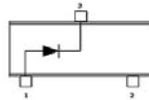


## SILICON PLANAR ZENER DIODES

## BZX84CXXX



SOT-23

**SOT-23**  
**SMD Package**  
**RoHS compliant**

### FEATURES:

1. Planar Die Construction
2. Power dissipation 300mW
3. Zener voltages: 2.4V to 75V
4. 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:** Low voltage general purpose voltage regulation applications.

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

PARAMETER	SYMBOL	VALUE	UNIT
Working Voltage Tolerance		±5	%
Repetitive Peak Forward Current	$I_{FRM}$	250	mA
Repetitive Peak Working Current	$I_{ZRM}$	250	mA
Power Dissipation up to Ta=25°C	$P_D^1$	300	mW
Power Dissipation up to Tc=25°C	$P_D^2$	250	mW
Junction Temperature	$T_j$	150	°C
Storage Temperature	$T_{stg}$	-65 to +150	°C
Thermal Resistance Junction to Ambient	$R_{th(j-a)}^1$	420	K/W



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**ELECTRICAL CHARACTERISTICS** (Ta=25°C unless specified otherwise)

(Forward Voltage at VF <0.9V at 10mA and <1.5V at 200mA)

Device	Marking	Zener Voltage Range <sup>3</sup>			Max Zener Impedence			Reverse Current		Temperature Coefficient	
		V <sub>Z</sub>		@I <sub>ZT</sub>	Z <sub>ZT</sub>	Z <sub>ZK</sub>	@I <sub>ZT</sub>	I <sub>r</sub>		S <sub>Z</sub> @ I <sub>Z</sub>	
		Min	Max		Max	Max		Max	V <sub>R</sub>	Min	Max
V		mA		Ω	Ω	mA	μA	V	(mV/K)		
BZX84C2V4	Z11	2.20	2.60	5.0	100	600	1.0	50	1.0	-3.5	0.0
BZX84C2V7	Z12	2.50	2.90	5.0	100	600	1.0	20	1.0	-3.5	0.0
BZX84C3V0	Z13	2.80	3.20	5.0	95	600	1.0	10	1.0	-3.5	0.0
BZX84C3V3	Z14	3.10	3.50	5.0	95	600	1.0	5.0	1.0	-3.5	0.0
BZX84C3V6	Z15	3.40	3.80	5.0	90	600	1.0	5.0	1.0	-3.5	0.0
BZX84C3V9	Z16	3.70	4.10	5.0	90	600	1.0	3.0	1.0	-3.5	0.0
BZX84C4V3	Z17	4.00	4.60	5.0	90	600	1.0	3.0	1.0	-3.5	0.0
BZX84C4V7	Z1	4.40	5.00	5.0	80	500	1.0	3.0	2.0	-3.5	0.2
BZX84C5V1	Z2	4.80	5.40	5.0	60	480	1.0	2.0	2.0	-2.7	1.2
BZX84C5V6	Z3	5.20	6.00	5.0	40	400	1.0	1.0	2.0	-2.0	2.5
BZX84C6V2	Z4	5.80	6.60	5.0	10	150	1.0	3.0	4.0	0.4	3.7
BZX84C6V8	Z5	6.40	7.20	5.0	15	80	1.0	2.0	4.0	1.2	4.5
BZX84C7V5	Z6	7.00	7.90	5.0	15	80	1.0	1.0	5.0	2.5	5.3
BZX84C8V2	Z7	7.70	8.70	5.0	15	80	1.0	0.7	5.0	3.2	6.2
BZX84C9V1	Z8	8.50	9.60	5.0	15	100	1.0	0.5	6.0	3.8	7.0
BZX84C10	Z9	9.40	10.60	5.0	20	150	1.0	0.2	7.0	4.5	8.0
BZX84C11	Y1	10.40	11.60	5.0	20	150	1.0	0.1	8.0	5.4	9.0
BZX84C12	Y2	11.40	12.70	5.0	25	150	1.0	0.1	8.0	6	10
BZX84C13	Y3	12.40	14.10	5.0	30	170	1.0	0.1	8.0	7	11
BZX84C15	Y4	13.80	15.60	5.0	30	200	1.0	0.05	10.5	9.2	13
BZX84C16	Y5	15.30	17.10	5.0	40	200	1.0	0.05	11.2	10.4	14
BZX84C18	Y6	16.80	19.10	5.0	45	225	1.0	0.05	12.6	12.4	16
BZX84C20	Y7	18.80	21.20	5.0	55	225	1.0	0.05	14.0	14.4	18
BZX84C22	Y8	20.80	23.30	5.0	55	250	1.0	0.05	15.4	16.4	20
BZX84C24	Y9	22.80	25.60	5.0	70	250	1.0	0.05	16.8	18.4	22
BZX84C27	Y10	25.10	28.90	2.00	80	300	0.5	0.05	18.9	21.4	25.3
BZX84C30	Y11	28.00	32.00	2.0	80	300	0.5	0.05	21.0	24.4	29.4
BZX84C33	Y12	31.00	35.00	2.0	80	325	0.5	0.05	23.1	27.4	33.4
BZX84C36	Y13	34.00	38.00	2.0	90	350	0.5	0.05	25.2	30.4	37.4
BZX84C39	Y14	37.00	41.00	2.0	130	350	0.5	0.05	27.3	33.4	41.2
BZX84C43	Y15	40.00	46.00	2.0	150	375	0.5	0.05	30.1	37.6	46.6
BZX84C47	Y16	44.00	50.00	2.0	170	375	0.5	0.05	32.9	42	51.8
BZX84C51	Y17	48.00	54.00	2.0	180	400	0.5	0.05	35.7	46.6	57.2
BZX84C56	Y18	52.00	60.00	2.0	200	425	0.5	0.05	39.2	52.2	63.8
BZX84C62	Y19	58.00	66.00	2.0	215	450	0.5	0.05	43.4	58.8	71.6
BZX84C68	Y20	64.00	72.00	2.0	240	475	0.5	0.05	47.6	65.6	79.8
BZX84C75	Y21	70.00	79.00	2.0	255	500	0.5	0.05	52.5	73.4	88.6

