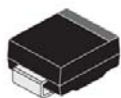


600W Transient Voltage Suppressors

P6SMB6.8A/CA



DO-214AA (SMB)



DO-214AA (SMB)
Surface Mount
Plastic Package
RoHS compliant

FEATURE:

1. Peak power dissipation 600W @10 x 1000 us Pulse
2. Low profile package.
3. Excellent clamping capability.
4. Glass passivated junction.
5. Fast response time: typically less than 1ps from 0 Volts to BV min
6. Typical IR less than 1uA when VBR min above 12V
7. IEC 61000-4-2 ESD 30KV(Air), 30KV(Contact)
8. ESD protection of data lines in accordance with IEC 61000-4-2
9. EFT protection of data lines in accordance with IEC 61000-4-4
10. Halogen free and RoHS compliant
11. Lead-free finish
12. This product is available in AEC-Q101 Qualified and PPAP Capable also.

Note: For AEC-Q101 qualified products, please use suffix -AQ in the part number while ordering.

APPLICATIONS:

1. Motor control: Robots, drones, power tools, and e-bikes
2. Telecommunications :Power line protection circuits

ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C Unless otherwise specified)

PARAMETER	SYMBOL	VALUE	UNIT
Peak Pulse Power Dissipation on 10/1000 us Waveform (Note 1, 2, FIG.1)	P_{PPM}	Min 600	W
Power Dissipation on Infinite Heat Sink at $T_L=50^{\circ}\text{C}$	P_D	5	W
Peak Pulse Current of on 10/1000us Waveform (Note 1, FIG.3)	I_{PPM}	See Table 1	A
Peak Forward Surge Current, 8.3ms Single Half Sine-Wave (Note 2. 3)	I_{FSM}	100	A
Operating Junction Temperature Range	T_J	-55 to +150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^{\circ}\text{C}$

Notes:

- 1). Non-Repetitive current pulse, per Fig.3 and derated above $T_A=25^{\circ}\text{C}$ per Fig.2.
- 2) Mounted on 5.0x5.0mm² (0.03mm thick) Copper Pads to each terminal.
- 3) Measured on 8.3ms single half sine-wave, or equivalent square wave, for Unidirectional device only.

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ELECTRICAL CHARACTERISTICS at (Ta = 25 °C Unless otherwise specified)

