

**TABLE 1 - PACKAGING ORDERING CODE**

ANTI-STATIC PACKAGE CODE	PACKAGING DESCRIPTION
52	DO-214/215AA (SMB), 12 mm tape, 7" diameter plastic reel
2C	DO-214/215AA (SMB), 12 mm tape, 7" diameter paper reel
2D	DO-218AB (SM5-8A), 24 mm tape, 13" diameter paper reel, anode towards sprocket hole
2E	DO-218AB (SM5-8A), 24 mm tape, 13" diameter paper reel, cathode towards sprocket hole
2G	DO-214AC (SMA), 12 mm tape, 7" diameter paper reel
2M	Tube packaging for 5KP/6KA type lead formed components
53	26 mm horizontal taping and ammo box packaging
54	52.4 mm horizontal tape, 13" diameter paper reel class I
55	DO-214/215AA (SMB), 12 mm tape, 13" diameter paper reel
5A	DO-214AC (SMA), 12 mm tape, 13" diameter plastic reel
5B	DO-214/215AA (SMB), 12 mm tape, 13" diameter plastic reel
57	DO-214/215AB (SMC), 16 mm tape, 7" diameter plastic reel
58	Avisert, cathode up, cathode first out of ammo pack
59	DO-214/215AB (SMC), 16 mm tape, 13" diameter paper reel
9A	DO-214/215AB (SMC), 16 mm tape, 13" diameter plastic reel
9C	DO-214/215AB (SMC), 16 mm tape, 7" diameter paper reel
61	DO-214AC (SMA), 12 mm tape, 7" diameter plastic reel
63	DO-214AC (SMA), 12 mm tape, 13" diameter paper reel
72	Bulk pack for KBPM, GBL, GBU and special axial-leaded formed devices
73	52.4 mm horizontal tape and ammo box packaging, class I
75	DO-213AB (GL41), 12 mm tape, 7" diameter paper reel
76	DO-213AB (GL41), 12 mm tape, 13" diameter paper reel
84A	DO-220AA (SMP), 12 mm tape, 7" diameter plastic reel
85A	DO-220AA (SMP), 12 mm tape, 13" diameter plastic reel
86A	SMPC, 12 mm tape, 7" diameter plastic reel
87A	SMPC, 12 mm tape, 13" diameter plastic reel
89A	MicroSMP, 8 mm tape, 7" diameter plastic reel
94	52.4 mm horizontal tape, 13" diameter paper reel, 5 mm component, spacing for 1.5KA devices only
96	DO-213AB (GL41), 12 mm tape, 7" diameter plastic reel
97	DO-213AB (GL41), 12 mm tape, 13" diameter plastic reel
98	DO-213AA (GL34), 8 mm tape, 7" diameter plastic reel
100	MPG06 pseudo radial tape, cathode first out of ammo pack

Note:

- "T" suffix added to the packaging codes for SMA, SMB and SMC products indicates that the patented folded-frame construction is used. This does not apply to TRANSZORB® TVS in SMA and SMB

AXIAL-LEADED TAPE AND REEL PACKAGING

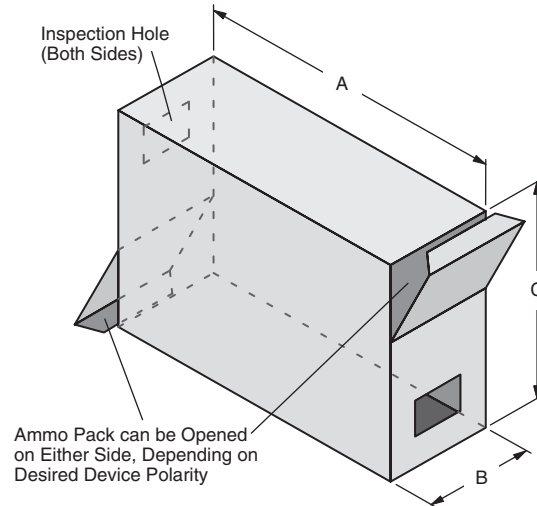


Figure 1.