**Note:**

1. Device mounted on a ceramic alumna
2. Device mounted on an FR5 printed circuit board
3. Pulse Test 20ms ≤ tp ≤ 50ms

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## TYPICAL CHARACTERISTICS CURVES

Fig 1: Power Derating Curve

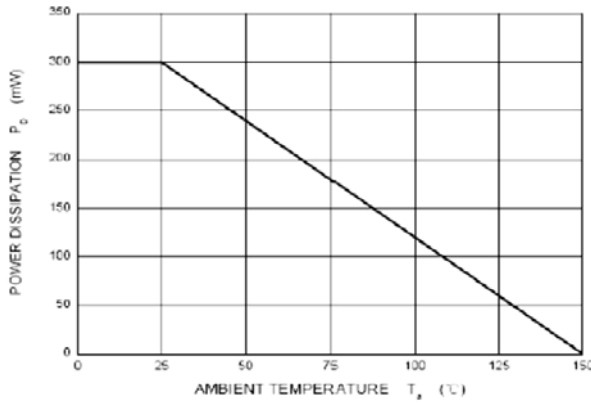


Fig 3: Temperature Coefficient

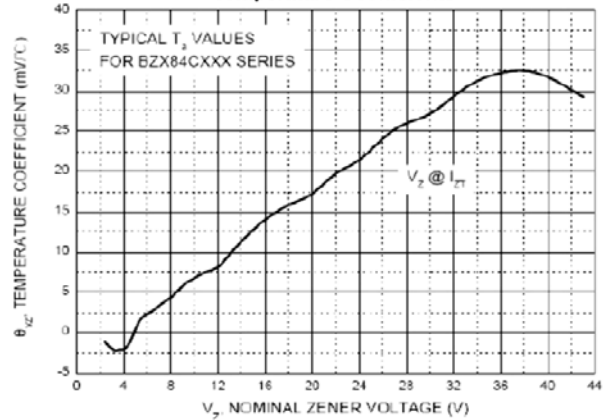


Fig 2: Typical Zener Breakdown Characteristics ( $V_Z$  up to 10V)