Type Number		Device Marking Code		Reverse Stand-off Voltage	Break-down Voltage Min. @I _T	Break-down Voltage Max. @I _T	Test Current	Maximum Clamping Voltage @I _{PP}	Peak Pulse Current	Reverse Leakage @ V _{RMW}
(Uni)	(Bi)	(Uni)	(Bi)	V _{RMW} (V)	V _{BR MIN} (V)	V _{BR MAX} (V)	I _T (mA)	V _C (V)	I _{PP} (A)	I _R (uA)
P6SMB6.8A	P6SMB6.8CA	6V8A	6V8C	5.80	6.45	7.14	10	10.5	58.1	1000
P6SMB7.5A	P6SMB7.5CA	7V5A	7V5C	6.40	7.13	7.88	10	11.3	54.0	500
P6SMB8.2A	P6SMB8.2CA	8V2A	8V2C	7.02	7.79	8.61	10	12.1	50.4	200
P6SMB9.1A	P6SMB9.1CA	9V1A	9V1C	7.78	8.65	9.55	1	13.4	45.5	50
P6SMB10A	P6SMB10CA	10A	10C	8.55	9.50	10.50	1	14.5	42.1	10
P6SMB11A	P6SMB11CA	11A	11C	9.40	10.50	11.60	1	15.6	39.1	5
P6SMB12A	P6SMB12CA	12A	12C	10.20	11.40	12.60	1	16.7	36.5	5
P6SMB13A	P6SMB13CA	13A	13C	11.10	12.40	13.70	1	18.2	33.5	1
P6SMB15A	P6SMB15CA	15A	15C	12.80	14.30	15.80	1	21.2	28.8	1
P6SMB16A	P6SMB16CA	16A	16C	13.60	15.20	16.80	1	22.5	27.1	1
P6SMB18A	P6SMB18CA	18A	18C	15.30	17.10	18.90	1	25.2	24.2	1
P6SMB20A	P6SMB20CA	20A	20C	17.10	19.00	21.00	1	27.7	22.0	1
P6SMB22A	P6SMB22CA	22A	22C	18.80	20.90	23.10	1	30.6	19.9	1
P6SMB24A	P6SMB24CA	24A	24C	20.50	22.80	25.20	1	33.2	18.4	1
P6SMB27A	P6SMB27CA	27A	27C	23.10	25.70	28.40	1	37.5	16.3	1
P6SMB30A	P6SMB30CA	30A	30C	25.60	28.50	31.50	1	41.4	14.7	1
P6SMB33A	P6SMB33CA	33A	33C	28.20	31.40	34.70	1	45.7	13.3	1
P6SMB36A	P6SMB36CA	36A	36C	30.80	34.20	37.80	1	49.9	12.2	1
P6SMB39A	P6SMB39CA	39A	39C	33.30	37.10	41.00	1	53.9	11.3	1
P6SMB43A	P6SMB43CA	43A	43C	36.80	40.90	45.20	1	59.3	10.3	1
P6SMB47A	P6SMB47CA	47A	47C	40.20	44.70	49.40	1	64.8	9.4	1
P6SMB51A	P6SMB51CA	51A	51C	43.60	48.50	53.60	1	70.1	8.7	1
P6SMB56A	P6SMB56CA	56A	56C	47.80	53.20	58.80	1	77.0	7.9	1
P6SMB62A	P6SMB62CA	62A	62C	53.00	58.90	65.10	1	85.0	7.2	1
P6SMB68A	P6SMB68CA	68A	68C	58.10	64.60	71.40	1	92.0	6.6	1
P6SMB75A	P6SMB75CA	75A	75C	64.10	71.30	78.80	1	103.0	5.9	1
P6SMB82A	P6SMB82CA	82A	82C	70.10	77.90	86.10	1	113.0	5.4	1
P6SMB91A	P6SMB91CA	91A	91C	77.80	86.50	95.50	1	125.0	4.9	1
P6SMB100A	P6SMB100CA	100A	100C	85.50	95.00	105.00	1	137.0	4.5	1
P6SMB110A	P6SMB110CA	110A	110C	94.00	105.00	116.00	1	152.0	4.0	1
P6SMB120A	P6SMB120CA	120A	120C	102.00	114.00	126.00	1	165.0	3.7	1
P6SMB130A	P6SMB130CA	130A	130C	111.00	124.00	137.00	1	179.0	3.4	1

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ELECTRICAL CHARACTERISTICS at (Ta = 25 °C Unless otherwise specified)

Type Number		Device Marking Code		Reverse Stand-off Voltage	Break-down Voltage Min. @I _T	Break-down Voltage Max. @I _T	Test Current	Maximum Clamping Voltage @I _{PP}	Peak Pulse Current	Reverse Leakage @ V _{RMW}
(Uni)	(Bi)	(Uni)	(Bi)	V _{RMW} (V)	V _{BR MIN} (V)	V _{BR MAX} (V)	I _T (mA)	V _C (V)	I _{PP} (A)	I _R (uA)
P6SMB150A	P6SMB150CA	150A	150C	128.00	143.00	158.00	1	207.0	2.9	1
P6SMB160A	P6SMB160CA	160A	160C	136.00	152.00	168.00	1	219.0	2.8	1
P6SMB170A	P6SMB170CA	170A	170C	145.00	162.00	179.00	1	234.0	2.6	1
P6SMB180A	P6SMB180CA	180A	180C	154.00	171.00	189.00	1	246.0	2.5	1
P6SMB200A	P6SMB200CA	200A	200C	171.00	190.00	210.00	1	274.0	2.2	1
P6SMB220A	P6SMB220CA	220A	220C	185.00	209.00	231.00	1	328.0	1.9	1
P6SMB250A	P6SMB250CA	250A	250C	214.00	237.00	263.00	1	344.0	1.8	1
P6SMB300A	P6SMB300CA	300A	300C	256.00	285.00	315.00	1	414.0	1.5	1
P6SMB350A	P6SMB350CA	350A	350C	300.00	332.00	368.00	1	482.0	1.3	1
P6SMB400A	P6SMB400CA	400A	400C	342.00	380.00	420.00	1	548.0	1.1	1
P6SMB440A	P6SMB440CA	440A	440C	376.00	418.00	462.00	1	602.0	1.0	1
P6SMB480A	P6SMB480CA	480A	480C	408.00	456.00	504.00	1	658.0	0.9	1
P6SMB510A	P6SMB510CA	510A	510C	434.00	485.00	535.00	1	698.0	0.9	1
P6SMB530A	P6SMB530CA	530A	530C	451.00	503.50	556.50	1	725.0	0.8	1
P6SMB540A	P6SMB540CA	540A	540C	460.00	513.00	567.00	1	740.0	0.8	1
P6SMB550A	P6SMB550CA	550A	550C	468.00	522.50	577.50	1	760.0	0.8	1

