

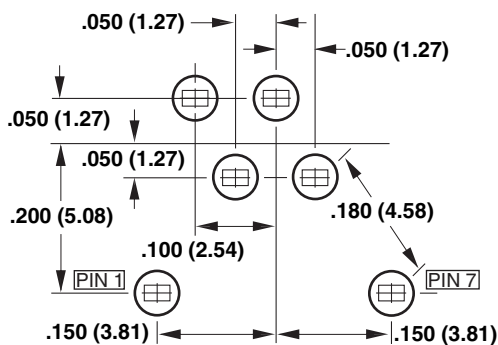
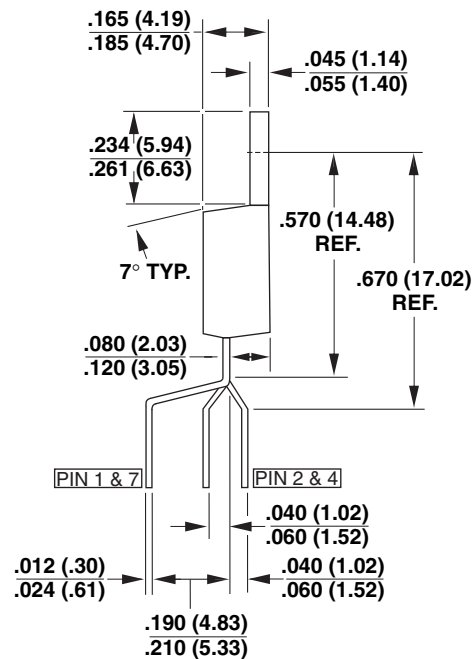
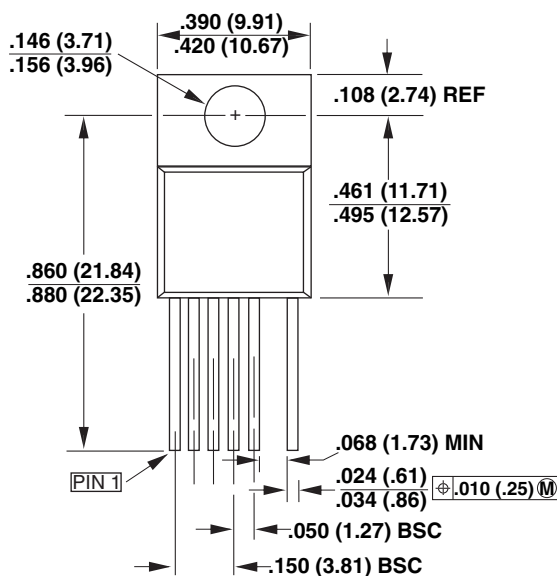
# Package Information