TABLE 2 - AMMO PACK PACKAGING						
PACKAGING	AVAILABLE PRODUCT OUTLINES	PREFERRED PACKAGE CODE	DIMENSION A	DIMENSION B	DIMENSION C	QUANTITY BOX
26 mm horizontal tape, ammo pack	DO-204AL (DO-41),	53	9.7"	1.7"	3.7"	3.0K
	TMPG06 DO-204AC	53	(247 mm)	(44 mm)	(95 mm)	1.5K
52 mm horizontal tape, ammo pack	DO-204AL, TMPG06	73	10.0"	3.15"	4.53"	3.0K
	DO-204AC	73				2.0K
	DO-201AD, 1.5KE	73				1.0K
	P600	73				0.3K
Pseudo/radial tape, ammo pack	TMPG06	100	13.4"	1.8"	7.9"	2.5K
			(340 mm)	(47 mm)	(200 mm)	

AXIAL-LEADED TAPE AND REEL PACKAGING

All axial leaded devices are packed in accordance with EIA standard RS-296-E. The diagrams given below refer to these specifications.

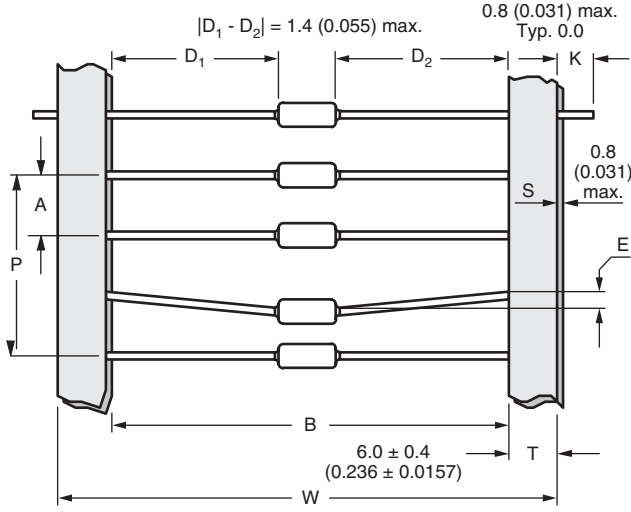


Figure 2.

DESCRIPTION	SYMBOL	
Component pitch	A	2, 3
Inside tape spacing	B	2, 3
Lead to lead eccentricity	$ D_1 - D_2 $	-
Lead extension	K	-
Lead bending	E	2
Cumulative pitch	P	3
Exposed adhesive	S	-
Tape width	T	-

Notes:

- All polarized components shall be oriented in the same direction
- All dimensions in millimeters (inches)

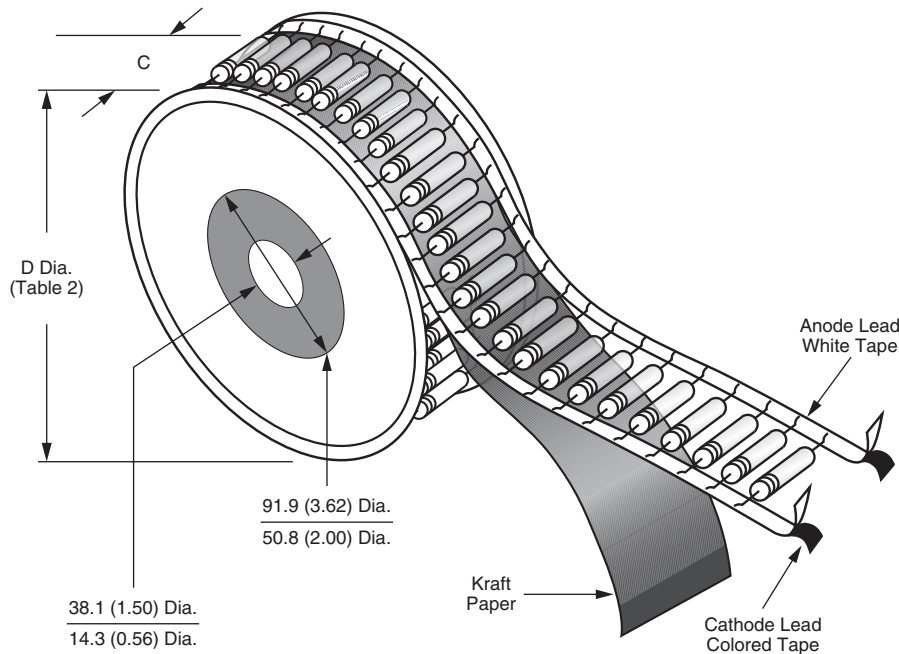


Figure 3.