1. For Bi-directional type having V_{RMW} of 10 Volts and less, the I_R limit is double.

2. For parts without A, the VBR is ± 10% and VC is 5% higher than with A parts.

THERMAL RESISTANCES

Typical thermal resistance, junction to ambient air ⁽¹⁾	R _{θJA}	100	°C/W
Typical thermal resistance, junction to lead	R _{θJL}	20	°C/W

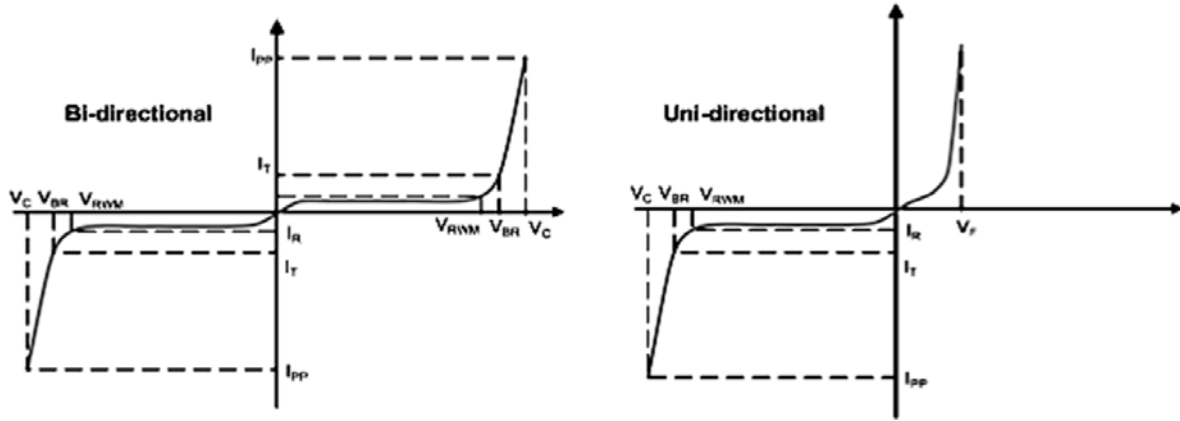
Note:

1. Mounted on minimum recommended pad layout

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TYPICAL CHARACTERISTICS CURVES



P_{PPM} Peak Pulse Power Dissipation - Max power dissipation

V_{RWM} Reverse Stand-off Voltage - Maximum voltage that can be applied to TVS without operation

V_{BR} Breakdown Voltage – Maximum voltage that flows through the TVS at a specified current (I_T)

V_C Clamping Voltage – Peak voltage measured across the TVS at a specified IPPM (peak impulse current)

