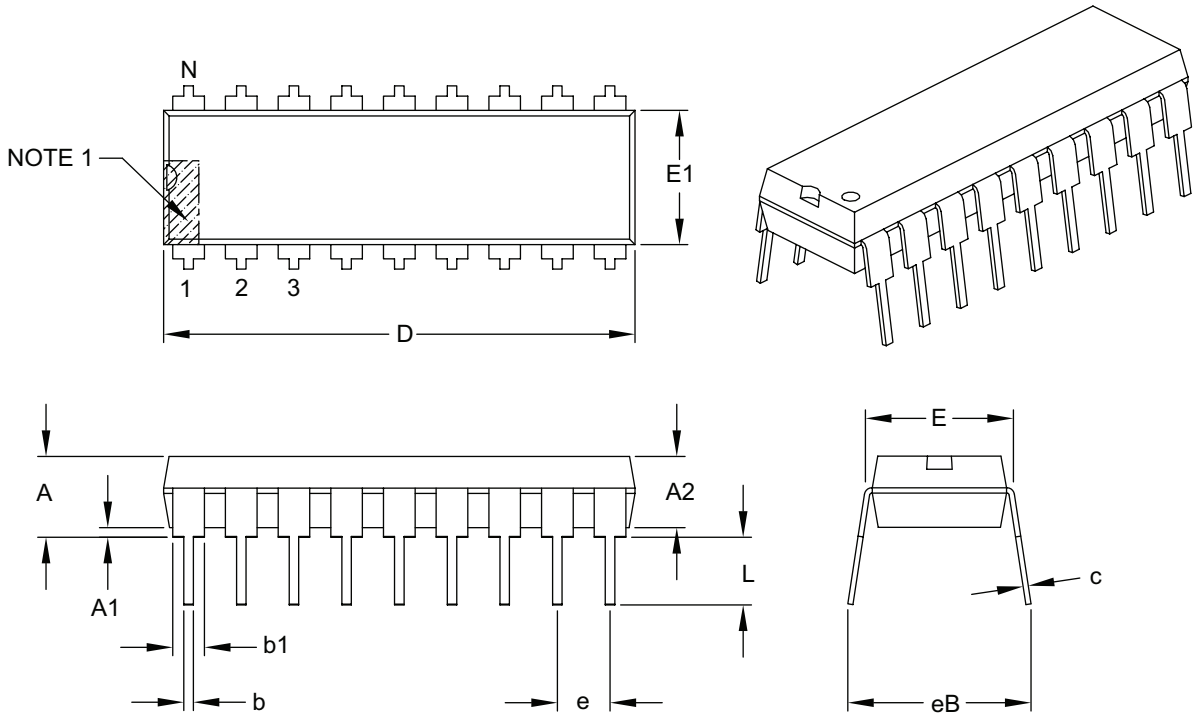
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-017B

# Packaging Diagrams and Parameters

## 18-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 18 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .210 |
| Molded Package Thickness | A2 | .115 | .130 | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .300 | .310 | .325 |
| Molded Package Width | E1 | .240 | .250 | .280 |
| Overall Length | D | .880 | .900 | .920 |
| Tip to Seating Plane | L | .115 | .130 | .150 |
| Lead Thickness | c | .008 | .010 | .014 |
| Upper Lead Width | b1 | .045 | .060 | .070 |
| Lower Lead Width | b | .014 | .018 | .022 |
| Overall Row Spacing § | eB | – | – | .430 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

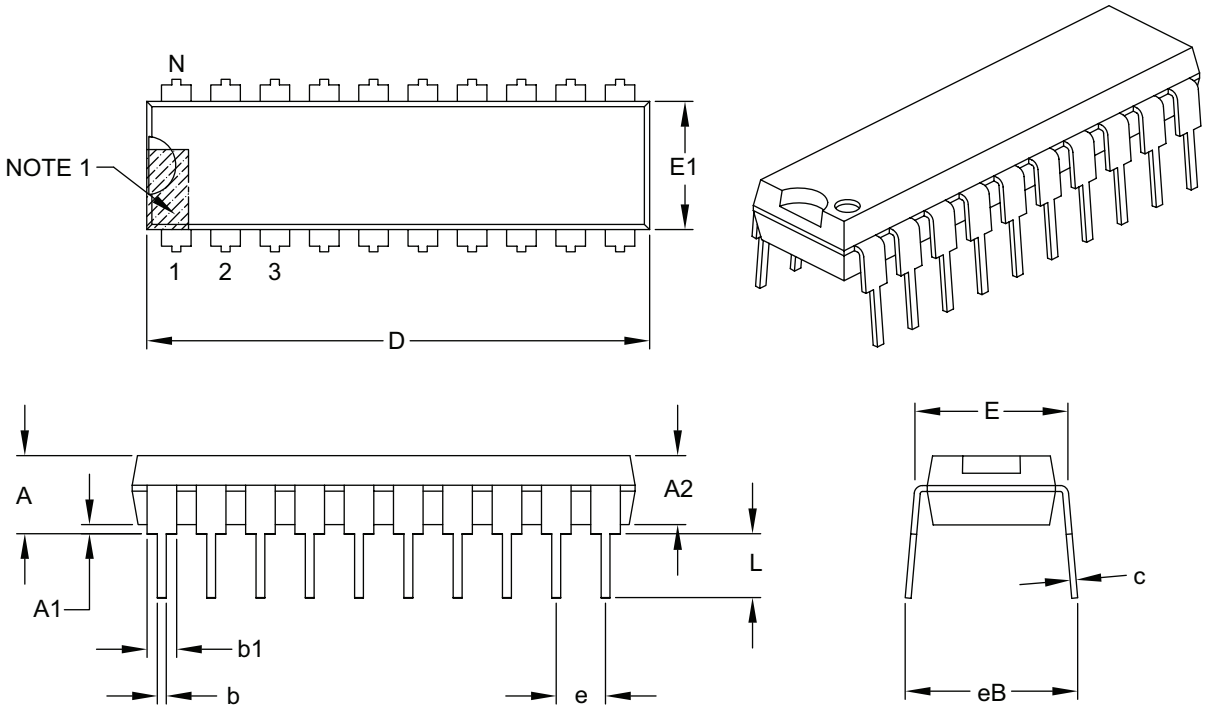
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-007B

# Packaging Diagrams and Parameters

## 20-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 20 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .210 |
| Molded Package Thickness | A2 | .115 | .130 | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .300 | .310 | .325 |
| Molded Package Width | E1 | .240 | .250 | .280 |
| Overall Length | D | .980 | 1.030 | 1.060 |
| Tip to Seating Plane | L | .115 | .130 | .150 |
| Lead Thickness | c | .008 | .010 | .015 |
| Upper Lead Width | b1 | .045 | .060 | .070 |
| Lower Lead Width | b | .014 | .018 | .022 |
| Overall Row Spacing § | eB | – | – | .430 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

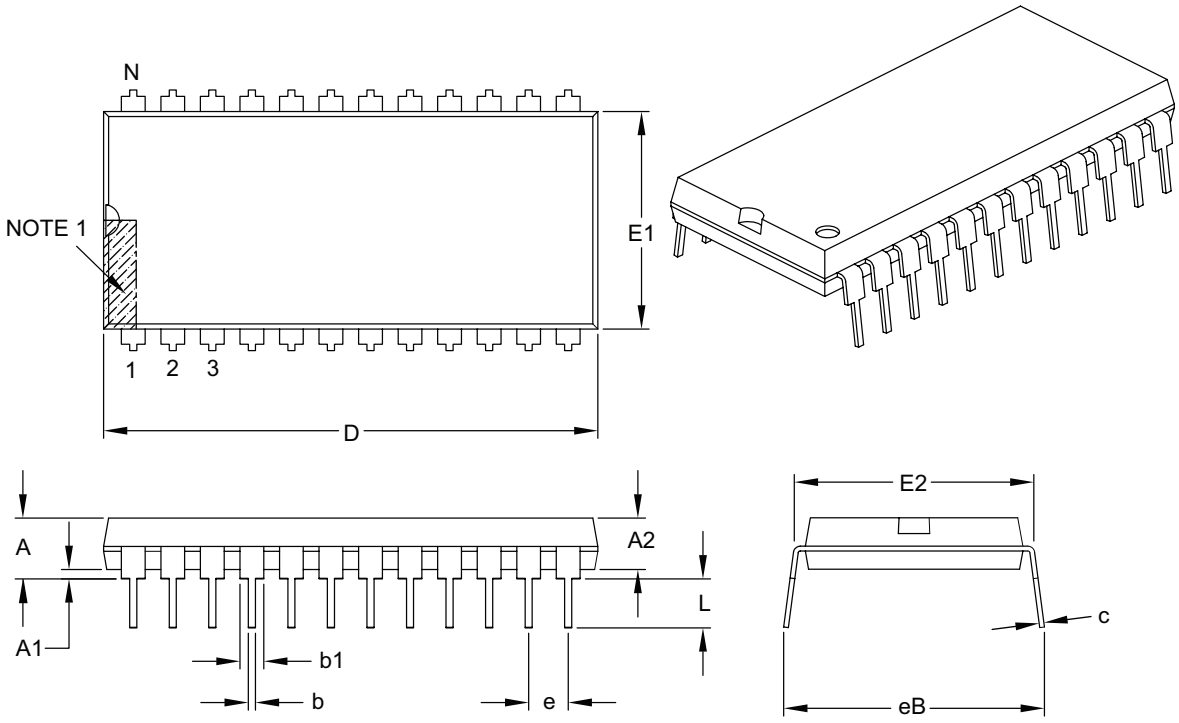
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-019B

# Packaging Diagrams and Parameters

## 24-Lead Plastic Dual In-Line (P) – 600 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 24 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .250 |
| Molded Package Thickness | A2 | .125 | – | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .590 | – | .625 |
| Molded Package Width | E1 | .485 | – | .580 |
| Overall Length | D | 1.150 | – | 1.290 |
| Tip to Seating Plane | L | .115 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .030 | – | .070 |
| Lower Lead Width | b | .014 | – | .022 |
| Overall Row Spacing § | eB | – | – | .700 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

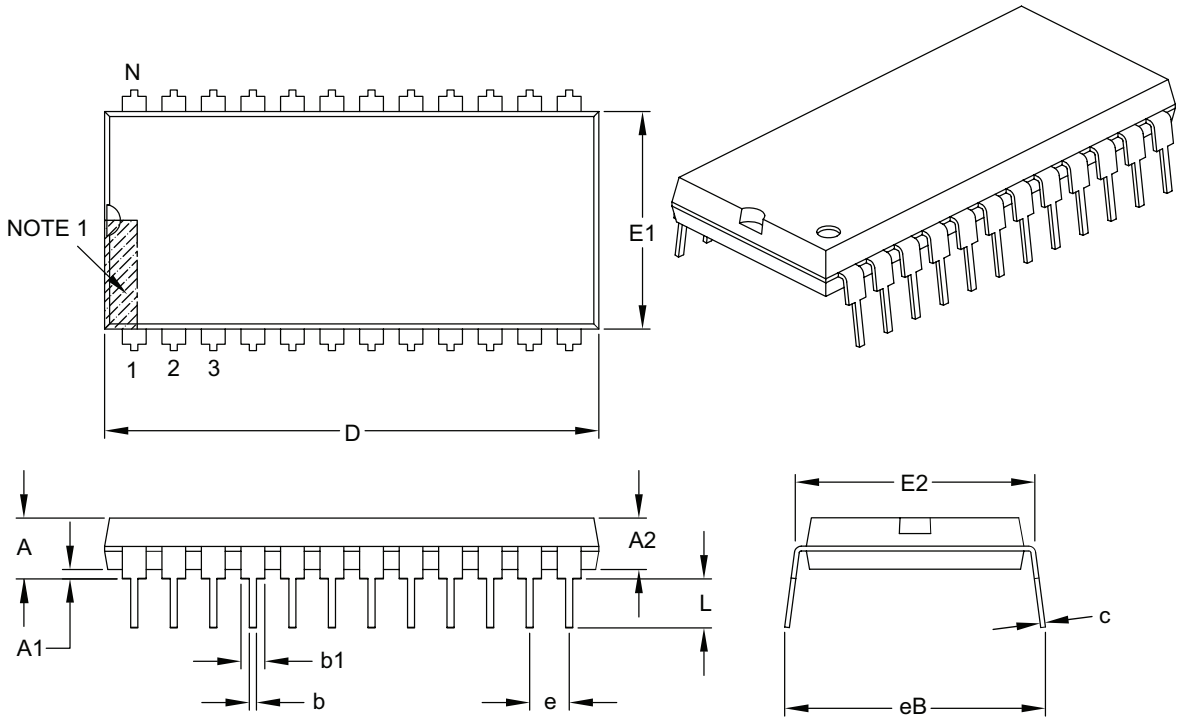
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-081B

# Packaging Diagrams and Parameters

## 24-Lead Plastic Dual In-Line (PG) – 600 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 24 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .250 |
| Molded Package Thickness | A2 | .125 | – | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .590 | – | .625 |
| Molded Package Width | E1 | .485 | – | .580 |
| Overall Length | D | 1.150 | – | 1.290 |
| Tip to Seating Plane | L | .115 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .030 | – | .070 |
| Lower Lead Width | b | .014 | – | .022 |
| Overall Row Spacing § | eB | – | – | .700 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

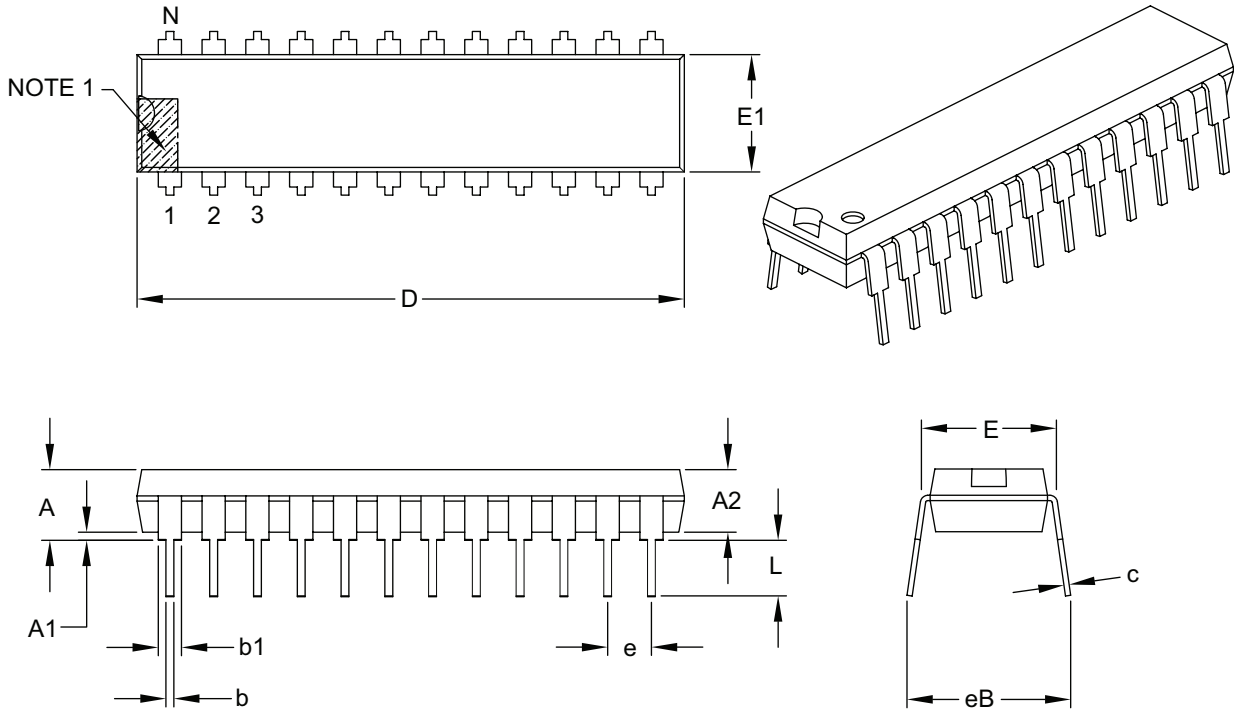
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-081B

# Packaging Diagrams and Parameters

## 24-Lead Skinny Plastic Dual In-Line (SP) – 300 mil Body [SPDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 24 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .210 |
| Molded Package Thickness | A2 | .115 | .130 | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .280 | .310 | .325 |
| Molded Package Width | E1 | .240 | .250 | .280 |
| Overall Length | D | 1.155 | 1.250 | 1.280 |
| Tip to Seating Plane | L | .115 | .130 | .160 |
| Lead Thickness | c | .008 | .010 | .015 |
| Upper Lead Width | b1 | .045 | .060 | .070 |
| Lower Lead Width | b | .014 | .018 | .023 |
| Overall Row Spacing § | eB | – | – | .430 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

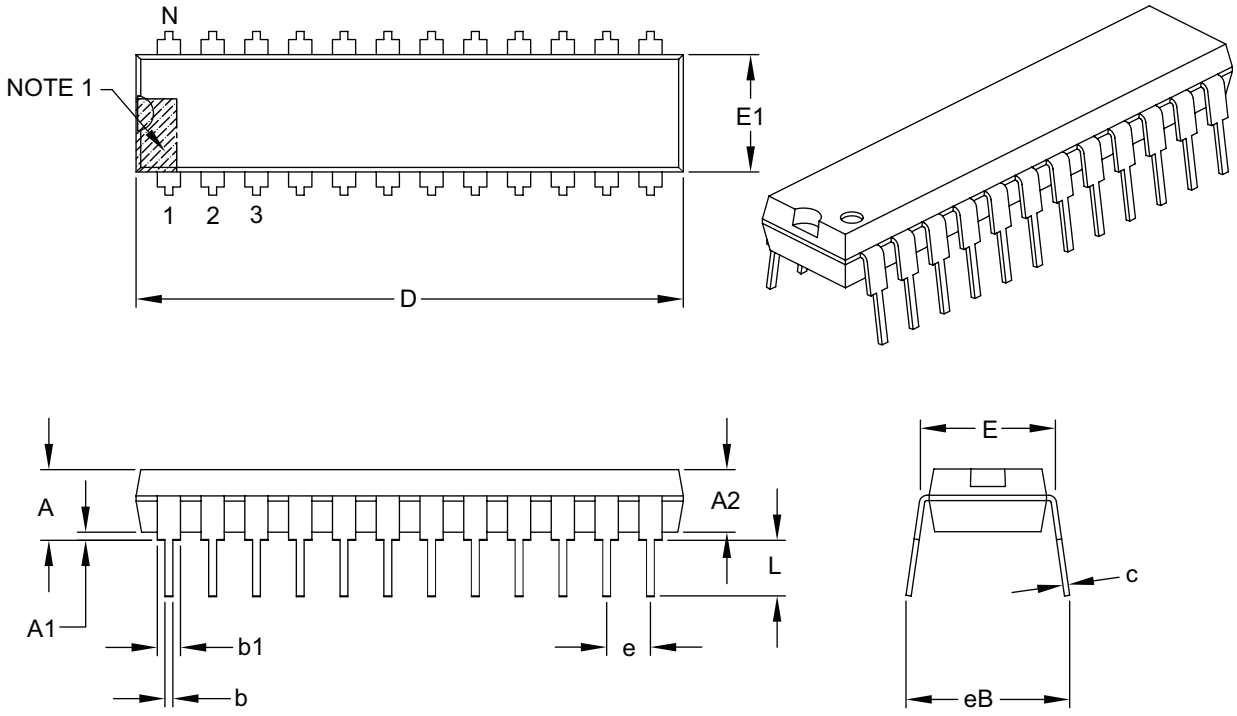
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-043B

# Packaging Diagrams and Parameters

## 24-Lead Skinny Plastic Dual In-Line (PF) – 300 mil Body [SPDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 24 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .210 |
| Molded Package Thickness | A2 | .115 | .130 | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .280 | .310 | .325 |
| Molded Package Width | E1 | .240 | .250 | .280 |
| Overall Length | D | 1.155 | 1.250 | 1.280 |
| Tip to Seating Plane | L | .115 | .130 | .160 |
| Lead Thickness | c | .008 | .010 | .015 |
| Upper Lead Width | b1 | .045 | .060 | .070 |
| Lower Lead Width | b | .014 | .018 | .023 |
| Overall Row Spacing § | eB | – | – | .430 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

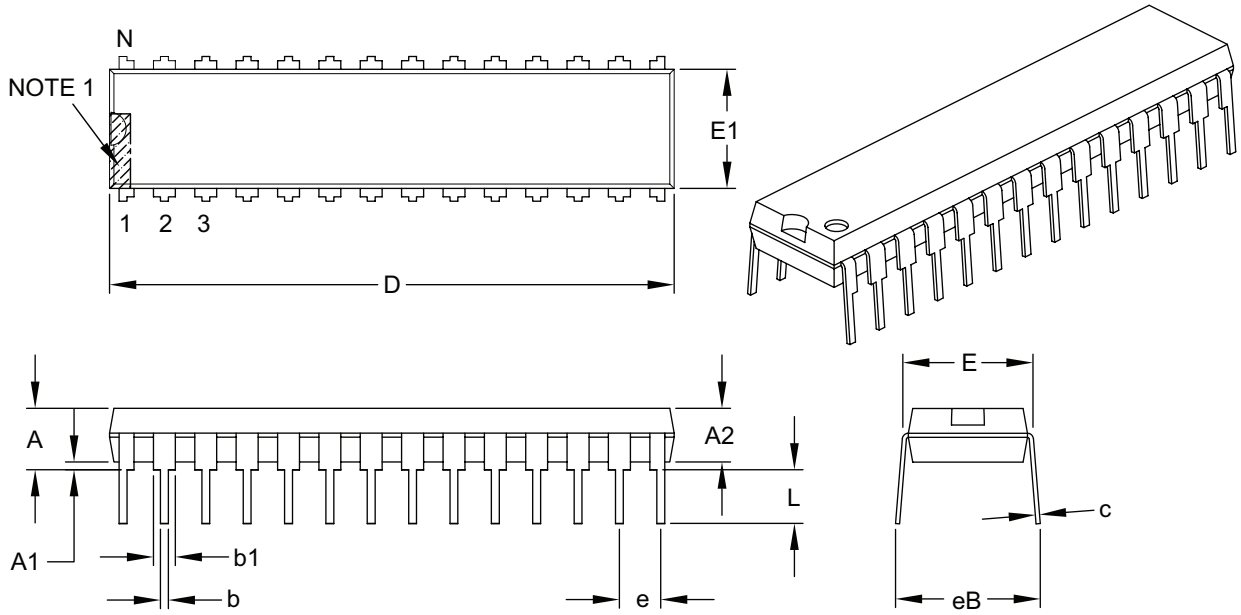
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-043B

# Packaging Diagrams and Parameters

## 28-Lead Skinny Plastic Dual In-Line (SP) – 300 mil Body [SPDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .200 |
| Molded Package Thickness | A2 | .120 | .135 | .150 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .290 | .310 | .335 |
| Molded Package Width | E1 | .240 | .285 | .295 |
| Overall Length | D | 1.345 | 1.365 | 1.400 |
| Tip to Seating Plane | L | .110 | .130 | .150 |
| Lead Thickness | c | .008 | .010 | .015 |
| Upper Lead Width | b1 | .040 | .050 | .070 |
| Lower Lead Width | b | .014 | .018 | .022 |
| Overall Row Spacing § | eB | – | – | .430 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

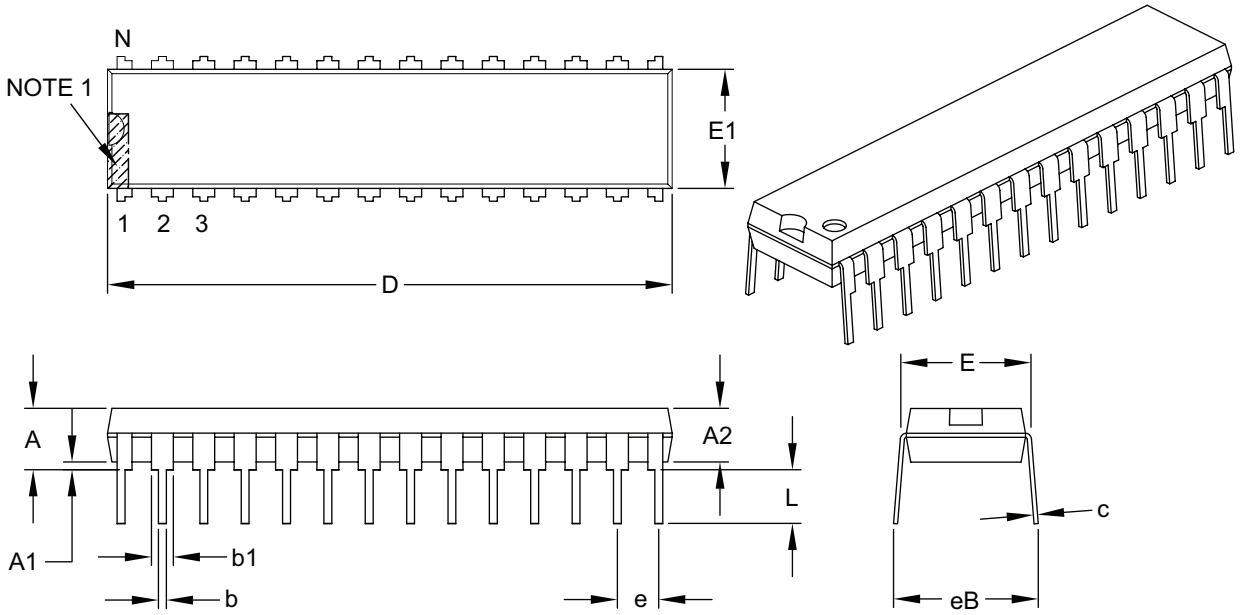
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-070B

# Packaging Diagrams and Parameters

## 28-Lead Skinny Plastic Dual In-Line (PJ) – 300 mil Body [SPDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .200 |
| Molded Package Thickness | A2 | .120 | .135 | .150 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .290 | .310 | .335 |
| Molded Package Width | E1 | .240 | .285 | .295 |
| Overall Length | D | 1.345 | 1.365 | 1.400 |
| Tip to Seating Plane | L | .110 | .130 | .150 |
| Lead Thickness | c | .008 | .010 | .015 |
| Upper Lead Width | b1 | .040 | .050 | .070 |
| Lower Lead Width | b | .014 | .018 | .022 |
| Overall Row Spacing § | eB | – | – | .430 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

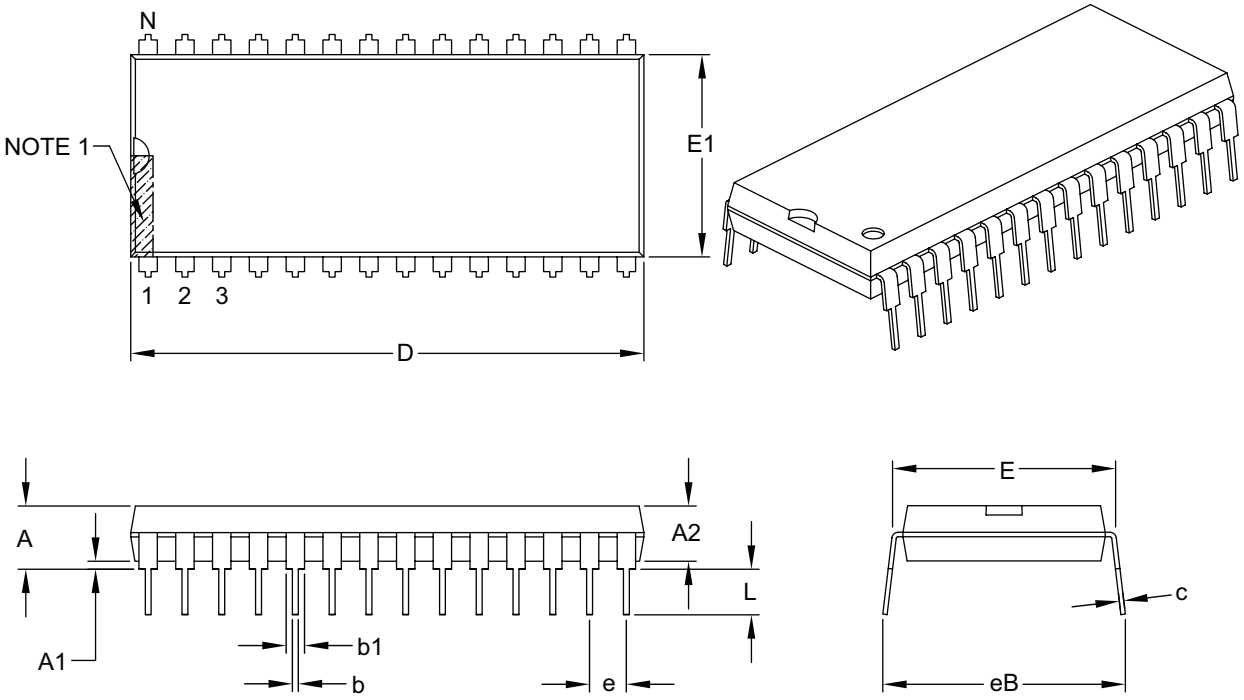
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-070B

# Packaging Diagrams and Parameters

## 28-Lead Plastic Dual In-Line (P) – 600 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .250 |
| Molded Package Thickness | A2 | .125 | – | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .590 | – | .625 |
| Molded Package Width | E1 | .485 | – | .580 |
| Overall Length | D | 1.380 | – | 1.565 |
| Tip to Seating Plane | L | .115 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .030 | – | .070 |
| Lower Lead Width | b | .014 | – | .022 |
| Overall Row Spacing § | eB | – | – | .700 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

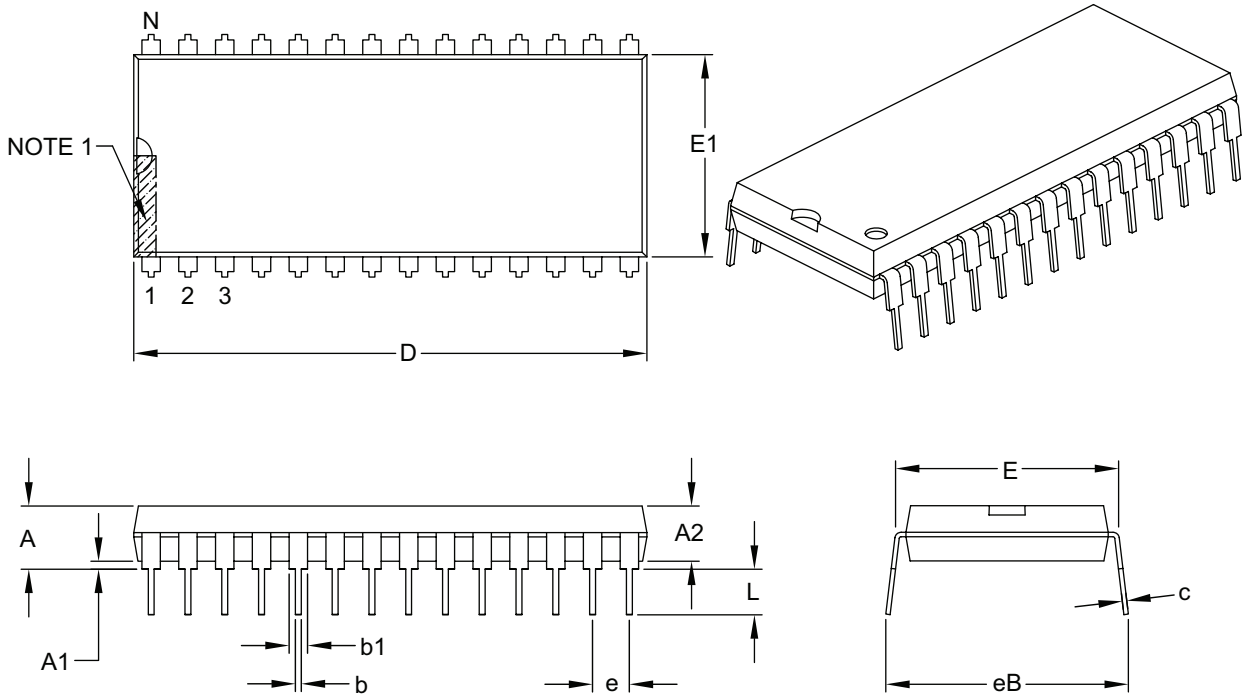
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-079B

# Packaging Diagrams and Parameters

## 28-Lead Plastic Dual In-Line (PI) – 600 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .250 |
| Molded Package Thickness | A2 | .125 | – | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .590 | – | .625 |
| Molded Package Width | E1 | .485 | – | .580 |
| Overall Length | D | 1.380 | – | 1.565 |
| Tip to Seating Plane | L | .115 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .030 | – | .070 |
| Lower Lead Width | b | .014 | – | .022 |
| Overall Row Spacing § | eB | – | – | .700 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

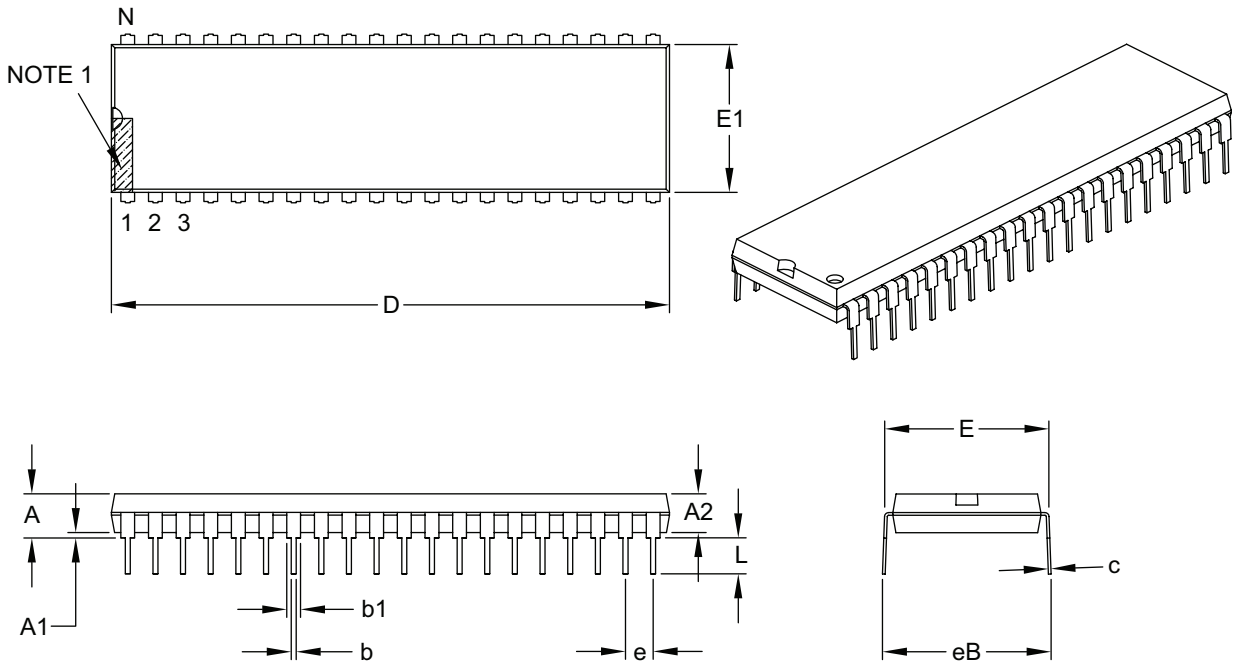
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-079B