The "C" dimension of Figure 3 is between flanges of the component reel and shall be 1.5 mm (0.059") to 8.00 mm (0.315") greater than the overall taped component width "W" (Figure 2). Where "W" dimension is 68.2 mm (2.68") max.



TABLE 3 - REEL AND AMMO PACK TAPING SPECIFICATIONS

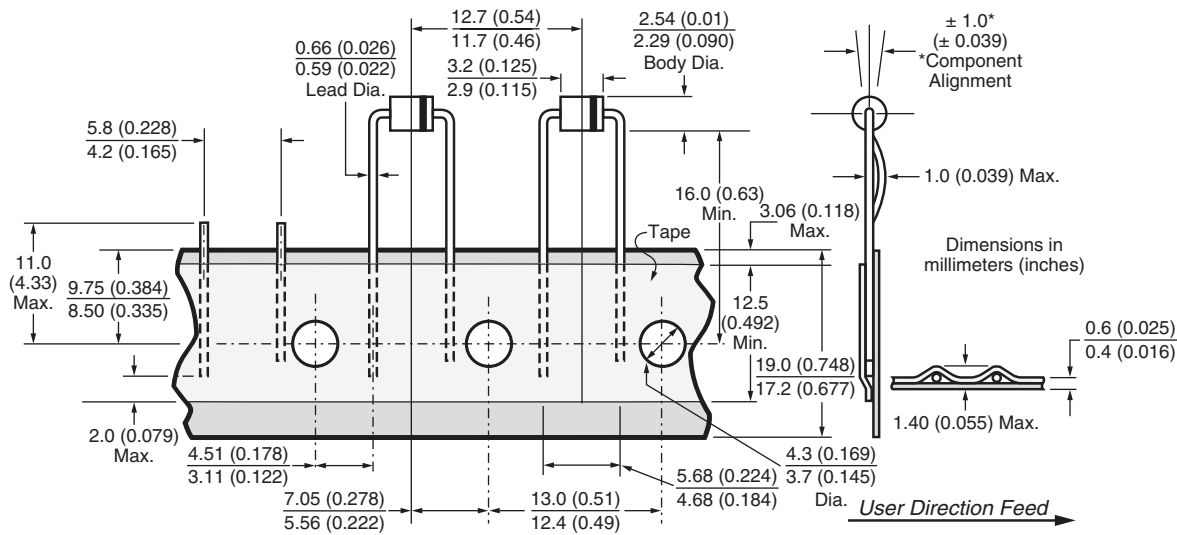
COMPONENT CASE TYPE	PREFERRED PACKAGE CODE	UNITS PER REEL	COMPONENT PITCH "A" FIGURE 2.		INSIDE TAPE SPACING "B" FIGURE 2.		REEL DIMENSION "D" FIGURE 3.		LEAD BENDING "E" FIGURE 2.		TYP. GROSS WEIGHT PER REEL	
			ea.	in.	mm	in.	mm	in.	mm	in.	mm	lbs.
DO-204AC	54	4000	0.200	5.0	2.06	52.4	13.0	330	0.047	1.2	4.66	2.11
DO-204AL	54	5500	0.200	5.0	2.06	52.4	13.0	330	0.047	1.2	5.2	2.3
DO-213AB (GL41)	96/97	1500/5000	0.157	4.0	-	-	7.0/13.0	178/330	See Figure 8.		0.62/1.96	0.281/0.89
1.5KE	54	1400	0.395	10.0	2.06	52.4	13.0	330	0.047	1.2	4.9/3.8	2.22/1.76
MPG06	54	5500	0.200	5.0	2.06	52.4	13.0	330	0.047	1.2	3.8	1.71
P600	54	800	0.395	10.0	2.06	52.4	13.0	330	0.047	1.2	5.3	2.39
SMP	84A/85A	3000/10000	0.157	4.0	-	-	7.0/13.0	178/330	See Figure 8.		0.35/1.54	0.16/0.70
MicroSMP	89A	4500	0.157	4.0	-	-	7.0	178	See Figure 8.		0.29	0.13
SMPC	86A/87A	1500/6500	0.314	8.0	-	-	7.0/13.0	178/330	See Figure 8.		0.53/2.23	0.24/1.01
DO-214AC (SMA)	61, 61T, TR/5A, 5AT, TR3	1800/7500	0.157	4.0	-	-	7.0/13.0	178/330	See Figure 8.		0.24/0.99	0.11/0.45
DO-214AA (SMB)	52, 52T/5B, 5BT	750/3200	0.314	8.0	-	-	7.0/13.0	178/330	See Figure 8.		0.24/0.99	0.11/0.45
DO-214AB (SMC)	57T/9AT	850/3500	0.472	12.0	-	-	7.0/13.0	178/330	See Figure 8.		0.44/1.39	0.20/0.63
DO-218AB	2D	750	0.630	16.0	-	-	13.0	330	See Figure 8.		4.85	2.2