## Package Design Specifications, Tape & Reel and Assembly Information



### Package Design Specifications

#### TO-220-7C



Y07C

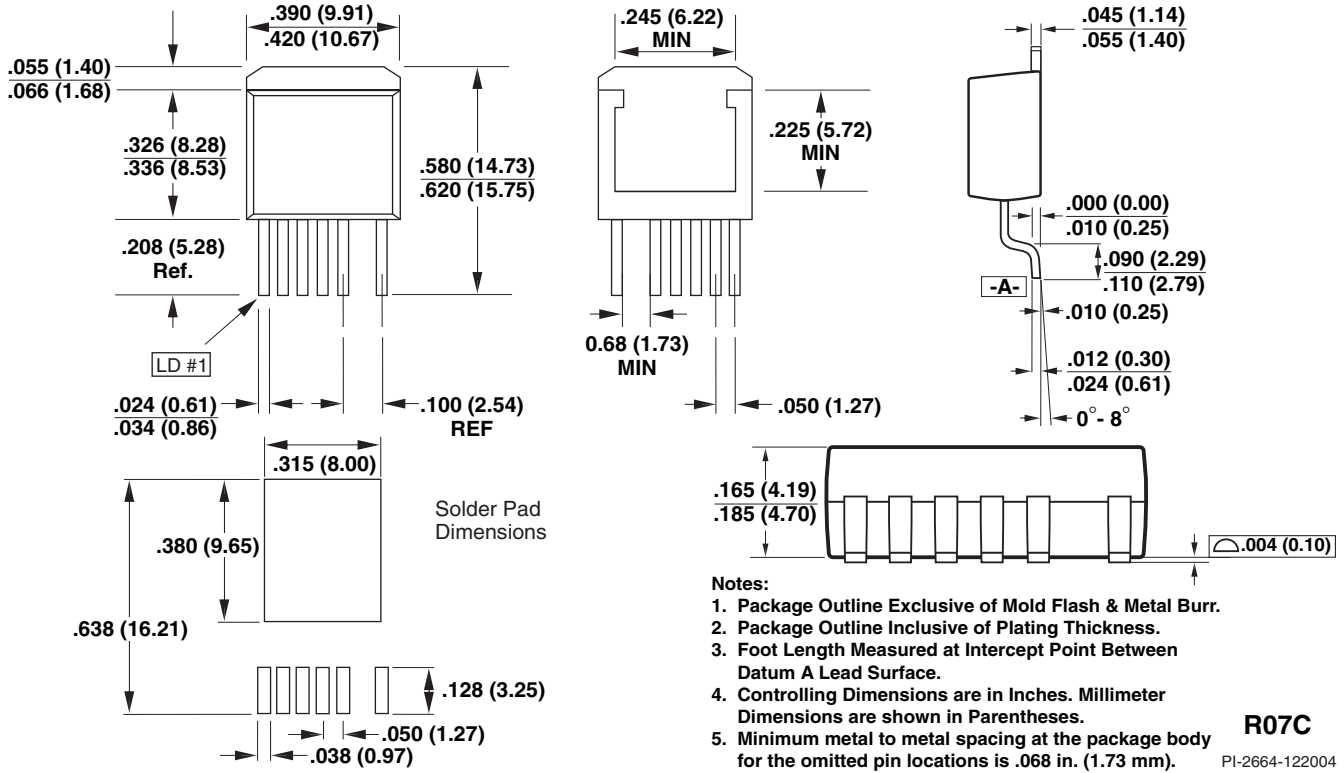
MOUNTING HOLE PATTERN

**Notes:**

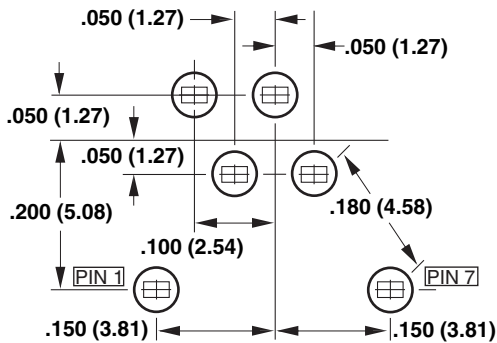
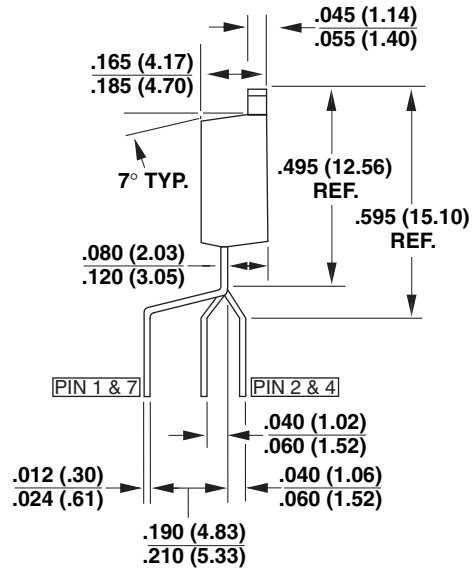
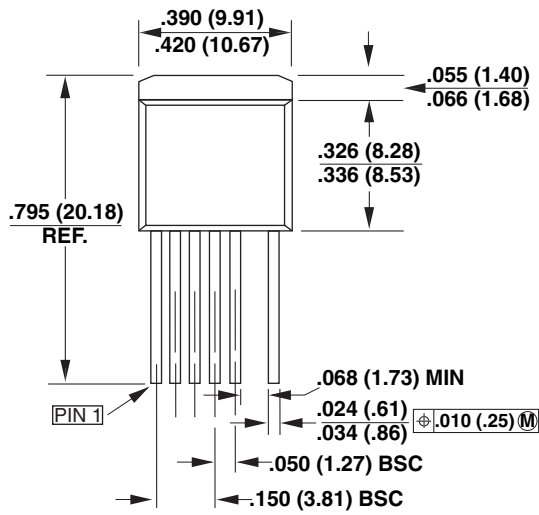
1. Controlling dimensions are inches. Millimeter dimensions are shown in parentheses.
2. Pin numbers start with Pin 1, and continue from left to right when viewed from the front.
3. Dimensions do not include mold flash or other protrusions. Mold flash or protrusions shall not exceed .006 (.15mm) on any side.
4. Minimum metal to metal spacing at the package body for omitted pin locations is .068 in. (1.73 mm).
5. Position of terminals to be measured at a location .25 (6.35) below the package body.
6. All terminals are solder plated.

PI-2644-122004

**TO-263-7C**



TO-262-7C



F07C

MOUNTING HOLE PATTERN

Notes:

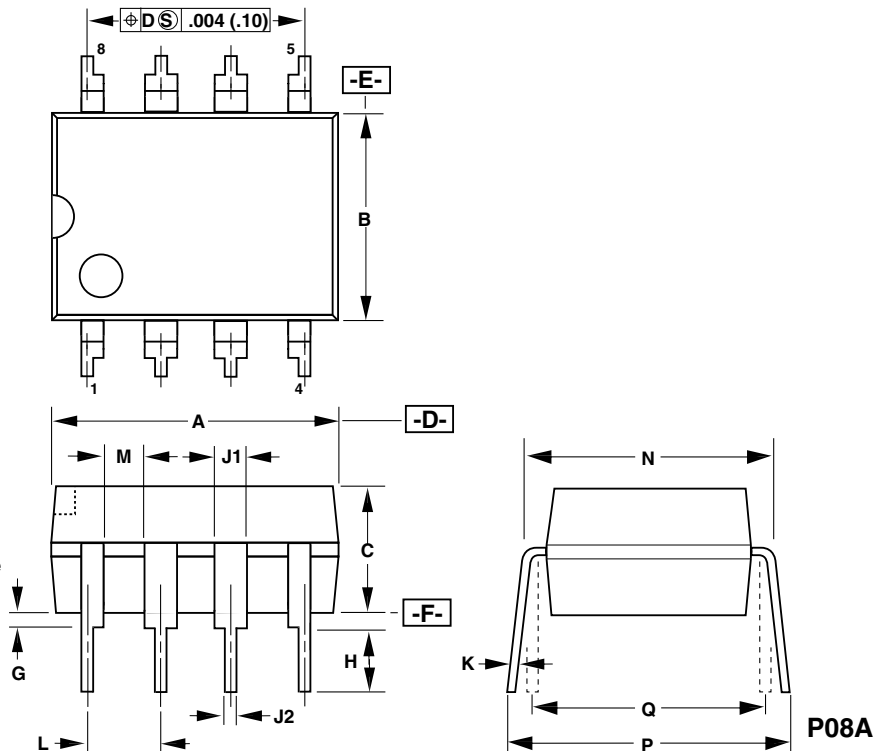
1. Controlling dimensions are inches. Millimeter dimensions are shown in parentheses.
2. Pin numbers start with Pin 1, and continue from left to right when viewed from the front.
3. Dimensions do not include mold flash or other protrusions. Mold flash or protrusions shall not exceed .006 (.15mm) on any side.
4. Minimum metal to metal spacing at the package body for omitted pin locations is .068 inch (1.73 mm).
5. Position of terminals to be measured at a location .25 (6.35) below the package body.
6. All terminals are solder plated.

PI-2757-122004

# PACKAGE INFORMATION

## DIP-8

DIM	inches	mm
A	0.367-0.387	9.32-9.83
B	0.240-0.260	6.10-6.60
C	0.125-0.145	3.18-3.68
G	0.015-0.040	0.38-1.02
H	0.120-0.140	3.05-3.56
J1	0.057-0.068	1.45-1.73
J2	0.014-0.022	0.36-0.56
K	0.008-0.015	0.20-0.38
L	0.100 BSC	2.54 BSC
M	0.030 (MIN)	0.76 (MIN)
N	0.300-0.320	7.62-8.13
P	0.300-0.390	7.62-9.91
Q	0.300 BSC	7.62 BSC

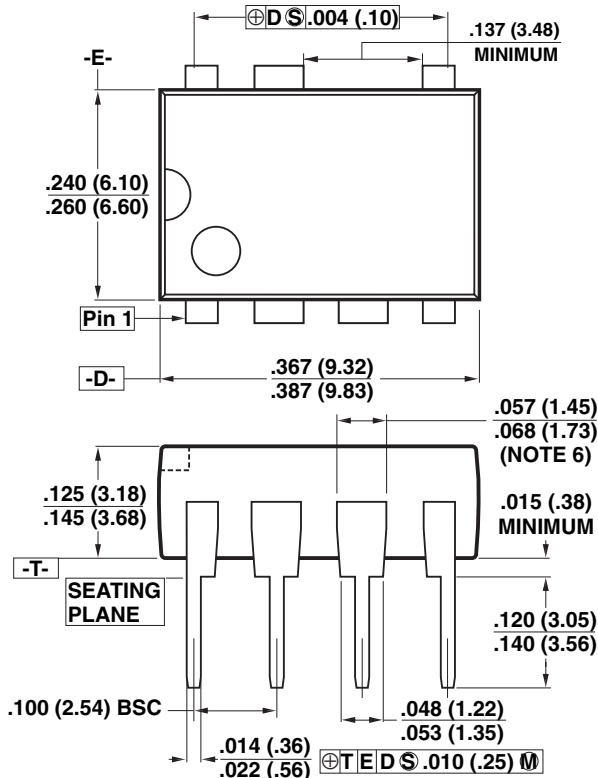


**Notes:**

1. Package dimensions conform to JEDEC specification MS-001-AB for standard dual in-line (DIP) package .300 inch row spacing (PLASTIC) 8 leads (issue B, 7/85).
2. Controlling dimensions are inches.
3. Dimensions shown do not include mold flash or other protrusions. Mold flash or protrusions shall not exceed .006 (.15) on any side.
4. D, E and F are reference datums on the molded body.