I_R Reverse Leakage Current – Current measured at V_R

V_F Forward Voltage Drop for Uni-directional

TYPICAL CHARACTERISTICS CURVES

Fig 1: Peak Pulse Power Rating

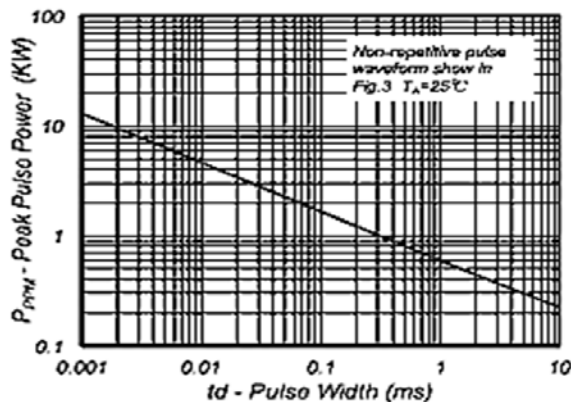


Fig 2: Pulse Waveform

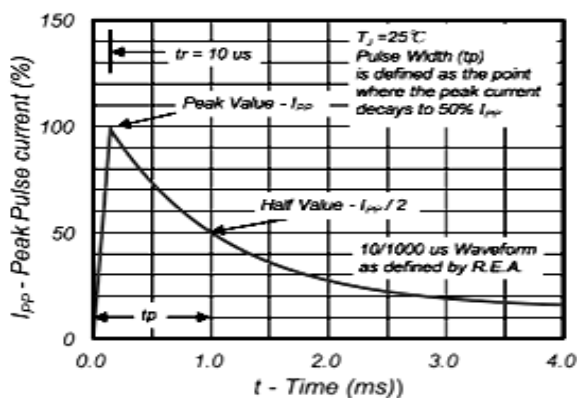


Fig 3: Typical Transient Thermal Impedance

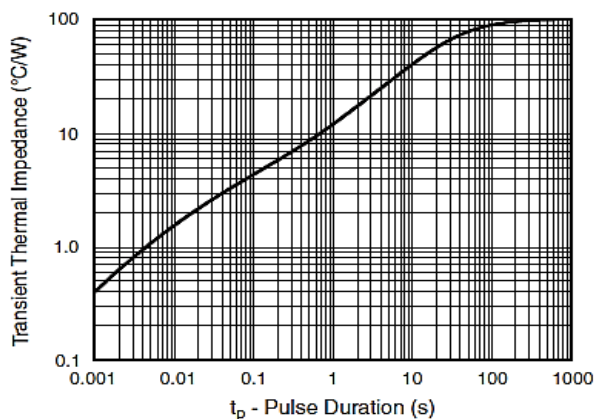


Fig 4: Pulse Derating Curves

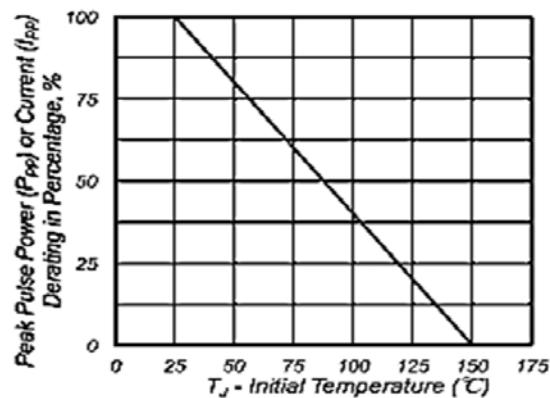


Fig 5: Typical Junction Capacitance

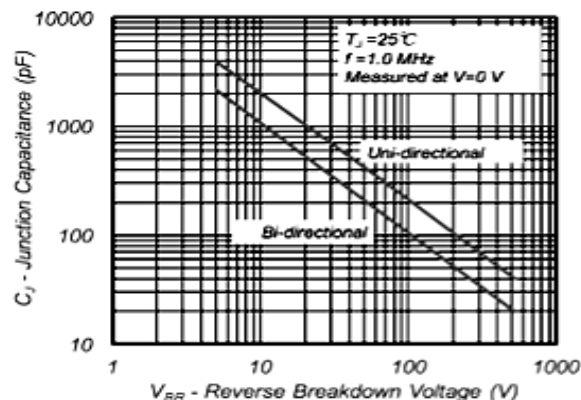