# Packaging Diagrams and Parameters

## 40-Lead Plastic Dual In-Line (P) – 600 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 40 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .250 |
| Molded Package Thickness | A2 | .125 | – | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .590 | – | .625 |
| Molded Package Width | E1 | .485 | – | .580 |
| Overall Length | D | 1.980 | – | 2.095 |
| Tip to Seating Plane | L | .115 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .030 | – | .070 |
| Lower Lead Width | b | .014 | – | .023 |
| Overall Row Spacing § | eB | – | – | .700 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

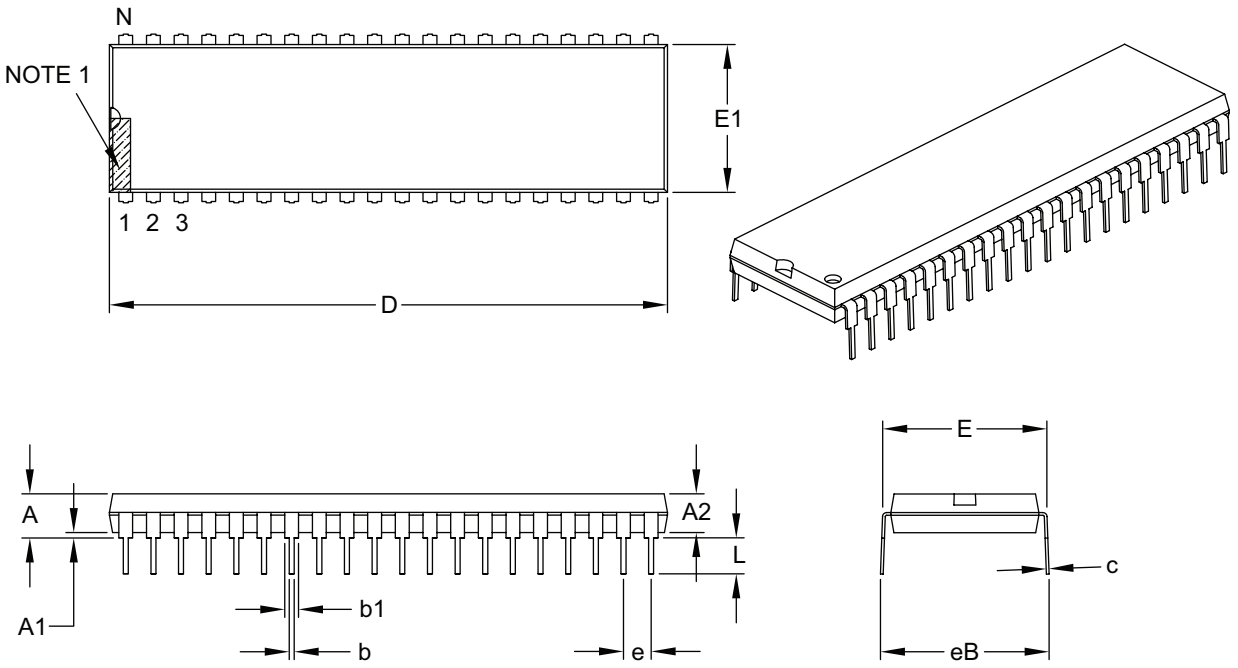
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-016B

# Packaging Diagrams and Parameters

## 40-Lead Plastic Dual In-Line (PL) – 600 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 40 | |
| Pitch | e | | .100 BSC | |
| Top to Seating Plane | A | – | – | .250 |
| Molded Package Thickness | A2 | .125 | – | .195 |
| Base to Seating Plane | A1 | .015 | – | – |
| Shoulder to Shoulder Width | E | .590 | – | .625 |
| Molded Package Width | E1 | .485 | – | .580 |
| Overall Length | D | 1.980 | – | 2.095 |
| Tip to Seating Plane | L | .115 | – | .200 |
| Lead Thickness | c | .008 | – | .015 |
| Upper Lead Width | b1 | .030 | – | .070 |
| Lower Lead Width | b | .014 | – | .023 |
| Overall Row Spacing § | eB | – | – | .700 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

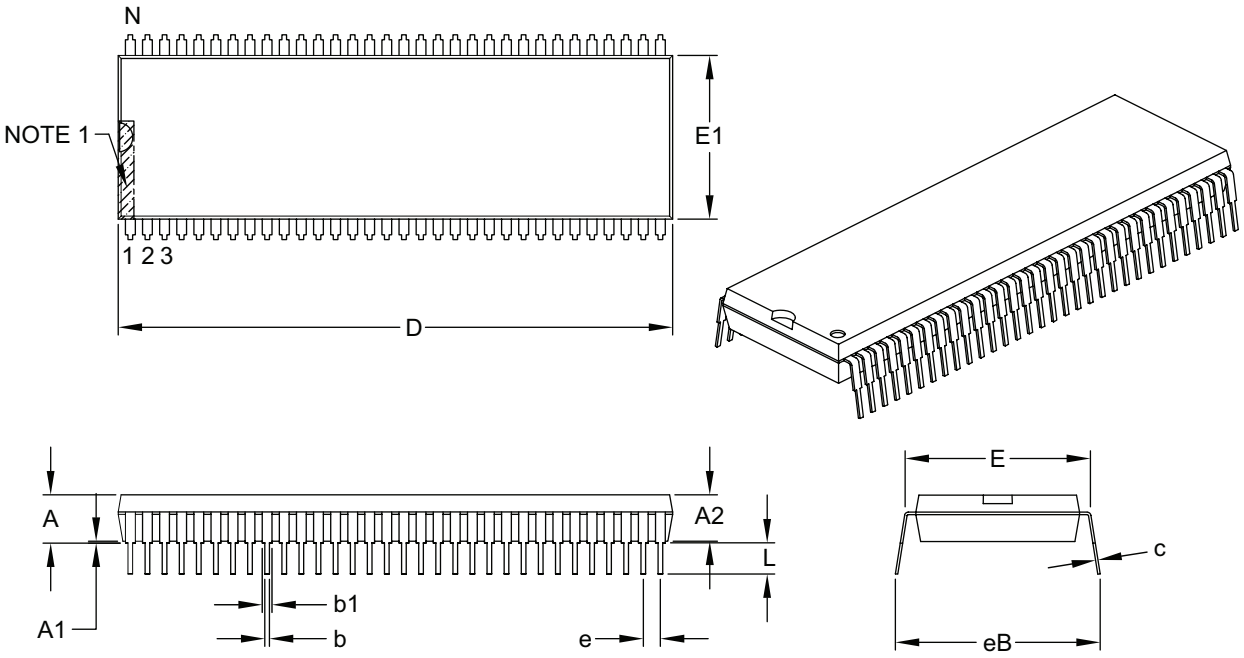
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-016B

# Packaging Diagrams and Parameters

## 64-Lead Shrink Plastic Dual In-Line (SP) – 750 mil Body [PDIP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 64 | |
| Pitch | e | | .070 BSC | |
| Top to Seating Plane | A | – | – | .200 |
| Molded Package Thickness | A2 | .120 | .150 | .180 |
| Base to Seating Plane | A1 | .020 | – | – |
| Shoulder to Shoulder Width | E | .750 | – | .785 |
| Molded Package Width | E1 | .650 | .670 | .690 |
| Overall Length | D | 2.260 | 2.270 | 2.280 |
| Tip to Seating Plane | L | .100 | .130 | .150 |
| Lead Thickness | c | .009 | .010 | .015 |
| Upper Lead Width | b1 | .035 | .040 | .045 |
| Lower Lead Width | b | .014 | .018 | .022 |
| Overall Row Spacing § | eB | – | – | .880 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-090B

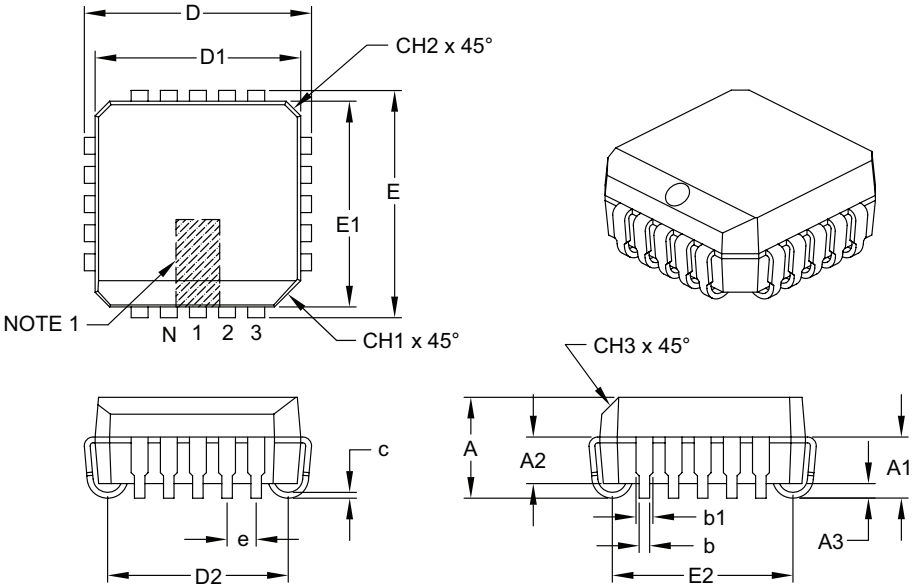
# Packaging Diagrams and Parameters

**NOTES:**

# Packaging Diagrams and Parameters

## 20-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 20 | |
| Pitch | e | | .050 | |
| Overall Height | A | .165 | .172 | .180 |
| Contact Height | A1 | .090 | .105 | .120 |
| Molded Package to Contact | A2 | .062 | – | .083 |
| Standoff § | A3 | .020 | – | – |
| Corner Chamfer | CH1 | .042 | – | .048 |
| Chamfers | CH2 | – | – | .020 |
| Side Chamfer | CH3 | .042 | – | .056 |
| Overall Width | E | .385 | .390 | .395 |
| Overall Length | D | .385 | .390 | .395 |
| Molded Package Width | E1 | .350 | .353 | .356 |
| Molded Package Length | D1 | .350 | .353 | .356 |
| Footprint Width | E2 | .282 | .310 | .338 |
| Footprint Length | D2 | .282 | .310 | .338 |
| Lead Thickness | c | .0075 | – | .0125 |
| Upper Lead Width | b1 | .026 | – | .032 |
| Lower Lead Width | b | .013 | – | .021 |

**Notes:**

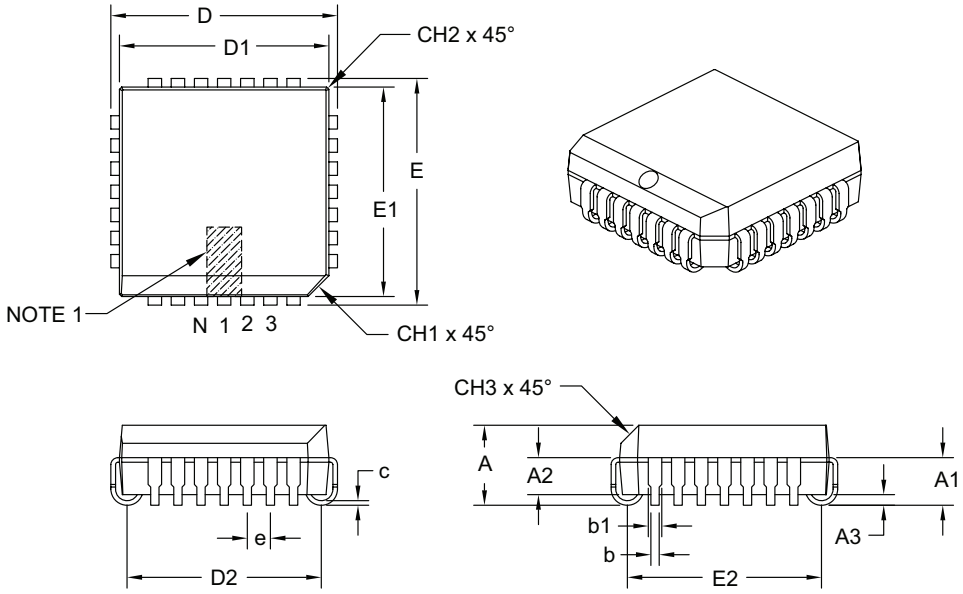
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-064B

# Packaging Diagrams and Parameters

## 28-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | .050 | |
| Overall Height | A | .165 | .172 | .180 |
| Contact Height | A1 | .090 | .105 | .120 |
| Molded Package to Contact | A2 | .062 | – | .083 |
| Standoff § | A3 | .020 | – | – |
| Corner Chamfer | CH1 | .042 | – | .048 |
| Chamfers | CH2 | – | – | .020 |
| Side Chamfer | CH3 | .042 | – | .056 |
| Overall Width | E | .485 | .490 | .495 |
| Overall Length | D | .485 | .490 | .495 |
| Molded Package Width | E1 | .450 | .453 | .456 |
| Molded Package Length | D1 | .450 | .453 | .456 |
| Footprint Width | E2 | .382 | .410 | .438 |
| Footprint Length | D2 | .382 | .410 | .438 |
| Lead Thickness | c | .0075 | – | .0125 |
| Upper Lead Width | b1 | .026 | – | .032 |
| Lower Lead Width | b | .013 | – | .021 |

**Notes:**

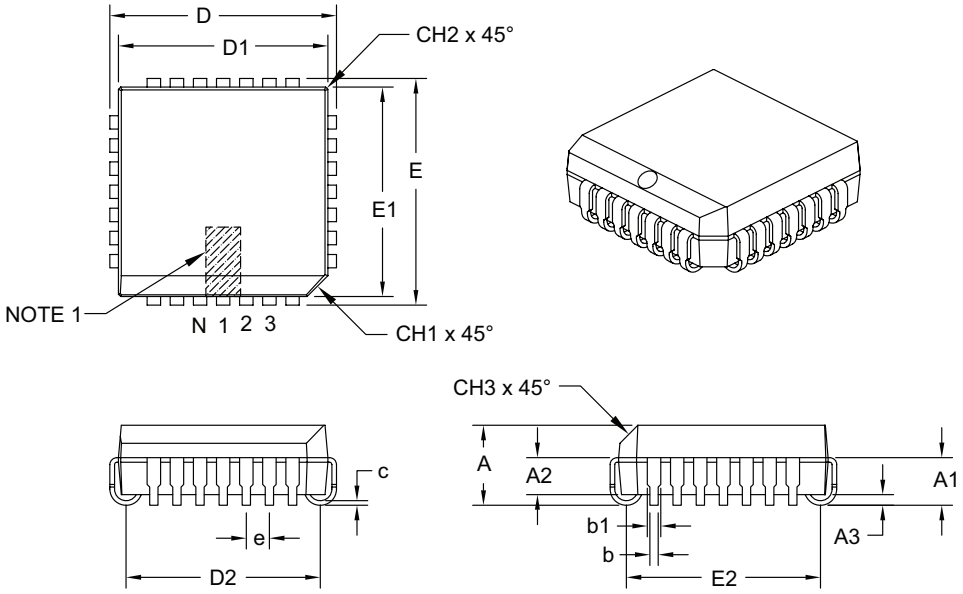
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-026B

# Packaging Diagrams and Parameters

## 28-Lead Plastic Leaded Chip Carrier (LI) – Square [PLCC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | .050 | |
| Overall Height | A | .165 | .172 | .180 |
| Contact Height | A1 | .090 | .105 | .120 |
| Molded Package to Contact | A2 | .062 | – | .083 |
| Standoff § | A3 | .020 | – | – |
| Corner Chamfer | CH1 | .042 | – | .048 |
| Chamfers | CH2 | – | – | .020 |
| Side Chamfer | CH3 | .042 | – | .056 |
| Overall Width | E | .485 | .490 | .495 |
| Overall Length | D | .485 | .490 | .495 |
| Molded Package Width | E1 | .450 | .453 | .456 |
| Molded Package Length | D1 | .450 | .453 | .456 |
| Footprint Width | E2 | .382 | .410 | .438 |
| Footprint Length | D2 | .382 | .410 | .438 |
| Lead Thickness | c | .0075 | – | .0125 |
| Upper Lead Width | b1 | .026 | – | .032 |
| Lower Lead Width | b | .013 | – | .021 |

**Notes:**

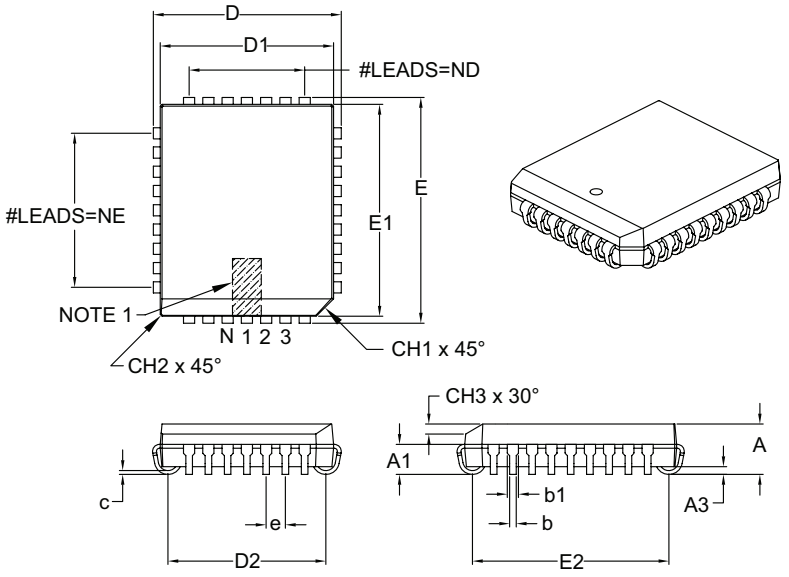
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-026B

# Packaging Diagrams and Parameters

## 32-Lead Plastic Leaded Chip Carrier (L) – Rectangle [PLCC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 32 | |
| Pitch | e | | .050 | |
| Pins along Length | ND | | 7 | |
| Pins along Width | NE | | 9 | |
| Overall Height | A | .125 | – | .140 |
| Contact Height | A1 | .060 | – | .095 |
| Standoff § | A3 | .015 | – | – |
| Corner Chamfer | CH1 | .042 | – | .048 |
| Chamfers | CH2 | – | – | .020 |
| Side Chamfer Height | CH3 | .023 | – | .029 |
| Overall Length | D | .485 | – | .495 |
| Overall Width | E | .585 | – | .595 |
| Molded Package Length | D1 | .447 | – | .453 |
| Molded Package Width | E1 | .547 | – | .553 |
| Footprint Length | D2 | .376 | – | .446 |
| Footprint Width | E2 | .476 | – | .546 |
| Lead Thickness | c | .008 | – | .013 |
| Upper Lead Width | b1 | .026 | – | .032 |
| Lower Lead Width | b | .013 | – | .021 |

**Notes:**

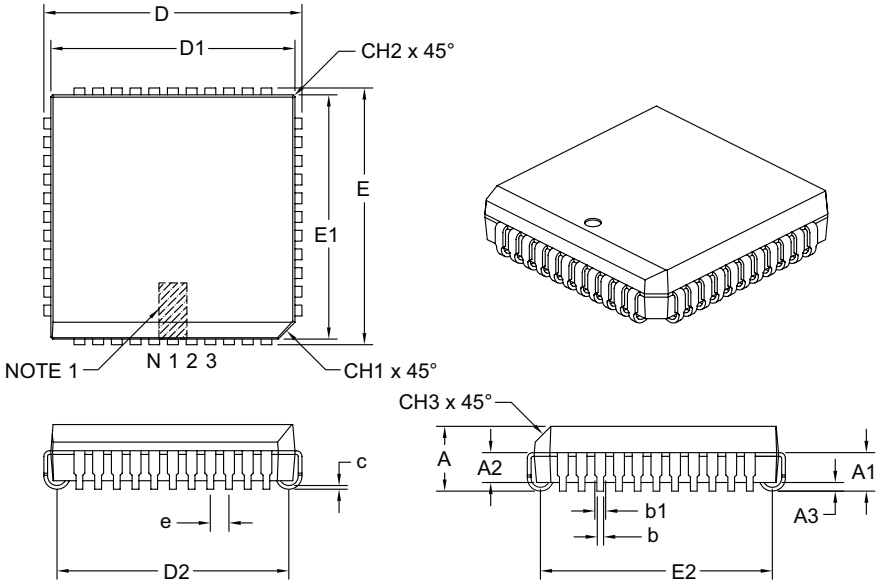
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-023B

# Packaging Diagrams and Parameters

## 44-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 44 | |
| Pitch | e | | .050 | |
| Overall Height | A | .165 | .172 | .180 |
| Contact Height | A1 | .090 | .105 | .120 |
| Molded Package to Contact | A2 | .062 | – | .083 |
| Standoff § | A3 | .020 | – | – |
| Corner Chamfer | CH1 | .042 | – | .048 |
| Chamfers | CH2 | – | – | .020 |
| Side Chamfer | CH3 | .042 | – | .056 |
| Overall Width | E | .685 | .690 | .695 |
| Overall Length | D | .685 | .690 | .695 |
| Molded Package Width | E1 | .650 | .653 | .656 |
| Molded Package Length | D1 | .650 | .653 | .656 |
| Footprint Width | E2 | .582 | .610 | .638 |
| Footprint Length | D2 | .582 | .610 | .638 |
| Lead Thickness | c | .0075 | – | .0125 |
| Upper Lead Width | b1 | .026 | – | .032 |
| Lower Lead Width | b | .013 | – | .021 |

**Notes:**

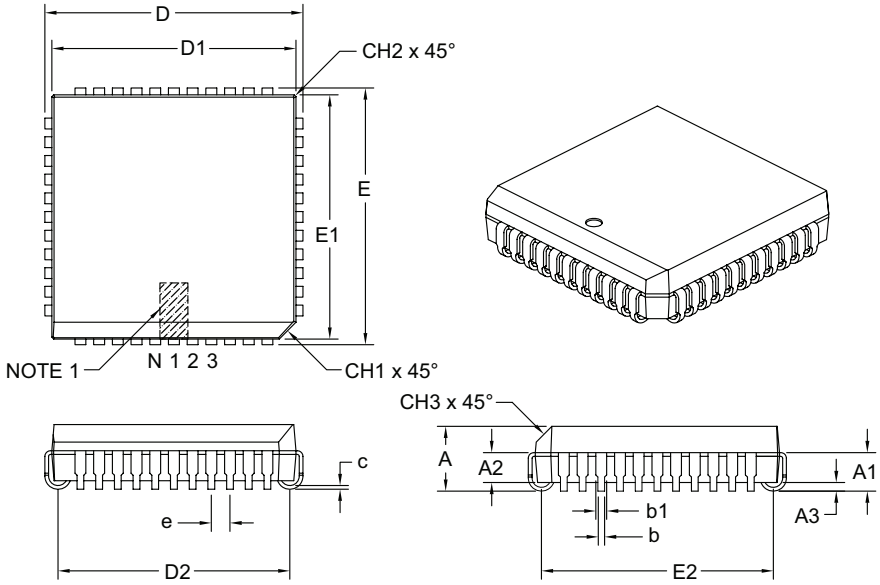
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-048B

# Packaging Diagrams and Parameters

## 44-Lead Plastic Leaded Chip Carrier (LW) – Square [PLCC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 44 | |
| Pitch | e | | .050 | |
| Overall Height | A | .165 | .172 | .180 |
| Contact Height | A1 | .090 | .105 | .120 |
| Molded Package to Contact | A2 | .062 | – | .083 |
| Standoff § | A3 | .020 | – | – |
| Corner Chamfer | CH1 | .042 | – | .048 |
| Chamfers | CH2 | – | – | .020 |
| Side Chamfer | CH3 | .042 | – | .056 |
| Overall Width | E | .685 | .690 | .695 |
| Overall Length | D | .685 | .690 | .695 |
| Molded Package Width | E1 | .650 | .653 | .656 |
| Molded Package Length | D1 | .650 | .653 | .656 |
| Footprint Width | E2 | .582 | .610 | .638 |
| Footprint Length | D2 | .582 | .610 | .638 |
| Lead Thickness | c | .0075 | – | .0125 |
| Upper Lead Width | b1 | .026 | – | .032 |
| Lower Lead Width | b | .013 | – | .021 |

**Notes:**

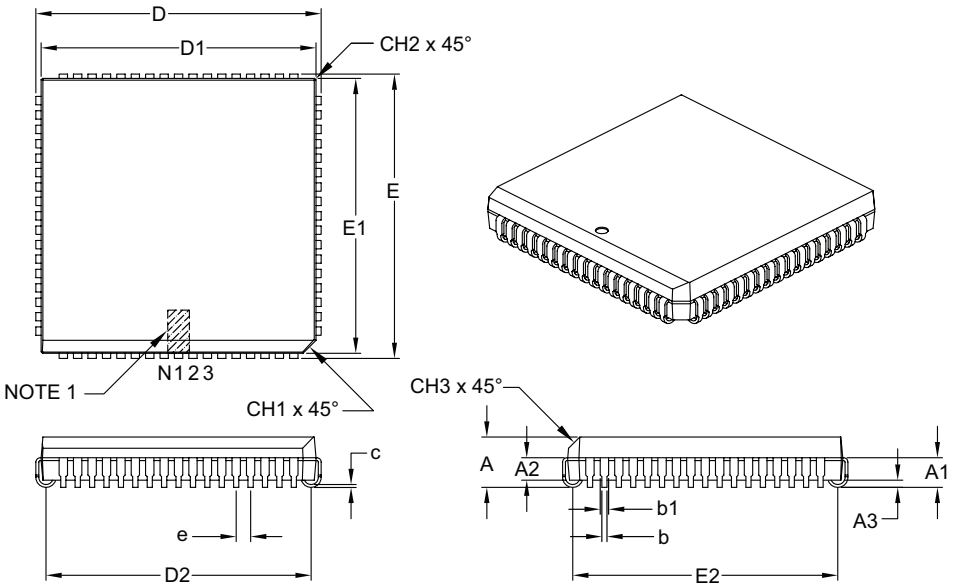
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-048B

# Packaging Diagrams and Parameters

## 68-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 68 | |
| Pitch | e | | .050 | |
| Overall Height | A | .165 | .172 | .180 |
| Contact Height | A1 | .090 | .105 | .120 |
| Molded Package to Contact | A2 | .062 | – | .083 |
| Standoff § | A3 | .020 | – | – |
| Corner Chamfer | CH1 | .042 | – | .048 |
| Chamfers | CH2 | – | – | .020 |
| Side Chamfer | CH3 | .042 | – | .056 |
| Overall Width | E | .985 | .990 | .995 |
| Overall Length | D | .985 | .990 | .995 |
| Molded Package Width | E1 | .950 | .954 | .958 |
| Molded Package Length | D1 | .950 | .954 | .958 |
| Footprint Width | E2 | .882 | .910 | .938 |
| Footprint Length | D2 | .882 | .910 | .938 |
| Lead Thickness | c | .0075 | – | .0125 |
| Upper Lead Width | b1 | .026 | – | .032 |
| Lower Lead Width | b | .013 | – | .021 |

**Notes:**

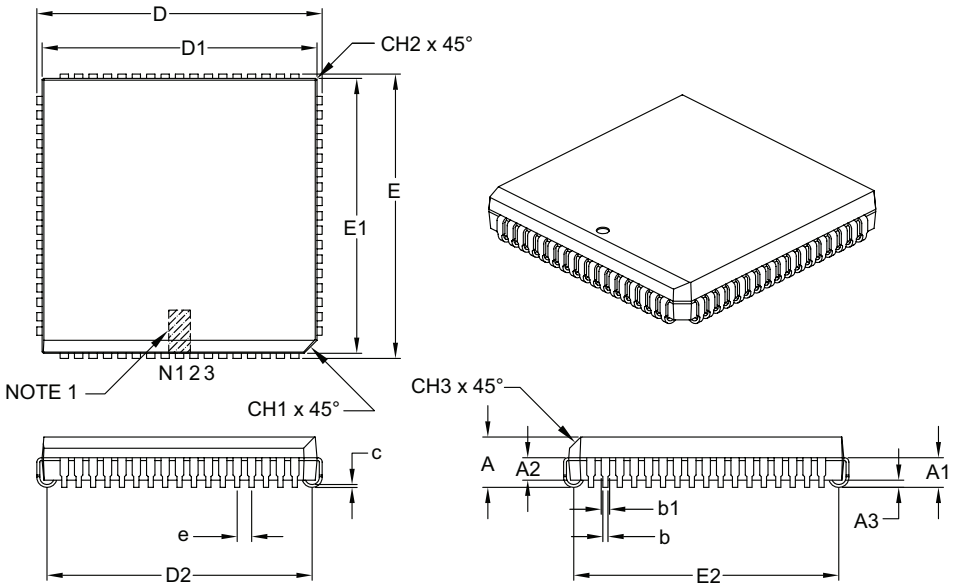
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-049B

# Packaging Diagrams and Parameters

## 68-Lead Plastic Leaded Chip Carrier (LS) – Square [PLCC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 68 | |
| Pitch | e | | .050 | |
| Overall Height | A | .165 | .172 | .180 |
| Contact Height | A1 | .090 | .105 | .120 |
| Molded Package to Contact | A2 | .062 | – | .083 |
| Standoff § | A3 | .020 | – | – |
| Corner Chamfer | CH1 | .042 | – | .048 |
| Chamfers | CH2 | – | – | .020 |
| Side Chamfer | CH3 | .042 | – | .056 |
| Overall Width | E | .985 | .990 | .995 |
| Overall Length | D | .985 | .990 | .995 |
| Molded Package Width | E1 | .950 | .954 | .958 |
| Molded Package Length | D1 | .950 | .954 | .958 |
| Footprint Width | E2 | .882 | .910 | .938 |
| Footprint Length | D2 | .882 | .910 | .938 |
| Lead Thickness | c | .0075 | – | .0125 |
| Upper Lead Width | b1 | .026 | – | .032 |
| Lower Lead Width | b | .013 | – | .021 |

**Notes:**

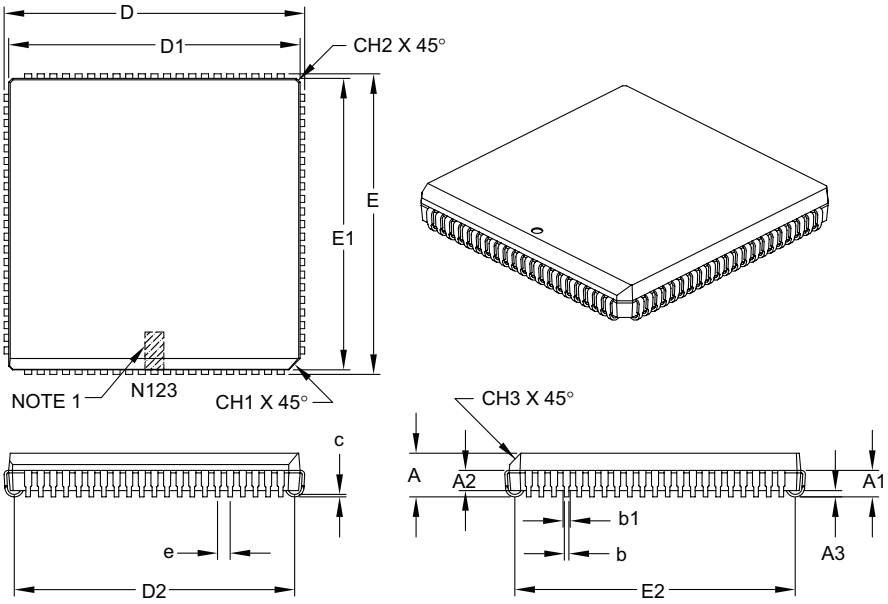
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-049B

# Packaging Diagrams and Parameters

## 84-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 84 | |
| Pitch | e | | .050 | |
| Overall Height | A | .165 | .172 | .200 |
| Contact Height | A1 | .090 | .105 | .130 |
| Molded Package to Contact | A2 | .059 | – | .080 |
| Standoff § | A3 | .020 | – | – |
| Corner Chamfer | CH1 | .042 | – | .048 |
| Chamfers | CH2 | – | – | .020 |
| Side Chamfer | CH3 | .042 | – | .056 |
| Overall Width | E | 1.185 | 1.190 | 1.195 |
| Overall Length | D | 1.185 | 1.190 | 1.195 |
| Molded Package Width | E1 | 1.150 | 1.154 | 1.158 |
| Molded Package Length | D1 | 1.150 | 1.154 | 1.158 |
| Footprint Width | E2 | 1.082 | 1.110 | 1.138 |
| Footprint Length | D2 | 1.082 | 1.110 | 1.138 |
| Lead Thickness | c | .0075 | – | .0125 |
| Upper Lead Width | b1 | .026 | – | .032 |
| Lower Lead Width | b | .013 | – | .021 |