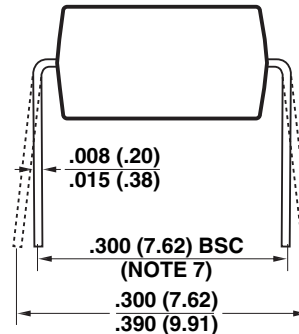
PI-2076-101102

## DIP-8B



**Notes:**

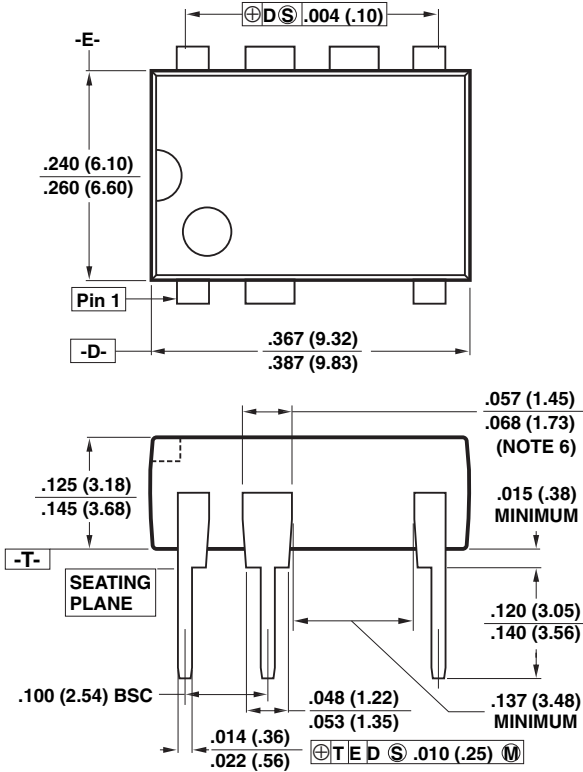
1. Package dimensions conform to JEDEC specification MS-001-AB (Issue B 7/85) for standard dual-in-line (DIP) package with .300 inch row spacing.
2. Controlling dimensions are inches. Millimeter sizes are shown in parentheses.
3. Dimensions shown do not include mold flash or other protrusions. Mold flash or protrusions shall not exceed .006 (.15) on any side.
4. Pin locations start with Pin 1, and continue counter-clockwise to Pin 8 when viewed from the top. The notch and/or dimple are aids in locating Pin 1. Pin 6 is omitted.
5. Minimum metal to metal spacing at the package body for the omitted lead location is .137 inch (3.48 mm).
6. Lead width measured at package body.
7. Lead spacing measured with the leads constrained to be perpendicular to plane T.



P08B

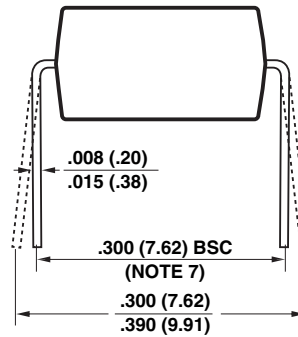
PI-2551-121504

DIP-8C



Notes:

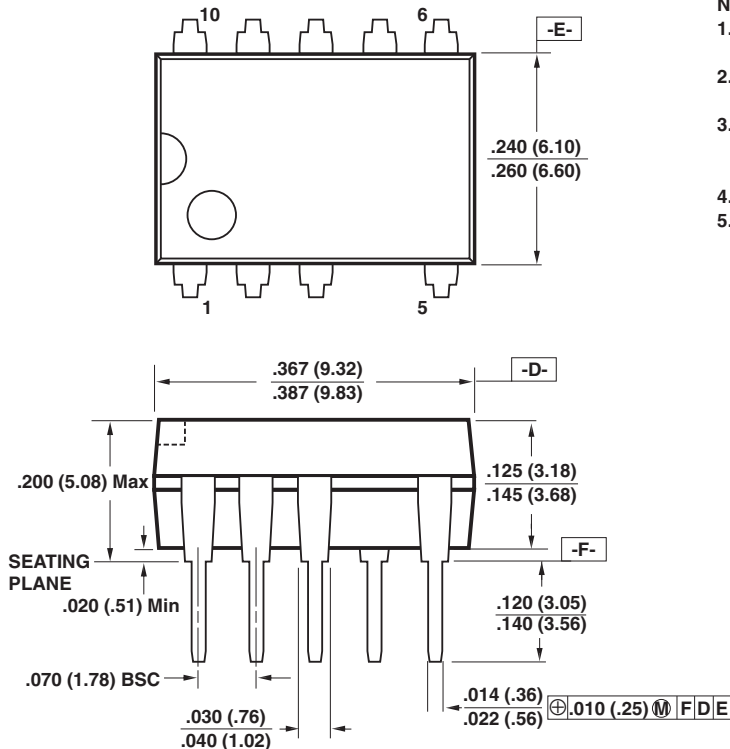
1. Package dimensions conform to JEDEC specification MS-001-AB (Issue B 7/85) for standard dual-in-line (DIP) package with .300 inch row spacing.
2. Controlling dimensions are inches. Millimeter sizes are shown in parentheses.
3. Dimensions shown do not include mold flash or other protrusions. Mold flash or protrusions shall not exceed .006 (.15) on any side.
4. Pin locations start with Pin 1, and continue counter-clockwise to Pin 8 when viewed from the top. The notch and/or dimple are aids in locating Pin 1. Pin 3 is omitted.
5. Minimum metal to metal spacing at the package body for the omitted lead location is .137 inch (3.48 mm).
6. Lead width measured at package body.
7. Lead spacing measured with the leads constrained to be perpendicular to plane T.



P08C

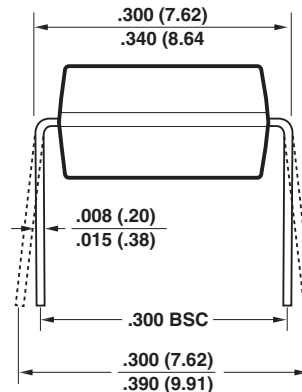
PI-3933-100504

SDIP-10C



Notes:

1. Package dimensions conform to JEDEC specification MS-019.
2. Controlling dimensions are inches. Millimeter sizes are shown in parentheses.
3. Dimensions shown do not include mold flash or other protrusions. Mold flash or protrusions shall not exceed .006 (.15) on any side.
4. D, E and F are reference datums.
5. Dimensioning and tolerancing conform to ASME Y14.5M-1994.

