



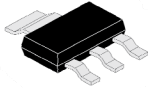
Continental Device India Pvt. Limited

An IATF 16949, ISO9001 and ISO 14001 Certified Company



## SOT-89 Plastic-Encapsulate Transistors

**BCX51/52/53 PNP**  
**BCX54/55/56 NPN**



SOT-89

**SOT-89**  
**Plastic Package**  
**RoHS compliant**

### FEATURE:

1. NPN Complements to BCX54,BCX55,BCX56
2. Low Voltage
3. High Current
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:

1. Medium Power General Purposes
2. Driver Stages of Audio Amplifiers

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

PARAMETER		SYMBOL	VALUE	UNIT
Collector-Base Voltage	BCX51 BCX54	$V_{CBO}$	45	V
	BCX52 BCX55		60	V
	BCX53 BCX56		100	V
Collector-Emitter Voltage	BCX51 BCX54	$V_{CEO}$	45	V
	BCX52 BCX55		60	V
	BCX53 BCX56		80	V
Emitter-Base Voltage		$V_{EBO}$	5	V
Collector Current		$I_C$	1	A
Collector Power Dissipation		$P_C$	500	mW
Thermal Resistance From Junction To Ambient		$R_{\theta JA}$	250	°C/W
Operation Junction and Storage Temperature Range		$T_J, T_{stg}$	-55 to +150	°C

BCX51\_56  
Rev1\_ 29072023EJS



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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT		
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=100\mu A, I_E=0$	BCX51	BCX54	45	--	--	V
			BCX52	BCX55	60	--	--	V
			BCX53	BCX56	100	--	--	V
Collector-emitter breakdown voltage	$V_{(BR)CEO}^1$	$I_C=10mA, I_B=0$	BCX51	BCX54	45	--	--	V
			BCX52	BCX55	60	--	--	V
			BCX53	BCX56	80	--	--	V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=100\mu A, I_C=0$	5	--	--	V		
Collector cut-off current	$I_{CBO}$	$V_{CB}=30V, I_E=0$	--	--	0.1	$\mu A$		
Emitter cut-off current	$I_{EBO}$	$V_{EB}=5V, I_C=0$	--	--	0.1	$\mu A$		
DC current gain	$h_{FE(1)}^1$	$V_{CE}=2V, I_C=5mA$	63	--	--			
	$h_{FE(2)}^1$	$V_{CE}=2V, I_C=150mA$	63	--	250			
	$h_{FE(3)}^1$	$V_{CE}=2V, I_C=0.5A$	40	--	--			
Collector-emitter saturation voltage	$V_{CE(sat)}^1$	$I_C=0.5A, I_B=50mA$	--	--	0.5	V		
Base -emitter voltage	$V_{BE}^1$	$V_{CE}=2V, I_C=0.5A$	--	--	1	V		
Transition frequency	$f_T$	$V_{CE}=5V, I_C=10mA, f=100MHz$	--	50	--	MHz		

**Note:**

1. Pulse Test
2. For PNP device voltage and current values will be negative (-).

**CLASSIFICATION OF  $h_{FE(2)}$**

<b>RANK</b>	BCX51	BCX51-10	BCX51-16
	BCX52	BCX52-10	BCX52-16
	BCX53	BCX53-10	BCX53-16
	BCX54	BCX54-10	BCX54-16
	BCX55	BCX55-10	BCX55-16
	BCX56	BCX56-10	BCX56-16
<b>RANGE</b>	63–250	63–160	100–250