**Notes:**

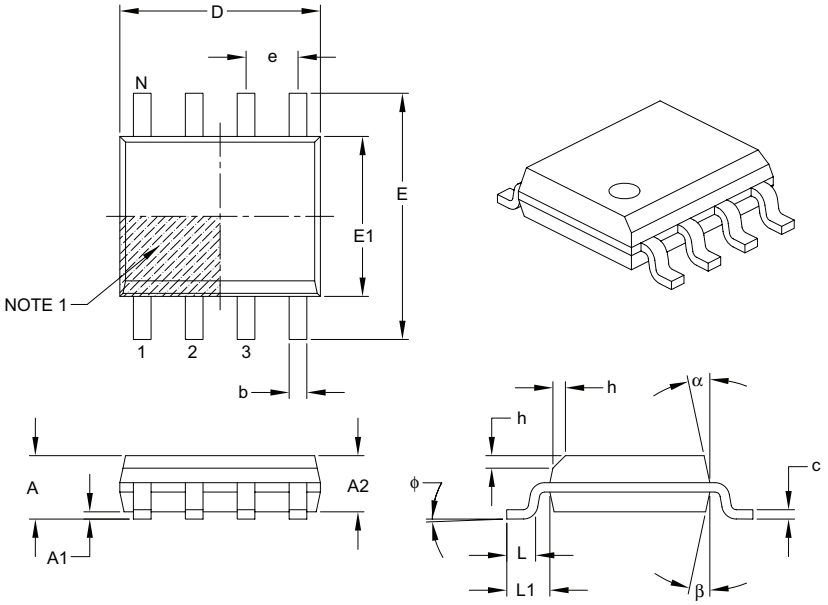
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-093B

# Packaging Diagrams and Parameters

## 8-Lead Plastic Small Outline (SN) – Narrow, 3.90 mm Body [SOIC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | – | – | 1.75 |
| Molded Package Thickness | A2 | 1.25 | – | – |
| Standoff § | A1 | 0.10 | – | 0.25 |
| Overall Width | E | | 6.00 BSC | |
| Molded Package Width | E1 | | 3.90 BSC | |
| Overall Length | D | | 4.90 BSC | |
| Chamfer (optional) | h | 0.25 | – | 0.50 |
| Foot Length | L | 0.40 | – | 1.27 |
| Footprint | L1 | | 1.04 REF | |
| Foot Angle | φ | 0° | – | 8° |
| Lead Thickness | c | 0.17 | – | 0.25 |
| Lead Width | b | 0.31 | – | 0.51 |
| Mold Draft Angle Top | α | 5° | – | 15° |
| Mold Draft Angle Bottom | β | 5° | – | 15° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

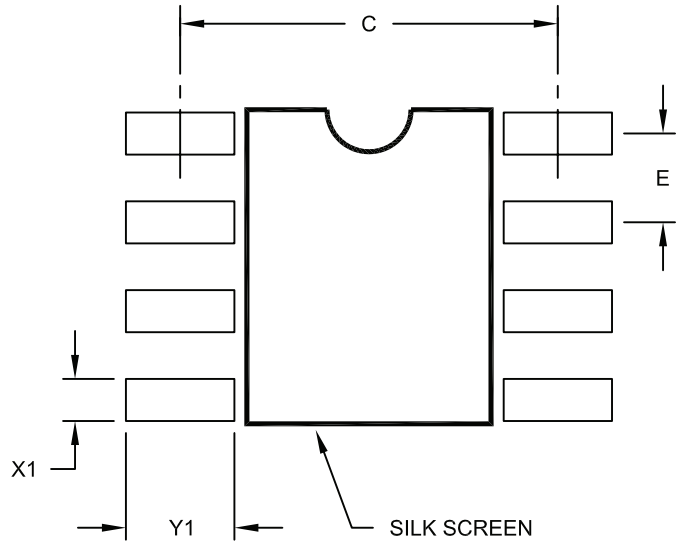
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-057B

# Land Pattern (Footprint)

## 8-Lead Plastic Small Outline (SN) – Narrow, 3.90 mm Body [SOIC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | | 1.27 BSC | |
| Contact Pad Spacing | C | | 5.40 | |
| Contact Pad Width (X8) | X1 | | | 0.60 |
| Contact Pad Length (X8) | Y1 | | | 1.55 |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

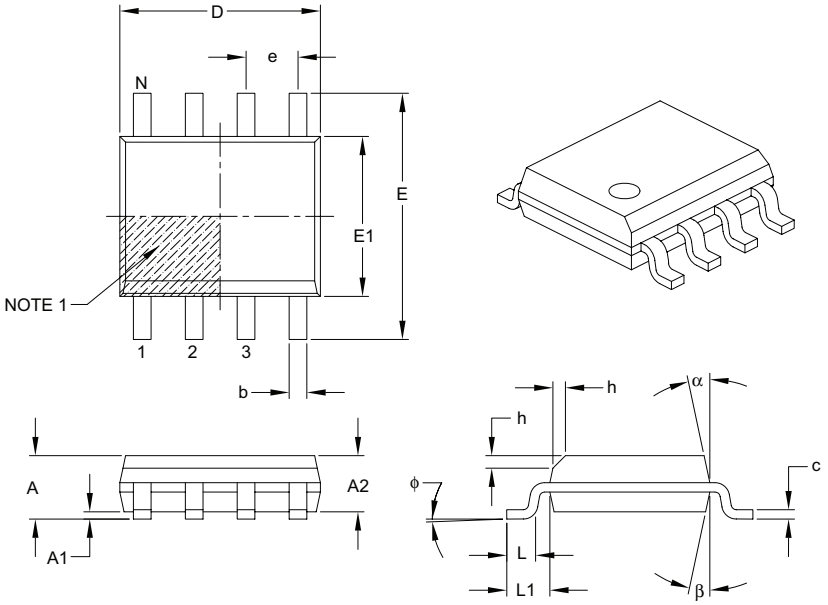
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2057A

# Packaging Diagrams and Parameters

## 8-Lead Plastic Small Outline (OA) – Narrow, 3.90 mm Body [SOIC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | – | – | 1.75 |
| Molded Package Thickness | A2 | 1.25 | – | – |
| Standoff § | A1 | 0.10 | – | 0.25 |
| Overall Width | E | | 6.00 BSC | |
| Molded Package Width | E1 | | 3.90 BSC | |
| Overall Length | D | | 4.90 BSC | |
| Chamfer (optional) | h | 0.25 | – | 0.50 |
| Foot Length | L | 0.40 | – | 1.27 |
| Footprint | L1 | | 1.04 REF | |
| Foot Angle | φ | 0° | – | 8° |
| Lead Thickness | c | 0.17 | – | 0.25 |
| Lead Width | b | 0.31 | – | 0.51 |
| Mold Draft Angle Top | α | 5° | – | 15° |
| Mold Draft Angle Bottom | β | 5° | – | 15° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

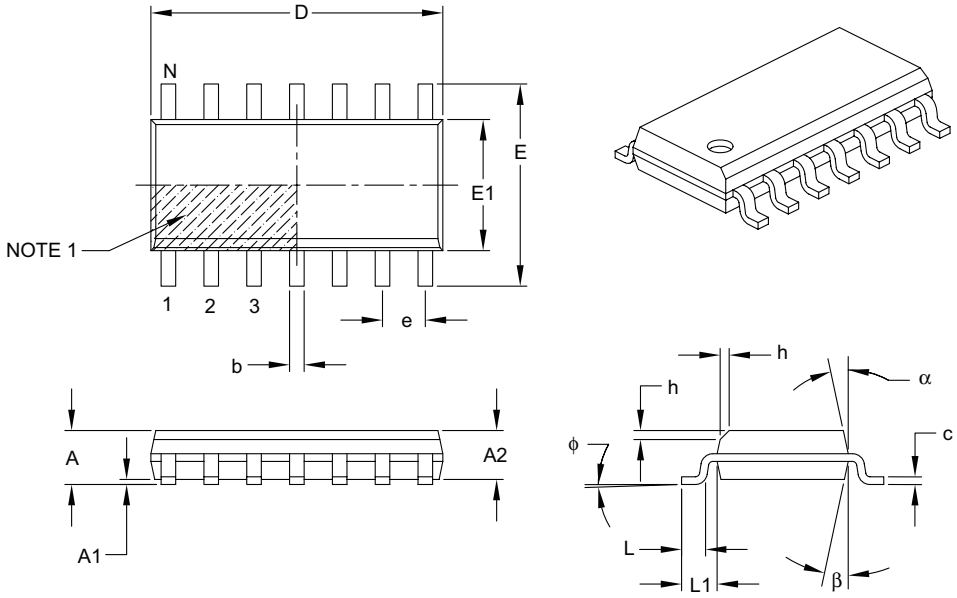
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-057B

# Packaging Diagrams and Parameters

## 14-Lead Plastic Small Outline (SL) – Narrow, 3.90 mm Body [SOIC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 14 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | – | – | 1.75 |
| Molded Package Thickness | A2 | 1.25 | – | – |
| Standoff § | A1 | 0.10 | – | 0.25 |
| Overall Width | E | | 6.00 BSC | |
| Molded Package Width | E1 | | 3.90 BSC | |
| Overall Length | D | | 8.65 BSC | |
| Chamfer (optional) | h | 0.25 | – | 0.50 |
| Foot Length | L | 0.40 | – | 1.27 |
| Footprint | L1 | | 1.04 REF | |
| Foot Angle | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.17 | – | 0.25 |
| Lead Width | b | 0.31 | – | 0.51 |
| Mold Draft Angle Top | α | 5° | – | 15° |
| Mold Draft Angle Bottom | β | 5° | – | 15° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

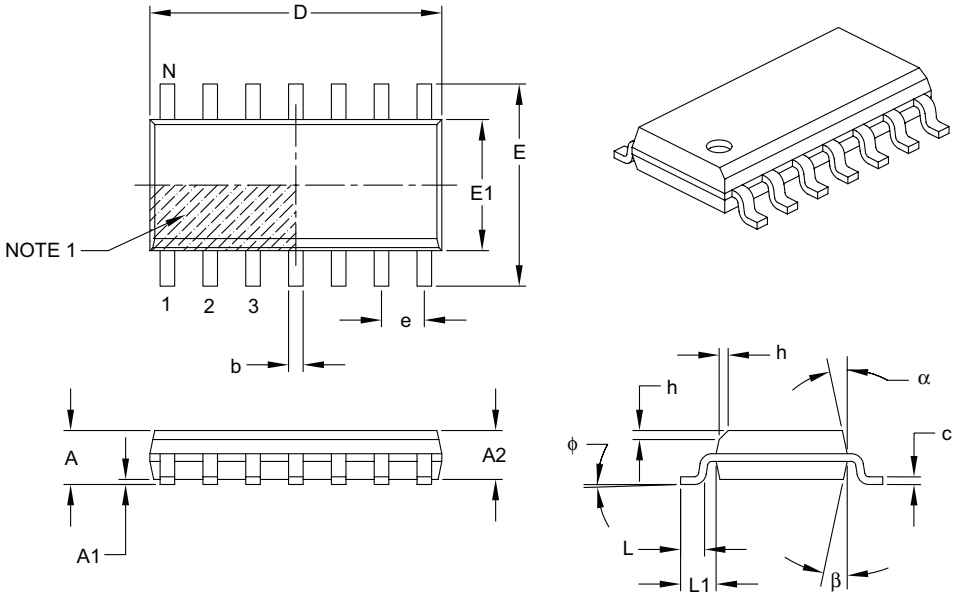
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-065B

# Packaging Diagrams and Parameters

## 14-Lead Plastic Small Outline (OD) – Narrow, 3.90 mm Body [SOIC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 14 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | – | – | 1.75 |
| Molded Package Thickness | A2 | 1.25 | – | – |
| Standoff § | A1 | 0.10 | – | 0.25 |
| Overall Width | E | | 6.00 BSC | |
| Molded Package Width | E1 | | 3.90 BSC | |
| Overall Length | D | | 8.65 BSC | |
| Chamfer (optional) | h | 0.25 | – | 0.50 |
| Foot Length | L | 0.40 | – | 1.27 |
| Footprint | L1 | | 1.04 REF | |
| Foot Angle | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.17 | – | 0.25 |
| Lead Width | b | 0.31 | – | 0.51 |
| Mold Draft Angle Top | α | 5° | – | 15° |
| Mold Draft Angle Bottom | β | 5° | – | 15° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

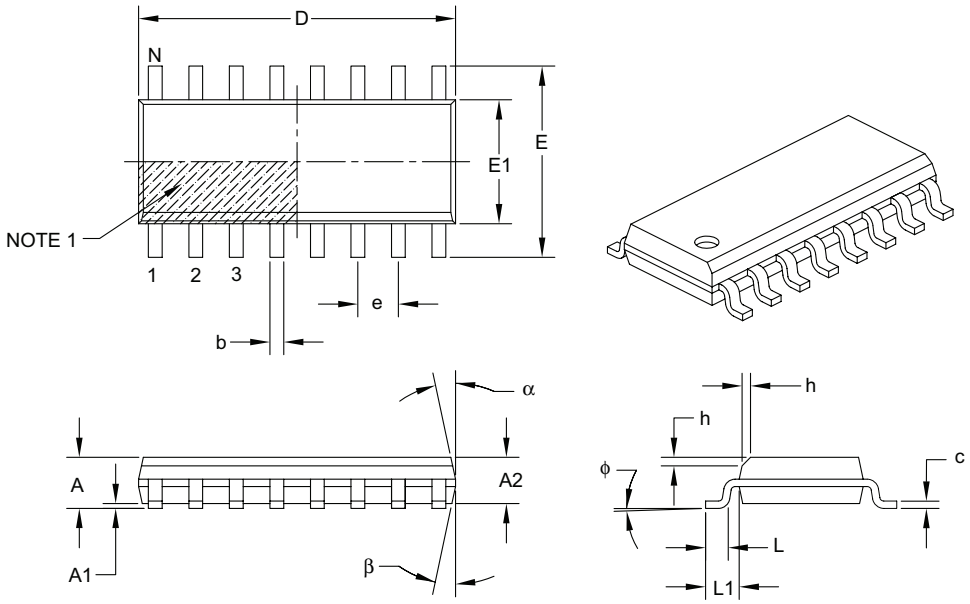
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-065B

# Packaging Diagrams and Parameters

## 16-Lead Plastic Small Outline (SL) – Narrow, 3.90 mm Body [SOIC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 16 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | – | – | 1.75 |
| Molded Package Thickness | A2 | 1.25 | – | – |
| Standoff § | A1 | 0.10 | – | 0.25 |
| Overall Width | E | | 6.00 BSC | |
| Molded Package Width | E1 | | 3.90 BSC | |
| Overall Length | D | | 9.90 BSC | |
| Chamfer (optional) | h | 0.25 | – | 0.50 |
| Foot Length | L | 0.40 | – | 1.27 |
| Footprint | L1 | | 1.04 REF | |
| Foot Angle | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.17 | – | 0.25 |
| Lead Width | b | 0.31 | – | 0.51 |
| Mold Draft Angle Top | α | 5° | – | 15° |
| Mold Draft Angle Bottom | β | 5° | – | 15° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

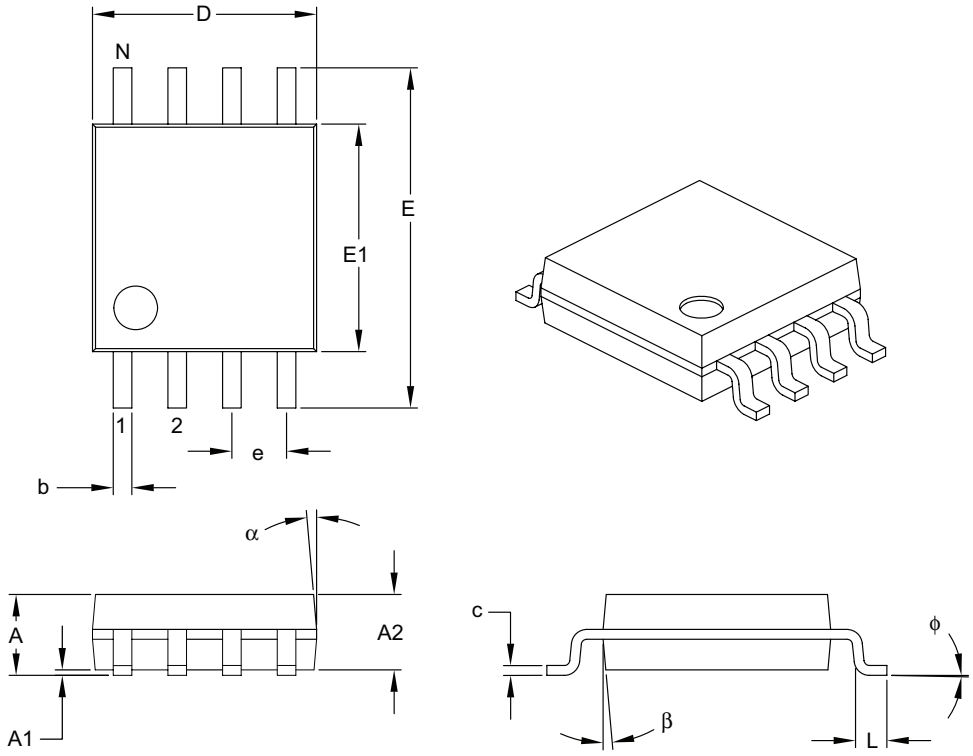
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-108B

# Packaging Diagrams and Parameters

## 8-Lead Plastic Small Outline (SM) – Medium, 5.28 mm Body [SOIJ]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | 1.77 | – | 2.03 |
| Molded Package Thickness | A2 | 1.75 | – | 1.98 |
| Standoff § | A1 | 0.05 | – | 0.25 |
| Overall Width | E | 7.62 | – | 8.26 |
| Molded Package Width | E1 | 5.11 | – | 5.38 |
| Overall Length | D | 5.13 | – | 5.33 |
| Foot Length | L | 0.51 | – | 0.76 |
| Foot Angle | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.15 | – | 0.25 |
| Lead Width | b | 0.36 | – | 0.51 |
| Mold Draft Angle Top | α | – | – | 15° |
| Mold Draft Angle Bottom | β | – | – | 15° |

**Notes:**

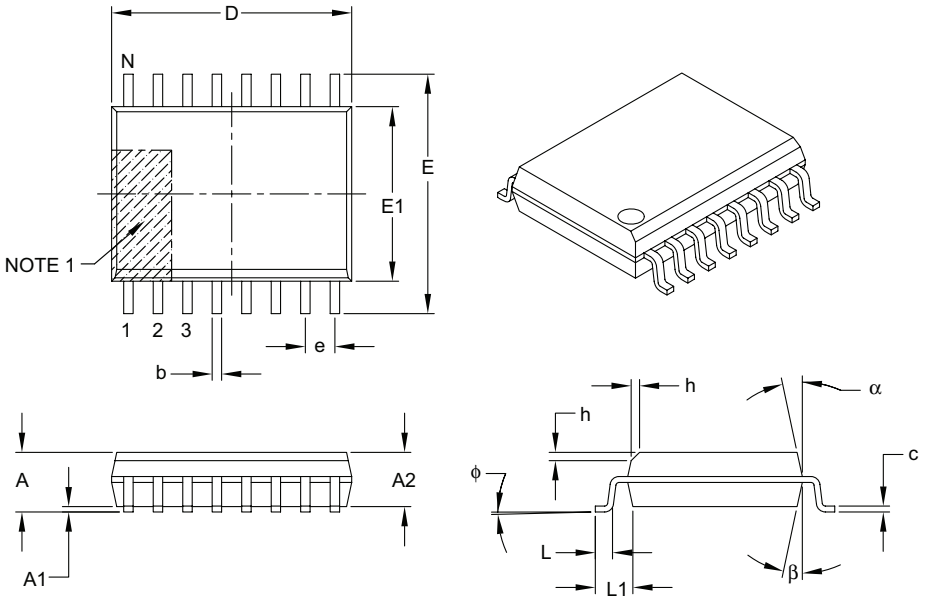
1. SOIJ, JEITA/EIAJ Standard, formerly called SOIC.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.

Microchip Technology Drawing C04-056B

# Packaging Diagrams and Parameters

## 16-Lead Plastic Small Outline (SO) – Wide, 7.50 mm Body [SOIC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 16 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | – | – | 2.65 |
| Molded Package Thickness | A2 | 2.05 | – | – |
| Standoff § | A1 | 0.10 | – | 0.30 |
| Overall Width | E | | 10.30 BSC | |
| Molded Package Width | E1 | | 7.50 BSC | |
| Overall Length | D | | 10.30 BSC | |
| Chamfer (optional) | h | 0.25 | – | 0.75 |
| Foot Length | L | 0.40 | – | 1.27 |
| Footprint | L1 | | 1.40 REF | |
| Foot Angle | φ | 0° | – | 8° |
| Lead Thickness | c | 0.20 | – | 0.33 |
| Lead Width | b | 0.31 | – | 0.51 |
| Mold Draft Angle Top | α | 5° | – | 15° |
| Mold Draft Angle Bottom | β | 5° | – | 15° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

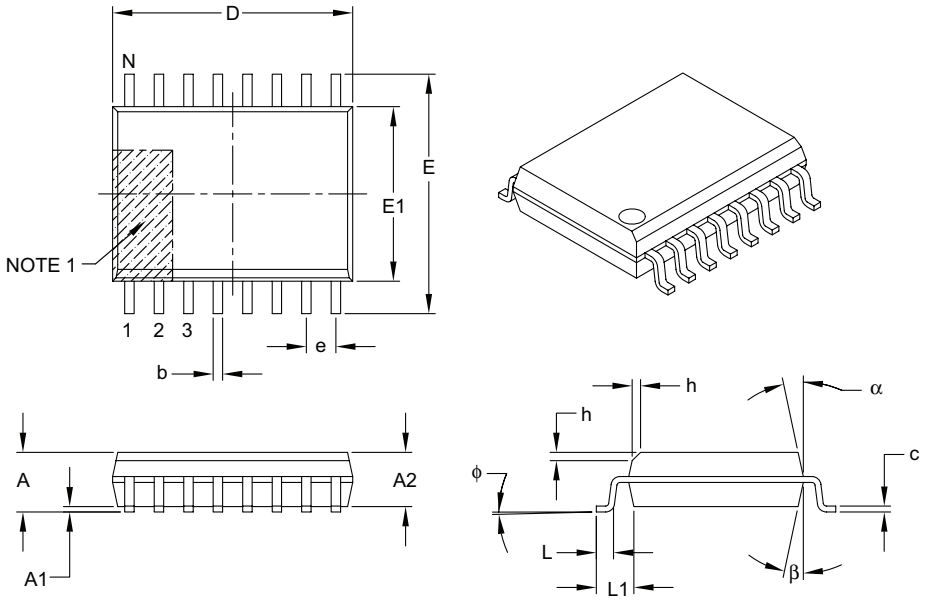
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-102B

# Packaging Diagrams and Parameters

## 16-Lead Plastic Small Outline (OE) – Wide, 7.50 mm Body [SOIC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 16 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | – | – | 2.65 |
| Molded Package Thickness | A2 | 2.05 | – | – |
| Standoff § | A1 | 0.10 | – | 0.30 |
| Overall Width | E | | 10.30 BSC | |
| Molded Package Width | E1 | | 7.50 BSC | |
| Overall Length | D | | 10.30 BSC | |
| Chamfer (optional) | h | 0.25 | – | 0.75 |
| Foot Length | L | 0.40 | – | 1.27 |
| Footprint | L1 | | 1.40 REF | |
| Foot Angle | φ | 0° | – | 8° |
| Lead Thickness | c | 0.20 | – | 0.33 |
| Lead Width | b | 0.31 | – | 0.51 |
| Mold Draft Angle Top | α | 5° | – | 15° |
| Mold Draft Angle Bottom | β | 5° | – | 15° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

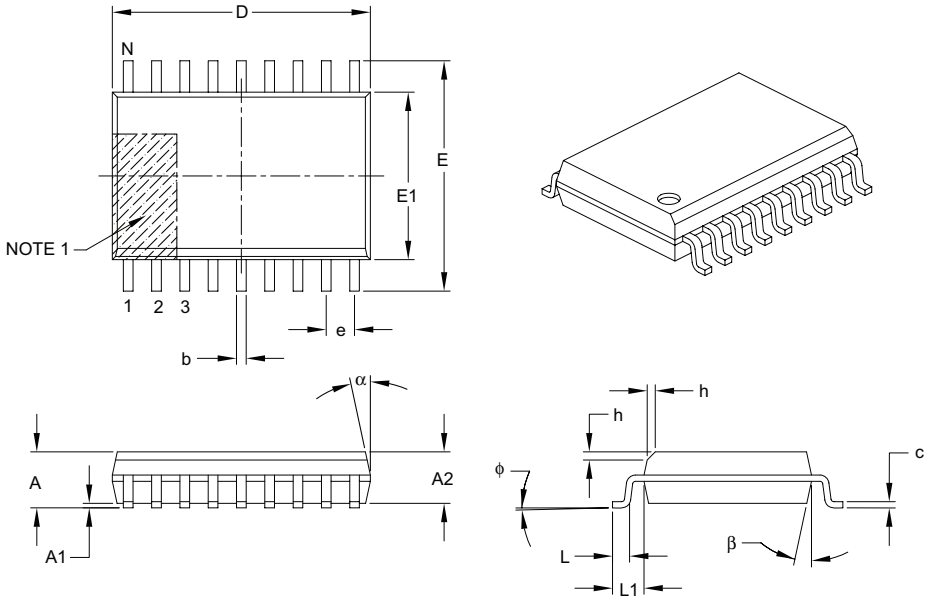
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-102B

# Packaging Diagrams and Parameters

## 18-Lead Plastic Small Outline (SO) – Wide, 7.50 mm Body [SOIC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 18 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | – | – | 2.65 |
| Molded Package Thickness | A2 | 2.05 | – | – |
| Standoff § | A1 | 0.10 | – | 0.30 |
| Overall Width | E | | 10.30 BSC | |
| Molded Package Width | E1 | | 7.50 BSC | |
| Overall Length | D | | 11.55 BSC | |
| Chamfer (optional) | h | 0.25 | – | 0.75 |
| Foot Length | L | 0.40 | – | 1.27 |
| Footprint | L1 | | 1.40 REF | |
| Foot Angle | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.20 | – | 0.33 |
| Lead Width | b | 0.31 | – | 0.51 |
| Mold Draft Angle Top | α | 5° | – | 15° |
| Mold Draft Angle Bottom | β | 5° | – | 15° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

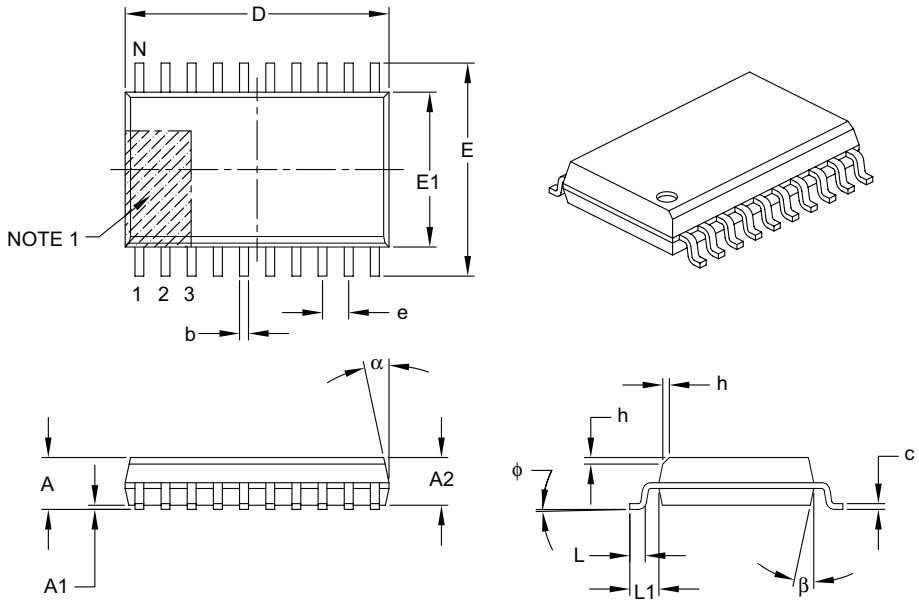
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-051B

# Packaging Diagrams and Parameters

## 20-Lead Plastic Small Outline (SO) – Wide, 7.50 mm Body [SOIC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 20 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | – | – | 2.65 |
| Molded Package Thickness | A2 | 2.05 | – | – |
| Standoff § | A1 | 0.10 | – | 0.30 |
| Overall Width | E | | 10.30 BSC | |
| Molded Package Width | E1 | | 7.50 BSC | |
| Overall Length | D | | 12.80 BSC | |
| Chamfer (optional) | h | 0.25 | – | 0.75 |
| Foot Length | L | 0.40 | – | 1.27 |
| Footprint | L1 | | 1.40 REF | |
| Foot Angle | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.20 | – | 0.33 |
| Lead Width | b | 0.31 | – | 0.51 |
| Mold Draft Angle Top | α | 5° | – | 15° |
| Mold Draft Angle Bottom | β | 5° | – | 15° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

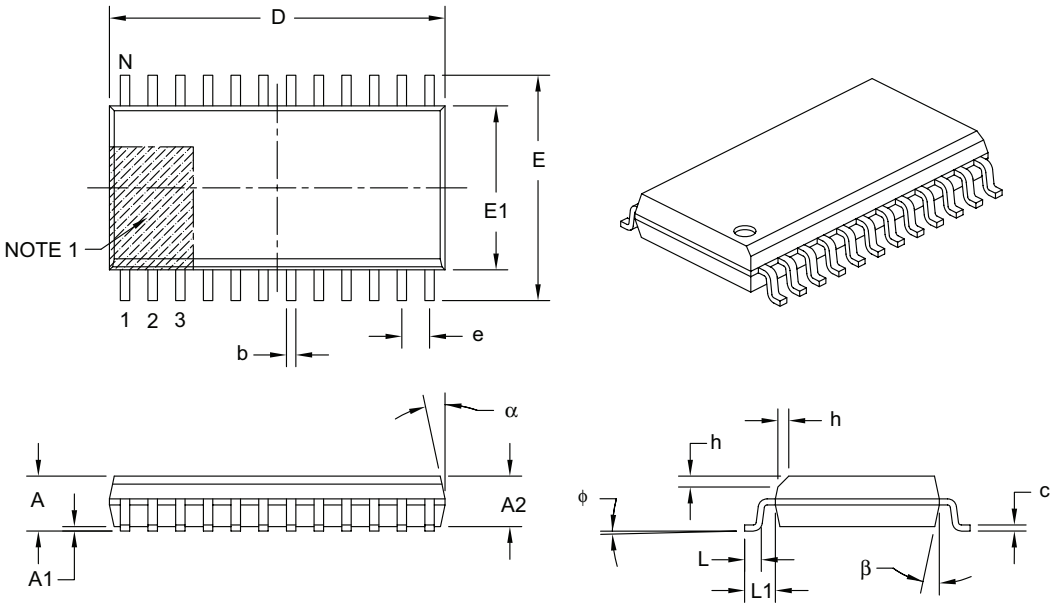
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-094B

# Packaging Diagrams and Parameters

## 24-Lead Plastic Small Outline (SO) – Wide, 7.50 mm Body [SOIC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 24 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | – | – | 2.65 |
| Molded Package Thickness | A2 | 2.05 | – | – |
| Standoff § | A1 | 0.10 | – | 0.30 |
| Overall Width | E | | 10.30 BSC | |
| Molded Package Width | E1 | | 7.50 BSC | |
| Overall Length | D | | 15.40 BSC | |
| Chamfer (optional) | h | 0.25 | – | 0.75 |
| Foot Length | L | 0.40 | – | 1.27 |
| Footprint | L1 | | 1.40 REF | |
| Foot Angle | φ | 0° | – | 8° |
| Lead Thickness | c | 0.20 | – | 0.33 |
| Lead Width | b | 0.31 | – | 0.51 |
| Mold Draft Angle Top | α | 5° | – | 15° |
| Mold Draft Angle Bottom | β | 5° | – | 15° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

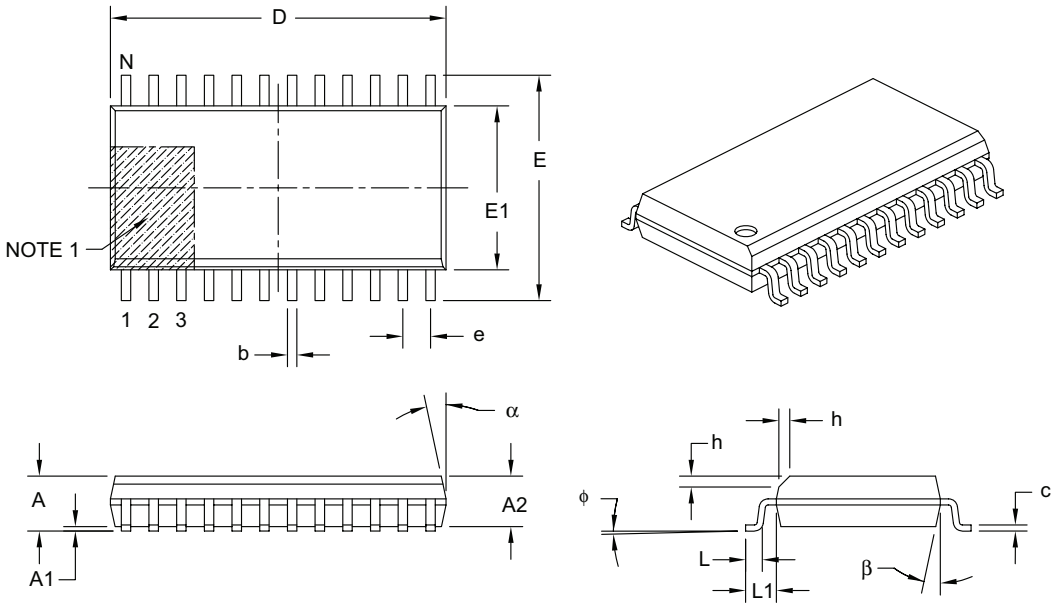
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-025B

# Packaging Diagrams and Parameters

## 24-Lead Plastic Small Outline (PF) – Wide, 7.50 mm Body [SOIC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 24 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | – | – | 2.65 |
| Molded Package Thickness | A2 | 2.05 | – | – |
| Standoff § | A1 | 0.10 | – | 0.30 |
| Overall Width | E | | 10.30 BSC | |
| Molded Package Width | E1 | | 7.50 BSC | |
| Overall Length | D | | 15.40 BSC | |
| Chamfer (optional) | h | 0.25 | – | 0.75 |
| Foot Length | L | 0.40 | – | 1.27 |
| Footprint | L1 | | 1.40 REF | |
| Foot Angle | φ | 0° | – | 8° |
| Lead Thickness | c | 0.20 | – | 0.33 |
| Lead Width | b | 0.31 | – | 0.51 |
| Mold Draft Angle Top | α | 5° | – | 15° |
| Mold Draft Angle Bottom | β | 5° | – | 15° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