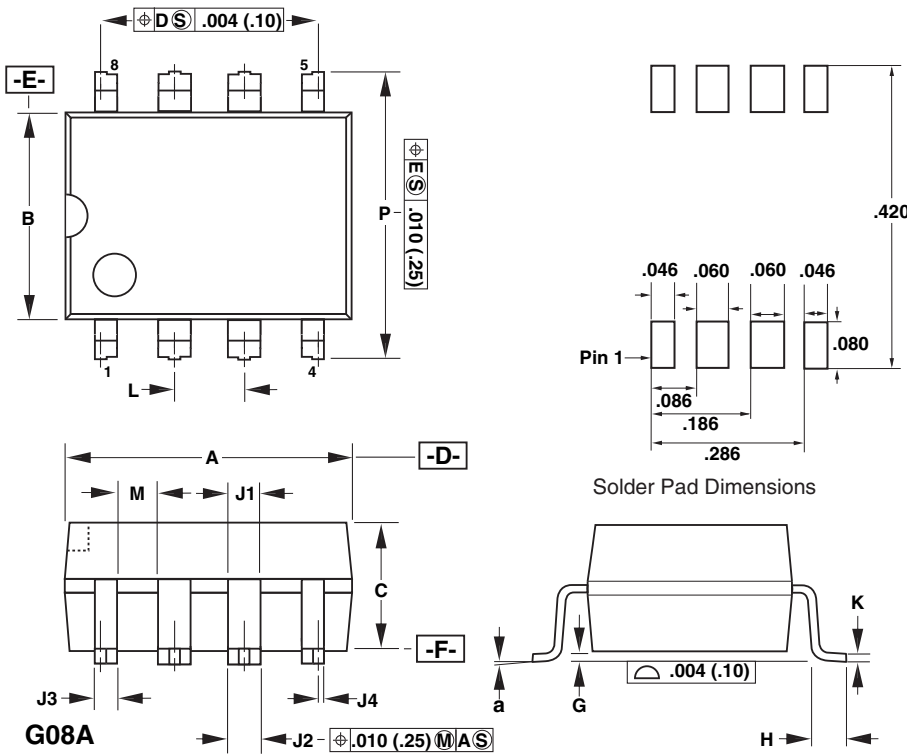


P10C

PI-4648-041107

# PACKAGE INFORMATION

## SMD-8



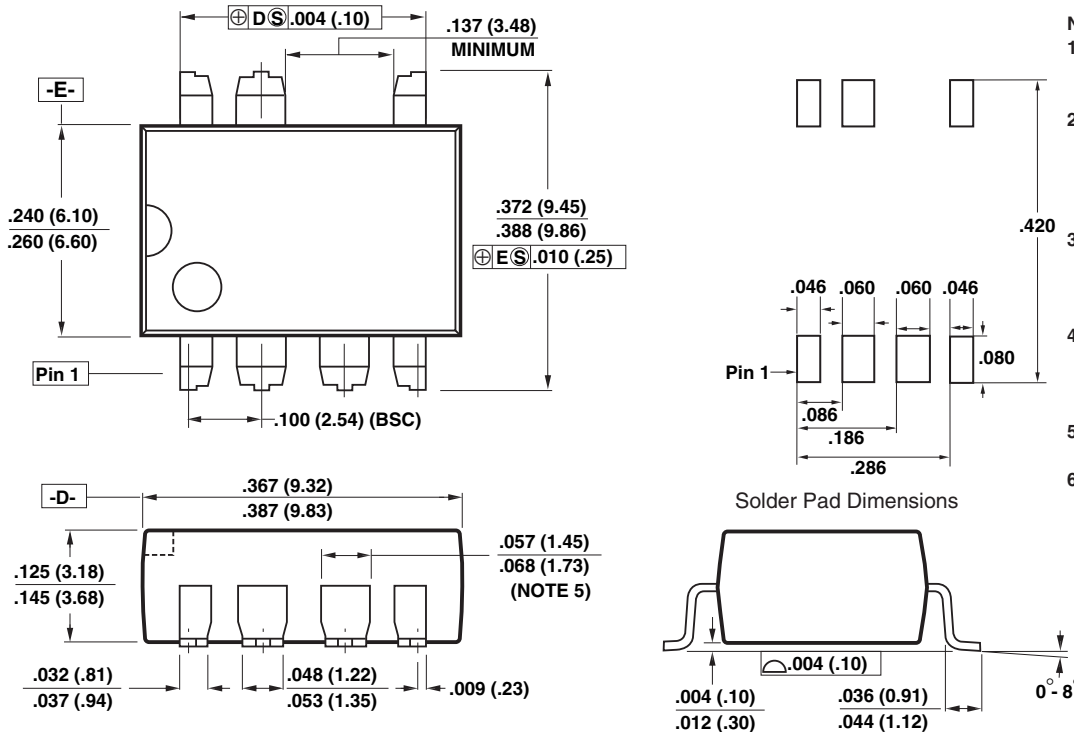
DIM	inches	mm
A	0.367-0.387	9.32-9.83
B	0.240-0.260	6.10-6.60
C	0.125-0.145	3.18-3.68
G	0.004-0.012	0.10-0.30
H	0.036-0.044	0.91-1.12
J1	0.057-0.068	1.45-1.73
J2	0.048-0.053	1.22-1.35
J3	0.032-0.037	0.81-0.94
J4	0.007-0.011	0.18-0.28
K	0.010-0.012	0.25-0.30
L	0.100 BSC	2.54 BSC
M	0.030 (MIN)	0.76 (MIN)
P	0.372-0.388	9.45-9.86
a	0-8°	0-8°

**Notes:**

1. Package dimensions conform to JEDEC specification MS-001-AB (issue B, 7/85) except for lead shape and size.
2. Controlling dimensions are inches.
3. Dimensions shown do not include mold flash or other protrusions. Mold flash or protrusions shall not exceed .006 (.15) on any side.
4. D, E and F are reference datums on the molded body.

PI-2077-041003

## SMD-8B



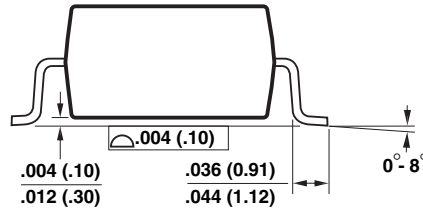
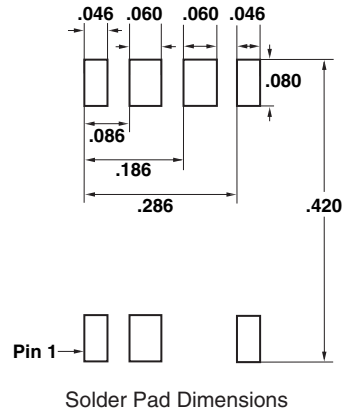
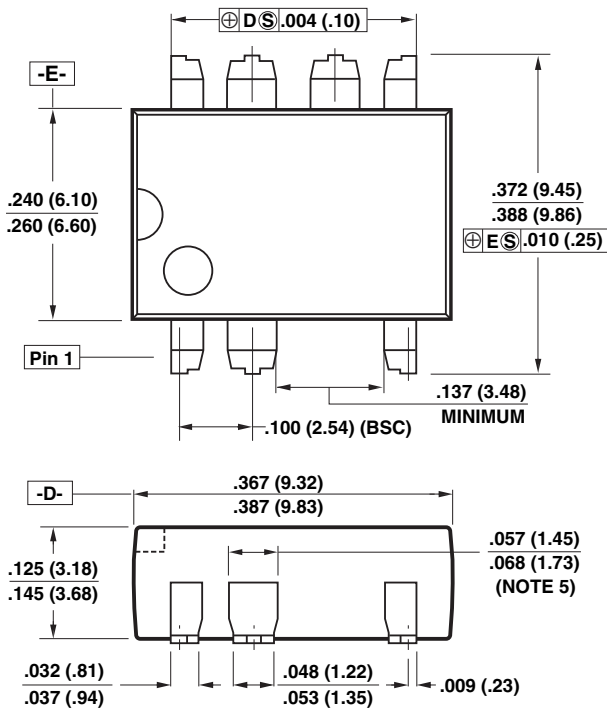
**Notes:**

1. Controlling dimensions are inches. Millimeter sizes are shown in parentheses.
2. Dimensions shown do not include mold flash or other protrusions. Mold flash or protrusions shall not exceed .006 (.15) on any side.
3. Pin locations start with Pin 1, and continue counter-clockwise to Pin 8 when viewed from the top. Pin 6 is omitted.
4. Minimum metal to metal spacing at the package body for the omitted lead location is .137 inch (3.48 mm).
5. Lead width measured at package body.
6. D and E are referenced datums on the package body.