Note:

- Package codes, 61/5A, 52/5B are matrix-frame constructions for TRANSZORB® TVS in SMA and SMB only.

TABLE 4 - COMPONENT AND INSIDE HORIZONTAL TAPE SPACING

COMPONENT BODY DIAMETER	COMPONENT SPACING A (LEAD TO LEAD)	INSIDE TAPE SPACING "B"	CUMULATIVE PITCH TOLERANCE
0 mm to 5 mm (0.0" to 0.197")	5.0 mm ± 0.5 mm (0.197" ± 0.020")	26 mm + 1.5 mm/- 0.0 mm (1.024" + 0.059"/- 0.0")	Not to exceed 1.5 mm (0.059") over 6 consecutive components
0 mm to 5 mm (0.0" to 0.197")	5.0 mm ± 0.5 mm (0.197" ± 0.020")	52.4 mm + 1.5 mm/- 0.4 mm (2.062" + 0.059"/- 0.016")	
5.01 mm to 10 mm (0.197" to 0.394")	10.0 mm ± 0.5 mm (0.394" ± 0.020")	52.4 mm + 1.5 mm/- 0.4 mm (2.062" + 0.059"/- 0.016")	



Available only for TMPG06 product in ammo pack in accordance with EIA Standard RS-468-A utilizing 0.61 mm (0.024") diameter leads. Maximum cumulative pitch tolerance: 1.0 mm (0.039")/20 pitch.

Figure 4.