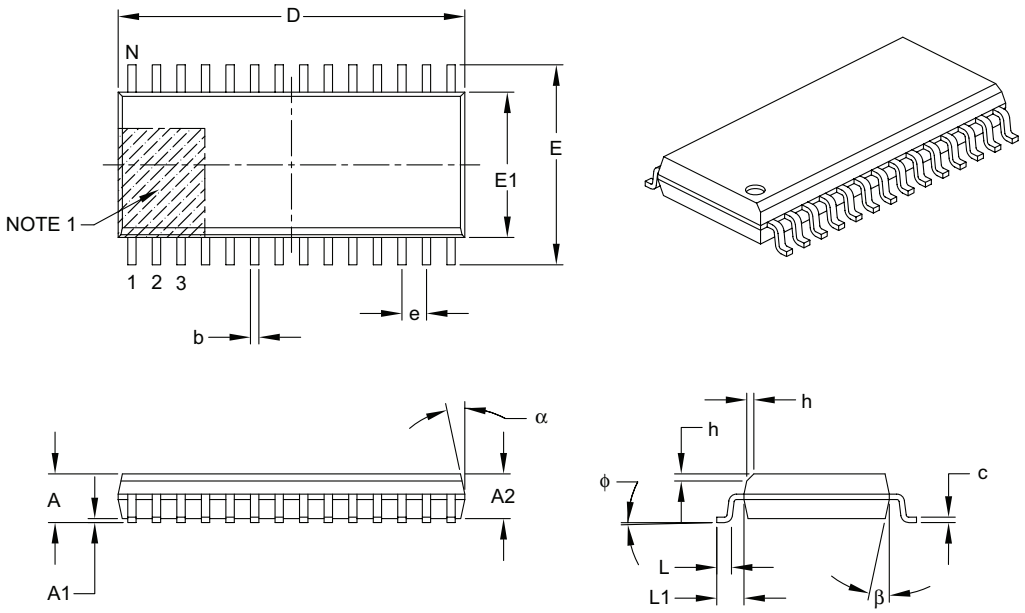
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-025B

# Packaging Diagrams and Parameters

## 28-Lead Plastic Small Outline (SO) – Wide, 7.50 mm Body [SOIC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | – | – | 2.65 |
| Molded Package Thickness | A2 | 2.05 | – | – |
| Standoff § | A1 | 0.10 | – | 0.30 |
| Overall Width | E | | 10.30 BSC | |
| Molded Package Width | E1 | | 7.50 BSC | |
| Overall Length | D | | 17.90 BSC | |
| Chamfer (optional) | h | 0.25 | – | 0.75 |
| Foot Length | L | 0.40 | – | 1.27 |
| Footprint | L1 | | 1.40 REF | |
| Foot Angle Top | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.18 | – | 0.33 |
| Lead Width | b | 0.31 | – | 0.51 |
| Mold Draft Angle Top | α | 5° | – | 15° |
| Mold Draft Angle Bottom | β | 5° | – | 15° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

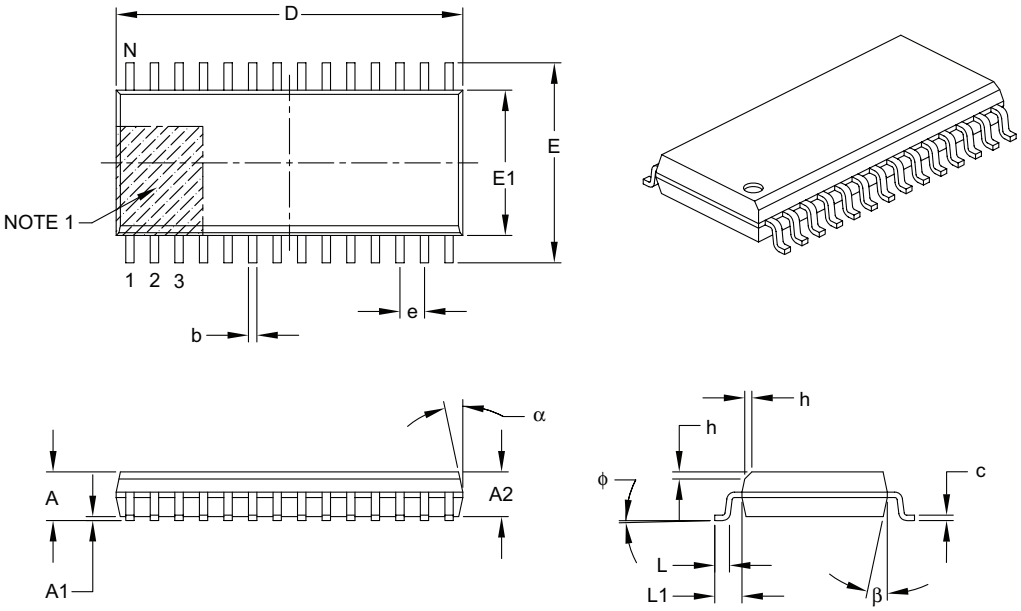
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-052B

# Packaging Diagrams and Parameters

## 28-Lead Plastic Small Outline (OI) – Wide, 7.50 mm Body [SOIC]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | – | – | 2.65 |
| Molded Package Thickness | A2 | 2.05 | – | – |
| Standoff § | A1 | 0.10 | – | 0.30 |
| Overall Width | E | | 10.30 BSC | |
| Molded Package Width | E1 | | 7.50 BSC | |
| Overall Length | D | | 17.90 BSC | |
| Chamfer (optional) | h | 0.25 | – | 0.75 |
| Foot Length | L | 0.40 | – | 1.27 |
| Footprint | L1 | | 1.40 REF | |
| Foot Angle Top | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.18 | – | 0.33 |
| Lead Width | b | 0.31 | – | 0.51 |
| Mold Draft Angle Top | α | 5° | – | 15° |
| Mold Draft Angle Bottom | β | 5° | – | 15° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

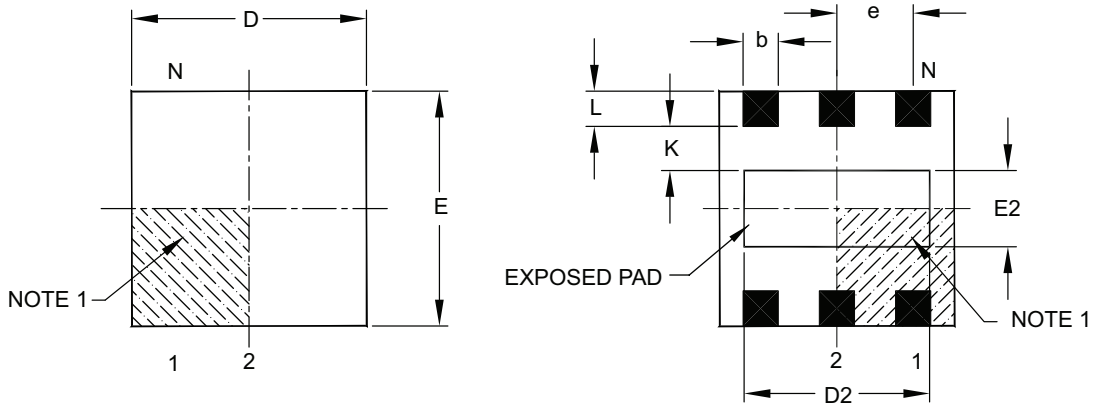
REF: Reference Dimension, usually without tolerance, for information purposes only.

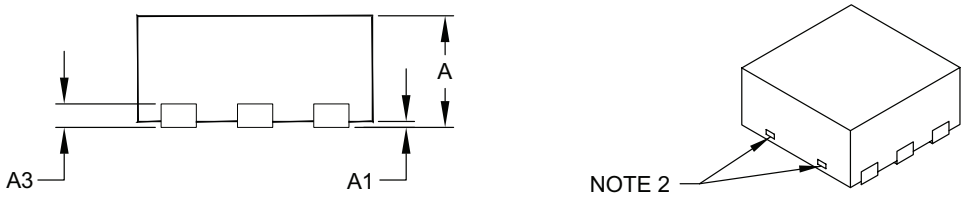
Microchip Technology Drawing C04-052B

# Packaging Diagrams and Parameters

## 6-Lead Plastic Dual Flat, No Lead Package (MA) – 2x2x0.9 mm Body [DFN]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 6 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | 0.80 | 0.90 | 1.00 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Contact Thickness | A3 | | 0.20 REF | |
| Overall Length | D | | 2.00 BSC | |
| Overall Width | E | | 2.00 BSC | |
| Exposed Pad Length | D2 | 0.00 | – | 1.58 |
| Exposed Pad Width | E2 | 0.00 | – | 0.65 |
| Contact Width | b | 0.25 | 0.30 | 0.35 |
| Contact Length | L | 0.20 | 0.30 | 0.45 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

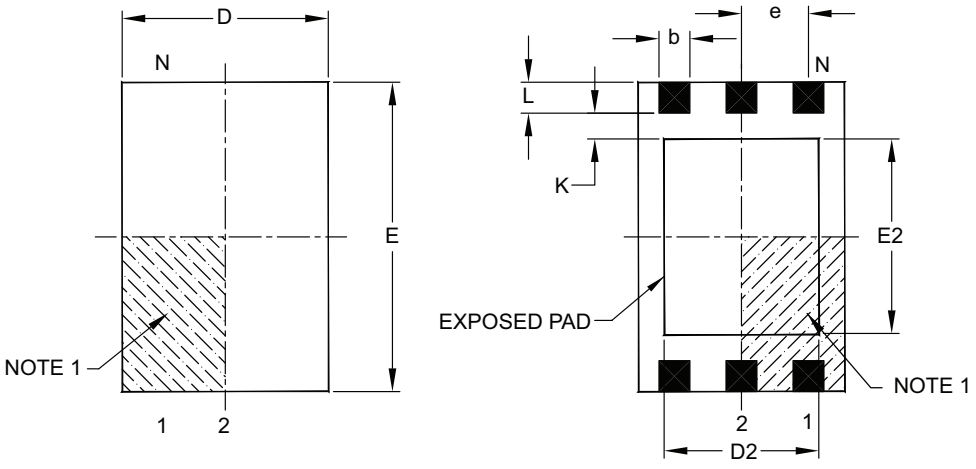
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-120A

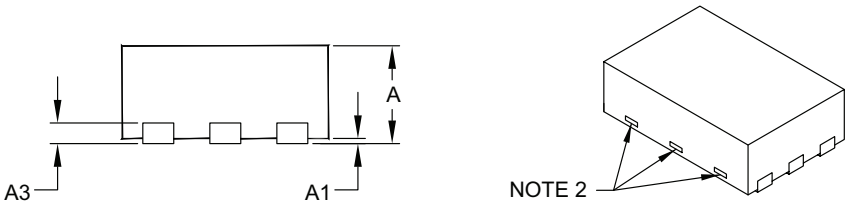
# Packaging Diagrams and Parameters

## 6-Lead Plastic Dual Flat, No Lead Package (ME) – 2x3x0.9 mm Body [DFN]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




**TOP VIEW** **BOTTOM VIEW**




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 6 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | 0.80 | 0.90 | 1.00 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Contact Thickness | A3 | | 0.20 REF | |
| Overall Length | D | | 2.00 BSC | |
| Overall Width | E | | 3.00 BSC | |
| Exposed Pad Length | D2 | 1.40 | – | 1.60 |
| Exposed Pad Width | E2 | 1.80 | – | 2.00 |
| Contact Width | b | 0.25 | 0.30 | 0.35 |
| Contact Length | L | 0.20 | 0.30 | 0.40 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

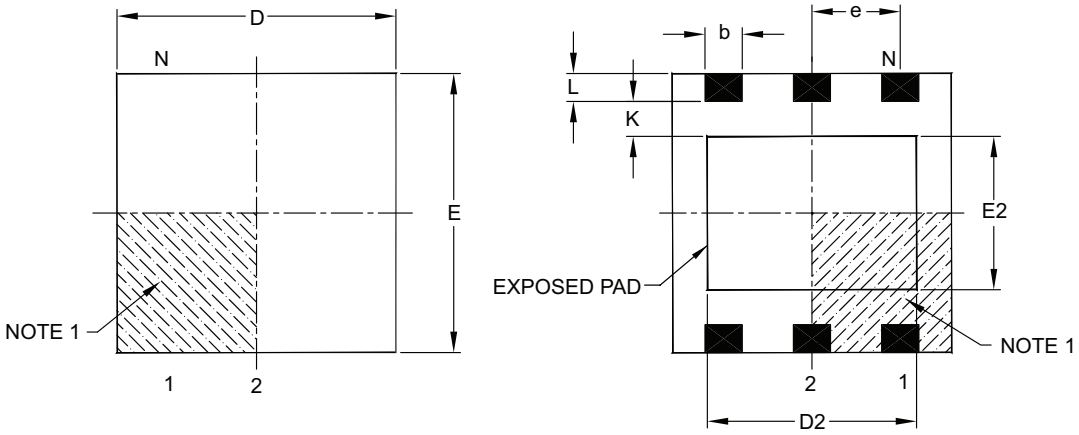
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

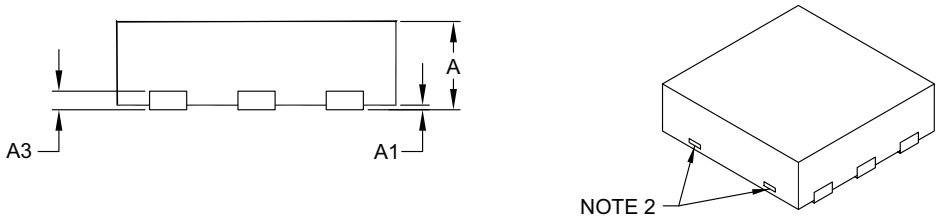
Microchip Technology Drawing C04-134A

# Packaging Diagrams and Parameters

## 6-Lead Plastic Dual Flat, No Lead Package (MH) – 3x3x0.9 mm Body [DFN]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 6 | |
| Pitch | e | | 0.95 BSC | |
| Overall Height | A | 0.80 | 0.90 | 1.00 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Contact Thickness | A3 | | 0.20 REF | |
| Overall Length | D | | 3.00 BSC | |
| Overall Width | E | | 3.00 BSC | |
| Exposed Pad Length | D2 | 0.00 | – | 2.25 |
| Exposed Pad Width | E2 | 0.00 | – | 1.65 |
| Contact Width | b | 0.30 | 0.40 | 0.45 |
| Contact Length | L | 0.20 | 0.30 | 0.45 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

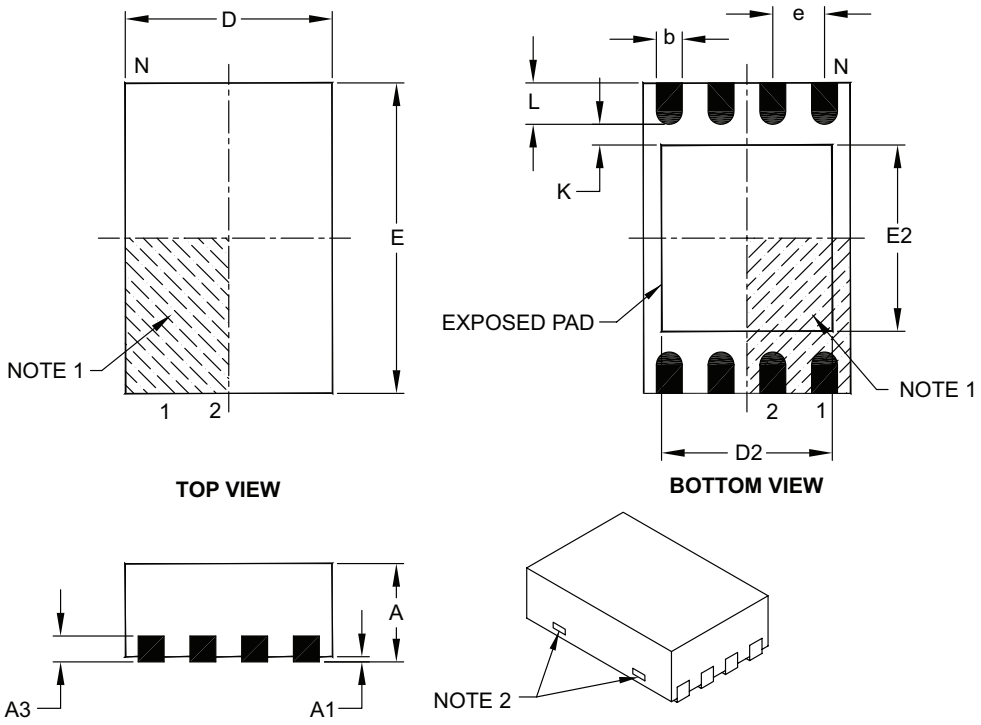
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-135A

# Packaging Diagrams and Parameters

## 8-Lead Plastic Dual Flat, No Lead Package (MC) – 2x3x0.9 mm Body [DFN]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | 0.50 BSC | |
| Overall Height | A | 0.80 | 0.90 | 1.00 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Contact Thickness | A3 | | 0.20 REF | |
| Overall Length | D | | 2.00 BSC | |
| Overall Width | E | | 3.00 BSC | |
| Exposed Pad Length | D2 | 1.30 | – | 1.75 |
| Exposed Pad Width | E2 | 1.50 | – | 1.90 |
| Contact Width | b | 0.18 | 0.25 | 0.30 |
| Contact Length | L | 0.30 | 0.40 | 0.50 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

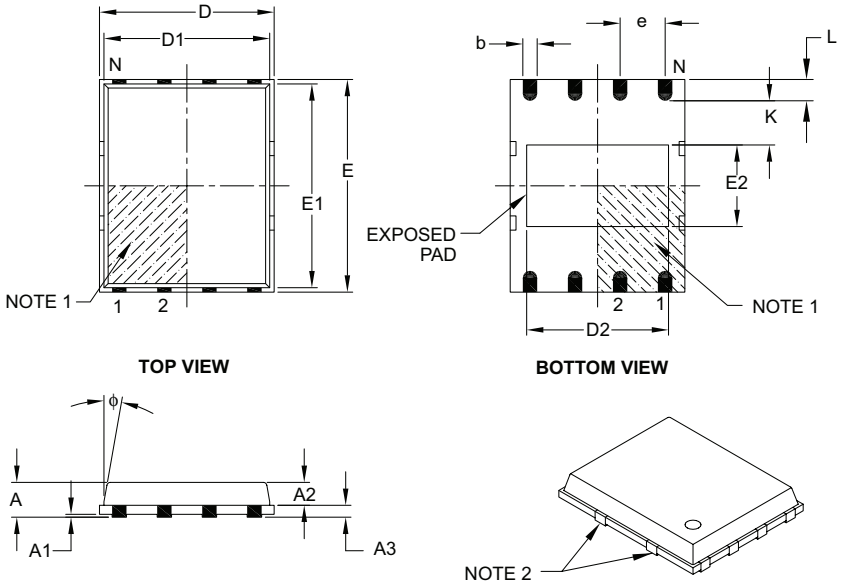
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-123B

# Packaging Diagrams and Parameters

## 8-Lead Plastic Dual Flat, No Lead Package (MF) – 6x5 mm Body [DFN-S] PUNCH SINGULATED

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | – | 0.85 | 1.00 |
| Molded Package Thickness | A2 | – | 0.65 | 0.80 |
| Standoff | A1 | 0.00 | 0.01 | 0.05 |
| Base Thickness | A3 | | 0.20 REF | |
| Overall Length | D | | 4.92 BSC | |
| Molded Package Length | D1 | | 4.67 BSC | |
| Exposed Pad Length | D2 | 3.85 | 4.00 | 4.15 |
| Overall Width | E | | 5.99 BSC | |
| Molded Package Width | E1 | | 5.74 BSC | |
| Exposed Pad Width | E2 | 2.16 | 2.31 | 2.46 |
| Contact Width | b | 0.35 | 0.40 | 0.47 |
| Contact Length | L | 0.50 | 0.60 | 0.75 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |
| Model Draft Angle Top | ϕ | – | – | 12° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

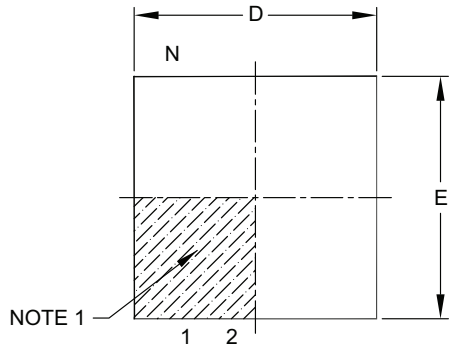
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-113B

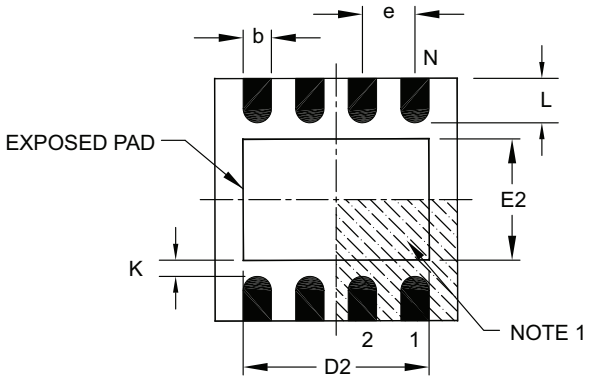
# Packaging Diagrams and Parameters

## 8-Lead Plastic Dual Flat, No Lead Package (MF) – 3x3x0.9 mm Body [DFN]

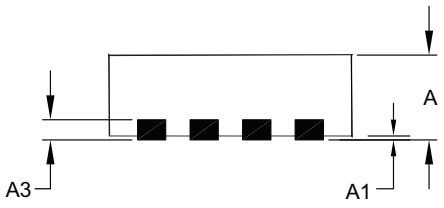
**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

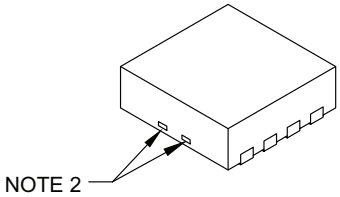



**TOP VIEW**




**BOTTOM VIEW**




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | 0.80 | 0.90 | 1.00 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Contact Thickness | A3 | | 0.20 REF | |
| Overall Length | D | | 3.00 BSC | |
| Exposed Pad Width | E2 | 0.00 | – | 1.60 |
| Overall Width | E | | 3.00 BSC | |
| Exposed Pad Length | D2 | 0.00 | – | 2.40 |
| Contact Width | b | 0.25 | 0.30 | 0.35 |
| Contact Length | L | 0.20 | 0.30 | 0.55 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

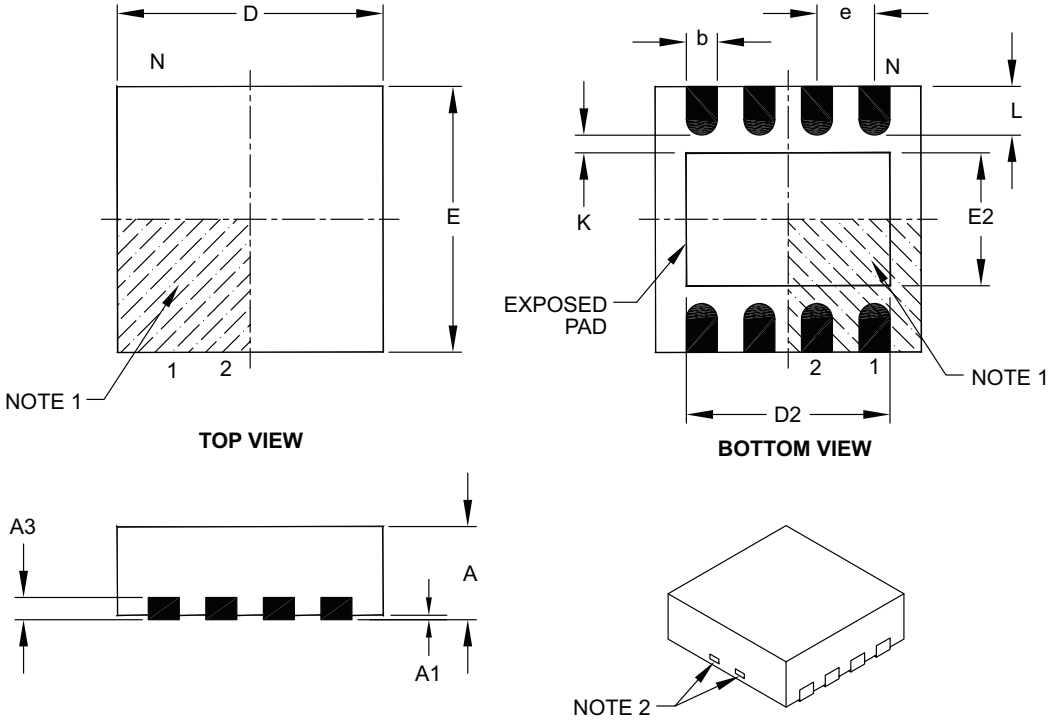
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-062B

# Packaging Diagrams and Parameters

## 8-Lead Plastic Dual Flat, No Lead Package (MD) – 4x4x0.9 mm Body [DFN]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | 0.80 BSC | |
| Overall Height | A | 0.80 | 0.90 | 1.00 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Contact Thickness | A3 | | 0.20 REF | |
| Overall Length | D | | 4.00 BSC | |
| Exposed Pad Width | E2 | 0.00 | 2.20 | 2.80 |
| Overall Width | E | | 4.00 BSC | |
| Exposed Pad Length | D2 | 0.00 | 3.00 | 3.60 |
| Contact Width | b | 0.25 | 0.30 | 0.35 |
| Contact Length | L | 0.30 | 0.55 | 0.65 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

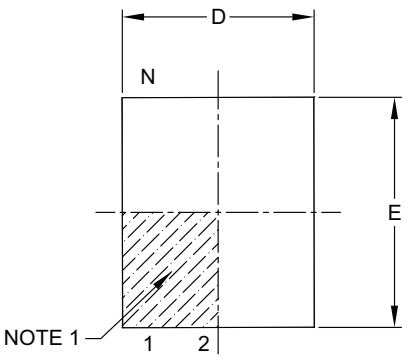
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-131C

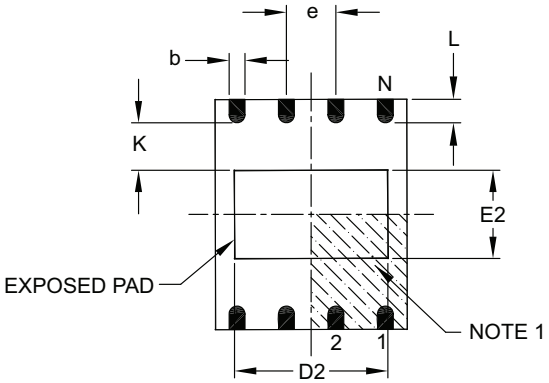
# Packaging Diagrams and Parameters

## 8-Lead Plastic Dual Flat, No Lead Package (MF) – 6x5 mm Body [DFN-S]

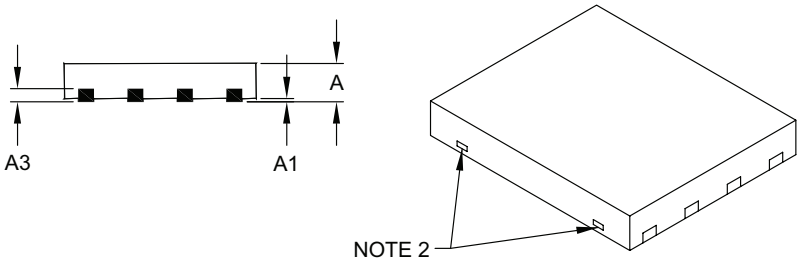
**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




**TOP VIEW**




**BOTTOM VIEW**




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | 1.27 BSC | |
| Overall Height | A | 0.80 | 0.85 | 1.00 |
| Standoff | A1 | 0.00 | 0.01 | 0.05 |
| Contact Thickness | A3 | | 0.20 REF | |
| Overall Length | D | | 5.00 BSC | |
| Overall Width | E | | 6.00 BSC | |
| Exposed Pad Length | D2 | 3.90 | 4.00 | 4.10 |
| Exposed Pad Width | E2 | 2.20 | 2.30 | 2.40 |
| Contact Width | b | 0.35 | 0.40 | 0.48 |
| Contact Length | L | 0.50 | 0.60 | 0.75 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

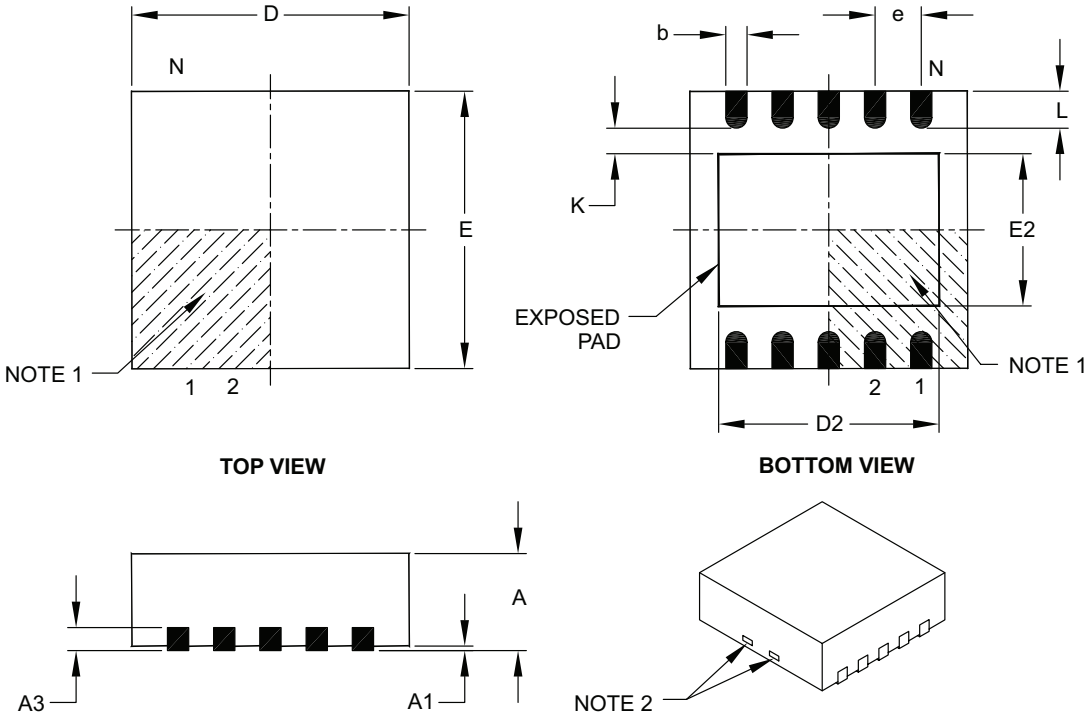
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-122B

# Packaging Diagrams and Parameters

## 10-Lead Plastic Dual Flat, No Lead Package (MF) – 3x3x0.9 mm Body [DFN]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 10 | |
| Pitch | e | | 0.50 BSC | |
| Overall Height | A | 0.80 | 0.90 | 1.00 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Contact Thickness | A3 | | 0.20 REF | |
| Overall Length | D | | 3.00 BSC | |
| Exposed Pad Length | D2 | 2.20 | 2.35 | 2.48 |
| Overall Width | E | | 3.00 BSC | |
| Exposed Pad Width | E2 | 1.40 | 1.58 | 1.75 |
| Contact Width | b | 0.18 | 0.25 | 0.30 |
| Contact Length | L | 0.30 | 0.40 | 0.50 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

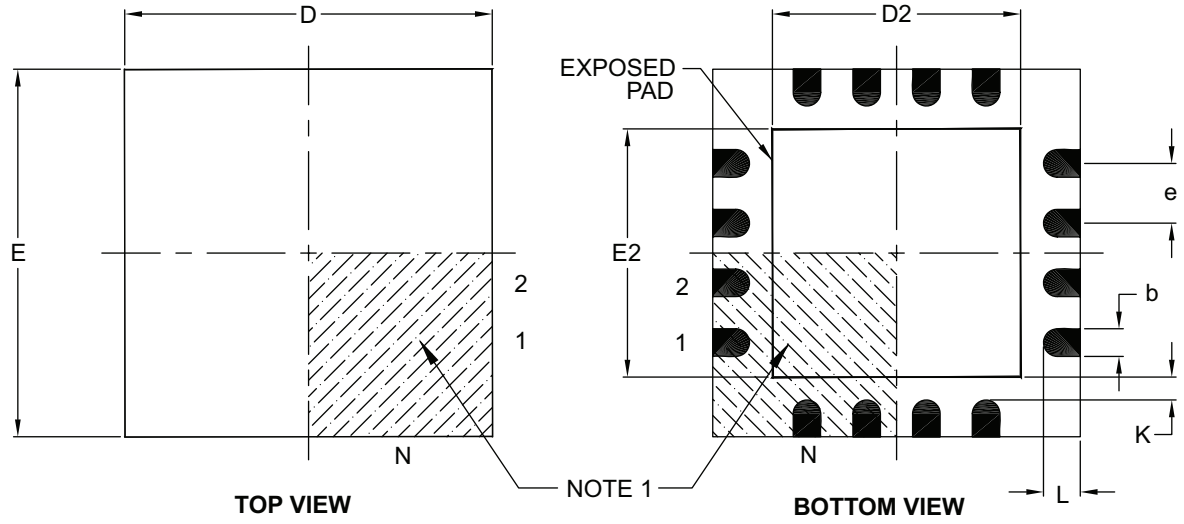
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