**G08B**

PI-2546-121504

**SMD-8C**



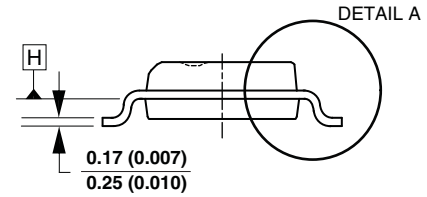
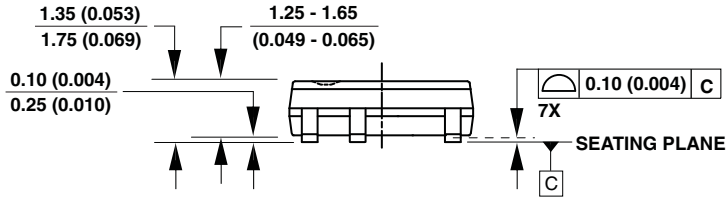
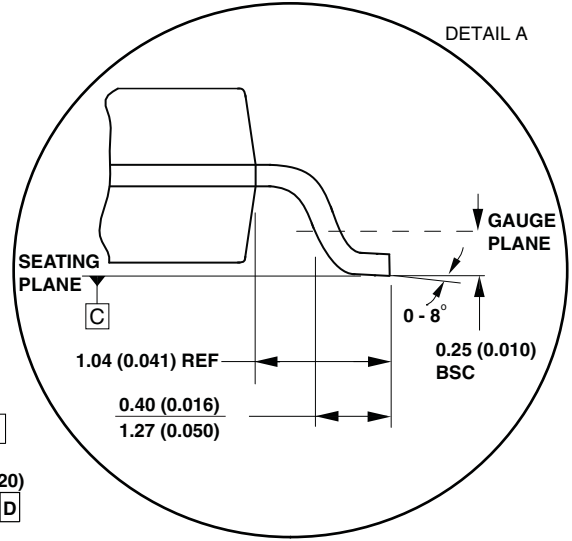
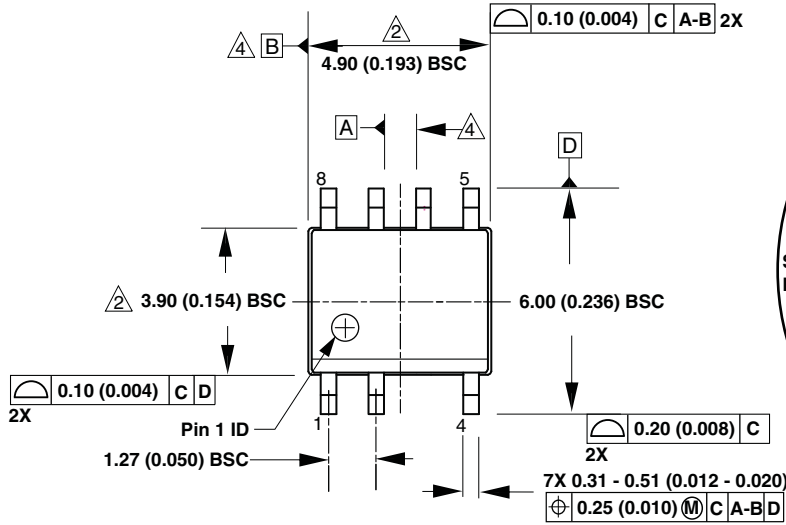
**Notes:**

1. Controlling dimensions are inches. Millimeter sizes are shown in parentheses.
2. Dimensions shown do not include mold flash or other protrusions. Mold flash or protrusions shall not exceed  $.006 (.15)$  on any side.
3. Pin locations start with Pin 1, and continue counter-clockwise to Pin 8 when viewed from the top. Pin 3 is omitted.
4. Minimum metal to metal spacing at the package body for the omitted lead location is  $.137$  inch ( $3.48$  mm).
5. Lead width measured at package body.
6. D and E are referenced datums on the package body.

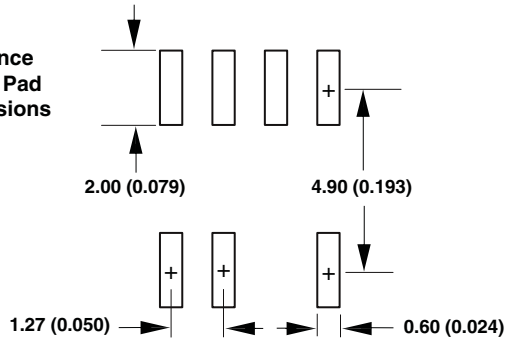
**G08C**

PI-4015-013106

**SO-8C**



Reference Solder Pad Dimensions



**Notes:**

1. JEDEC reference: MS-012.
2. Package outline exclusive of mold flash and metal burr.
3. Package outline inclusive of plating thickness.
4. Datums A and B to be determined at datum plane H.
5. Controlling dimensions are in millimeters. Inch dimensions are shown in parenthesis. Angles in degrees.

**D07C**

PI-4526-040207



## Tape & Reel Ordering Information

Power Integrations makes selected surface-mount parts available in tape and reel form for use with automatic pick-and-place equipment. Tape and reel specifications meet or exceed industry standard specification EIA-481.

### Ordering Information

Parts available in tape and reel form can be ordered by placing a T&R ordering suffix after the base part number. The ordering suffix is TL.

**Base Part #**  
TNY264G

**T&R Suffix**  
-TL

Please contact the factory for other options. Minimum order size is 1 reel per line item, and all orders will be in multiples of full reel quantities. The quantity per reel for each package type is shown in Table 1. Power Integrations normal terms and conditions apply.

### Electrical Specifications

Parts are subjected to the Power Integrations standard test flow, after which the parts are loaded into the tape cavities and sealed with a cover tape using standard anti-static handling procedures. The tape and cover are constructed of conductive modified polystyrene, providing a surface resistivity of  $\leq 10^6 \Omega/\text{square}$ . The reel is made of polystyrene with a topical anti-static coating, providing a surface resistivity of  $\leq 10^{11} \Omega/\text{square}$ .