SURFACE MOUNT TAPE AND REEL PACKAGING

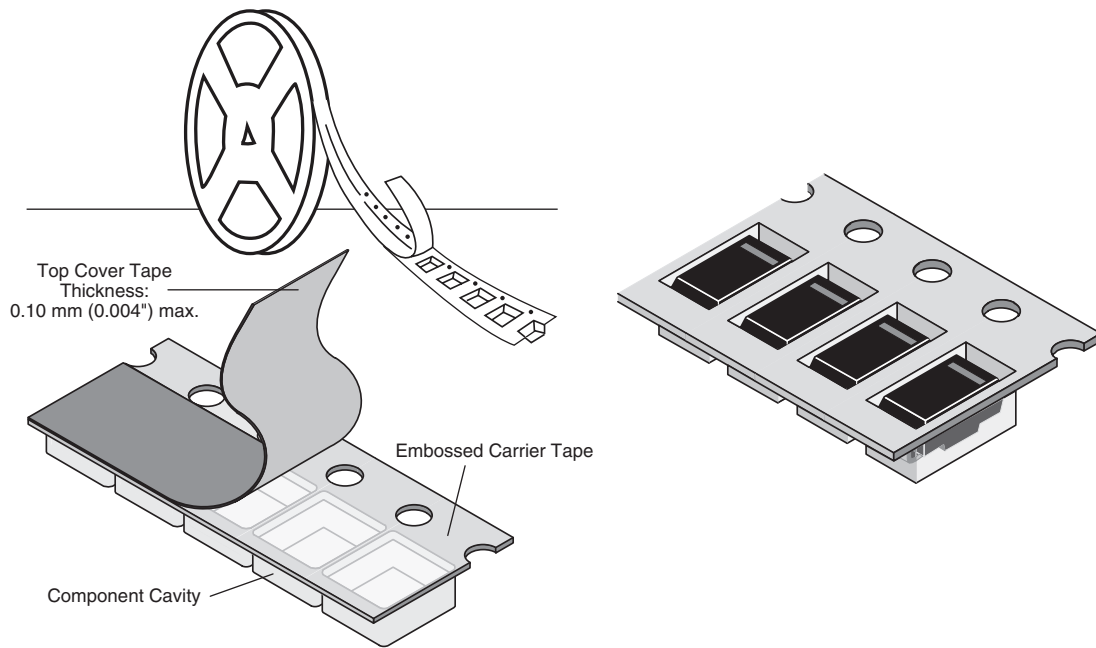


Figure 5.

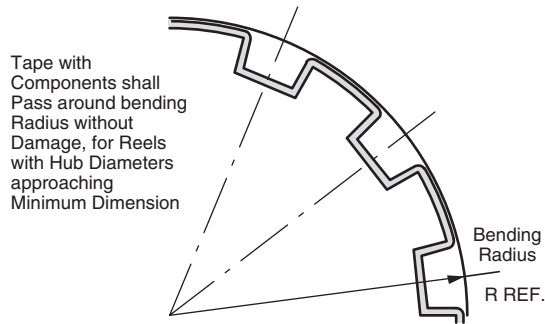


Figure 6.

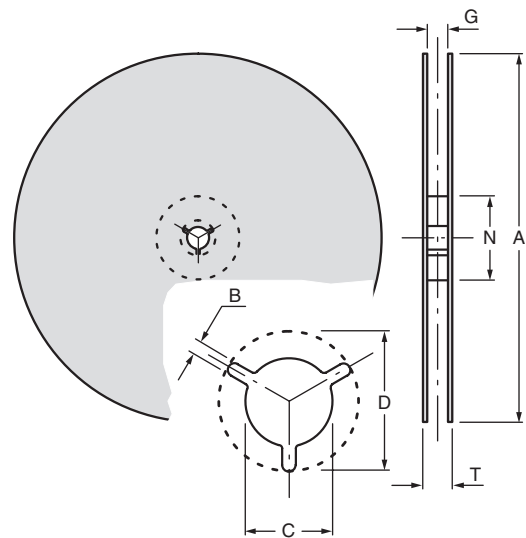


Figure 7.

TABLE 5 - DIMENSIONS in millimeters (inches)							
TAPE SIZE	A MAX.	B MAX.	C	D MAX.	N MIN.	G MAX.	T MAX.
8 (0.315)	330 ± 2.0 (13.0 ± 0.079) 178 ± 2.0 (7.0 ± 0.079)	1.5 (0.059)	13.0 ± 0.20 (0.51 ± 0.0008)	20.2 (0.795)	50 (1.97)	9.9 (0.389)	14.4 (0.567)
12 (0.472)	330 ± 2.0 (13.0 ± 0.079) 178 ± 2.0 (7.0 ± 0.079)	1.5 (0.059)	13.0 ± 0.20 (0.51 ± 0.0008)	20.2 (0.795)	50 (1.97)	14.4 (0.567)	18.4 (0.724)
16 (0.630)	330 ± 2.0 (13.0 ± 0.079) 178 ± 2.0 (7.0 ± 0.079)	1.5 (0.059)	13.0 ± 0.20 (0.51 ± 0.0008)	20.2 (0.795)	50 (1.97)	18.4 (0.724)	22.4 (0.802)
24 (0.945)	330 ± 2.0 (13.0 ± 0.079) 178 ± 2.0 (7.0 ± 0.079)	1.5 (0.059)	13.0 ± 0.20 (0.51 ± 0.0008)	20.2 (0.795)	50 (1.97)	26.4 (1.039)	30.4 (1.197)