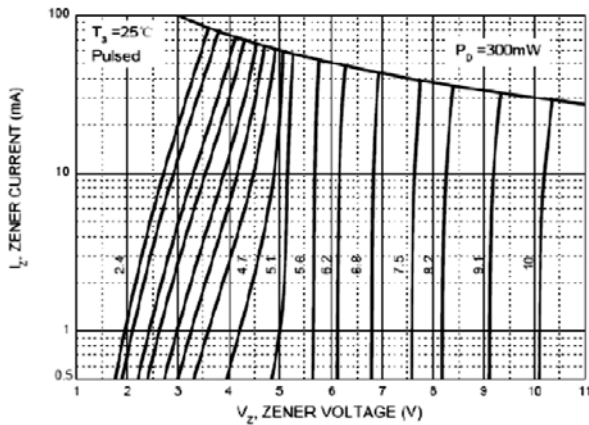
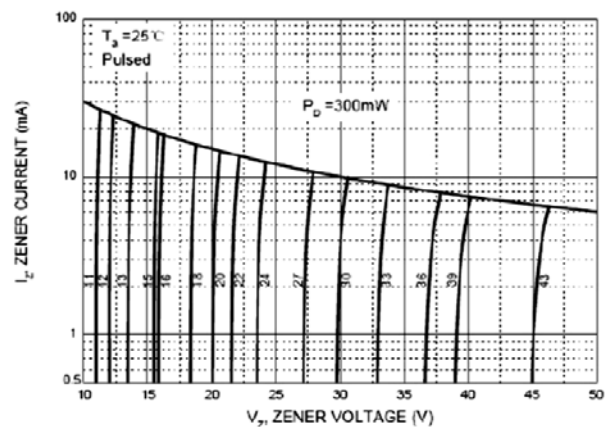


Fig 4: Typical Zener Breakdown Characteristics (11V to 43V)



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### TYPICAL CHARACTERISTICS CURVES