PACKAGE	TAPE		REEL DIA	REEL QTY
	WIDTH (W)	PITCH (P)		
SMD-8	16 mm	12 mm	330 mm	1000
TO-263	24 mm	16 mm	330 mm	750
SO-8C	12 mm	8 mm	330 mm	2500

Table 1. Primary Tape & Reel Dimensions and Reel Quantities.

### Physical Specifications

Physical specifications of the tape, cover, and reel are governed by EIA-481. Physical dimensions of the tapes are given in Figure 2 and Table 2, and physical dimensions of the reels are given in Figure 3 and Table 3.

### Packaging for Shipment

Power Integrations supplies the following information on the side of each reel for ease of product identification:

- Power Integrations part number (MPN), including orientation suffix
- Encapsulation date code (D/C)
- Assembly lot identification (LOT)
- Quantity (QTY)
- Tape and reel packing date code (R/D)

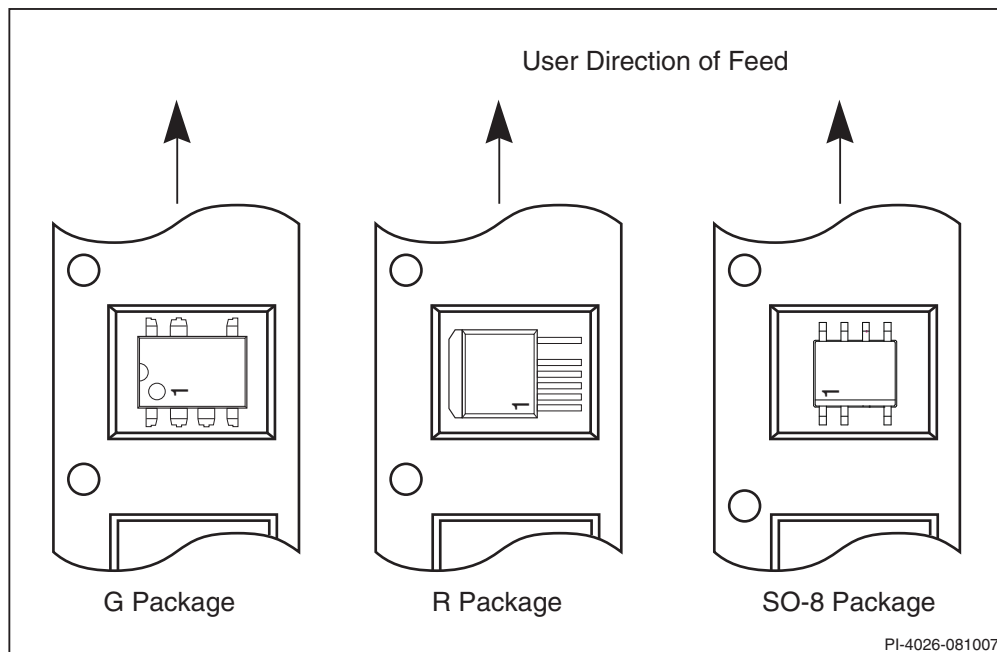
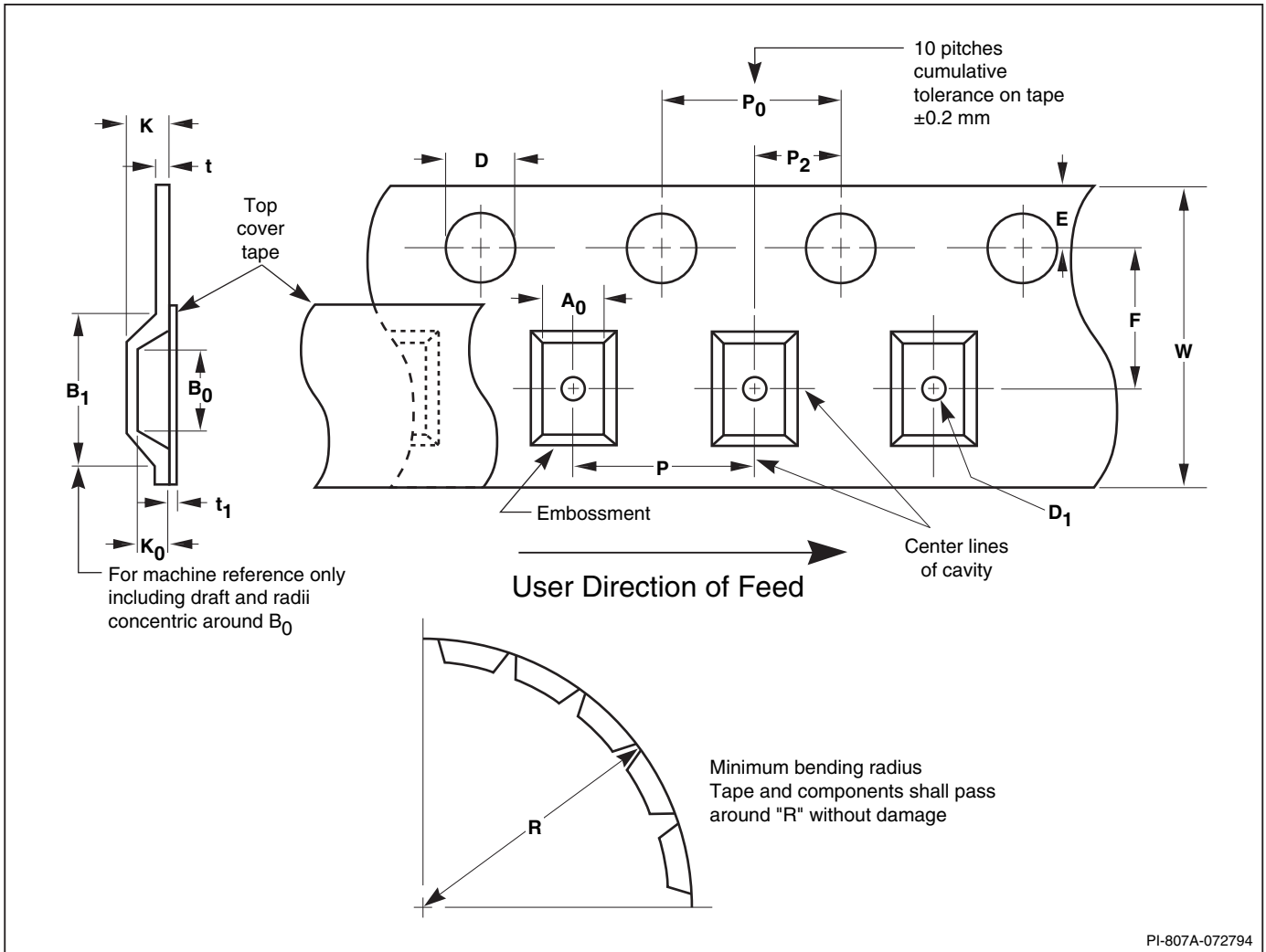


Figure 1. Part Orientation.