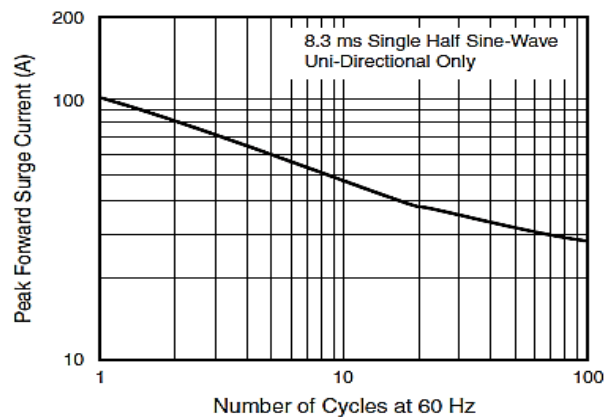
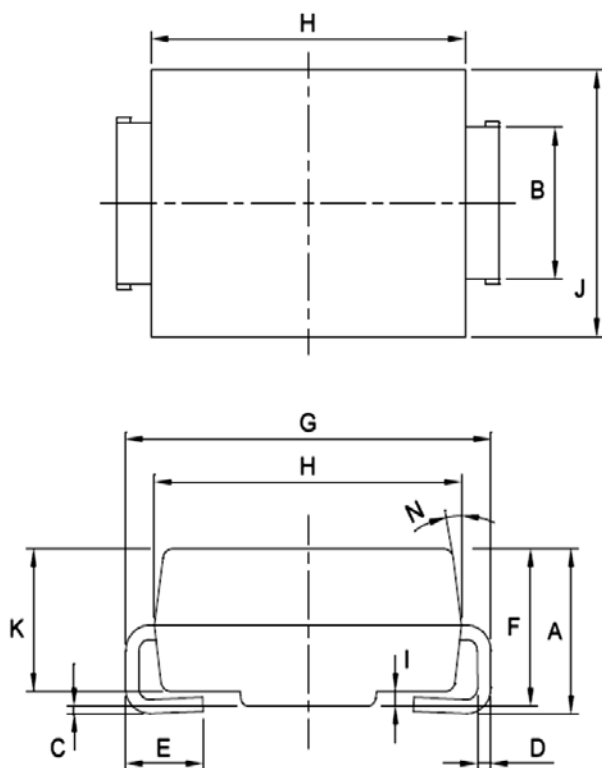


Fig 6: Maximum Non-Repetitive Peak Forward Surge Current



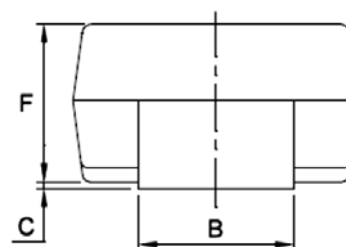
PACKAGE DETAIL

Package: DO-214AA(SMB)



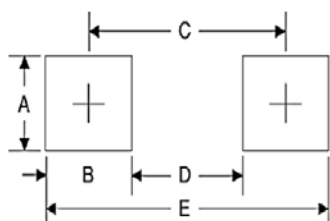
DIM	MIN	MAX
A	1.95	2.65
B	1.95	2.20
C	0.05	0.20
D	0.15	0.41
E	0.75	1.60
F	1.90	2.45
G	5.10	5.60
H*	4.05	4.60
I	0.10	0.30
J*	3.30	3.95
K	1.85	2.15
N	7° Typ.	

* Dimensions H & J do not include mold flash, mold flash shall not exceed 0.13mm per side.