Fig 5: Typical Leakage current

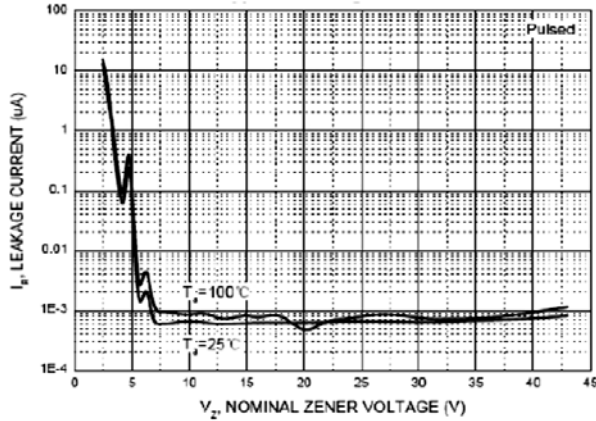


Fig 6: Typical Capacitance

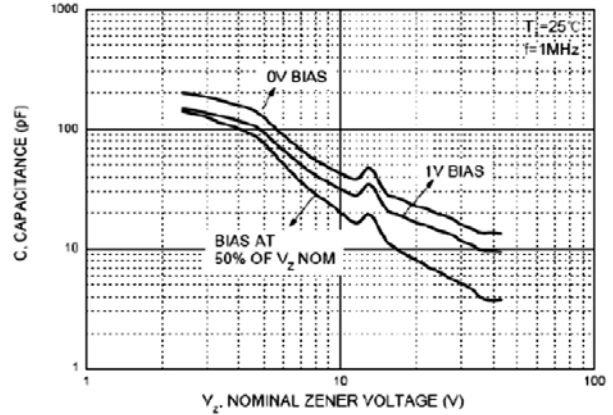
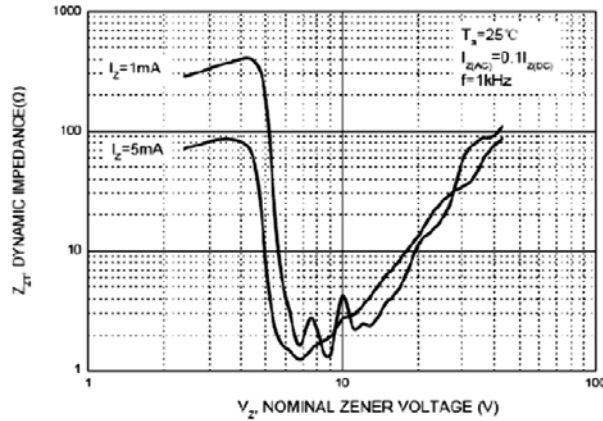
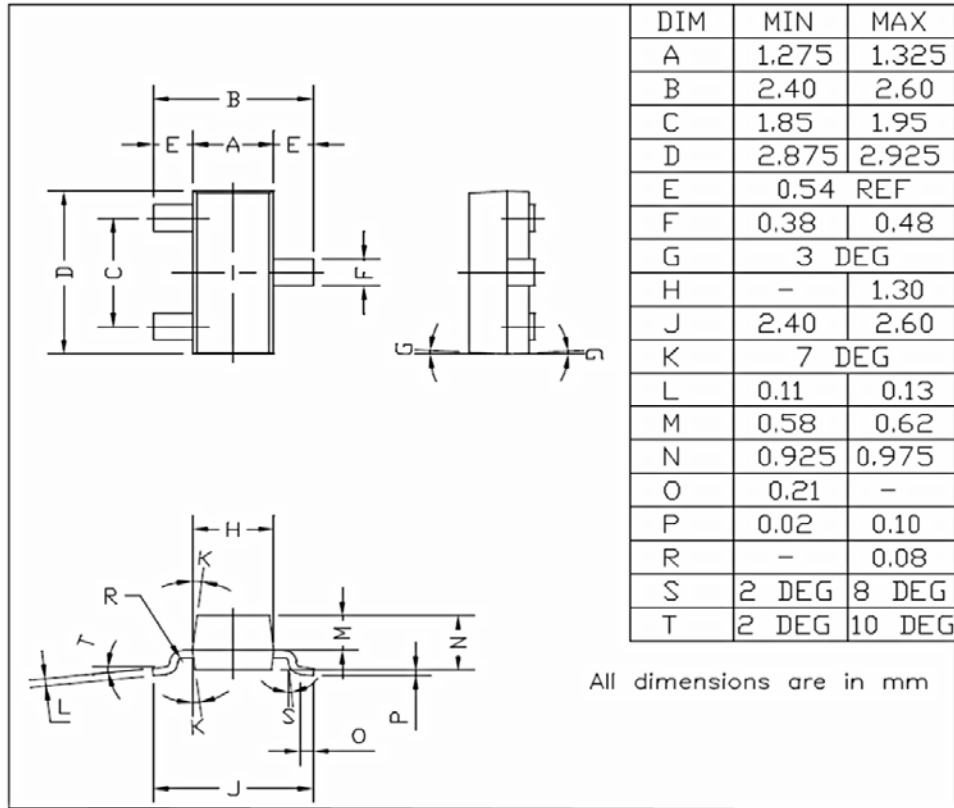