# PACKAGE INFORMATION



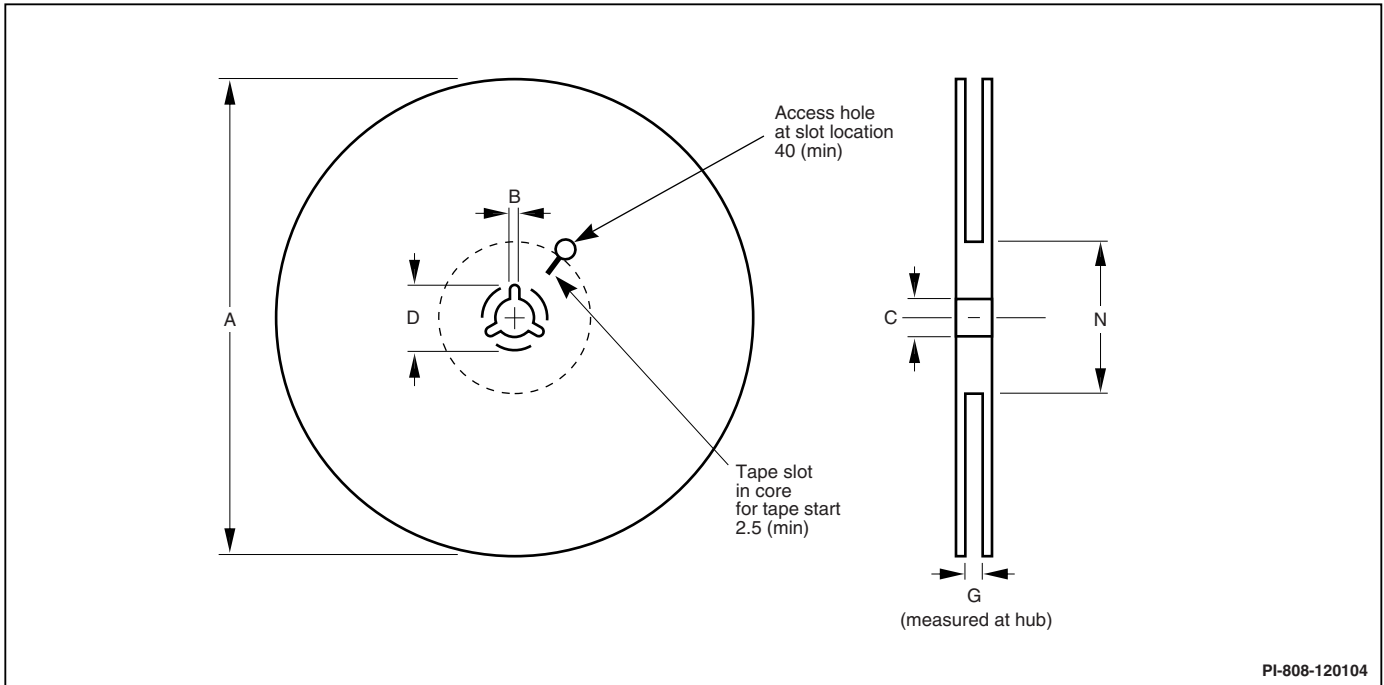
PI-807A-072794

Figure 2. Tape Dimension Index.

Package Type	Tape Size	A <sub>0</sub>	B <sub>0</sub>	B <sub>1</sub>	D	D <sub>1</sub>	E	F	K
SMD-8	16 mm	10.1-10.3	10.0-10.2	12.1 (max)	1.5-1.6	1.5 (min)	1.65-1.85	7.40-7.60	6.5 (max)
TO-263	24 mm	10.9-11.1	16.2-16.4	16.9 (max)	1.5-1.6	1.5 (min)	1.65-1.85	11.40-11.60	5.9 (max)
SO-8C	12 mm	6.5-6.7	5.2-5.4	5.8 (max)	1.5-1.6	1.5 (min)	1.65-1.85	5.45-5.55	2.2 (max)

Package Type	Tape Size	K <sub>0</sub>	P	P <sub>0</sub>	P <sub>2</sub>	R	t	t <sub>1</sub>	W
SMD-8	16 mm	3.60-3.80	11.9-12.1	3.9-4.1	1.90-2.10	40 (min)	0.400 (max)	0.10 (max)	23.7-24.3
TO-263	24 mm	5.40-5.60	15.9-16.1	3.9-4.1	1.90-2.10	50 (min)	0.350 (max)	0.07 (max)	23.7-24.3
SO-8C	12 mm	1.60-1.80	7.90-8.10	3.8-4.2	1.95-2.05	50 (min)	0.35 (max)	0.05 (typ)	11.7-12.3

Table 2. Tape Dimensions (in mm).



PI-808-120104

Figure 3. Reel Dimension Index.

Package Type	Tape Size	A	B	C	D	G	N
SMD-8	16 mm	330 (max)	1.5 (min)	12.80-13.50	20.2 (min)	16	102 (ref)
TO-263	24 mm	330 (max)	1.5 (min)	12.80-13.50	20.2 (min)	24	102 (ref)
SO-8C	12 mm	330 (max)	1.5 (min)	12.80-13.50	20.2 (min)	12	102 (ref)

Table 3. Reel Dimensions (in mm).

## Pb-Free and RoHS Compliant Products

Power Integrations is committed to environmental, health and safety excellence and is actively complying with regulatory requirements regarding the removal of hazardous materials in manufacturing standards and processes. In response to concerns regarding the environmental impact of lead (Pb), a Pb-free solder finish is now available using 100% matte tin (Sn).

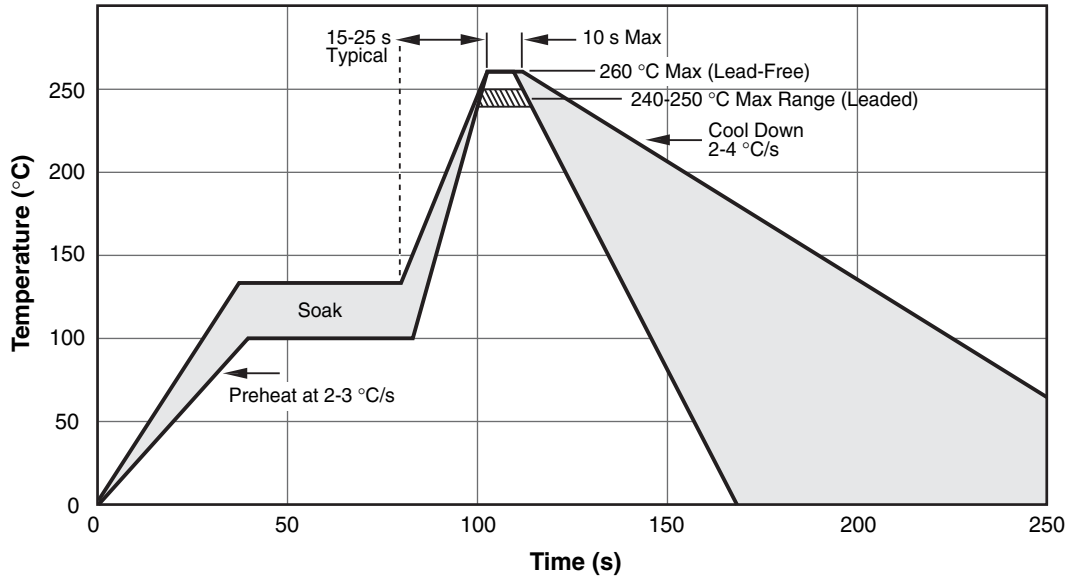
Pb-free packages offered by Power Integrations meet the requirements of the European law on the Restriction of Hazardous Substances (RoHS), which mandates the removal of lead and other hazardous substances cited in the directive.