All dimensions are in mm

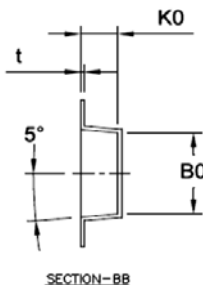
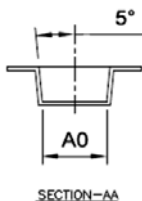
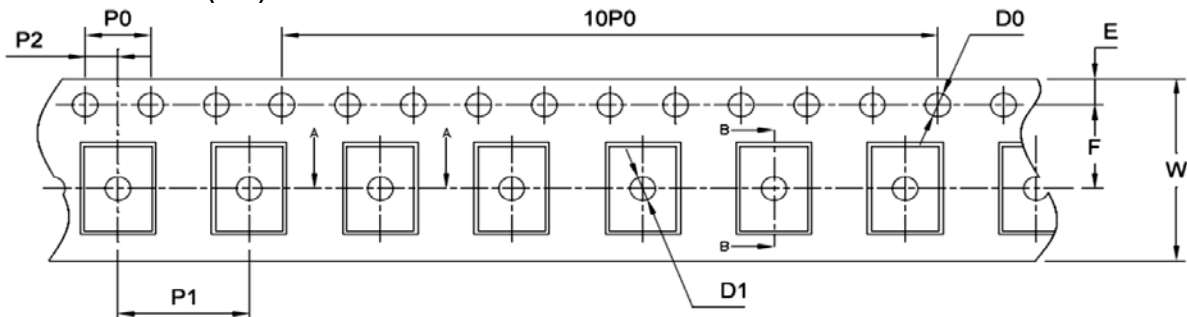
Suggested Pad Layout



Symbol	Dim.(mm)
A	2.23 max.
B	1.63 max
C	3.97 min
D	2.34 min
E	5.60 Ref.

Package Information

Carrier Dimension(mm)



DIM.	SIZE/SPACIFICATION
E	1.75 ±0.10 = (1.65~1.85)
F	5.50 ±0.10 = (5.40~5.60)
P2	2.00 ±0.10 = (1.90~2.10)
D0	1.55 ±0.05 = (1.50~1.60)
D1	1.55 ±0.05 = (1.50~1.60)
P0	4.00 ±0.10 = (3.90~4.10)
10P0	40.00 ±0.20 = (39.80~40.20)

W	12.00 ±0.10 = (11.90~12.10)
P1	8.00 ±0.10 = (7.90~8.10)
A0	4.10 ±0.10 = (3.90~4.20)
B0	5.55 ±0.10 = (5.45~5.65)
K0	2.60 ±0.10 = (2.50~2.70)
t	0.25 ±0.03 = (0.22~0.28)

All dimensions are in mm

MECHANICAL DATA

Case : Molded plastic body

Terminals : Solder plated, solderable per MIL-STD-750, Method 2026

Polarity : Polarity symbol marking on body for unidirectional device only.