Fig 5: Effect of Zener Voltage over Zener impedance

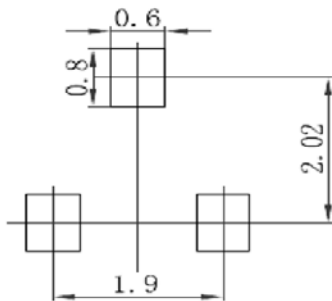


## PACKAGE DETAILS

SOT-23 SMD Package



### Suggested Pad Layout

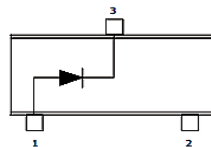
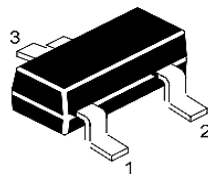


**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.

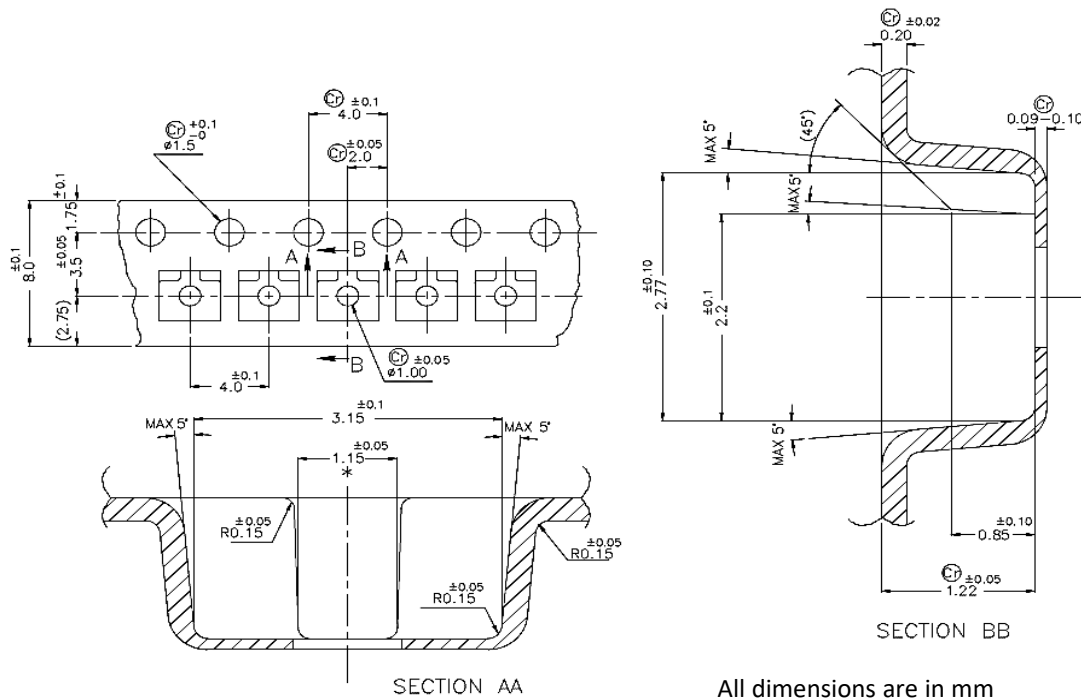
### Pin Configuration

1. Anode
2. NC
3. Cathode



## PACKING INFORMATION

### EMBOSSED PLASTIC CARRIER TAPE FOR SOT-23



All dimensions are in mm

#### NOTES:

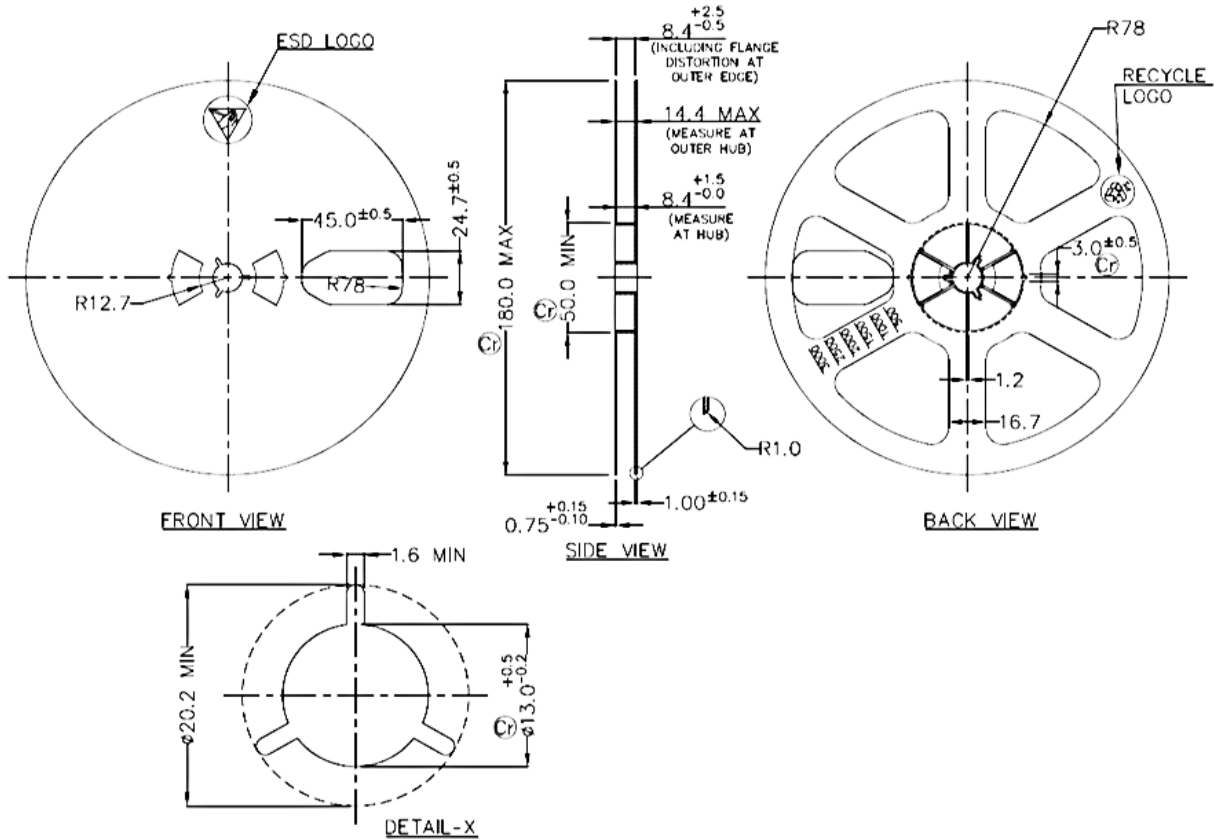
1. The bandoier of 330mm reel contains at least 10,000 device.
2. The bandoier of 180mm reel contains at least 3,000 device.
3. No more than 0.5% missing device/reel 50 empty compartments for 330mm reel. 15 empty compartments for 180mm reel.
4. Three consecutive empty places might be found provided this gap is followed by 6 consecutive devices.
5. The carrier tape (leader) starts with at least 75 empty positions (equivalent to 330 mm). In order to fix the carrier tape a self adhesive tape of 20 to 50 mm is applied. At the end of the bandoier at least 40 empty positions (equivalent to 160 mm) are there.