SURFACE MOUNT TAPE AND REEL PACKAGING

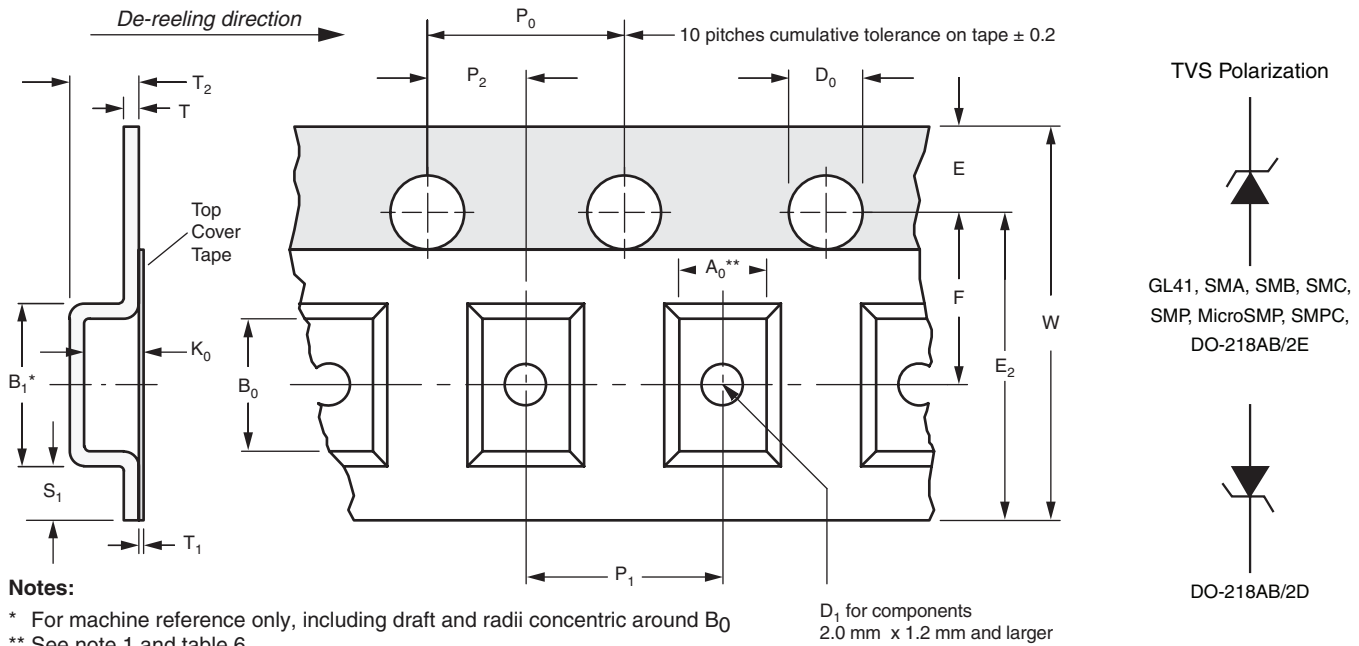


Figure 8. 8, 12, 16, and 24 mm ebossed tape

TABLE 6 - DIMENSIONS in millimeters (inches)								
TAPE SIZE	D_0	E_1	P_0	P_2	A_0, B_0, K_0	S_1 MIN.	T Max.	T_1 Max.
8, 12 mm	1.5 ± 0.1 (0.059 \pm 0.004)	1.75 ± 0.1 (0.069 \pm 0.004)	4.0 ± 0.1 (0.157 \pm 0.004)	2.0 ± 0.05 (0.79 \pm 0.002)	See Note 1	0.6 (0.024)	0.6 (0.024)	0.1 (0.004)
16, 24 mm				2.0 ± 0.1 (0.79 \pm 0.004)				