All Pb-free and RoHS compliant products have passed qualification testing for moisture sensitivity, solderability, and whisker growth. Pb-free and RoHS compliant surface mount products also comply with the joint IPC/JEDEC industry standard on reflow solderability (J-STD-020C). More information on soldering is included below.

RoHS compliant and Pb-free products are designated by an N-suffix at the end of the part number (see the Part Ordering Information section of the product family data sheets).

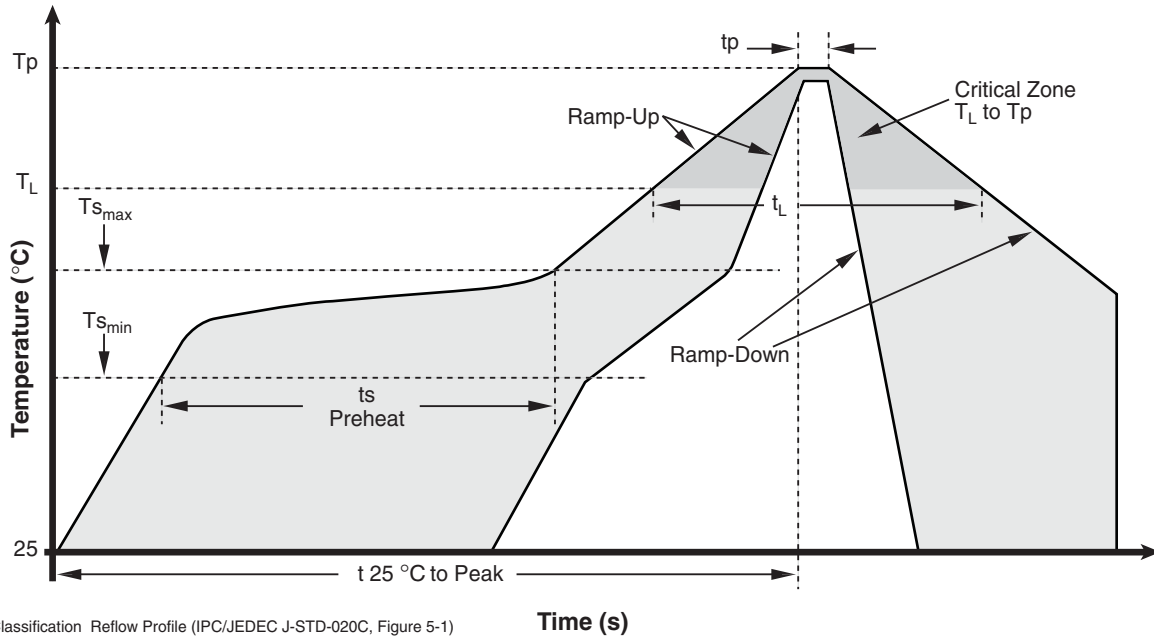
**Solder Temperature Profiles**

**TYPICAL WAVE SOLDER PROFILE FOR Sn-Pb AND Pb-FREE THROUGH-HOLE PACKAGES**



PI-3852-042706

**TYPICAL IR REFLOW PROFILE FOR LEAD-TIN AND Pb-FREE SURFACE MOUNT PACKAGES**



Classification Reflow Profile (IPC/JEDEC J-STD-020C, Figure 5-1)  
 Reproduced with permission by IPC and JEDEC, 2005

PI-3955-030107

Note 1: Pb-free packages are qualified for Sn-Pb assembly. Sn-Pb packages are not qualified for Pb-free assembly.

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-Up Rate (Ts <sub>max</sub> to Tp)	3 °C/second max.	3 °C/second max.
Preheat ± Temperature Min (Ts <sub>min</sub> ) ± Temperature Max (Ts <sub>max</sub> ) ± Time (ts <sub>min</sub> to ts <sub>max</sub> )	100 °C 150 °C 60-120 seconds	150 °C 200 °C 60-180 seconds
Time maintained above: ± Temperature (T <sub>l</sub> ) ± Time (t <sub>l</sub> )	183 °C 60-150 seconds	217 °C 60-150 seconds
Peak/Classification Temperature (Tp)	See Table 5	See Table 5
Time within 5 °C of actual Peak Temperature (tp)	10-30 seconds	20-40 seconds
Ramp-Down Rate	6 °C/second max.	6 °C/second max.
Time 25 °C to Peak Temperature	6 minutes max.	8 minutes max.

Table 4. Classification Reflow Profiles (per IPC/JEDEC J-STD-020C, Table 5.2)

Note 1: All temperatures refer to topside of the package, measured on the package body surface.

Package Type	MSL	Sn-Pb Eutectic Assembly	Pb-Free Assembly
SMD-8	4	225 +0/-5 °C	250 + 0 °C*
TO-263	4	225 +0/-5 °C	Not Available
*Tolerance: Process compatibility is up to and including the stated classification temperature (this means Peak reflow temperature + 0 °C. For example, 250 + 0 °C) at the rated MSL level.			

Table 5. Peak/Classification Temperature (Tp) for PI Surface Mount Packages.

Note 1: Classification temperatures are in accordance with guidelines set forth in IPC/JEDEC J-STD-020C.

**Soldering Guidelines:**

1. Profiles shown are typical and will therefore vary with different soldering systems.
2. Density and types of components on the board, size and type of board, solder and flux being used, substrate material being used, equipment type/model and age are factors that can influence the profile.
3. Since the melting temperature of solder is higher than the rated temperature of the device, care should be taken that the device will get as little exposure as possible at the high temperature. Not doing so increases possibility of a device failure.

4. Limit high temperature exposure only to single side or one time and mostly to the leads area only.
5. Upon completion of soldering, gradual natural cooling should be observed for a minimum of three minutes. Using forced cooling will increase temperature gradient which increases mechanical stress leading to latent failure.

**PC Board Cleaning**

Power Integrations does not recommend the use of "no-clean" flux.

## **Mounting Guidelines for TO-220 Package**

### **Maximum Torque:**

The screw torque specification for the TO-220 packages used for Power Integrations products is 4 lbf · in or 0.45 N · m (4.6 kgf · cm) maximum.

### **Mounting Guidelines:**

The recommended fastener is a 6-32 screw using a rectangular washer to prevent damage to the tab. If a rectangular washer is not used, a round flat washer is required. The head of a machine screw is not flat enough to prevent damage. Without a washer, damage to the plastic case and semiconductor chip within may occur.

A smaller screw or larger heat sink hole can cause the tab to be deformed, cracking the package. Care must also be taken to prevent contact between the plastic package and the screw head or tool used to tighten it. Self-tapping screws may deform the heat sink causing poor thermal contact.

Rivets should not be used under any circumstances for TO-220 packages.

The mounting surface must be flat and without burrs. Otherwise, the TO-220 tab may be bent, causing damage to the IC chip.

Finally, the IC should be mounted to the heat sink before soldering the assembly to the PCB. Soldering the IC and heat sink to the PCB and then screwing them together will put unacceptable mechanical stress on the IC package.