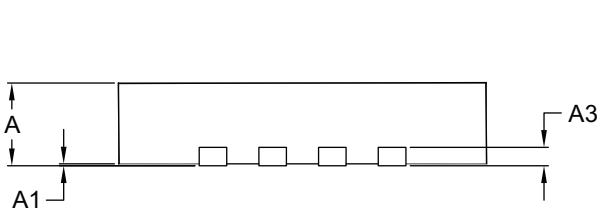
Microchip Technology Drawing C04-063B

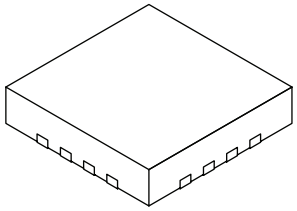
# Packaging Diagrams and Parameters

## 16-Lead Plastic Quad Flat, No Lead Package (ML) – 4x4x0.9 mm Body [QFN]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 16 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | 0.80 | 0.90 | 1.00 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Contact Thickness | A3 | | 0.20 REF | |
| Overall Width | E | | 4.00 BSC | |
| Exposed Pad Width | E2 | 2.50 | 2.65 | 2.80 |
| Overall Length | D | | 4.00 BSC | |
| Exposed Pad Length | D2 | 2.50 | 2.65 | 2.80 |
| Contact Width | b | 0.25 | 0.30 | 0.35 |
| Contact Length | L | 0.30 | 0.40 | 0.50 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

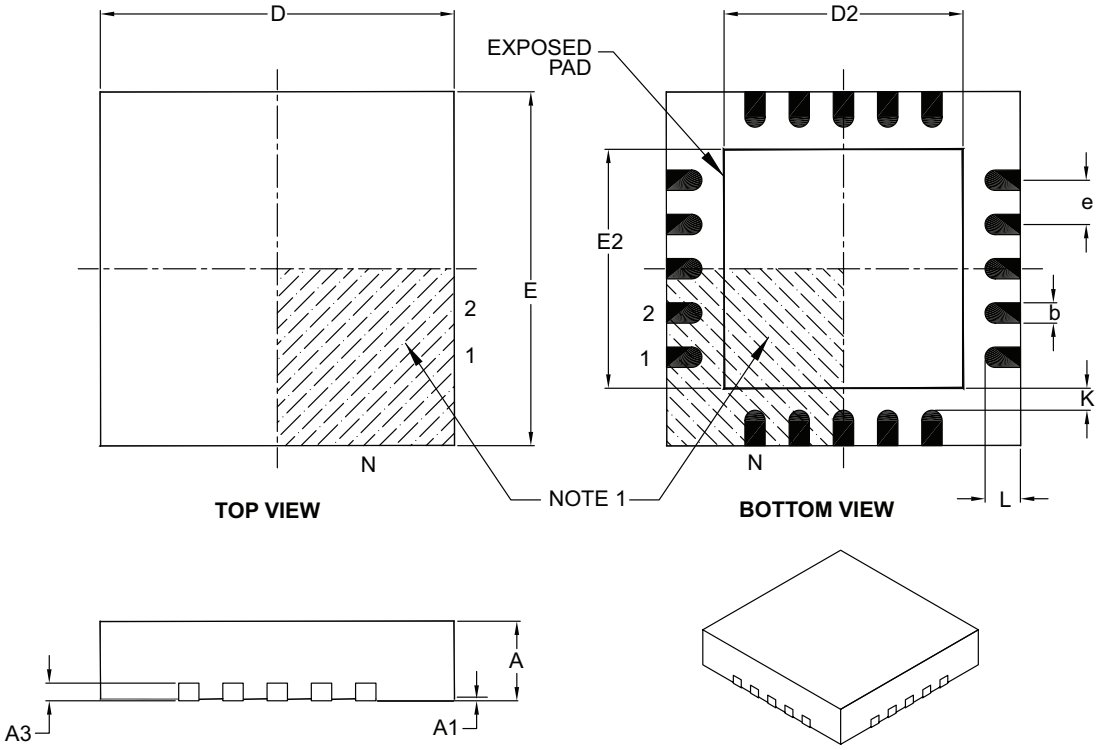
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-127B

# Packaging Diagrams and Parameters

## 20-Lead Plastic Quad Flat, No Lead Package (ML) – 4x4x0.9 mm Body [QFN]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 20 | |
| Pitch | e | | 0.50 BSC | |
| Overall Height | A | 0.80 | 0.90 | 1.00 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Contact Thickness | A3 | | 0.20 REF | |
| Overall Width | E | | 4.00 BSC | |
| Exposed Pad Width | E2 | 2.60 | 2.70 | 2.80 |
| Overall Length | D | | 4.00 BSC | |
| Exposed Pad Length | D2 | 2.60 | 2.70 | 2.80 |
| Contact Width | b | 0.18 | 0.25 | 0.30 |
| Contact Length | L | 0.30 | 0.40 | 0.50 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

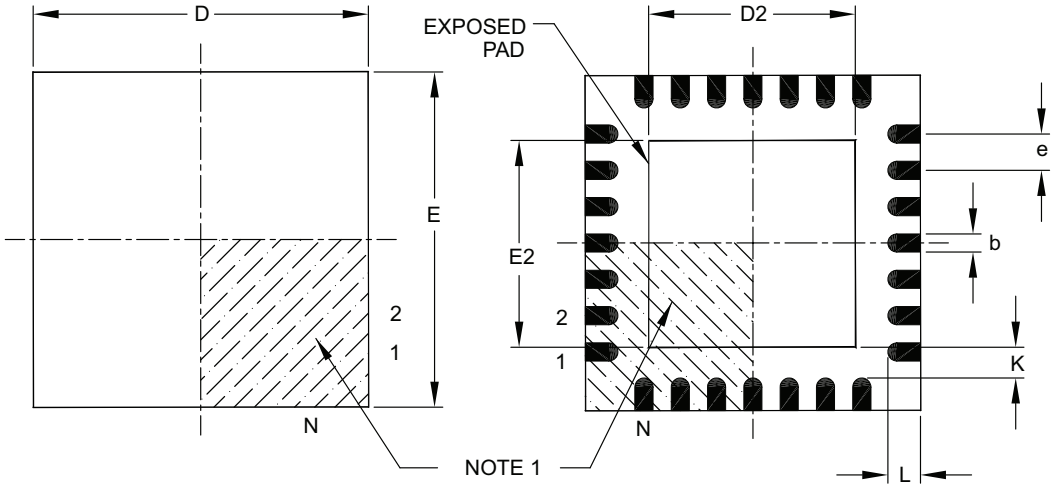
   REF: Reference Dimension, usually without tolerance, for information purposes only.

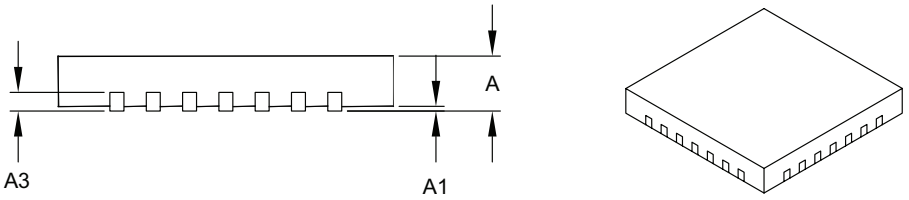
Microchip Technology Drawing C04-126B

# Packaging Diagrams and Parameters

## 28-Lead Plastic Quad Flat, No Lead Package (ML) – 6x6 mm Body [QFN] with 0.55 mm Contact Length

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | 0.80 | 0.90 | 1.00 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Contact Thickness | A3 | | 0.20 REF | |
| Overall Width | E | | 6.00 BSC | |
| Exposed Pad Width | E2 | 3.65 | 3.70 | 4.20 |
| Overall Length | D | | 6.00 BSC | |
| Exposed Pad Length | D2 | 3.65 | 3.70 | 4.20 |
| Contact Width | b | 0.23 | 0.30 | 0.35 |
| Contact Length | L | 0.50 | 0.55 | 0.70 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

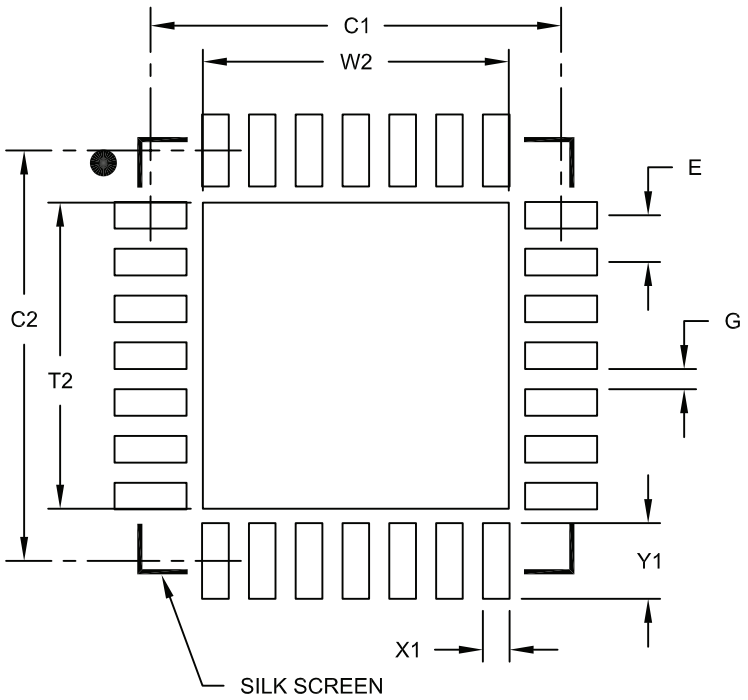
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-105B

# Land Pattern (Footprint)

**28-Lead Plastic Quad Flat, No Lead Package (ML) – 6x6 mm Body [QFN] with 0.55 mm Contact Length**

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | | 0.65 BSC | |
| Optional Center Pad Width | W2 | | | 4.25 |
| Optional Center Pad Length | T2 | | | 4.25 |
| Contact Pad Spacing | C1 | | 5.70 | |
| Contact Pad Spacing | C2 | | 5.70 | |
| Contact Pad Width (X28) | X1 | | | 0.37 |
| Contact Pad Length (X28) | Y1 | | | 1.00 |
| Distance Between Pads | G | 0.20 | | |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

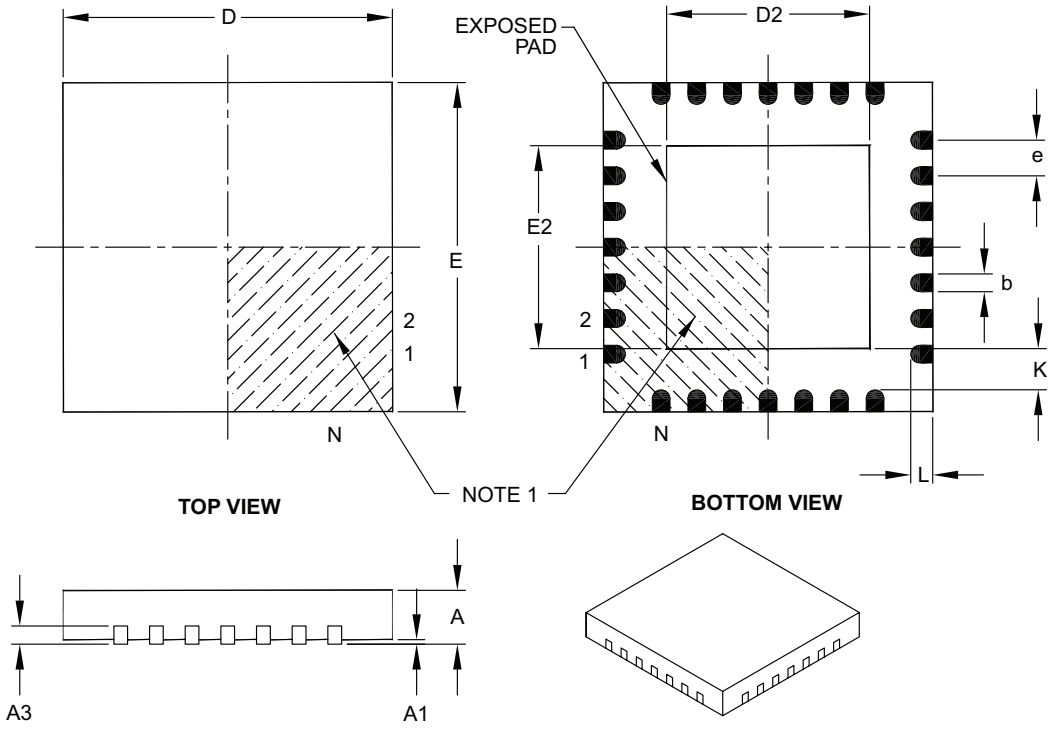
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2105A

# Packaging Diagrams and Parameters

## 28-Lead Plastic Quad Flat, No Lead Package (MM) – 6x6x0.9 mm Body [QFN-S] with 0.40 mm Contact Length

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | 0.80 | 0.90 | 1.00 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Contact Thickness | A3 | | 0.20 REF | |
| Overall Width | E | | 6.00 BSC | |
| Exposed Pad Width | E2 | 3.65 | 3.70 | 4.70 |
| Overall Length | D | | 6.00 BSC | |
| Exposed Pad Length | D2 | 3.65 | 3.70 | 4.70 |
| Contact Width | b | 0.23 | 0.38 | 0.43 |
| Contact Length | L | 0.30 | 0.40 | 0.50 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

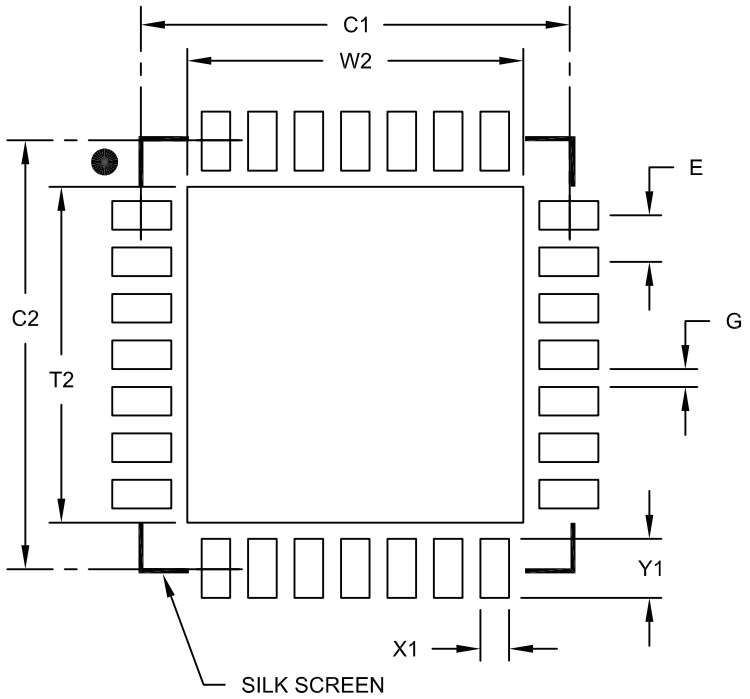
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-124B

# Land Pattern (Footprint)

**28-Lead Plastic Quad Flat, No Lead Package (MM) – 6x6x0.9 mm Body [QFN-S] with 0.40 mm Contact Length**

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | | 0.65 BSC | |
| Optional Center Pad Width | W2 | | | 4.70 |
| Optional Center Pad Length | T2 | | | 4.70 |
| Contact Pad Spacing | C1 | | 6.00 | |
| Contact Pad Spacing | C2 | | 6.00 | |
| Contact Pad Width (X28) | X1 | | | 0.40 |
| Contact Pad Length (X28) | Y1 | | | 0.85 |
| Distance Between Pads | G | 0.25 | | |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

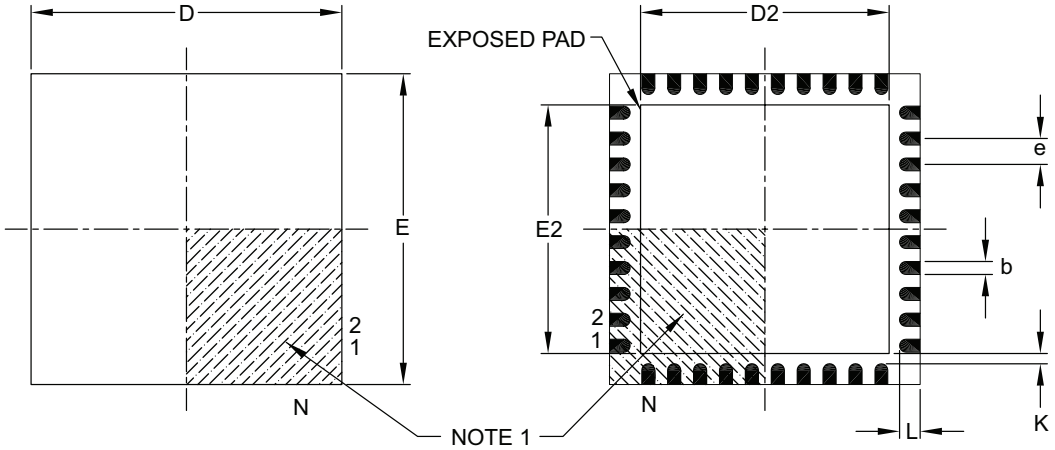
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

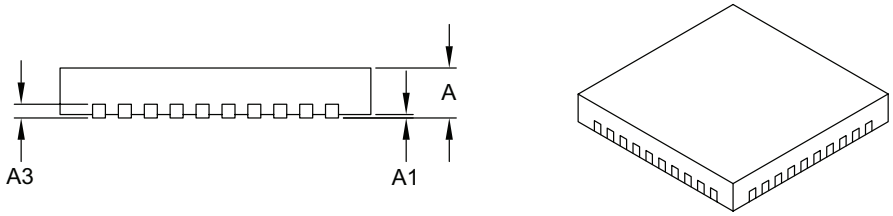
Microchip Technology Drawing No. C04-2124A

# Packaging Diagrams and Parameters

## 40-Lead Plastic Quad Flat, No Lead Package (MM) – 6x6x0.9 mm Body [QFN] with 0.40 mm Contact Length

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 40 | |
| Pitch | e | | 0.50 BSC | |
| Overall Height | A | 0.80 | 0.90 | 1.00 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Contact Thickness | A3 | | 0.20 REF | |
| Overall Width | E | | 6.00 BSC | |
| Exposed Pad Width | E2 | 4.50 | 4.65 | 4.80 |
| Overall Length | D | | 6.00 BSC | |
| Exposed Pad Length | D2 | 4.50 | 4.65 | 4.80 |
| Contact Width | b | 0.18 | 0.25 | 0.30 |
| Contact Length | L | 0.30 | 0.40 | 0.50 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-118B

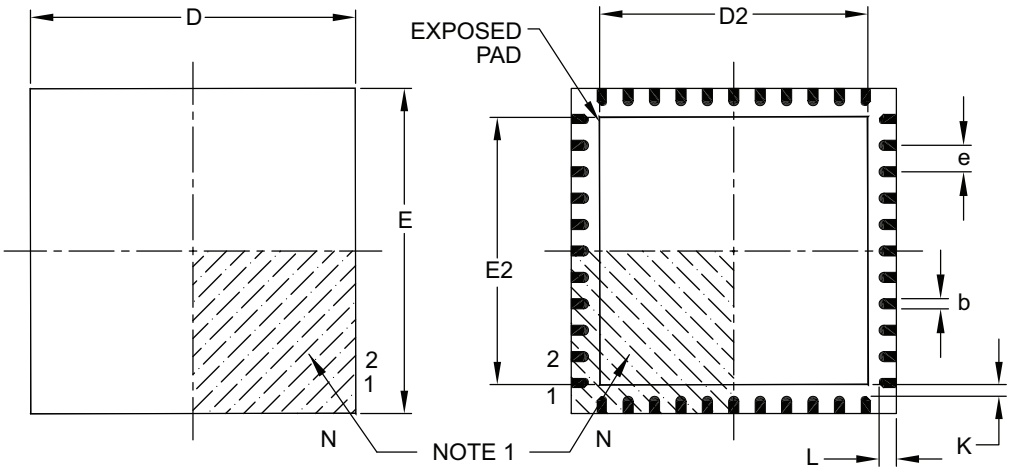
# Packaging Diagrams and Parameters

**NOTES:**

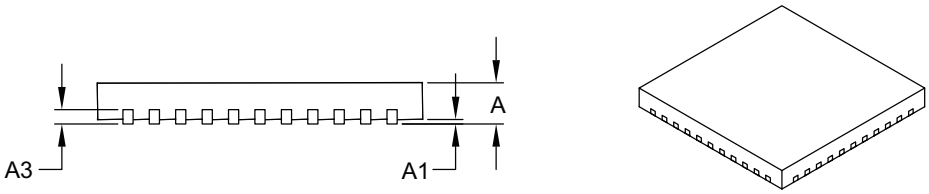
# Packaging Diagrams and Parameters

## 44-Lead Plastic Quad Flat, No Lead Package (ML) – 8x8 mm Body [QFN]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




**TOP VIEW** **BOTTOM VIEW**




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 44 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | 0.80 | 0.90 | 1.00 |
| Standoff | A1 | 0.00 | 0.02 | 0.05 |
| Contact Thickness | A3 | | 0.20 REF | |
| Overall Width | E | | 8.00 BSC | |
| Exposed Pad Width | E2 | 6.30 | 6.45 | 6.80 |
| Overall Length | D | | 8.00 BSC | |
| Exposed Pad Length | D2 | 6.30 | 6.45 | 6.80 |
| Contact Width | b | 0.25 | 0.30 | 0.38 |
| Contact Length | L | 0.30 | 0.40 | 0.50 |
| Contact-to-Exposed Pad | K | 0.20 | – | – |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

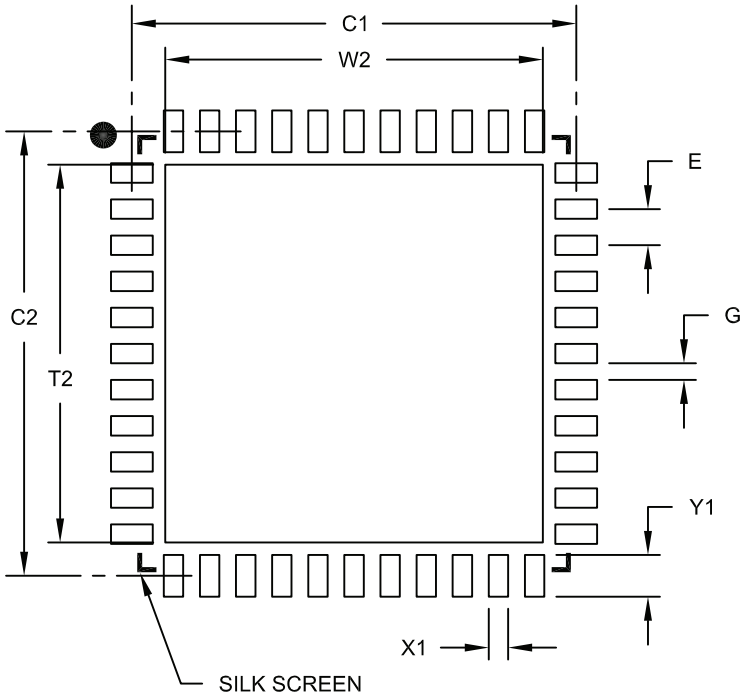
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-103B

# Land Pattern (Footprint)

## 44-Lead Plastic Quad Flat, No Lead Package (ML) – 8x8 mm Body [QFN]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | | 0.65 BSC | |
| Optional Center Pad Width | W2 | | | 6.80 |
| Optional Center Pad Length | T2 | | | 6.80 |
| Contact Pad Spacing | C1 | | 8.00 | |
| Contact Pad Spacing | C2 | | 8.00 | |
| Contact Pad Width (X44) | X1 | | | 0.35 |
| Contact Pad Length (X44) | Y1 | | | 0.80 |
| Distance Between Pads | G | 0.25 | | |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2103A

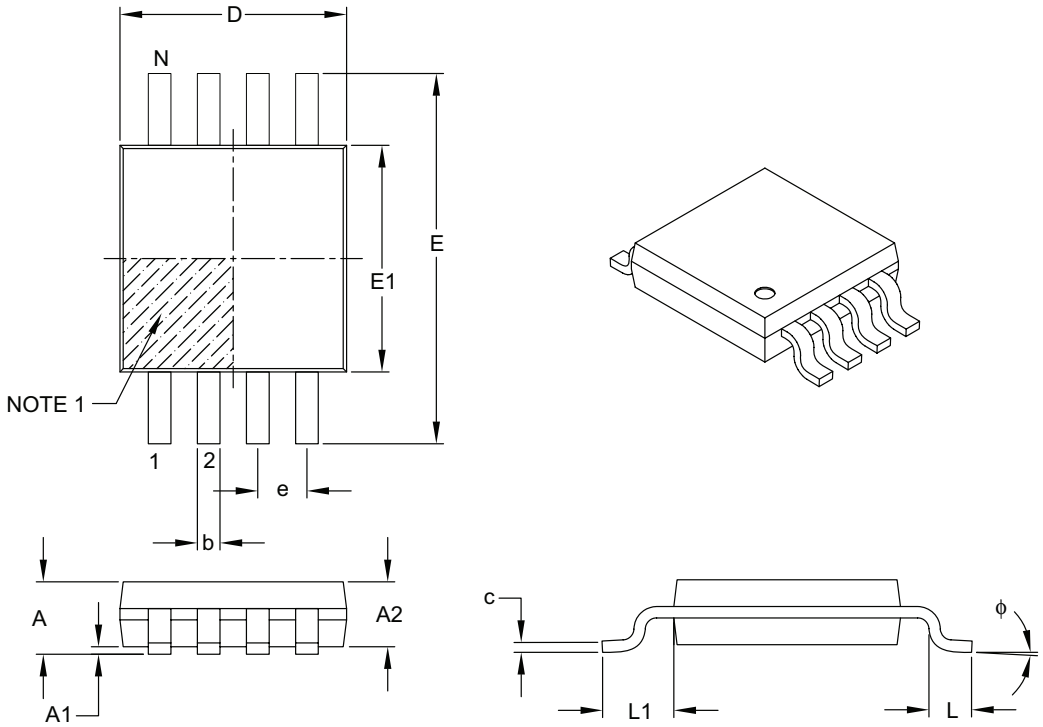
# Packaging Diagrams and Parameters

**NOTES:**

# Packaging Diagrams and Parameters

## 8-Lead Plastic Micro Small Outline Package (MS) [MSOP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | – | – | 1.10 |
| Molded Package Thickness | A2 | 0.75 | 0.85 | 0.95 |
| Standoff | A1 | 0.00 | – | 0.15 |
| Overall Width | E | | 4.90 BSC | |
| Molded Package Width | E1 | | 3.00 BSC | |
| Overall Length | D | | 3.00 BSC | |
| Foot Length | L | 0.40 | 0.60 | 0.80 |
| Footprint | L1 | | 0.95 REF | |
| Foot Angle | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.08 | – | 0.23 |
| Lead Width | b | 0.22 | – | 0.40 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

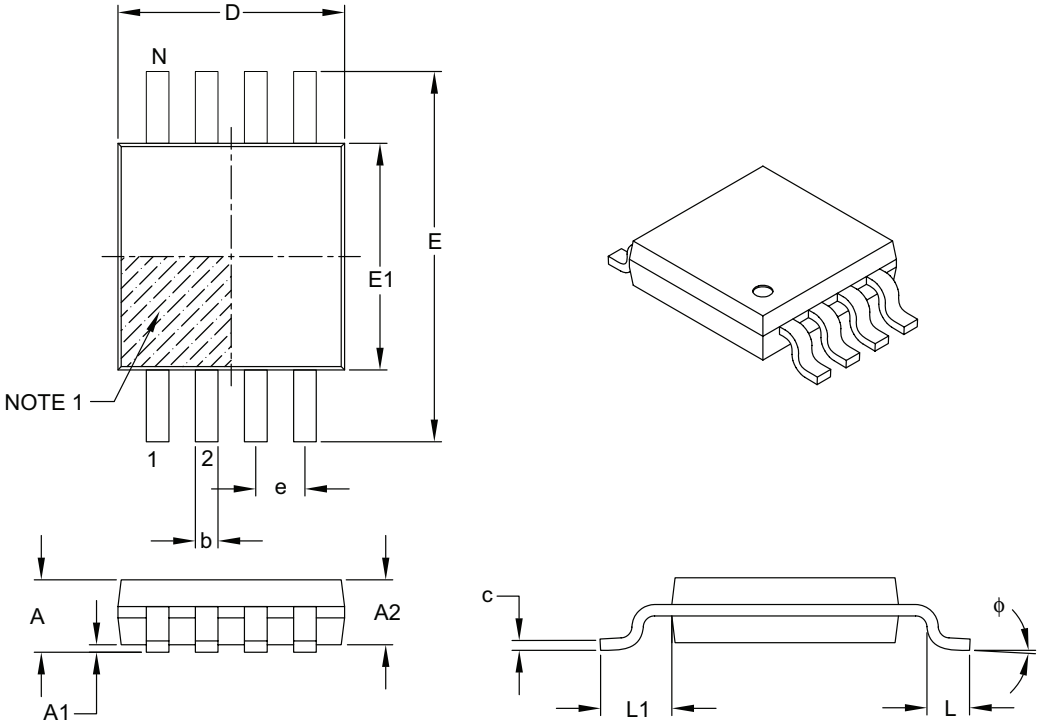
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-111B

# Packaging Diagrams and Parameters

## 8-Lead Plastic Micro Small Outline Package (UA) [MSOP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | – | – | 1.10 |
| Molded Package Thickness | A2 | 0.75 | 0.85 | 0.95 |
| Standoff | A1 | 0.00 | – | 0.15 |
| Overall Width | E | | 4.90 BSC | |
| Molded Package Width | E1 | | 3.00 BSC | |
| Overall Length | D | | 3.00 BSC | |
| Foot Length | L | 0.40 | 0.60 | 0.80 |
| Footprint | L1 | | 0.95 REF | |
| Foot Angle | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.08 | – | 0.23 |
| Lead Width | b | 0.22 | – | 0.40 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

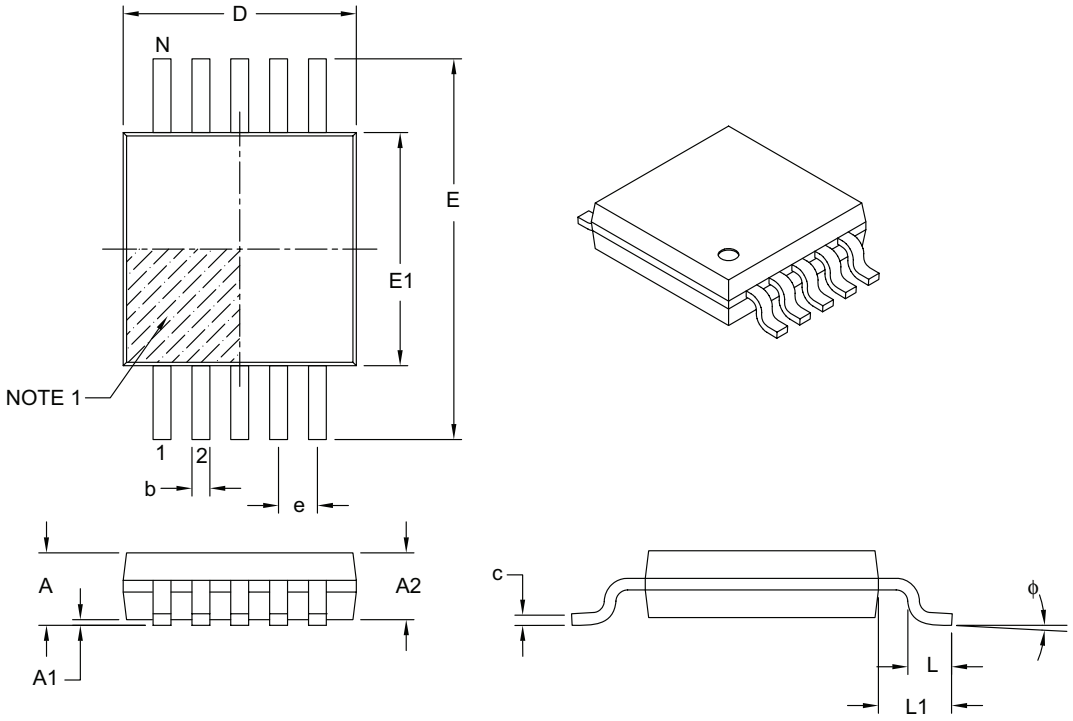
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-111B

# Packaging Diagrams and Parameters

## 10-Lead Plastic Micro Small Outline Package (MS) [MSOP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 10 | |
| Pitch | e | | 0.50 BSC | |
| Overall Height | A | – | – | 1.10 |
| Molded Package Thickness | A2 | 0.75 | 0.85 | 0.95 |
| Standoff | A1 | 0.00 | – | 0.15 |
| Overall Width | E | | 4.90 BSC | |
| Molded Package Width | E1 | | 3.00 BSC | |
| Overall Length | D | | 3.00 BSC | |
| Foot Length | L | 0.40 | 0.60 | 0.80 |
| Footprint | L1 | | 0.95 REF | |
| Foot Angle | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.08 | – | 0.23 |
| Lead Width | b | 0.15 | – | 0.33 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

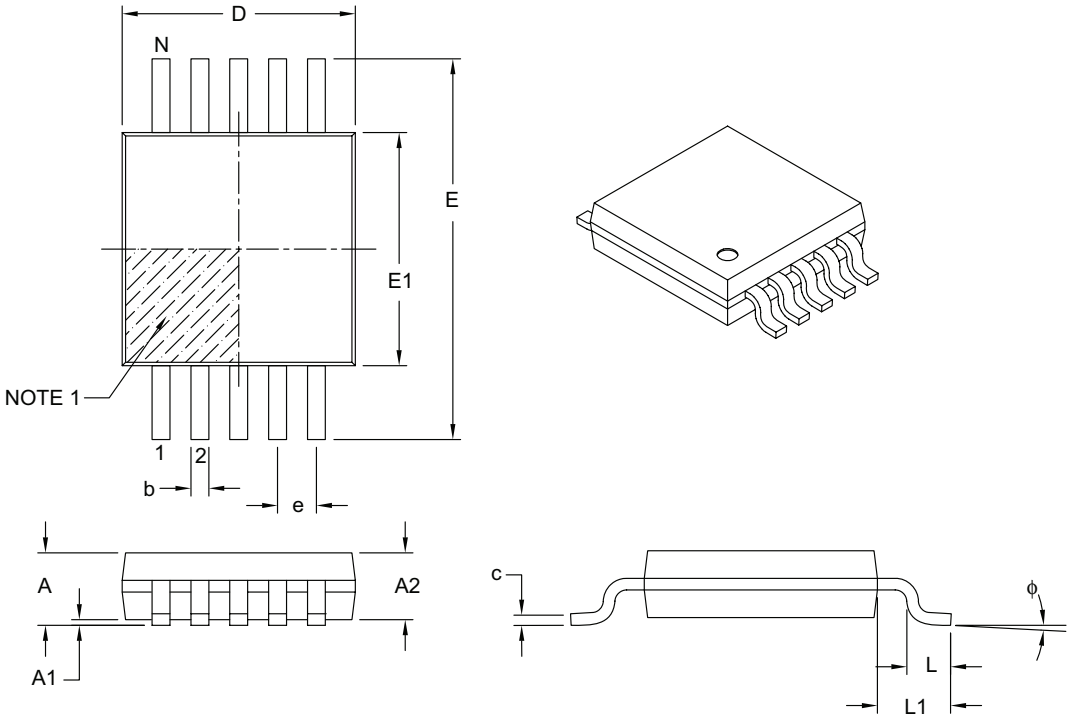
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-021B