CASE TYPE	TAPE SIZE	B_1 MAX.	D_1 MAX.	E_2 MAX.	F	P_1	R REF.	T_2 MAX.	W
MicroSMP	8 (0.315)	3.28 (0.129)	1.0 (0.039)	6.05 (0.238)	3.5 ± 0.05 (0.138 \pm 0.002)		25 (0.984)	1.919 (0.076)	8.0 ± 0.30 (0.315 \pm 0.012)
DO-213AB (GL41)	12 (0.472)	8.2 (0.323)	1.5 (0.059)	10.25 (0.404)	5.5 ± 0.05 (0.217 \pm 0.002)	4.0 ± 0.10 (0.157 \pm 0.004)	30 (1.181)	4.5 (0.177)	12.0 ± 0.30 (0.472 \pm 0.012)
DO-214AC (SMA)								2.54 ± 0.10 (0.100 \pm 0.004)	
SMP								1.74 ± 0.10 (0.069 \pm 0.004)	
SMPC								1.33 ± 0.10 (0.052 \pm 0.004)	
DO-214/215 (SMB)		8.2 (0.323)				8.0 ± 0.10 (0.315 \pm 0.004)		2.67 ± 0.10 (0.105 \pm 0.004)	16.0 ± 0.20 (0.630 \pm 0.008)
DO-214/215AB (SMC)	16 (0.630)	12.1 (0.476)		14.25 (0.561)	7.5 ± 0.05 (0.295 \pm 0.002)			2.5 ± 0.10 (0.100 \pm 0.004)	
DO-218AB	24 (0.945)	20.1 (0.791)		22.25 (0.876)	11.5 ± 0.10 (0.453 \pm 0.004)	16.0 ± 0.10 (0.630 \pm 0.004)		5.21 ± 0.10 (0.205 \pm 0.004)	24.0 ± 0.20 (0.945 \pm 0.008)

- Notes:**
- A_0 , B_0 and K_0 are determined by the maximum dimensions of the component size. The clearance between the component and the cavity must be within 0.05 mm (0.002") min. to 0.5 mm (0.02") max. for 8 mm tape and 12 mm tape, 0.15 mm (0.066") min. to 0.90 mm (0.035") max. for 16 mm tape and 0.15 mm (0.006") min to 1.0 mm (0.039") max. for 24 mm tape.
 - All surface mount components are packed in accordance with EIA standard 481-C.

VISHAY GENERAL SEMICONDUCTOR RECOMMENDED SOLDERING PROCESS FOR SURFACE MOUNTED AND AXIAL-LEADED COMPONENTS

RECOMMENDED WAVE SOLDERING PROFILE (Sn-Pb/Lead (Pb)-free)

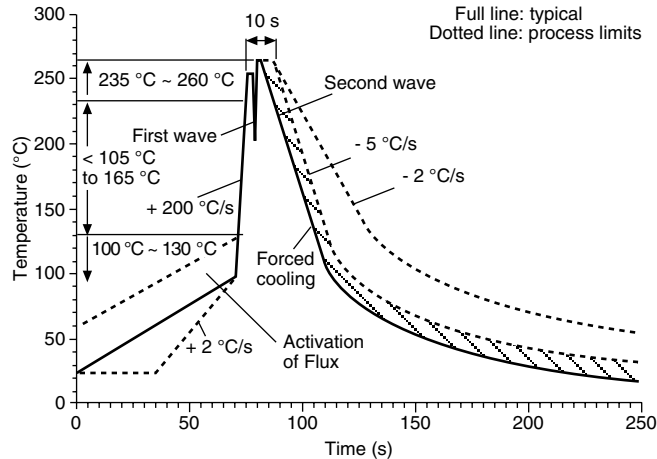


Figure 9.

Wave Soldering Notes

The profile illustrated above depends ultimately on the type of flux used with the solder paste. The peak temperature for this process should not exceed 265 °C for PC-board mounting.