#### Mechanical Data

1. Package Material: Molded Plastic. UL Flammability Classification Rating 94V-0
2. Polarity: Pls. see pin configuration
- 3 Weight: 0.008 grams (Approximate)

## PACKING INFORMATION

### SOT-23 Tape and Reel



All dimensions are in mm

**Note:** 13" Reel is also available.

Size of Tape	8mm	8mm
Size of reel	330mm (13")	180mm (7")
No. of Device	10,000 Pcs	3,000 Pcs

### Packing Detail

SOT 23						
Package	Standard Pack		Inner Carton Box		Outer Box	
	Details	Net Weight/Qty	Size	Qty	Size	Qty
SOT 23 T&R	3K/reel	110 gm/3K pcs	7.5" x 7.5" x 3"	18 K	18" x 9" x 9"	150 K
			9" x 9" x 9"	60 K	18" x 12" x 9"	180 K
					18" x 15" x 9"	240 K
					19" x 19" x 20"	480 K
	10K/reel	370 gm/10Kpcs	13.5" x 13.5" x 1"	20 K	13.5" x 13.5" x 6"	100 K

### 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

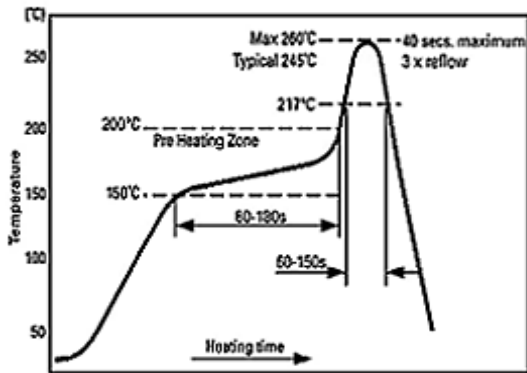
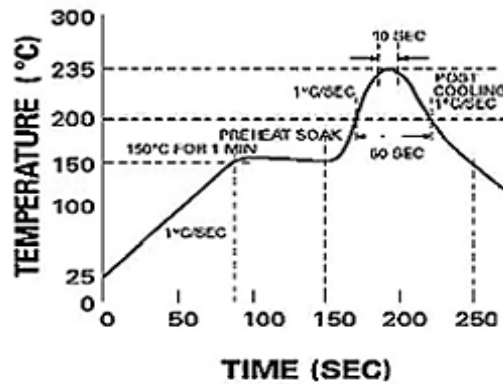


Figure 2



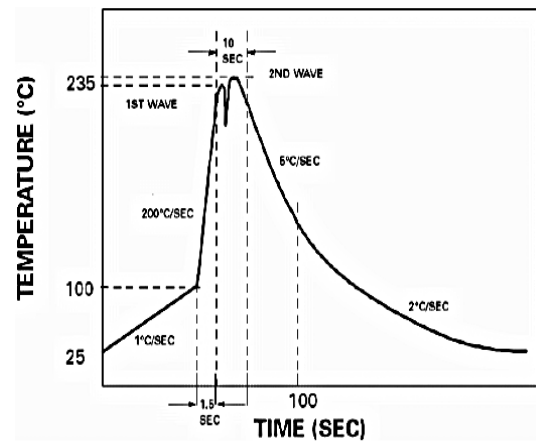
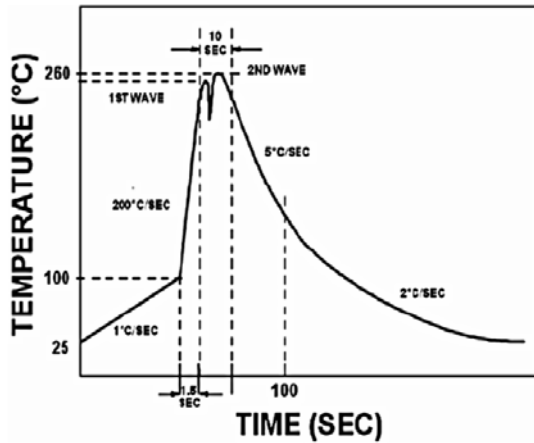
#### Reflow profiles in tabular form

Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~3°C/second	~3°C/second
<b>Preheat</b>		
– Temperature Range	150-170°C	150-200°C
– Time	60-180 seconds	60-180 seconds
Time maintained above:		
– Temperature	200°C	217°C
– Time	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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