# Packaging Diagrams and Parameters

## 10-Lead Plastic Micro Small Outline Package (UN) [MSOP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 10 | |
| Pitch | e | | 0.50 BSC | |
| Overall Height | A | – | – | 1.10 |
| Molded Package Thickness | A2 | 0.75 | 0.85 | 0.95 |
| Standoff | A1 | 0.00 | – | 0.15 |
| Overall Width | E | | 4.90 BSC | |
| Molded Package Width | E1 | | 3.00 BSC | |
| Overall Length | D | | 3.00 BSC | |
| Foot Length | L | 0.40 | 0.60 | 0.80 |
| Footprint | L1 | | 0.95 REF | |
| Foot Angle | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.08 | – | 0.23 |
| Lead Width | b | 0.15 | – | 0.33 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

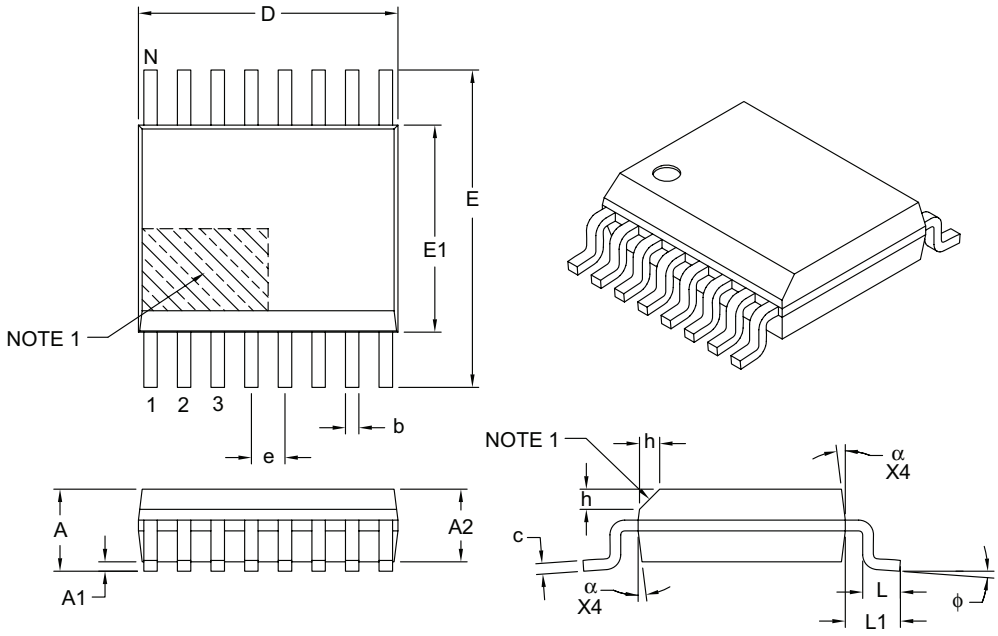
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-021B

# Packaging Diagrams and Parameters

## 16-Lead Plastic Shrink Small Outline Narrow Body (QR) – .150" Body [QSOP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | INCHES | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 16 | |
| Pitch | e | | .025 BSC | |
| Overall Height | A | – | – | .069 |
| Standoff § | A1 | .004 | – | .010 |
| Molded Package Height | A2 | .049 | – | – |
| Overall Width | E | | .236 BSC | |
| Molded Package Width | E1 | | .154 BSC | |
| Overall Length | D | | .193 BSC | |
| Chamfer Distance | h | .010 | – | .020 |
| Lead Thickness | c | .006 | – | .010 |
| Lead Width | b | .008 | – | .012 |
| Footprint | L1 | | .041 REF | |
| Foot Length | L | .016 | – | .050 |
| Foot Angle | φ | 0° | – | 8° |
| Molded Draft Angle | α | 5° | – | 15° |

**Notes:**

1. Chamfer feature is optional. If it is not present, then a Pin 1 visual index feature must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .006" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

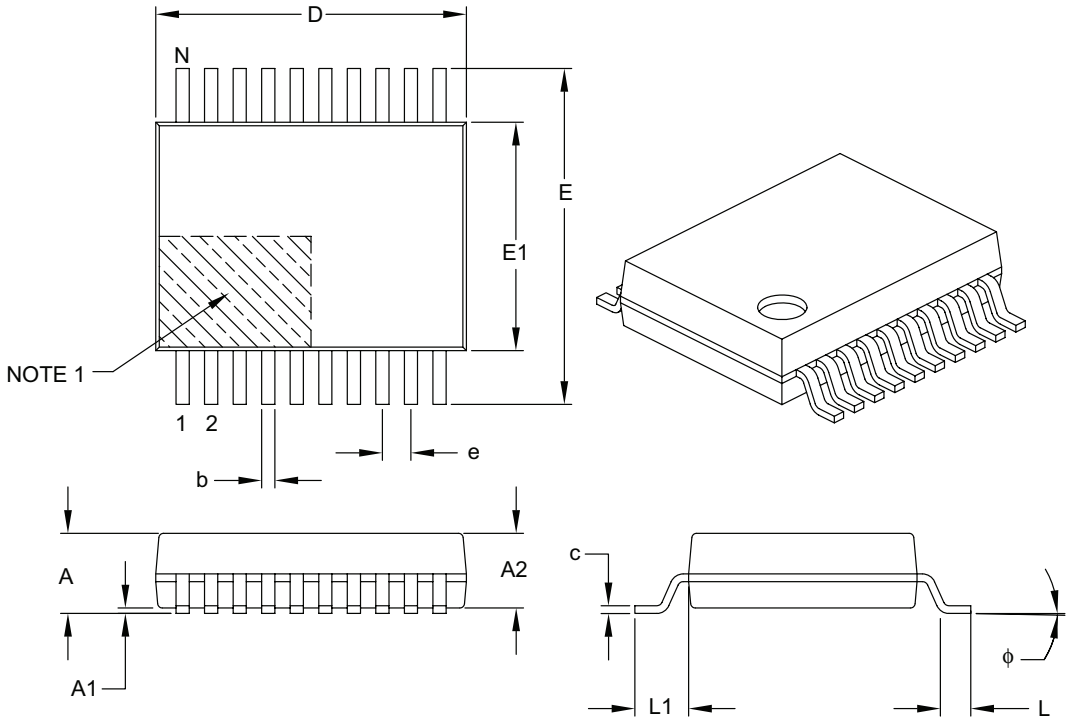
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-024C

# Packaging Diagrams and Parameters

## 20-Lead Plastic Shrink Small Outline (SS) – 5.30 mm Body [SSOP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 20 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | – | – | 2.00 |
| Molded Package Thickness | A2 | 1.65 | 1.75 | 1.85 |
| Standoff | A1 | 0.05 | – | – |
| Overall Width | E | 7.40 | 7.80 | 8.20 |
| Molded Package Width | E1 | 5.00 | 5.30 | 5.60 |
| Overall Length | D | 6.90 | 7.20 | 7.50 |
| Foot Length | L | 0.55 | 0.75 | 0.95 |
| Footprint | L1 | | 1.25 REF | |
| Lead Thickness | c | 0.09 | – | 0.25 |
| Foot Angle | ϕ | 0° | 4° | 8° |
| Lead Width | b | 0.22 | – | 0.38 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.20 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

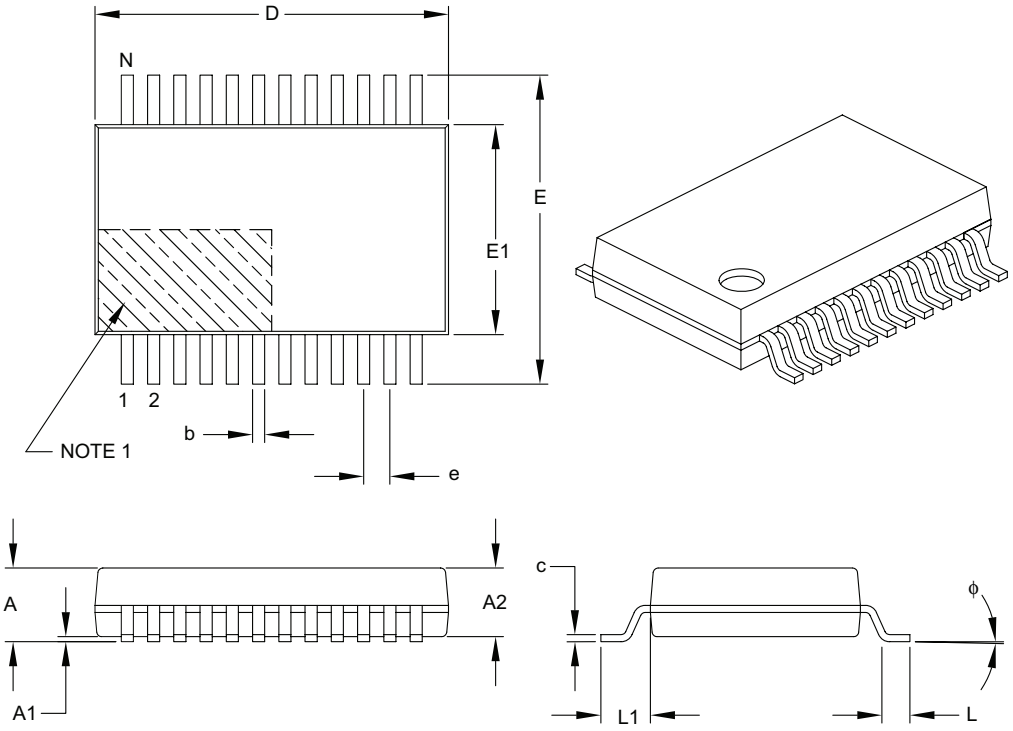
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-072B

# Packaging Diagrams and Parameters

## 24-Lead Plastic Shrink Small Outline (SS) – 5.30 mm Body [SSOP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 24 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | – | – | 2.00 |
| Molded Package Thickness | A2 | 1.65 | 1.75 | 1.85 |
| Standoff | A1 | 0.05 | – | – |
| Overall Width | E | 7.40 | 7.80 | 8.20 |
| Molded Package Width | E1 | 5.00 | 5.30 | 5.60 |
| Overall Length | D | 7.90 | 8.20 | 8.50 |
| Foot Length | L | 0.55 | 0.75 | 0.95 |
| Footprint | L1 | | 1.25 REF | |
| Lead Thickness | c | 0.09 | – | 0.25 |
| Foot Angle | ϕ | 0° | 4° | 8° |
| Lead Width | b | 0.22 | – | 0.38 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.20 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

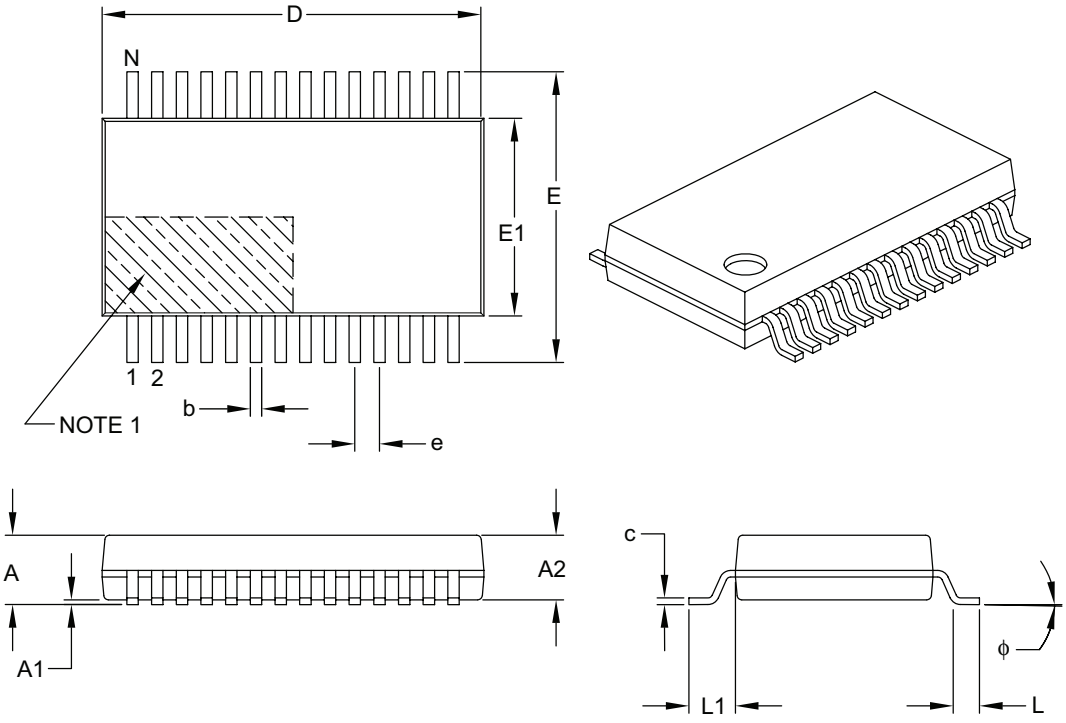
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-132B

# Packaging Diagrams and Parameters

## 28-Lead Plastic Shrink Small Outline (SS) – 5.30 mm Body [SSOP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | – | – | 2.00 |
| Molded Package Thickness | A2 | 1.65 | 1.75 | 1.85 |
| Standoff | A1 | 0.05 | – | – |
| Overall Width | E | 7.40 | 7.80 | 8.20 |
| Molded Package Width | E1 | 5.00 | 5.30 | 5.60 |
| Overall Length | D | 9.90 | 10.20 | 10.50 |
| Foot Length | L | 0.55 | 0.75 | 0.95 |
| Footprint | L1 | | 1.25 REF | |
| Lead Thickness | c | 0.09 | – | 0.25 |
| Foot Angle | ϕ | 0° | 4° | 8° |
| Lead Width | b | 0.22 | – | 0.38 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.20 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

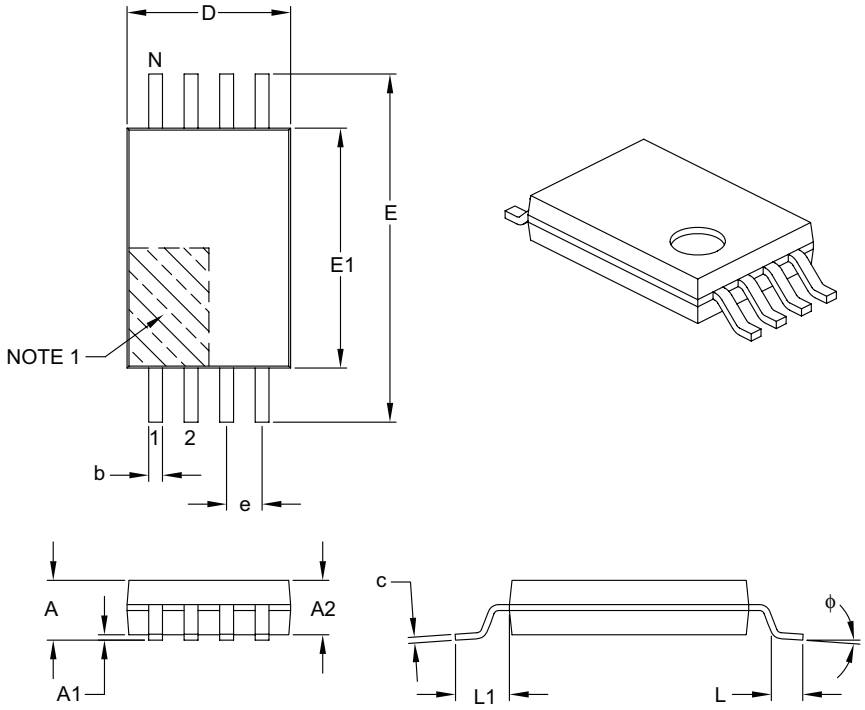
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-073B

# Packaging Diagrams and Parameters

## 8-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 8 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | – | – | 1.20 |
| Molded Package Thickness | A2 | 0.80 | 1.00 | 1.05 |
| Standoff | A1 | 0.05 | – | 0.15 |
| Overall Width | E | | 6.40 BSC | |
| Molded Package Width | E1 | 4.30 | 4.40 | 4.50 |
| Molded Package Length | D | 2.90 | 3.00 | 3.10 |
| Foot Length | L | 0.45 | 0.60 | 0.75 |
| Footprint | L1 | | 1.00 REF | |
| Foot Angle | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.09 | – | 0.20 |
| Lead Width | b | 0.19 | – | 0.30 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

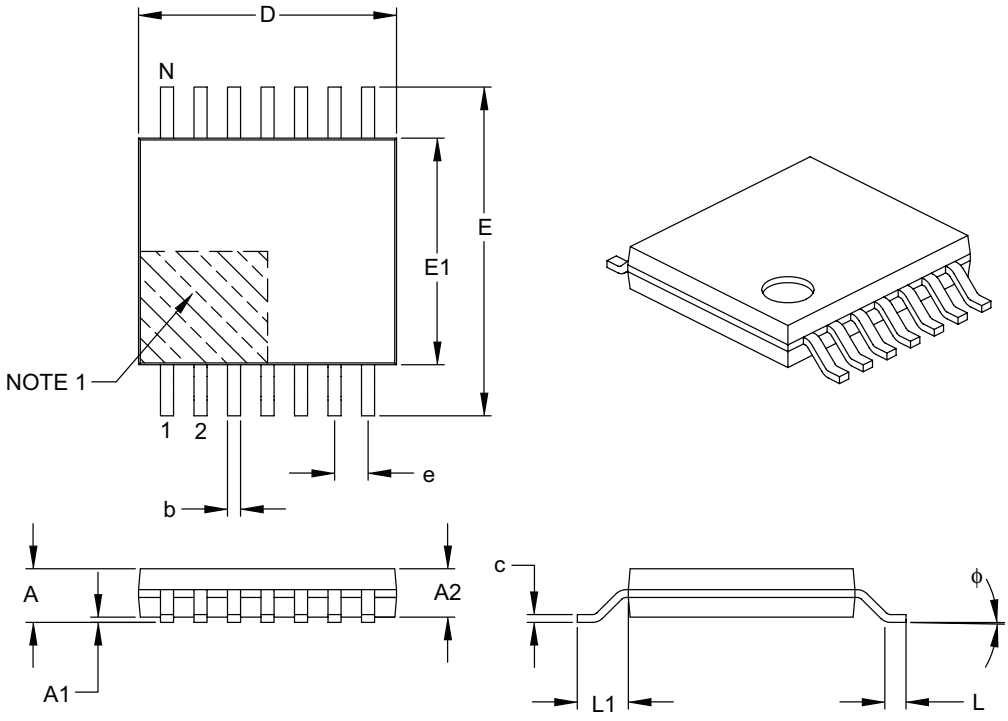
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-086B

# Packaging Diagrams and Parameters

## 14-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 14 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | – | – | 1.20 |
| Molded Package Thickness | A2 | 0.80 | 1.00 | 1.05 |
| Standoff | A1 | 0.05 | – | 0.15 |
| Overall Width | E | | 6.40 BSC | |
| Molded Package Width | E1 | 4.30 | 4.40 | 4.50 |
| Molded Package Length | D | 4.90 | 5.00 | 5.10 |
| Foot Length | L | 0.45 | 0.60 | 0.75 |
| Footprint | L1 | | 1.00 REF | |
| Foot Angle | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.09 | – | 0.20 |
| Lead Width | b | 0.19 | – | 0.30 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

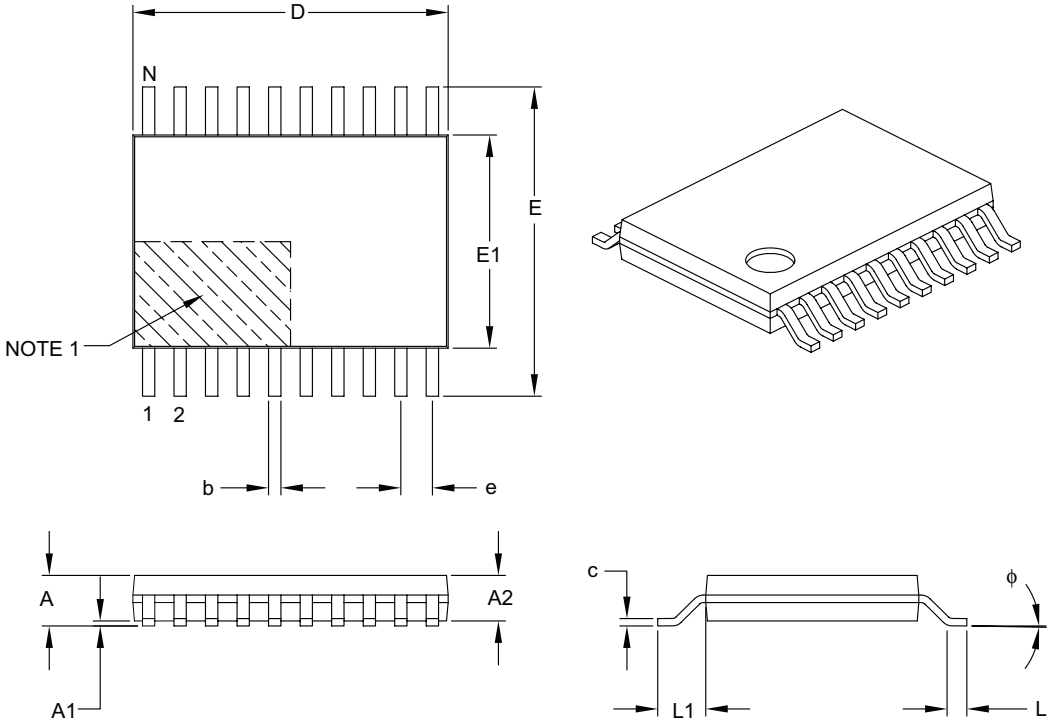
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-087B

# Packaging Diagrams and Parameters

## 20-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 20 | |
| Pitch | e | | 0.65 BSC | |
| Overall Height | A | – | – | 1.20 |
| Molded Package Thickness | A2 | 0.80 | 1.00 | 1.05 |
| Standoff | A1 | 0.05 | – | 0.15 |
| Overall Width | E | | 6.40 BSC | |
| Molded Package Width | E1 | 4.30 | 4.40 | 4.50 |
| Molded Package Length | D | 6.40 | 6.50 | 6.60 |
| Foot Length | L | 0.45 | 0.60 | 0.75 |
| Footprint | L1 | | 1.00 REF | |
| Foot Angle | ϕ | 0° | – | 8° |
| Lead Thickness | c | 0.09 | – | 0.20 |
| Lead Width | b | 0.19 | – | 0.30 |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-088B

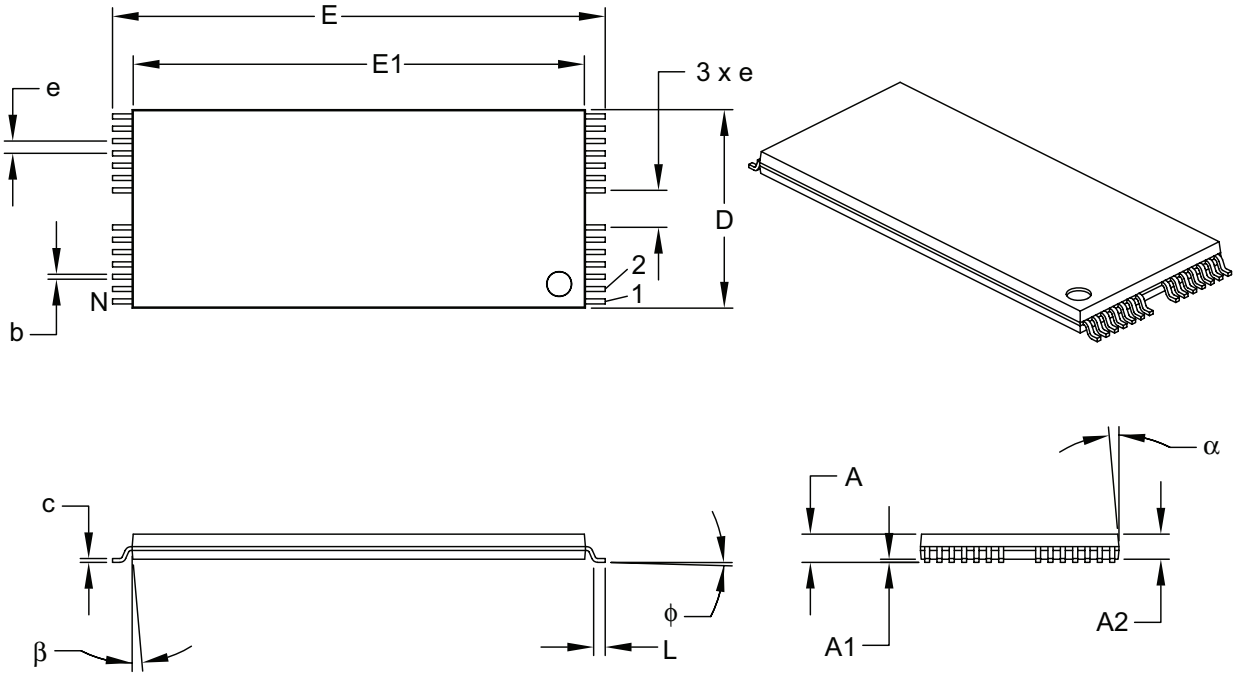
# Packaging Diagrams and Parameters

**NOTES:**

# Packaging Diagrams and Parameters

## 28-Lead Plastic Thin Small Outline (TS) – 8x20 mm [TSOP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | 0.50 | |
| Overall Height | A | 0.99 | 1.14 | 1.30 |
| Molded Package Thickness | A2 | 0.95 | 1.00 | 1.05 |
| Standoff § | A1 | 0.05 | 0.15 | 0.25 |
| Overall Width | E | 19.80 | 20.00 | 20.20 |
| Molded Package Width | E1 | 18.30 | 18.40 | 18.50 |
| Molded Package Length | D | 7.80 | 8.00 | 8.20 |
| Foot Length | L | 0.50 | 0.60 | 0.70 |
| Foot Angle | ϕ | 0° | 4° | 8° |
| Lead Thickness | c | 0.10 | 0.15 | 0.20 |
| Lead Width | b | 0.15 | 0.20 | 0.25 |
| Mold Draft Angle Top | α | 0° | 5° | 10° |
| Mold Draft Angle Bottom | β | 0° | 5° | 10° |

**Notes:**

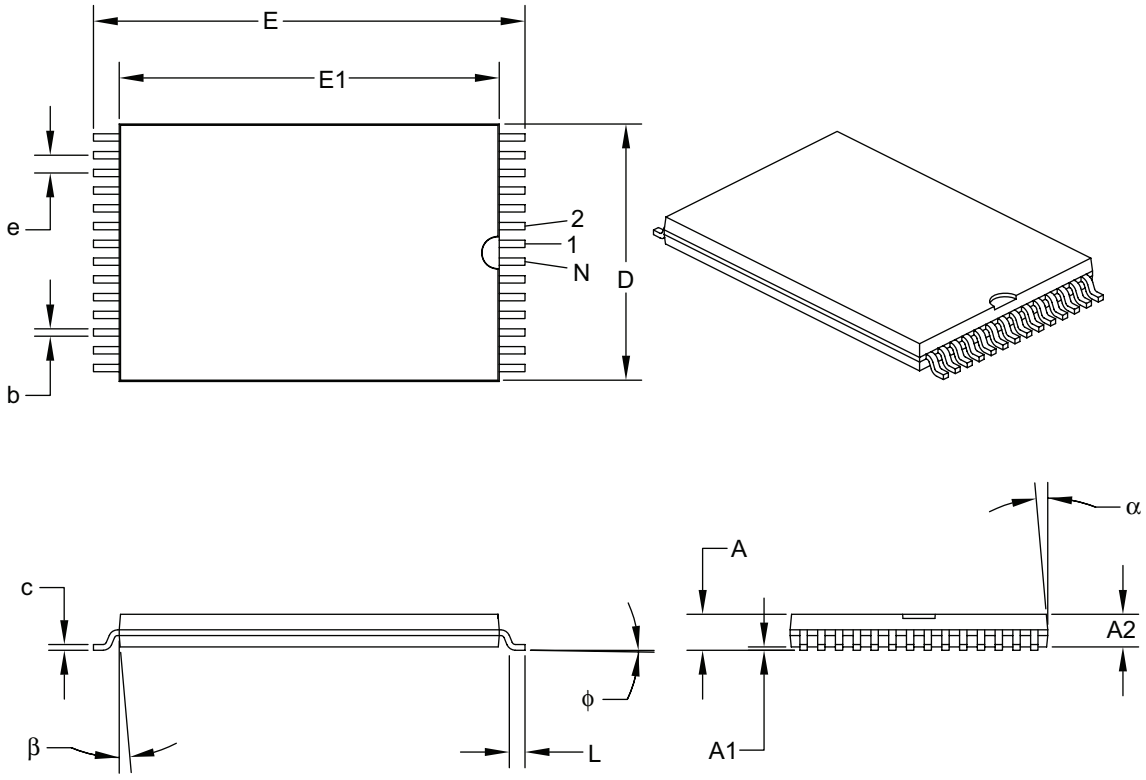
1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. § Significant Characteristic.

Microchip Technology Drawing C04-067B

# Packaging Diagrams and Parameters

## 28-Lead Plastic Very Small Outline (VS) – 8x13.4 mm Body [VSOP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | | 28 | |
| Pitch | e | | 0.55 | |
| Overall Height | A | 0.99 | 1.14 | 1.29 |
| Molded Package Thickness | A2 | 0.95 | 1.00 | 1.05 |
| Standoff § | A1 | 0.05 | 0.13 | 0.25 |
| Overall Width | E | 13.20 | 13.40 | 13.60 |
| Molded Package Width | E1 | 11.70 | 11.80 | 11.90 |
| Molded Package Length | D | 7.90 | 8.00 | 8.10 |
| Foot Length | L | 0.30 | 0.50 | 0.70 |
| Foot Angle | ϕ | 0° | 3° | 5° |
| Lead Thickness | c | 0.14 | 0.15 | 0.16 |
| Lead Width | b | 0.17 | 0.20 | 0.23 |
| Mold Draft Angle Top | α | 0° | 5° | 10° |
| Mold Draft Angle Bottom | β | 0° | 5° | 10° |

**Notes:**

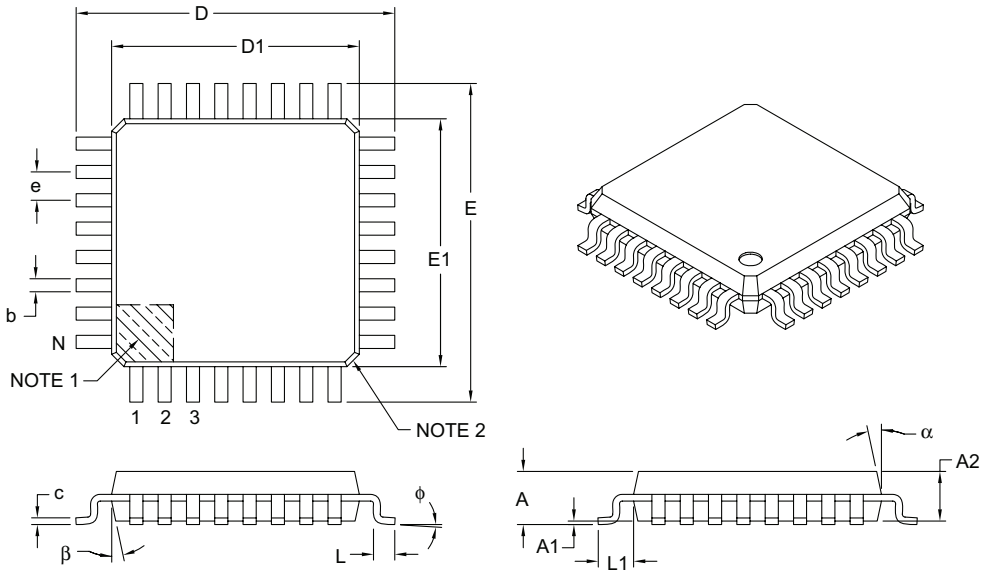
1. § Significant Characteristic.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.