Mounting Position : Any

Weight : 0.0035 ounce, 0.098 grams

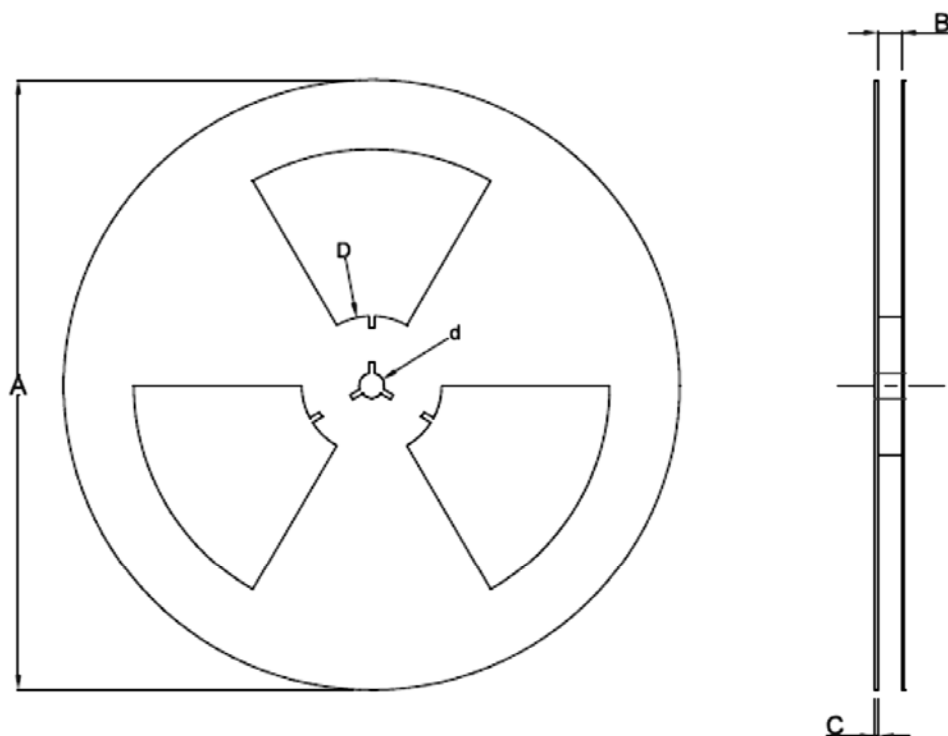


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Packaging Specifications



SIZE	13 INCH
OUTER DIA (A)	330 ^{+0.4} MM
INTERNAL SIZE (B)	12.5 ^{+0.3} MM
THICKNESS (C)	1.5 ^{+0.3} MM
CENTRAL DIA (D)	105.0 ^{+0.8} MM
INTERNAL DIA (d)	13.5 ^{+0.3} MM

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Recommended Reflow Solder Profiles

The recommended reflow solder profiles for Pb and Pb-free devices are shown below.

Figure 1 shows the recommended solder profile for devices that have Pb-free terminal plating, and where a Pb-free solder is used.

Figure 2 shows the recommended solder profile for devices with Pb-free terminal plating used with leaded solder, or for devices with leaded terminal plating used with a leaded solder.

Figure 1

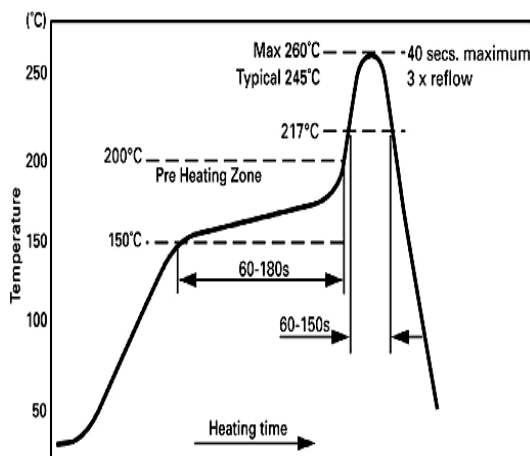
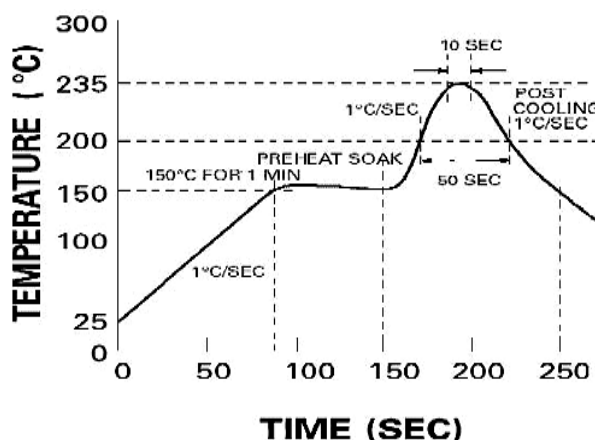