## TYPICAL CHARACTERISTICS CURVES

Fig 1: Static Characteristic

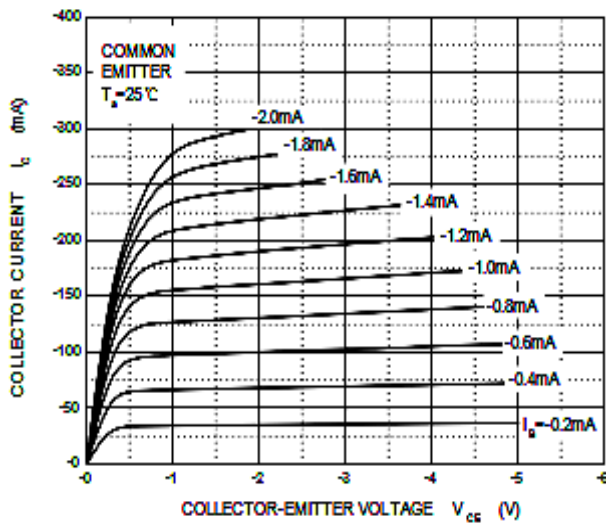
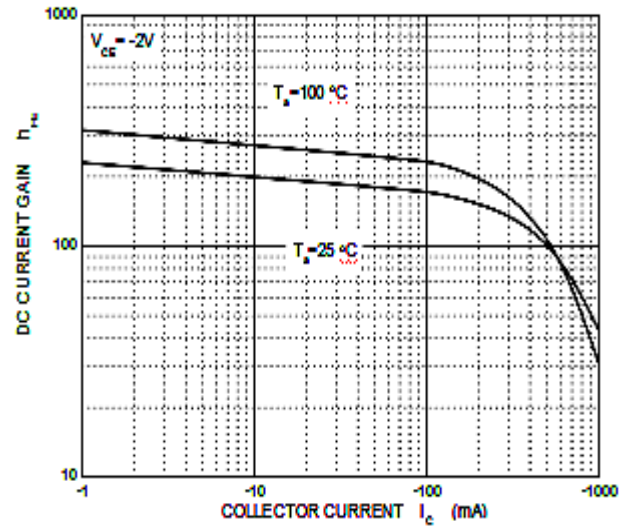


Fig 3: DC current gain vs Collector Current



2: Base-Emitter Saturation voltage vs Collector Curr

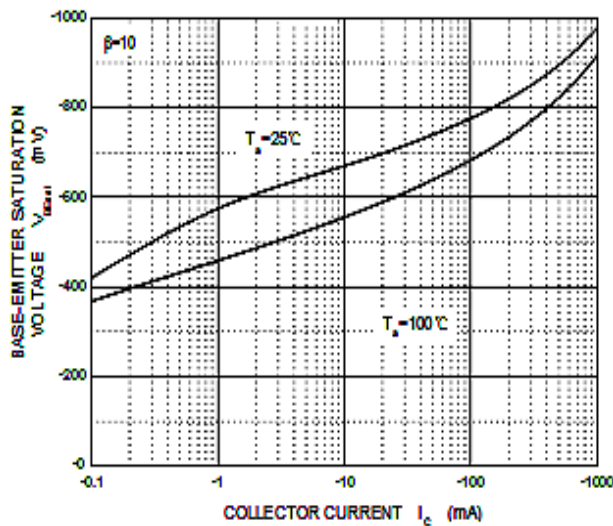
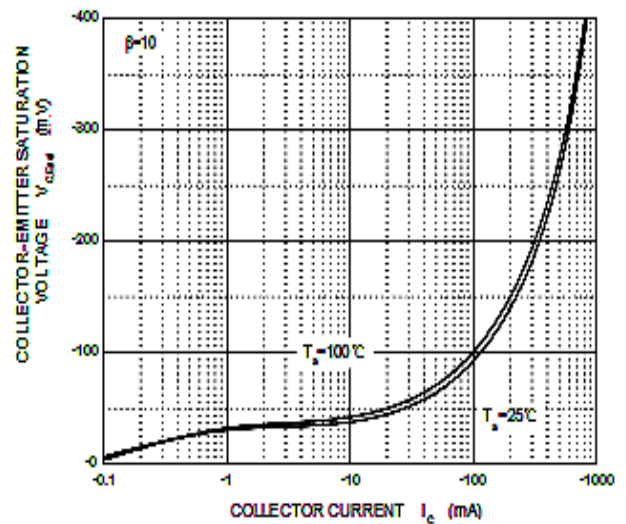