Microchip Technology Drawing C04-075B

# Packaging Diagrams and Parameters

## 32-Lead Plastic Low-Profile Quad Flatpack (PL) – 7x7x1.4 mm Body, 2.0 mm [LQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 32 | |
| Lead Pitch | e | | 0.80 BSC | |
| Overall Height | A | – | – | 1.60 |
| Molded Package Thickness | A2 | 1.35 | 1.40 | 1.45 |
| Standoff | A1 | 0.05 | – | 0.15 |
| Foot Length | L | 0.45 | 0.60 | 0.75 |
| Footprint | L1 | | 1.00 REF | |
| Foot Angle | ϕ | 0° | 3.5° | 7° |
| Overall Width | E | | 9.00 BSC | |
| Overall Length | D | | 9.00 BSC | |
| Molded Package Width | E1 | | 7.00 BSC | |
| Molded Package Length | D1 | | 7.00 BSC | |
| Lead Thickness | c | 0.09 | – | 0.20 |
| Lead Width | b | 0.30 | 0.37 | 0.45 |
| Mold Draft Angle Top | α | 11° | 12° | 13° |
| Mold Draft Angle Bottom | β | 11° | 12° | 13° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

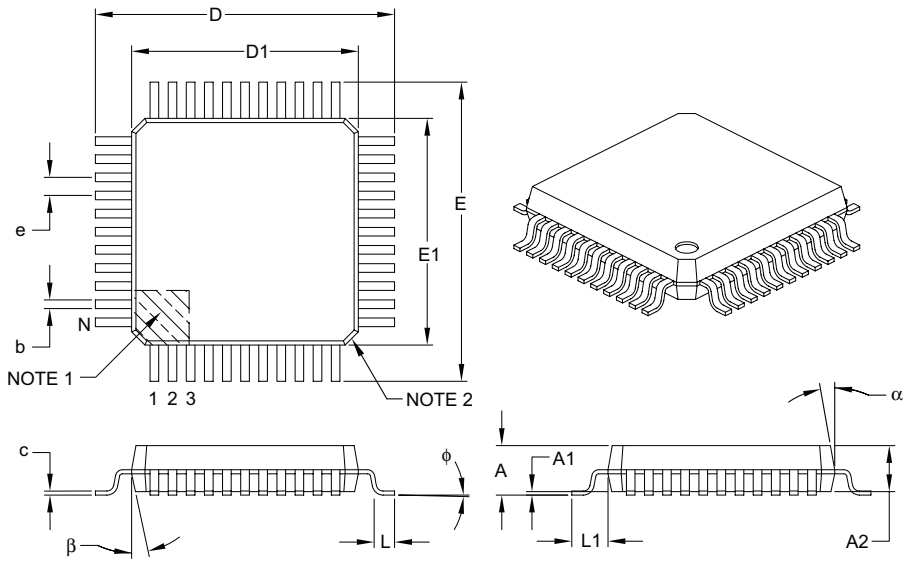
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-045B

# Packaging Diagrams and Parameters

## 44-Lead Plastic Metric Quad Flatpack (PQ) – 10x10x2 mm Body, 3.20 mm [MQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 44 | |
| Lead Pitch | e | | 0.80 BSC | |
| Overall Height | A | – | – | 2.45 |
| Molded Package Thickness | A2 | 1.80 | 2.00 | 2.20 |
| Standoff § | A1 | 0.00 | – | 0.25 |
| Foot Length | L | 0.73 | 0.88 | 1.03 |
| Footprint | L1 | | 1.60 REF | |
| Foot Angle | φ | 0° | – | 7° |
| Overall Width | E | | 13.20 BSC | |
| Overall Length | D | | 13.20 BSC | |
| Molded Package Width | E1 | | 10.00 BSC | |
| Molded Package Length | D1 | | 10.00 BSC | |
| Lead Thickness | c | 0.11 | – | 0.23 |
| Lead Width | b | 0.29 | – | 0.45 |
| Mold Draft Angle Top | α | 5° | – | 16° |
| Mold Draft Angle Bottom | β | 5° | – | 16° |

**Notes:**

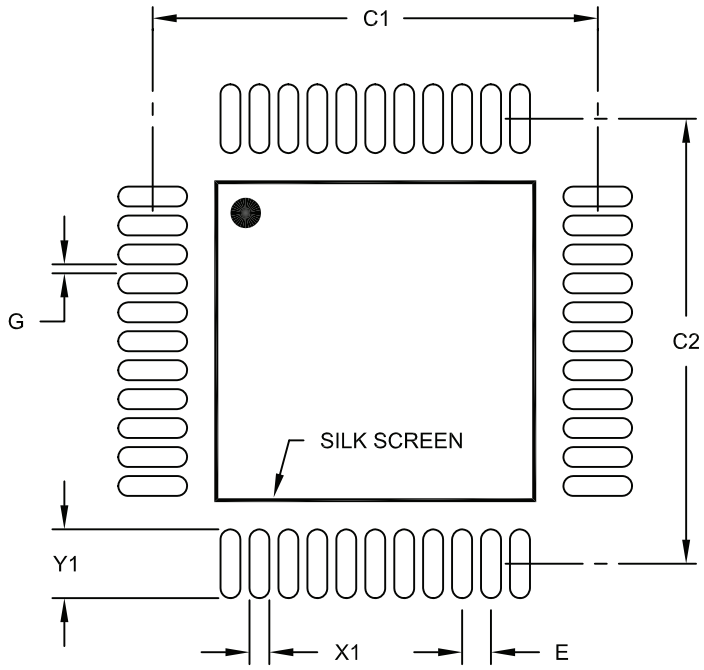
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. § Significant Characteristic.

Microchip Technology Drawing C04-071B

# Land Pattern (Footprint)

### 44-Lead Plastic Metric Quad Flatpack (PQ) – 10x10x2 mm Body, 3.20 mm [MQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | 0.80 BSC | | |
| Contact Pad Spacing | C1 | | 12.30 | |
| Contact Pad Spacing | C2 | | 12.30 | |
| Contact Pad Width (X44) | X1 | | | 0.55 |
| Contact Pad Length (X44) | Y1 | | | 1.90 |
| Distance Between Pads | G | 0.25 | | |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2071A

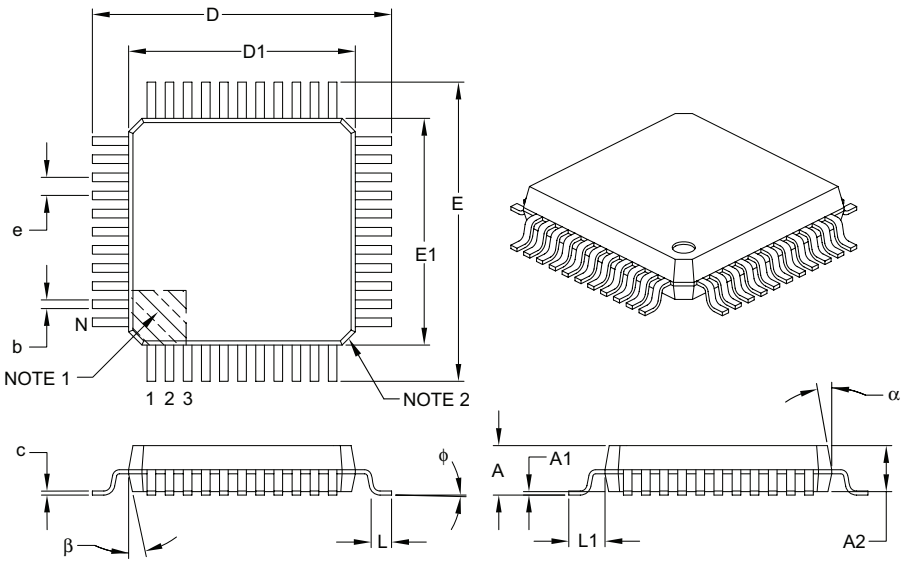
# Packaging Diagrams and Parameters

**NOTES:**

# Packaging Diagrams and Parameters

## 44-Lead Plastic Metric Quad Flatpack (KW) – 10x10x2 mm Body, 3.20 mm [MQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 44 | |
| Lead Pitch | e | | 0.80 BSC | |
| Overall Height | A | – | – | 2.45 |
| Molded Package Thickness | A2 | 1.80 | 2.00 | 2.20 |
| Standoff § | A1 | 0.00 | – | 0.25 |
| Foot Length | L | 0.73 | 0.88 | 1.03 |
| Footprint | L1 | | 1.60 REF | |
| Foot Angle | ϕ | 0° | – | 7° |
| Overall Width | E | | 13.20 BSC | |
| Overall Length | D | | 13.20 BSC | |
| Molded Package Width | E1 | | 10.00 BSC | |
| Molded Package Length | D1 | | 10.00 BSC | |
| Lead Thickness | c | 0.11 | – | 0.23 |
| Lead Width | b | 0.29 | – | 0.45 |
| Mold Draft Angle Top | α | 5° | – | 16° |
| Mold Draft Angle Bottom | β | 5° | – | 16° |

**Notes:**

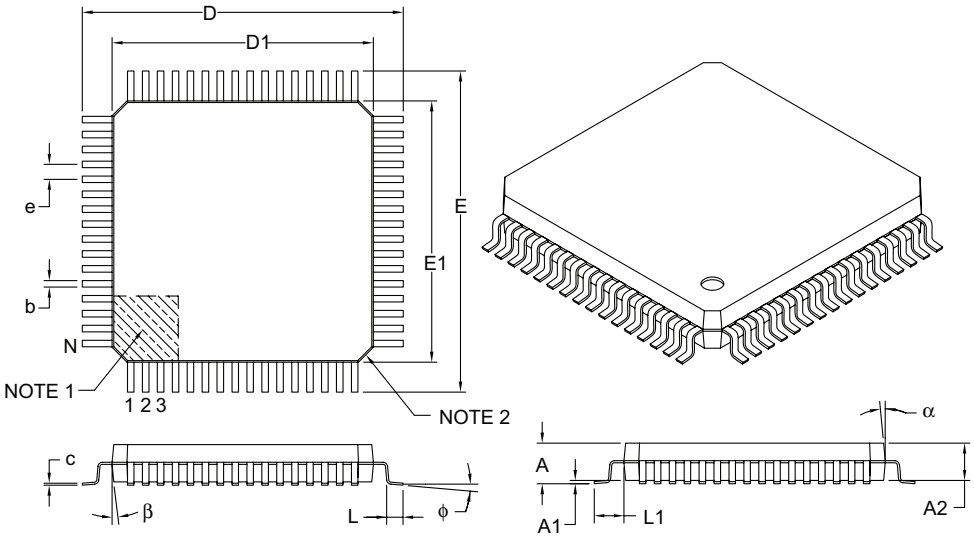
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. § Significant Characteristic.

Microchip Technology Drawing C04-071B

# Packaging Diagrams and Parameters

## 64-Lead Plastic Metric Quad Flatpack (BU) – 14x14x2.7 mm Body, 3.20 mm [MQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 64 | |
| Lead Pitch | e | | 0.80 BSC | |
| Overall Height | A | – | – | 3.15 |
| Molded Package Thickness | A2 | 2.50 | 2.70 | 2.90 |
| Standoff § | A1 | 0.00 | – | 0.25 |
| Overall Width | E | | 17.20 BSC | |
| Molded Package Width | E1 | | 14.00 BSC | |
| Overall Length | D | | 17.20 BSC | |
| Molded Package Length | D1 | | 14.00 BSC | |
| Foot Length | L | 0.73 | 0.88 | 1.03 |
| Footprint | L1 | | 1.60 REF | |
| Foot Angle | φ | 0° | – | 7° |
| Lead Thickness | c | 0.11 | – | 0.23 |
| Lead Width | b | 0.29 | – | 0.45 |
| Mold Draft Angle Top | α | 5° | – | 16° |
| Mold Draft Angle Bottom | β | 5° | – | 16° |

**Notes:**

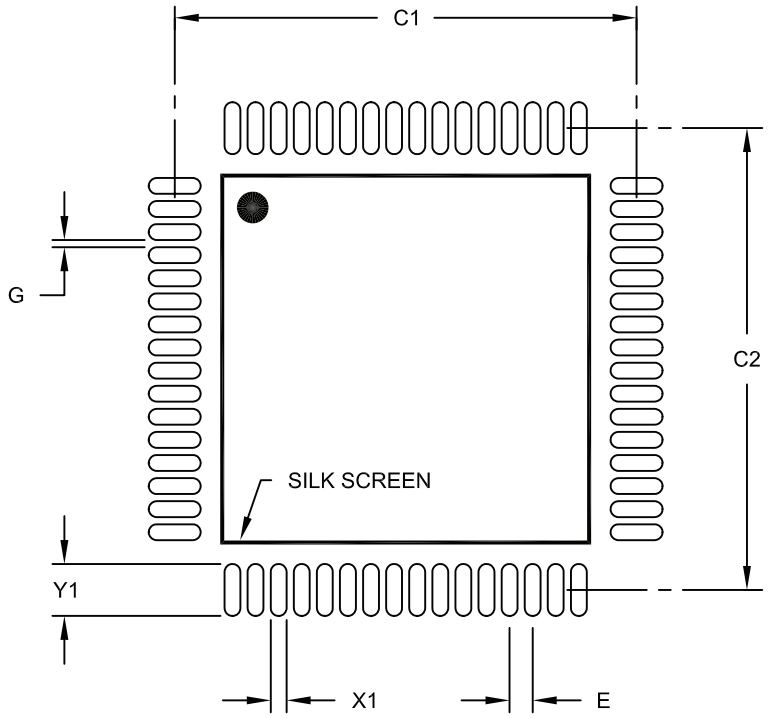
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. § Significant Characteristic.
6. Formerly TelCom PQFP package.

Microchip Technology Drawing C04-022B

# Land Pattern (Footprint)

### 64-Lead Plastic Metric Quad Flatpack (BU) – 14x14x2.7 mm Body, 3.20 mm [MQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | | 0.80 BSC | |
| Contact Pad Spacing | C1 | | 16.10 | |
| Contact Pad Spacing | C2 | | 16.10 | |
| Contact Pad Width (X64) | X1 | | | 0.55 |
| Contact Pad Length (X64) | Y1 | | | 1.80 |
| Distance Between Pads | G | 0.25 | | |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2022A

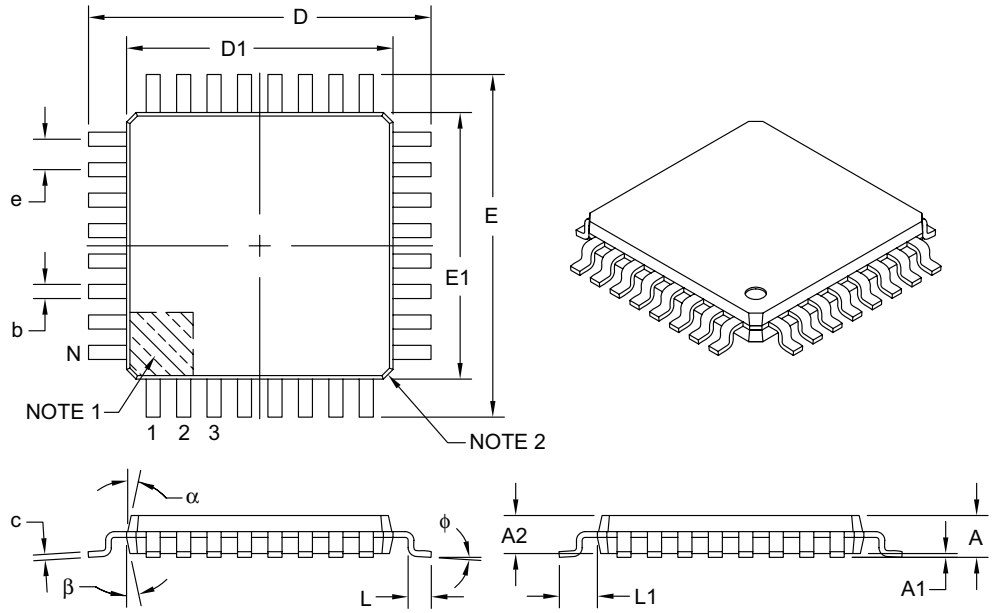
# Packaging Diagrams and Parameters

**NOTES:**

# Packaging Diagrams and Parameters

## 32-Lead Plastic Thin Quad Flatpack (PT) – 7x7x1.0 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 32 | |
| Lead Pitch | e | | 0.80 BSC | |
| Overall Height | A | – | – | 1.20 |
| Standoff | A1 | 0.05 | – | 0.15 |
| Molded Package Thickness | A2 | 0.95 | 1.00 | 1.05 |
| Foot Length | L | 0.45 | 0.60 | 0.75 |
| Footprint | L1 | | 1.00 REF | |
| Foot Angle | ϕ | 0° | 3.5° | 7° |
| Overall Width | E | | 9.00 BSC | |
| Overall Length | D | | 9.00 BSC | |
| Molded Package Width | E1 | | 7.00 BSC | |
| Molded Package Length | D1 | | 7.00 BSC | |
| Lead Thickness | c | 0.09 | – | 0.20 |
| Lead Width | b | 0.30 | 0.37 | 0.45 |
| Mold Draft Angle Top | α | 11° | 12° | 13° |
| Mold Draft Angle Bottom | β | 11° | 12° | 13° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

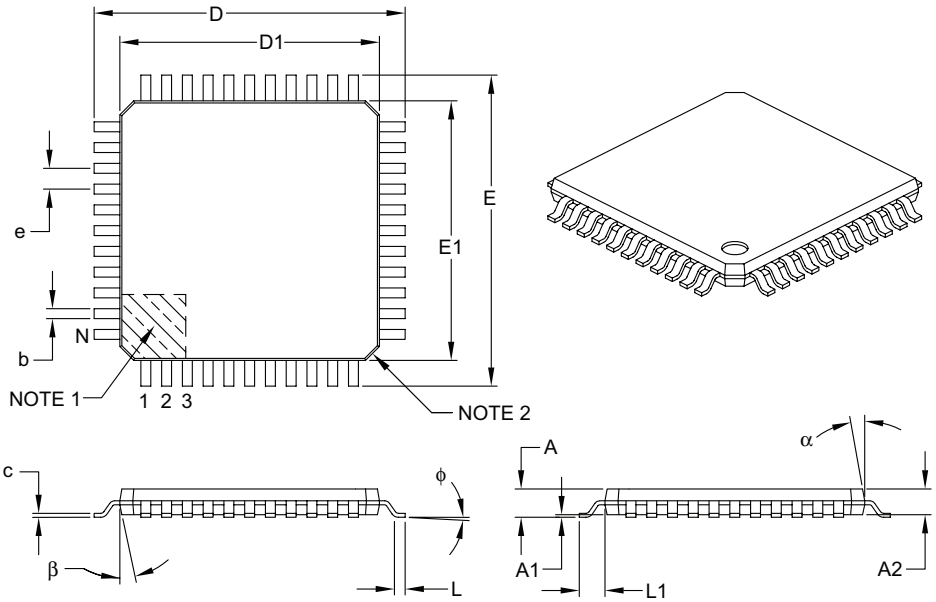
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-074B

# Packaging Diagrams and Parameters

## 44-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 44 | |
| Lead Pitch | e | | 0.80 BSC | |
| Overall Height | A | – | – | 1.20 |
| Molded Package Thickness | A2 | 0.95 | 1.00 | 1.05 |
| Standoff | A1 | 0.05 | – | 0.15 |
| Foot Length | L | 0.45 | 0.60 | 0.75 |
| Footprint | L1 | | 1.00 REF | |
| Foot Angle | φ | 0° | 3.5° | 7° |
| Overall Width | E | | 12.00 BSC | |
| Overall Length | D | | 12.00 BSC | |
| Molded Package Width | E1 | | 10.00 BSC | |
| Molded Package Length | D1 | | 10.00 BSC | |
| Lead Thickness | c | 0.09 | – | 0.20 |
| Lead Width | b | 0.30 | 0.37 | 0.45 |
| Mold Draft Angle Top | α | 11° | 12° | 13° |
| Mold Draft Angle Bottom | β | 11° | 12° | 13° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

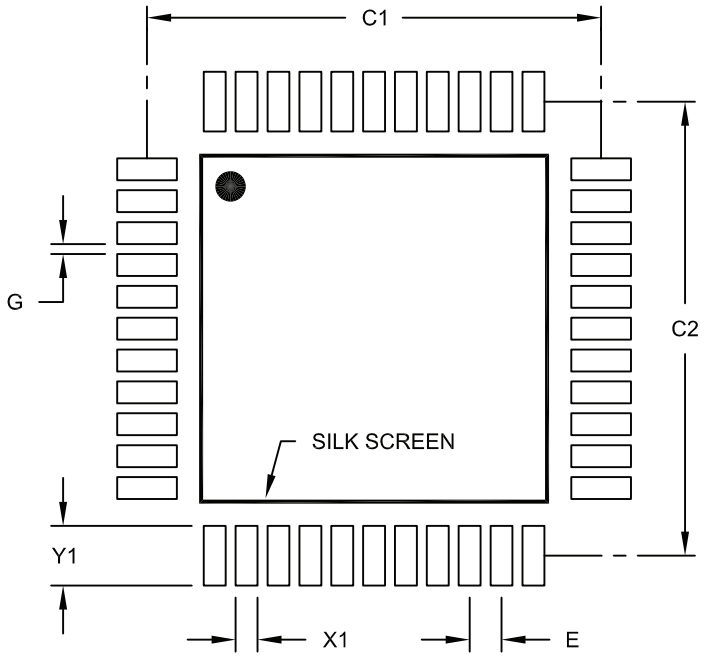
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-076B

# Land Pattern (Footprint)

### 44-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | | 0.80 BSC | |
| Contact Pad Spacing | C1 | | 11.40 | |
| Contact Pad Spacing | C2 | | 11.40 | |
| Contact Pad Width (X44) | X1 | | | 0.55 |
| Contact Pad Length (X44) | Y1 | | | 1.50 |
| Distance Between Pads | G | 0.25 | | |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

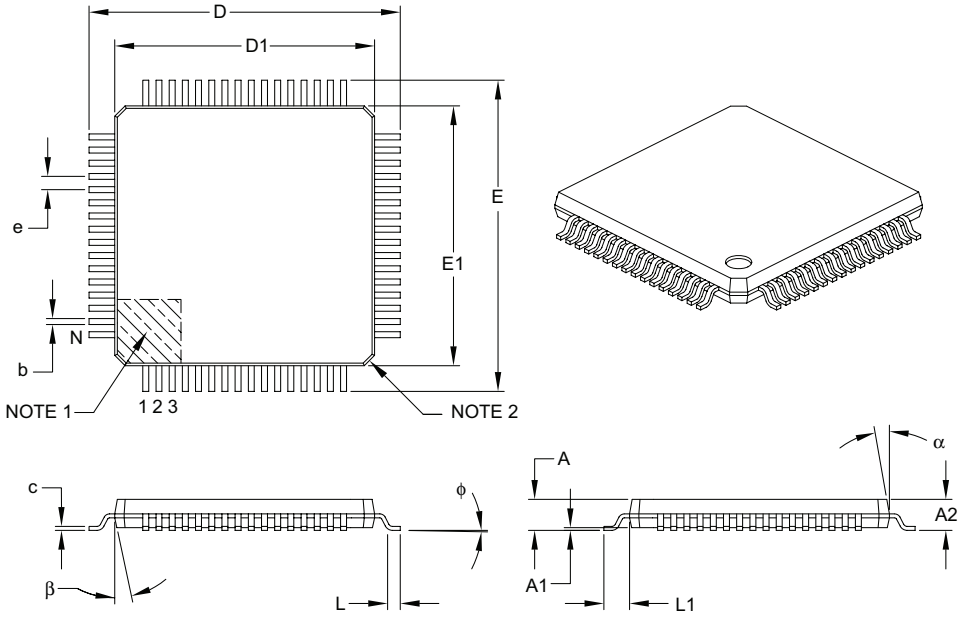
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2076A

# Packaging Diagrams and Parameters

## 64-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 64 | |
| Lead Pitch | e | | 0.50 BSC | |
| Overall Height | A | – | – | 1.20 |
| Molded Package Thickness | A2 | 0.95 | 1.00 | 1.05 |
| Standoff | A1 | 0.05 | – | 0.15 |
| Foot Length | L | 0.45 | 0.60 | 0.75 |
| Footprint | L1 | | 1.00 REF | |
| Foot Angle | ϕ | 0° | 3.5° | 7° |
| Overall Width | E | | 12.00 BSC | |
| Overall Length | D | | 12.00 BSC | |
| Molded Package Width | E1 | | 10.00 BSC | |
| Molded Package Length | D1 | | 10.00 BSC | |
| Lead Thickness | c | 0.09 | – | 0.20 |
| Lead Width | b | 0.17 | 0.22 | 0.27 |
| Mold Draft Angle Top | α | 11° | 12° | 13° |
| Mold Draft Angle Bottom | β | 11° | 12° | 13° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

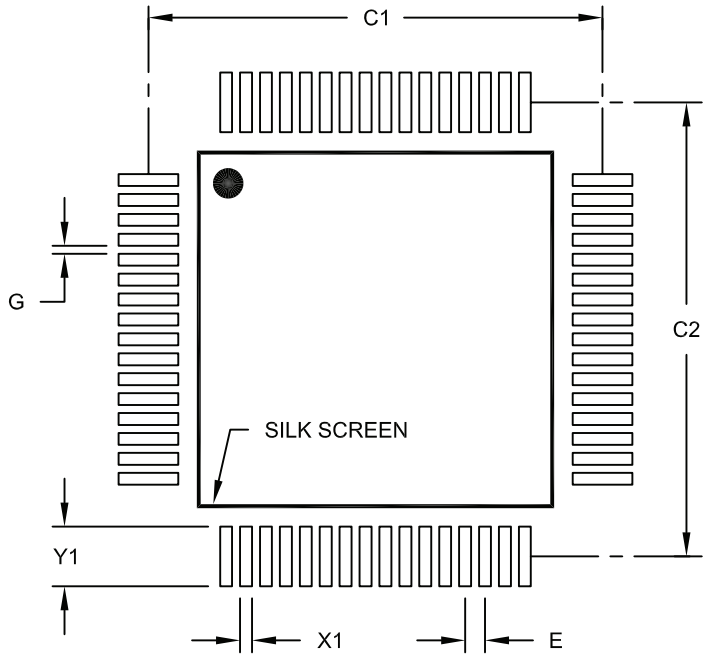
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-085B

# Land Pattern (Footprint)

## 64-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | 0.50 BSC | | |
| Contact Pad Spacing | C1 | | 11.40 | |
| Contact Pad Spacing | C2 | | 11.40 | |
| Contact Pad Width (X64) | X1 | | | 0.30 |
| Contact Pad Length (X64) | Y1 | | | 1.50 |
| Distance Between Pads | G | 0.20 | | |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

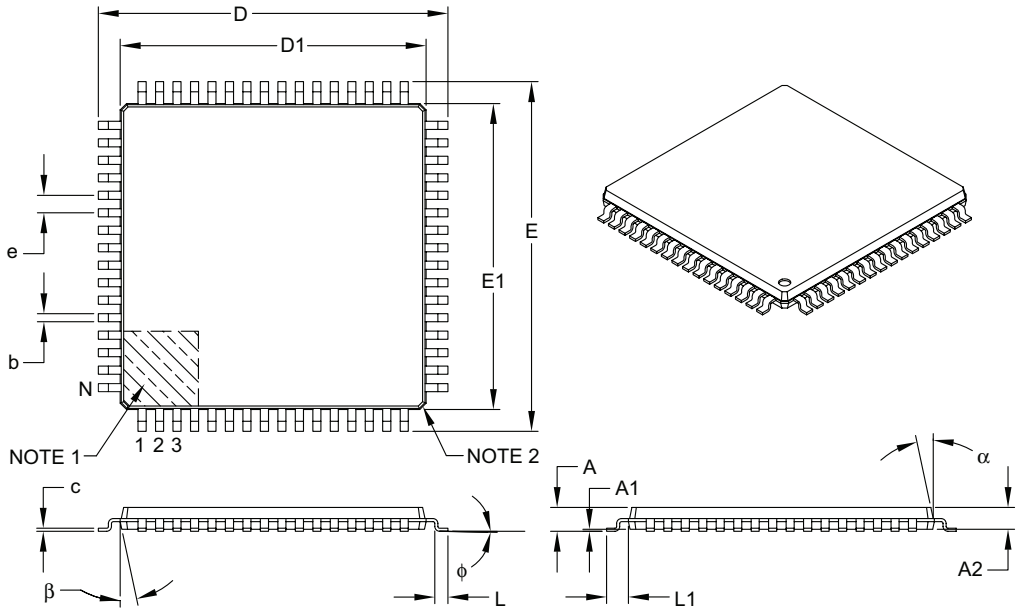
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2085A

# Packaging Diagrams and Parameters

## 64-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 64 | |
| Lead Pitch | e | | 0.80 BSC | |
| Overall Height | A | – | – | 1.20 |
| Molded Package Thickness | A2 | 0.95 | 1.00 | 1.05 |
| Standoff | A1 | 0.05 | – | 0.15 |
| Foot Length | L | 0.45 | 0.60 | 0.75 |
| Footprint | L1 | | 1.00 REF | |
| Foot Angle | ϕ | 0° | 3.5° | 7° |
| Overall Width | E | | 16.00 BSC | |
| Overall Length | D | | 16.00 BSC | |
| Molded Package Width | E1 | | 14.00 BSC | |
| Molded Package Length | D1 | | 14.00 BSC | |
| Lead Thickness | c | 0.09 | – | 0.20 |
| Lead Width | b | 0.30 | 0.37 | 0.45 |
| Mold Draft Angle Top | α | 11° | 12° | 13° |
| Mold Draft Angle Bottom | β | 11° | 12° | 13° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

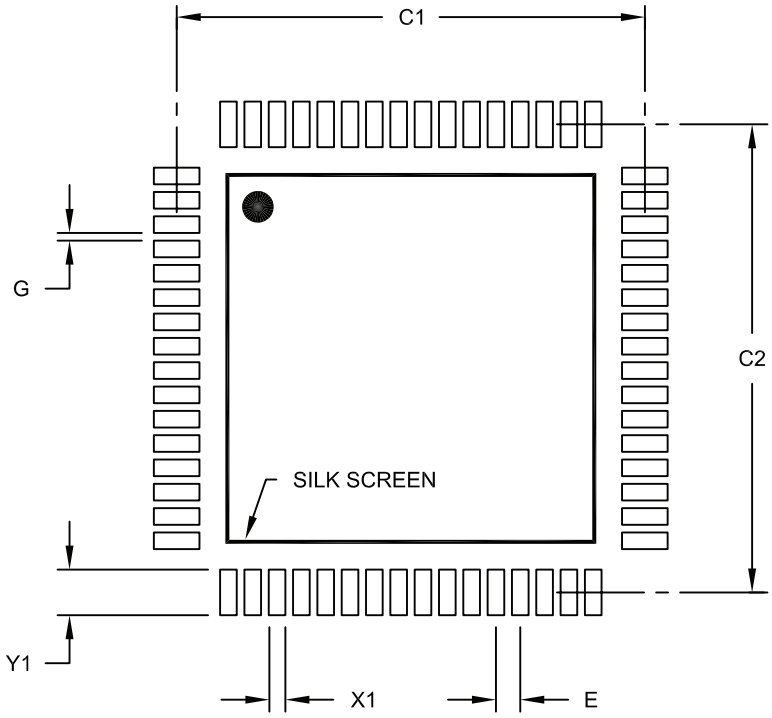
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-066B

# Land Pattern (Footprint)

## 64-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | | 0.80 BSC | |
| Contact Pad Spacing | C1 | | 15.40 | |
| Contact Pad Spacing | C2 | | 15.40 | |
| Contact Pad Width (X64) | X1 | | | 0.55 |
| Contact Pad Length (X64) | Y1 | | | 1.50 |
| Distance Between Pads | G | 0.25 | | |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

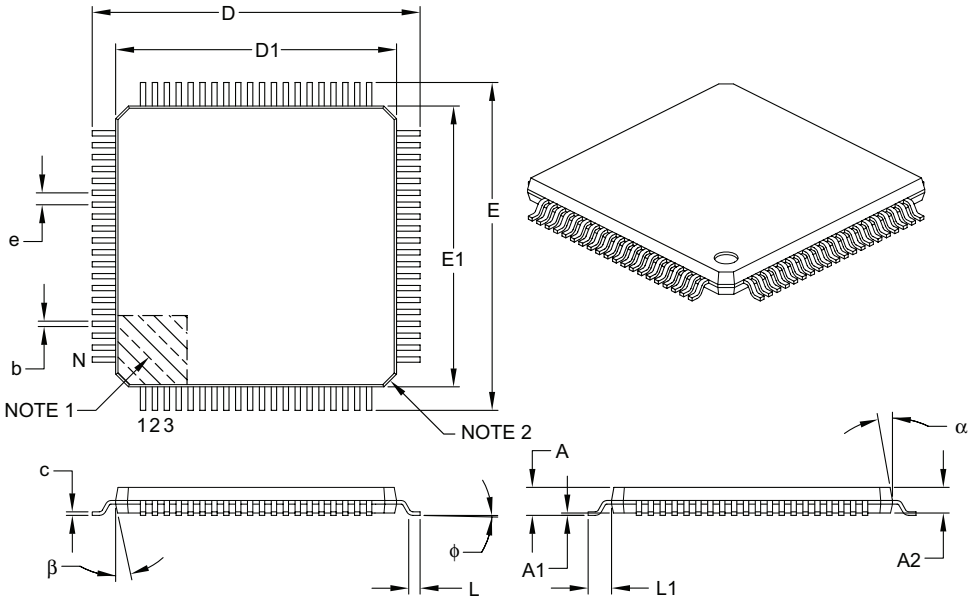
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2066A

# Packaging Diagrams and Parameters

## 80-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 80 | |
| Lead Pitch | e | | 0.50 BSC | |
| Overall Height | A | – | – | 1.20 |
| Molded Package Thickness | A2 | 0.95 | 1.00 | 1.05 |
| Standoff | A1 | 0.05 | – | 0.15 |
| Foot Length | L | 0.45 | 0.60 | 0.75 |
| Footprint | L1 | | 1.00 REF | |
| Foot Angle | ϕ | 0° | 3.5° | 7° |
| Overall Width | E | | 14.00 BSC | |
| Overall Length | D | | 14.00 BSC | |
| Molded Package Width | E1 | | 12.00 BSC | |
| Molded Package Length | D1 | | 12.00 BSC | |
| Lead Thickness | c | 0.09 | – | 0.20 |
| Lead Width | b | 0.17 | 0.22 | 0.27 |
| Mold Draft Angle Top | α | 11° | 12° | 13° |
| Mold Draft Angle Bottom | β | 11° | 12° | 13° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