REFLOW

TABLE 7 - CLASSIFICATION REFLOW PROFILE		
PROFILE FEATURE	Sn-Pb EUTECTIC ASSEMBLY	LEAD (Pb)-FREE ASSEMBLY
Preheat and soak		
Temperature min (T_{smin})	100 °C	150 °C
Temperature max (T_{smax})	150 °C	200 °C
Time (T_{smin} to T_{smax}) (t_s)	60 to 120 s	60 to 120 s
Average ramp-up rate (T_{smax} to T_P)	3 °C/s maximum	
Liquidous temperature (T_L)	183 °C	217 °C
Time to liquidous (t_L)	60 to 150 s	60 to 150 s
Peak package body temperature (T_P)*	See classification temp in Table 2	See classification temp in Table 3
Time (t_P)** with 5 °C of the specified classification temperature (T_C)	20 s**	30 s**
Average ramp-down rate (T_P to T_{smax})	6 °C/s maximum	
Time 25 °C to peak temperature	6 minutes maximum	8 minutes maximum
* Tolerance for peak profile temperature (T_P) is defined as a supplier minimum and a user maximum		
** Tolerance for time at peak profile temperature (T_P) is defined as a supplier minimum and a user maximum		

Note:

- All temperature refer to the center of the package, measured on the package body surface

REFLOW PROFILE

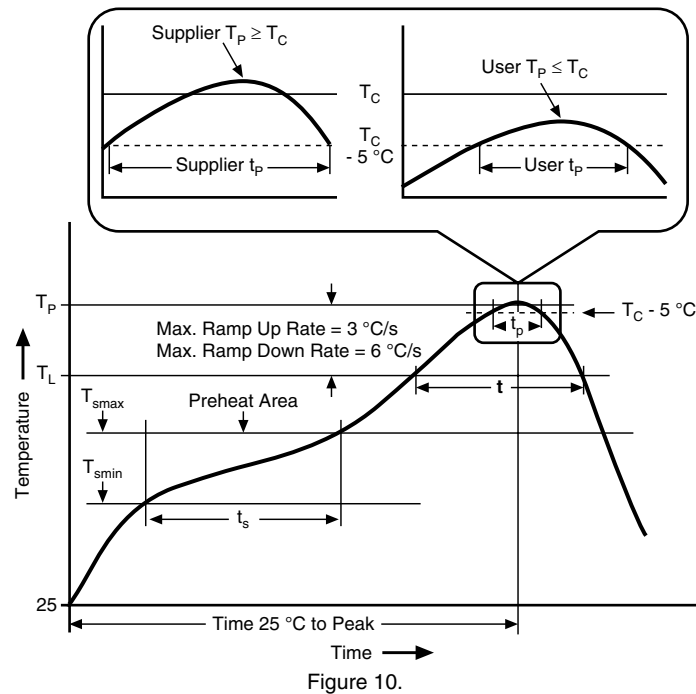


TABLE 8 - Sn-Pb EUTECTIC PROCESS PACKAGE PEAK REFLOW TEMPERATURES		
PACKAGE THICKNESS	VOLUME mm ³ < 350	VOLUME mm ³ ≥ 350
< 2.5 mm	235 °C	220 °C
≥ 2.5 mm	220 °C	220 °C

TABLE 9 - LEAD (Pb)-FREE PROCESS PACKAGE CLASSIFICATION REFLOW TEMPERATURES			
PACKAGE THICKNESS	VOLUME mm ³ < 350	VOLUME mm ³ 350 to 2000	VOLUME mm ³ > 2000
< 1.6 mm	260 °C	260 °C	260 °C
1.6 mm to 2.5 mm	260 °C	250 °C	245 °C
≥ 2.5 mm	250 °C	245 °C	245 °C

Tolerance: The device manufacturer/supplier shall assure process compatibility up to and including the stated classification temperature at the rated MSL level.

Notes:

- Package volume excludes external terminals (balls, bumps, lands, leads) and/or non-integral heatsinks.
- The maximum component temperature reached during reflow depends on package thickness and volume. The use of convection reflow processes reduces the thermal gradients between packages. However, thermal gradients due to differences in thermal mass of SMD packages may still exist.
- Recommended soldering process is accordance with J-STD-020D.