Figure 2

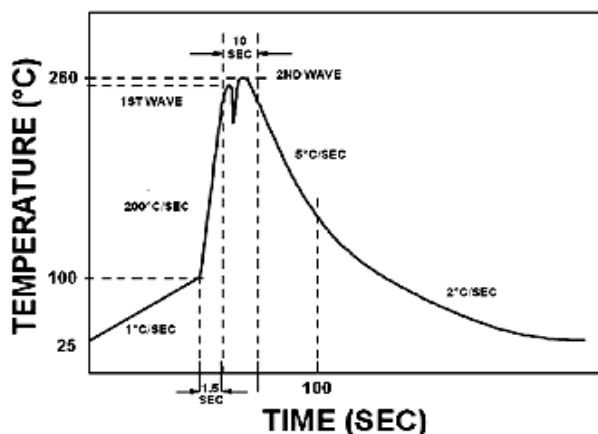


Reflow profiles in tabular form

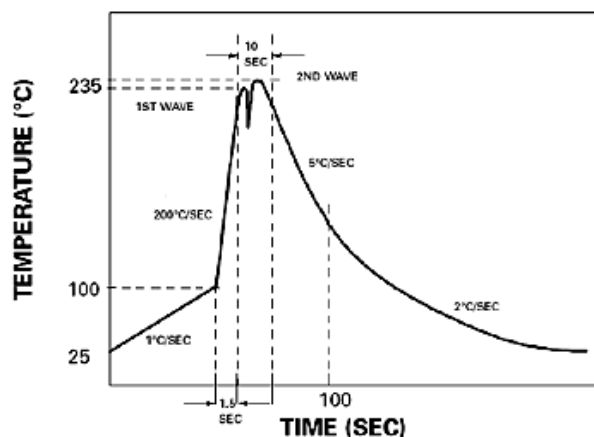
Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~3°C/second	~3°C/second
Preheat		
– Temperature Range	150-170°C	150-200°C
– Time	60-180 seconds	60-180 seconds
Time maintained above:		
– Temperature	200°C	217°C
– Tim	30-50 seconds	60-150 seconds
Peak Temperature	235°C	260°C max.
Time within +0 -5°C of actual Peak	10 seconds	40 seconds
Ramp-Down Rate	3°C/second max.	6°C/second max

Recommended Wave Solder Profiles

The Recommended solder Profile For Devices with Pb-free terminal plating where a Pb-free solder is used



The Recommended solder Profile For Devices with Pb-free terminal plating used with leaded solder, or for devices with leaded terminal plating used with leaded solder



Wave Profiles in Tabular Form

Profile Feature	Sn-Pb System	Pb-free System
Average Ramp-Up Rate	~200°C/second	~200°C/second
Heating rate during preheat	Typical 1-2, Max 4°C/Sec	Typical 1-2, Max 4°C/Sec
Final preheat Temperature	Within 125°C of Solder Temp	Within 125°C of Solder Temp
Peak Temperature	235°C	260°C max.
Time within +0 -5°C of actual Peak	10 seconds	10 seconds
Ramp-Down Rate	5°C/second max.	5°C/second max.



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Recommended Product Storage Environment for Discrete Semiconductor Devices

This storage environment assumes that the Diodes and transistors are packed properly inside the original packing supplied by CDIL.

- Temperature 5 °C to 30 °C
- Humidity between 40 to 70 %RH
- Air should be clean.
- Avoid harmful gas or dust.
- Avoid outdoor exposure or storage in areas subject to rain or water spraying .
- Avoid storage in areas subject to corrosive gas or dust. Product shall not be stored in areas exposed to direct sunlight.
- Avoid rapid change of temperature.
- Avoid condensation.
- Mechanical stress such as vibration and impact shall be avoided.
- The product shall not be placed directly on the floor.
- The product shall be stored on a plane area. They should not be turned upside down.
They should not be placed against the wall.

Shelf Life of CDIL Products

The shelf life of products is the period from product manufacture to shipment to customers. The product can be unconditionally shipped within this period. The period is defined as 2 years.

If products are stored longer than the shelf life of 2 years the products shall be subjected to quality check as per CDIL quality procedure.

The products are further warranted for another one year after the date of shipment subject to the above conditions in CDIL original packing.

Floor Life of CDIL Products and MSL Level

When the products are opened from the original packing, the floor life will start.

For this, the following JEDEC table may be referred:

JEDEC MSL Level		
Level	Time	Condition
1	Unlimited	≤30 °C / 85% RH
2	1 Year	≤30 °C / 60% RH
2a	4 Weeks	≤30 °C / 60% RH
3	168 Hours	≤30 °C / 60% RH
4	72 Hours	≤30 °C / 60% RH
5	48 Hours	≤30 °C / 60% RH
5a	24 Hours	≤30 °C / 60% RH
6	Time on Label(TOL)	≤30 °C / 60% RH



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Customer Notes

Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

Disclaimer

The product information and the selection guides facilitate selection of the CDIL's Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD are believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s). CDIL strives for continuous improvement and reserves the right to change the specifications of its products without prior notice.



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CIN No. U32109DL1964PTC004291

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