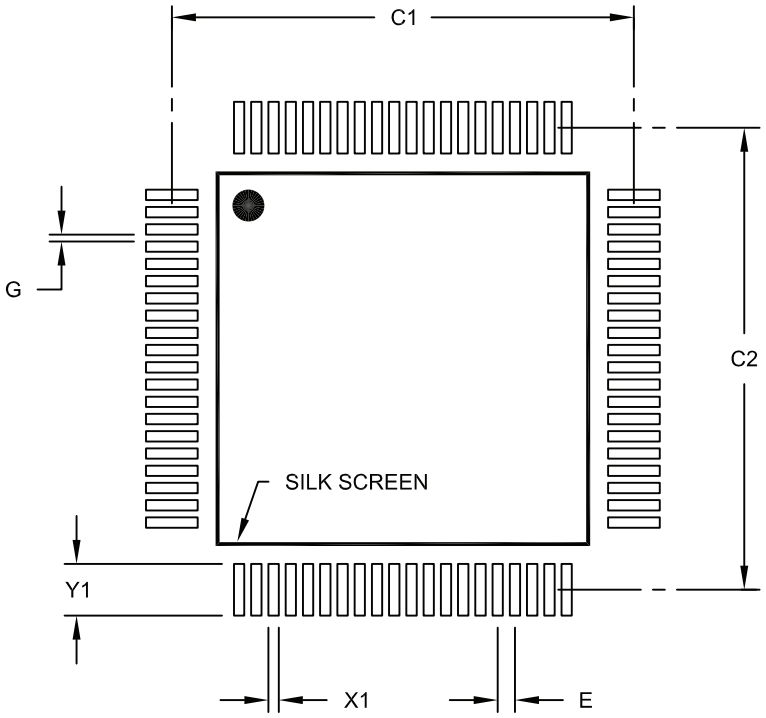
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-092B

# Land Pattern (Footprint)

## 80-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | | 0.50 BSC | |
| Contact Pad Spacing | C1 | | 13.40 | |
| Contact Pad Spacing | C2 | | 13.40 | |
| Contact Pad Width (X80) | X1 | | | 0.30 |
| Contact Pad Length (X80) | Y1 | | | 1.50 |
| Distance Between Pads | G | 0.20 | | |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

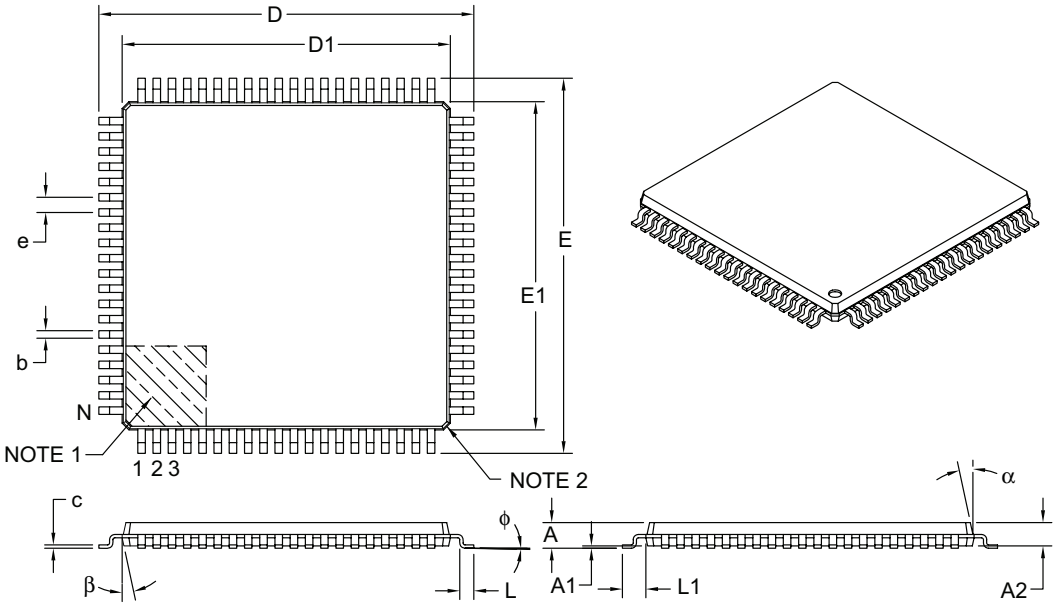
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2092A

# Packaging Diagrams and Parameters

## 80-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 80 | |
| Lead Pitch | e | | 0.65 BSC | |
| Overall Height | A | – | – | 1.20 |
| Molded Package Thickness | A2 | 0.95 | 1.00 | 1.05 |
| Standoff | A1 | 0.05 | – | 0.15 |
| Foot Length | L | 0.45 | 0.60 | 0.75 |
| Footprint | L1 | | 1.00 REF | |
| Foot Angle | φ | 0° | 3.5° | 7° |
| Overall Width | E | | 16.00 BSC | |
| Overall Length | D | | 16.00 BSC | |
| Molded Package Width | E1 | | 14.00 BSC | |
| Molded Package Length | D1 | | 14.00 BSC | |
| Lead Thickness | c | 0.09 | – | 0.20 |
| Lead Width | b | 0.22 | 0.32 | 0.38 |
| Mold Draft Angle Top | α | 11° | 12° | 13° |
| Mold Draft Angle Bottom | β | 11° | 12° | 13° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

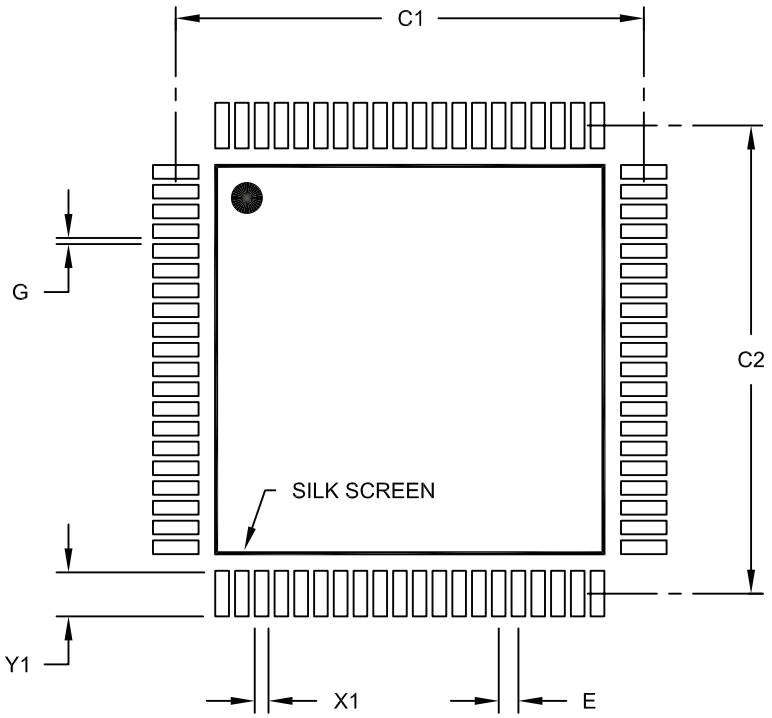
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-116B

# Land Pattern (Footprint)

## 80-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | | 0.80 BSC | |
| Contact Pad Spacing | C1 | | 15.40 | |
| Contact Pad Spacing | C2 | | 15.40 | |
| Contact Pad Width (X80) | X1 | | | 0.45 |
| Contact Pad Length (X80) | Y1 | | | 1.50 |
| Distance Between Pads | G | 0.20 | | |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

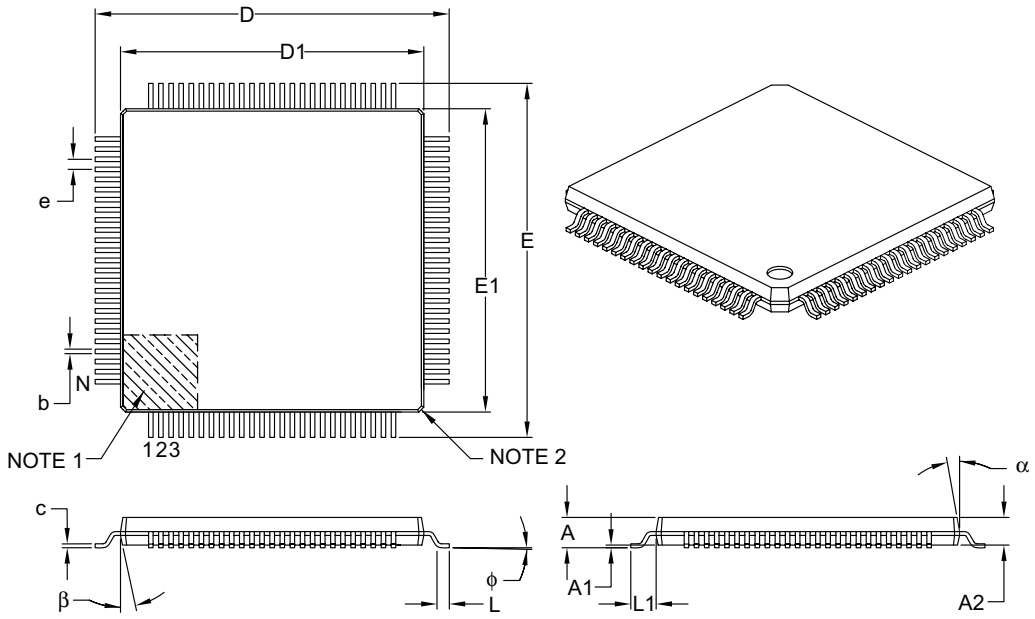
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2116A

# Packaging Diagrams and Parameters

## 100-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 100 | |
| Lead Pitch | e | | 0.40 BSC | |
| Overall Height | A | – | – | 1.20 |
| Molded Package Thickness | A2 | 0.95 | 1.00 | 1.05 |
| Standoff | A1 | 0.05 | – | 0.15 |
| Foot Length | L | 0.45 | 0.60 | 0.75 |
| Footprint | L1 | | 1.00 REF | |
| Foot Angle | ϕ | 0° | 3.5° | 7° |
| Overall Width | E | | 14.00 BSC | |
| Overall Length | D | | 14.00 BSC | |
| Molded Package Width | E1 | | 12.00 BSC | |
| Molded Package Length | D1 | | 12.00 BSC | |
| Lead Thickness | c | 0.09 | – | 0.20 |
| Lead Width | b | 0.13 | 0.18 | 0.23 |
| Mold Draft Angle Top | α | 11° | 12° | 13° |
| Mold Draft Angle Bottom | β | 11° | 12° | 13° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

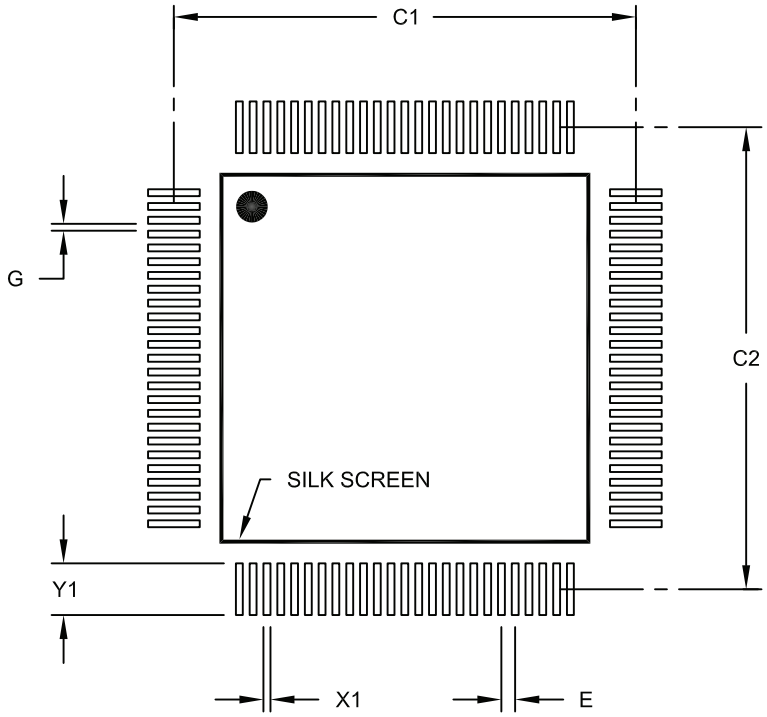
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-100B

# Land Pattern (Footprint)

### 100-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | | 0.40 BSC | |
| Contact Pad Spacing | C1 | | 13.40 | |
| Contact Pad Spacing | C2 | | 13.40 | |
| Contact Pad Width (X100) | X1 | | | 0.20 |
| Contact Pad Length (X100) | Y1 | | | 1.50 |
| Distance Between Pads | G | 0.20 | | |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

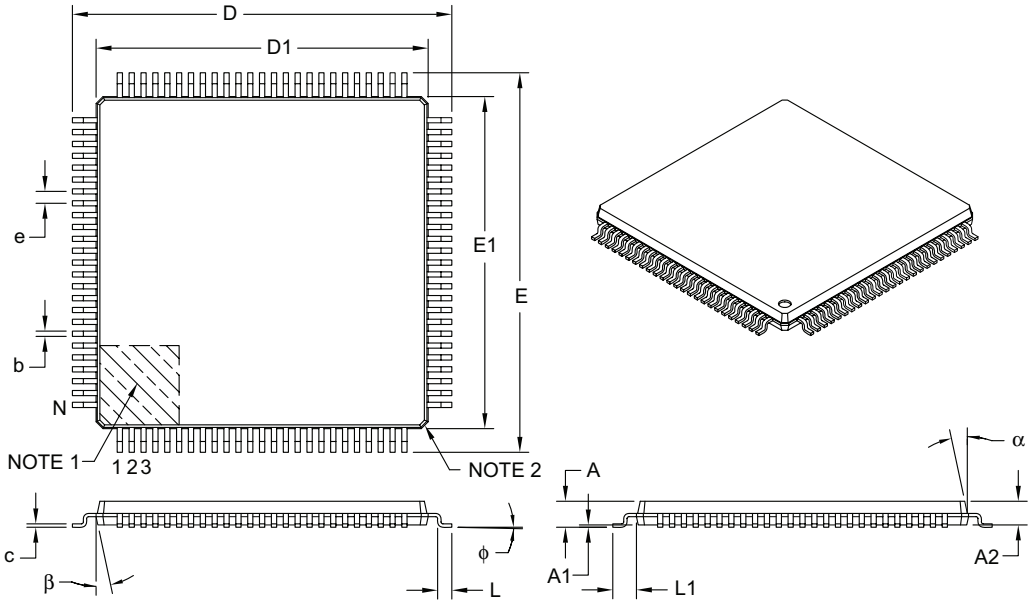
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2100A

# Packaging Diagrams and Parameters

## 100-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Leads | N | | 100 | |
| Lead Pitch | e | | 0.50 BSC | |
| Overall Height | A | – | – | 1.20 |
| Molded Package Thickness | A2 | 0.95 | 1.00 | 1.05 |
| Standoff | A1 | 0.05 | – | 0.15 |
| Foot Length | L | 0.45 | 0.60 | 0.75 |
| Footprint | L1 | | 1.00 REF | |
| Foot Angle | ϕ | 0° | 3.5° | 7° |
| Overall Width | E | | 16.00 BSC | |
| Overall Length | D | | 16.00 BSC | |
| Molded Package Width | E1 | | 14.00 BSC | |
| Molded Package Length | D1 | | 14.00 BSC | |
| Lead Thickness | c | 0.09 | – | 0.20 |
| Lead Width | b | 0.17 | 0.22 | 0.27 |
| Mold Draft Angle Top | α | 11° | 12° | 13° |
| Mold Draft Angle Bottom | β | 11° | 12° | 13° |

**Notes:**

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

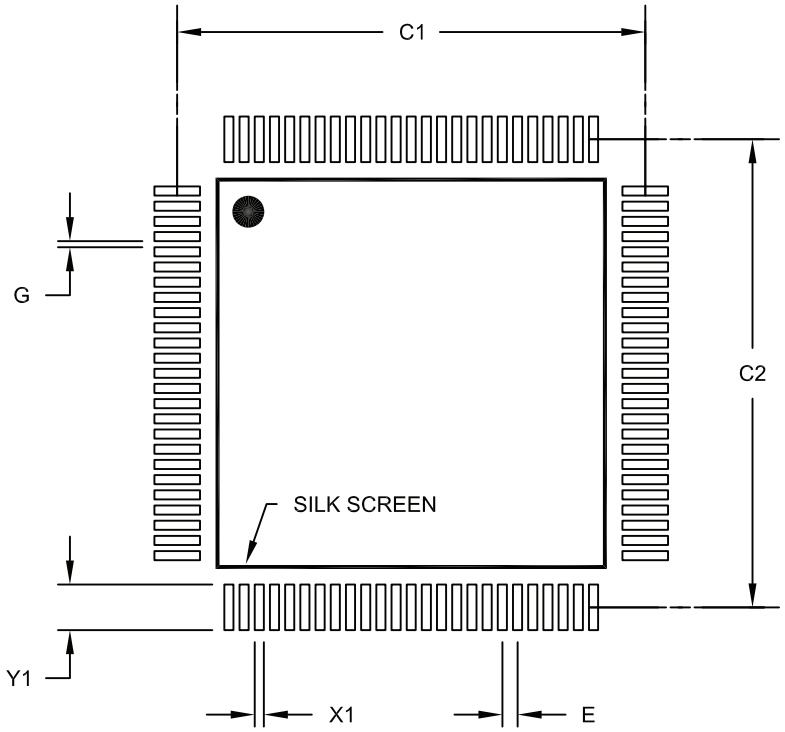
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-110B

# Land Pattern (Footprint)

### 100-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




RECOMMENDED LAND PATTERN

| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Contact Pitch | E | | 0.50 BSC | |
| Contact Pad Spacing | C1 | | 15.40 | |
| Contact Pad Spacing | C2 | | 15.40 | |
| Contact Pad Width (X100) | X1 | | | 0.30 |
| Contact Pad Length (X100) | Y1 | | | 1.50 |
| Distance Between Pads | G | 0.20 | | |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2110A

# Packaging Diagrams and Parameters

**NOTES:**

# Overview of Microchip Die/Wafer Support

## INTRODUCTION

In addition to packaged devices, Microchip Technology Inc. devices are available in wafer and die form. All products sold in die or wafers have been characterized and qualified according to the requirements of Microchip Technology Inc. Specifications SPI-41014, “Characterization and Qualification of Integrated Circuits” and QCI-39000, “Worldwide Quality Conformance Requirements”.

## PRODUCT INTEGRITY

Product supplied in die or wafer form is fully tested and characterized. Die and wafers are inspected to Microchip Technology Inc. Specification, QCI-30014.

**CAUTION**

Some EEPROM devices use EPROM cells for device configuration. Exposure to ultraviolet light must be avoided. Exposure to ultraviolet light may cause the device to operate improperly.

Extreme care is urged in the handling and assembly of these products since they are susceptible to damage from electro-static discharge.

## PACKAGING OPTIONS

Die/wafer products are available as individual Die in Waffle Pack, Whole Wafers or as Sawn Wafer on Frame. As a standard, all die on a wafer are tested and Ink Dots are used to indicate the bad die on a wafer. Inkless wafers with electronic wafer maps are also available upon request. To acquire individual electronic wafer maps, customers can request a password-protected account on a Microchip FTP site where their wafer maps are stored and easily downloaded.

Various wafer thicknesses are available, which include 8, 11, 15 and 29 mils for unground wafers. Standard wafer thickness varies from product to product, so contact your Microchip Sales Office for details.

## ORDERING INFORMATION

Die sales must be initiated by contacting your Microchip Sales Office. To order or to obtain information (on pricing or delivery) for a specific device, use one of the following part numbers.

| **Standard Thickness Die/Wafer** | | **EEPROM Examples** |
|---|---|---|
| DEVICE_NUMBER/S | Die in Waffle Pack | 24LC01B-I/S |
| DEVICE_NUMBER/W | Whole Wafers | 24LC01B-I/W |
| DEVICE_NUMBER/WF | Sawn Wafer on Frame | 24LC01B-I/WF |
| **No Backgrind Wafers** | | |
| DEVICE_NUMBER/WNBG | Whole Wafers with Ink | 24LC01B-I/WNBG |
| DEVICE_NUMBER/WNBI | Whole Wafers without Ink | 24LC01B-I/WNBI |
| **Standard Die/Wafers with Manufacturing Process Included in Part Number** | | |
| DEVICE_NUMBER/SXXX | Die in Waffle Pack | 24LC01B-I/S15K |
| DEVICE_NUMBER/WXXX | Whole Wafers | 24LC01B-I/W15K |
| DEVICE_NUMBER/WFXXX | Sawn Wafer on Frame | 24LC01B-I/WF15K |

DEVICE_NUMBER is the base part number of the device that you require, the S specifies Die in Waffle Pack, a W specifies a Whole Wafer and WF specifies Sawn Wafer on Frame. Whole wafers specified as NBG are shipped as inked wafers with no backgrind (29 mils) and those specified as NBI are shipped with no backgrind and without Ink.

As further clarification, the manufacturing process is sometimes indicated with a three digit suffix added at the end of the part number. For example, a wafer from the 160K process will use the suffix 16K, one from the 150K process will use 15K and one from the 121K process will use 12K.

## ELECTRICAL SPECIFICATIONS

The functional and electrical specifications of Microchip devices in die form are identical to those of a packaged version. Please refer to individual data sheets for complete details.

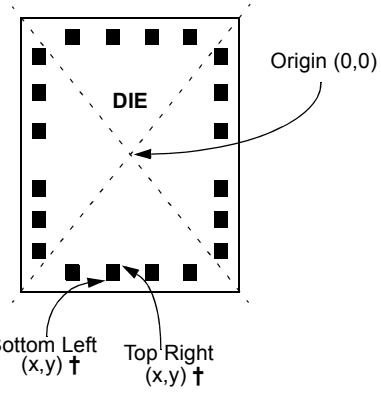
## DIE MECHANICAL SPECIFICATIONS

Refer to the individual data sheet for these specifications.

## BOND PAD COORDINATES

The die figures have associated bond pad coordinates. These coordinates assist in the attaching of the bond wire to the die. All the dimensions of these coordinates are in micrometers (μm) unless otherwise specified. The origin for the coordinates is the center of the die, as shown in Figure 1. Refer to the specific die data sheet for each device for openings and pitch.

**FIGURE 1: DIE COORDINATE ORIGIN**




† All dimensions in μm unless specified otherwise.

The die is capable of thermosonic gold or ultrasonic wire bonding. Die meet the minimum conditions of MIL-STD 883, Method 2011 on “Bond Strength (Destructive Bond Pull Test)”. The Bond Pad metallization is silicon doped aluminum.

## SUBSTRATE BONDING

Substrate bonding may be required on certain product families. For more information, refer to the specific die data sheet for that product.

## SHIPPING OPTIONS

### Die Form (/S)

Microchip product in die form can be shipped in waffle pack. The waffle pack has sufficient cavity area to restrain the die, while maintaining their orientation. Lint free paper inserts are placed over the waffle packs, and each pack is secured with a plastic locking clip. Groups of waffle packs are assembled into sets for shipment. A label with lot number, quantity and part number is attached.

These waffle packs are hermetically sealed in bags.

### Wafer Form (/W)

Products may also be shipped in wafer form (see ordering information). Wafers are uncut and shipped in a wafer tub. The tub is padded with non-conductive foam. Lint free paper inserts are placed around each wafer. A label with lot number, quantity and part number is attached.

### Sawn Wafer on Frames (/WF)

Products may also be shipped on wafer frames. Wafers are mounted on plastic frames and 100% sawn through. Sawn wafer on frames may be shipped in bulk (25 wafers per carrier) or as a single wafer in a carrier. A label with lot number, quantity and part number is attached with each shipment.

### Storage Procedures

Temperature and humidity greatly affect the storage life of die. It is recommended that the die be used as soon as possible after receipt.

Upon receipt, the sealed bags should be stored in a cool and dry environment (25°C and 25% relative humidity). In these conditions, sealed bags have a shelf life of 12 months. Temperatures or humidities greater than these will reduce the storage life.

Once a bag containing waffle packs has been opened, the devices should be assembled and encapsulated within 48 hours (assuming 25°C and 25% humidity).

## APPENDIX A: REVISION HISTORY

### Revision AE (September 2005)

The following is the list of modifications:

1. Added **Appendix A: Revision History**.
2. Revised dimensions D2 and E2 in the 8-Lead Plastic, No Lead (MC) 2x3x0.9 mm body (DFN) – Saw Singulated package diagram
3. Corrected graphic format in all packaging diagrams.
4. Added the following Packages:
   - 16-Lead Plastic Small Outline Narrow Body (QSOP)
   - 4-Lead Plastic Small Outline Transistor (SOT-143)
   - 3-Lead Plastic Small Outline Transistor (SOT-223)
   - 32-Lead Thin Quad Flatpack 7x7x1mm Body 1.0/0.10 Lead Form (TQFP)
   - 3-Lead SC-70 package diagram corrected.
5. The following package diagrams were replaced:
   - Drawing C04-142 replaced by C04-128 (5-Lead Small Outline Transistor) (TSOT)
   - Drawing C04-300 replaced by C04-132 (24-Lead Plastic Shrink Small Outline) (SSOP)
6. Added Part Number Designators DB, RC and QR to Part Number Suffix Designations table.

### Revision AF (January 2006)

The following is the list of modifications:

1. Revised 28-Lead Plastic Shrink Small Outline (SS) – 209 mil body, 5.30 mm (SSOP)
2. Revised 28-Lead Plastic Quad Flat No Lead (MM) 6x6x0.9 mm body (QFN-S) with 0.40 mm Contact Length (Saw Singulated)

### Revision AG (July 2006)

The following is the list of modifications:

1. Revised 8-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm (TSSOP)
2. Added 40-Lead Plastic Quad Flat, No Lead (MM) 6x6x0.9 mm Body (QFN) with 0.40 mm Contact Length (Saw Singulated
3. Added 3-Lead Plastic Transistor Outline (AB) (TO-220)
4. Removed Drawing No. C04-300 as it does not exist.
5. Revised 28-Lead Plastic Shrink Small Outline (SS) – 209 mil Body, 5.30 mm (SSOP)
6. Revised 20-Lead Plastic Shrink Small Outline (SS) – 209 mil Body, 5.30 mm (SSOP)
7. Revised 14-Lead Plastic Small Outline (SL) – Narrow, 150 mil (SOIC)
8. Revised 64-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 1.0/0.10 mm Lead Form (TQFP)
9. Revised 80-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 1.0/0.10 mm Lead Form (TQFP)
10. Revised Part Number Suffix Designations

### Revision AH (August 2006)

The following is the list of modifications:

1. Revised 28-Lead Plastic Quad Flat No Lead (ML) 6x6 mm Body (QFN) with 0.55 mm Contact Length (Saw Singulated)

### Revision AJ (September 2006)

The following is the list of modifications:

1. Revised 8-Lead Plastic Dual Flat, No Lead Package (MC) - 2x3x0.9 mm Body [DFN]
2. Revised 8-Lead Plastic Dual Flat, No Lead Package (MF) - 6x5 mm Body (DFN-S) – Punch Singulated
3. Revised 8-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9 mm Body [DFN]
4. Revised 8-Lead Plastic Dual Flat, No Lead Package (MD) - 4x4x0.9 mm Body [DFN]
5. Revised 8-Lead Plastic Dual Flat, No Lead Package (MF) - 6x5 mm Body [DFN-S]
6. Revised 10-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9 mm Body [DFN]
7. Revised 16-Lead Plastic Quad Flat, No Lead Package (ML) - 4x4x0.9 mm Body [QFN]
8. Revised 20-Lead Plastic Quad Flat, No Lead Package (ML) - 4x4x0.9 mm Body [QFN]
9. Revised 28-Lead Plastic Quad Flat, No Lead Package (ML) - 6x6 mm Body [QFN] With 0.55 mm Contact Length
10. Revised 28-Lead Plastic Quad Flat, No Lead Package (MM) - 6x6x0.9 mm Body [QFN-S] With 0.40 mm Contact Length
11. Revised 40-Lead Plastic Quad Flat, No Lead Package (MM) 6x6x0.9 mm Body [QFN] With 0.40 mm Contact Length
12. Revised 44-Lead Plastic Quad Flat, No Lead Package (ML) - 8x8 mm Body [QFN]
13. Revised 8-Lead Plastic Micro Small Outline Package (MS) [MSOP]
14. Revised 10-Lead Plastic Micro Small Outline Package (MS) [MSOP]

### Revision AK (January 2007)

The entire Packaging Specification has been updated.

### Revision AL (February 2007)

Packages were revised. Telcom package designators were added where the designators vary from Microchip designators.

1. Revised 3-Lead Plastic Transistor Outline (TO or ZB) [TO-92]
2. Revised 3-Lead Plastic Small Outline Transistor (TT or NB) [SOT-23]
3. Revised 3-Lead Plastic Small Outline Transistor (CB or NB) [SOT-23A]
4. Revised 3-Lead Plastic Small Outline Transistor (DB) [SOT-223]
5. Revised 5-Lead Plastic Small Outline Transistor (DB) [SOT-223]
6. Revised 4-Lead Plastic Small Outline Transistor (RC) [SOT-143]
7. Revised 5-Lead Plastic Small Outline Transistor (OT or CT) [SOT-23]
8. Revised 6-Lead Plastic Small Outline Transistor (CH) [SOT-23]
9. Revised 8-Lead Plastic Dual In-Line (P or PA) 300 mil Body [PDIP]
10. Revised 14-Lead Plastic Dual In-Line (P or PD) 300 mil Body [PDIP]
11. Revised 16-Lead Plastic Dual In-Line (P or PE) 300 mil Body [PDIP]
12. Revised 24-Lead Plastic Dual In-Line (P or PG) 600 mil Body [PDIP]
13. Revised 24-Lead Skinny Plastic Dual In-Line (SP or PF) 300 mil Body [SPDIP]
14. Revised 28-Lead Skinny Plastic Dual In-Line (SP or PJ) 300 mil Body [SPDIP]
15. Revised 28-Lead Plastic Dual In-Line (P or PI) 600 mil Body [PDIP]
16. Revised 40-Lead Plastic Dual In-Line (P or PL) 600 mil Body [PDIP]
17. Revised 20-Lead Plastic Leaded Chip Carrier (L) Square [PLCC]
18. Revised 28-Lead Plastic Leaded Chip Carrier (L or LI) Square [PLCC]
19. Revised 32-Lead Plastic Leaded Chip Carrier (L) Rectangle [PLCC]
20. Revised 44-Lead Plastic Leaded Chip Carrier (L or LW) Square [PLCC]
21. Revised 68-Lead Plastic Leaded Chip Carrier (L or LS) Square [PLCC]
22. Revised 84-Lead Plastic Leaded Chip Carrier (L) Square [PLCC]
23. Revised 8-Lead Plastic Small Outline (SN or OA) Narrow, 3.90 mm Body [SOIC]
24. Revised 14-Lead Plastic Small Outline (SL or OD) Narrow, 3.90 mm Body [SOIC]
25. Revised 16-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body [SOIC]
26. Revised 8-Lead Plastic Small Outline (SM) Medium, 5.28 mm Body [SOIJ]
27. Revised 16-Lead Plastic Small Outline (SO or OE) Wide, 7.50 mm Body [SOIC]
28. Revised 18-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC]
29. Revised 20-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC]
30. Revised 24-Lead Plastic Small Outline (SO or PF) Wide, 7.50 mm Body [SOIC]
31. Revised 28-Lead Plastic Small Outline (SO or OI) Wide, 7.50 mm Body [SOIC]
32. Revised 8-Lead Plastic Micro Small Outline Package (MS or UA) [MSOP]
33. Revised 10-Lead Plastic Micro Small Outline Package (MS or UN) [MSOP]
34. Revised 16-Lead Plastic Shrink Small Outline Narrow Body (QR) .150" Body [QSOP]
35. Revised 64-Lead Plastic Metric Quad Flatpack (KU) 14x14x2.7 mm Body, 3.20 mm Footprint [MQFP]
36. Revised 44-Lead Plastic Metric Quad Flatpack (KW) 10x10x2.0 mm Body, 3.9 mm Footprint [PQFP]

### Revision AM (March 2007)

Four Microchip and Telcom package designators were corrected and one package was removed.

1. Revised 6-Lead Plastic Small Outline Transistor (CH) [SOT-23] to (CH or OT)
2. Revised 3-Lead Plastic Small Outline Transistor (CB or NB) [SOT-23A] to (CB)
3. Revised 44-Lead Plastic Metric Quad Flatpack (PQ) [MQFP] to (PQ or KW)
4. Revised 64-Lead Plastic Metric Quad Flatpack (KU) [MQFP] to (BU)
5. Deleted 44-Lead Plastic Metric Quad Flatpack (KW) – 10x10x2.0 mm Body, 3.9 mm Footprint [PQFP]

### Revision AN (March 2007)

16-Lead Plastic Shrink Small Outline Narrow Body (QR) .150” Body [QSOP]: the nominal pitch value for the package is corrected to “.025.” This correction revises MCHP Drawing C04-024B to C04-024C.

Packages with a Microchip and a Telcom designator are represented on separate pages, rather than having both designators on a single page.

### Revision AP (April 2007)

Revised 40-Lead Ceramic Dual In-Line with Window (JW) .600” Body [CERDIP]. The E-1 MAX dimension has changed from “.540” to “.583”. This correction revises MCHP Drawing C04-014B to C04-014C.

### Revision AQ (July 2007)

Revised 5-Lead Plastic Small Outline Transistor [SOT-223] package designator from (DB) to (DC). This correction revises MCHP Drawing C04-137A to C04-137B.

### Revision AR (September 2007)

Land patterns have been added for the following 13 packages:

8-Lead Plastic Small Outline (SN) – Narrow, 3.90 mm Body [SOIC]

28-Lead Plastic Quad Flat, No Lead Package (ML) – 6x6 mm Body [QFN]
with 0.55 mm Contact Length

28-Lead Plastic Quad Flat, No Lead Package (MM) – 6x6x0.9 mm Body [QFN-S]
with 0.40 mm Contact Length

44-Lead Plastic Quad Flat, No Lead Package (ML) – 8x8 mm Body [QFN]

44-Lead Plastic Metric Quad Flatpack (PQ) – 10x10x2 mm Body, 3.20 mm [MQFP]

64-Lead Plastic Metric Quad Flatpack (BU) – 14x14x2.7 mm Body, 3.20 mm [MQFP]

44-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP]

64-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP]

64-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

80-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

80-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

100-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

100-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Please refer to the Packaging Index for page numbers.

**Notes:** Packaging outline drawings and land pattern drawings appear on facing pages.

The last three digits of a package outline drawing number will always correspond to the last three digits of the land pattern drawing number.

The Microchip drawing number for any land pattern begins with the following characters: C04-2xxx.

# Packaging

**NOTES:**

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