Fig 4: Collector-emitter saturation voltage vs Collector Current



## TYPICAL CHARACTERISTICS CURVES

Fig 5: Transition frequency vs Collector Current

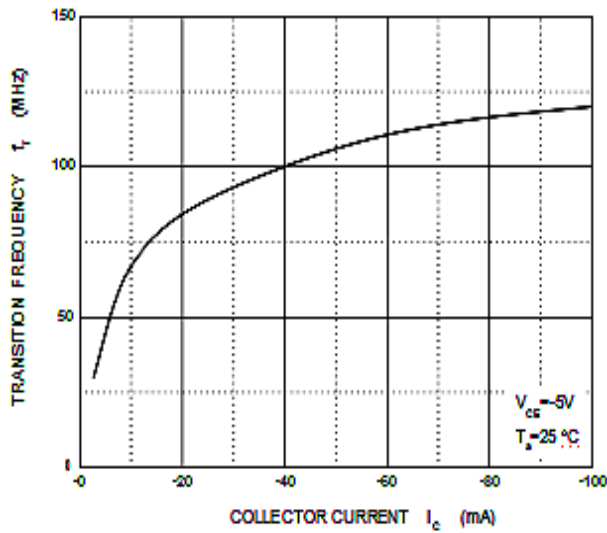


Fig 7: Capacitance vs Reverse Voltage

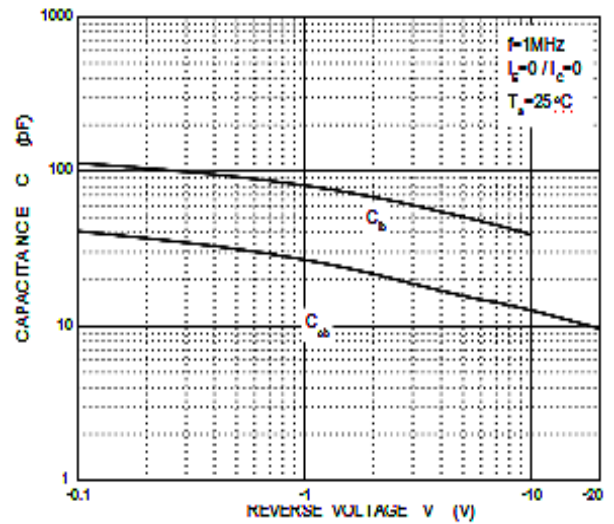


Fig 6: Collector Current vs Base-emitter voltage

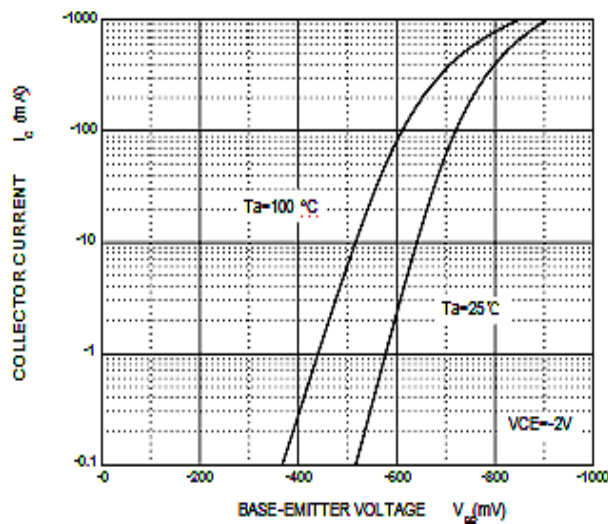
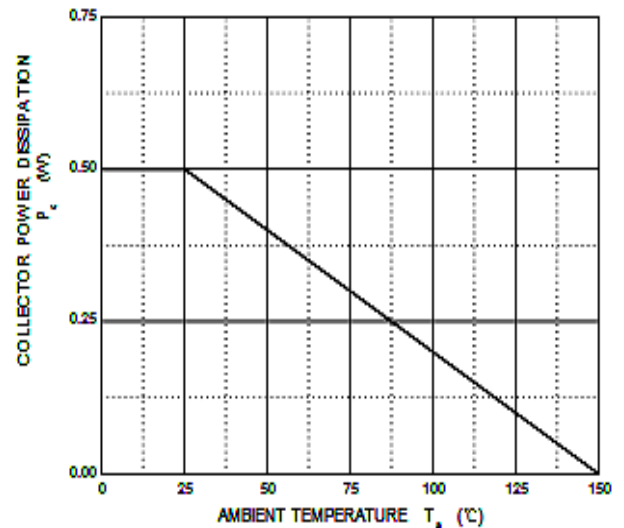
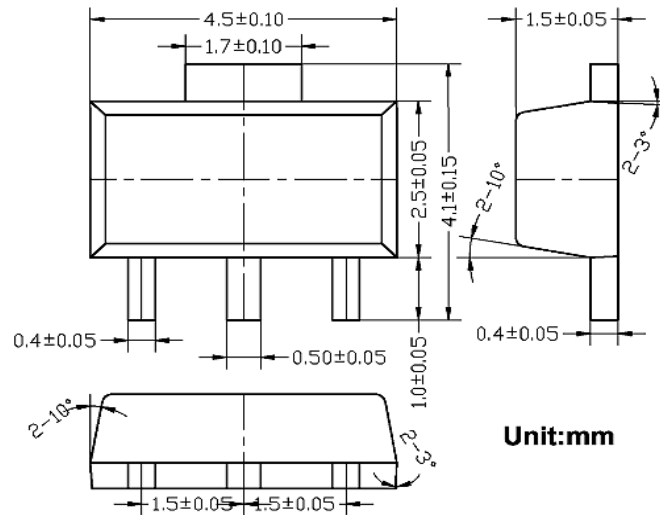


Fig 8: Collector Power Dissipation vs Ambient Temperature



## PACKAGE DETAILS

### SOT-89 Plastic Package

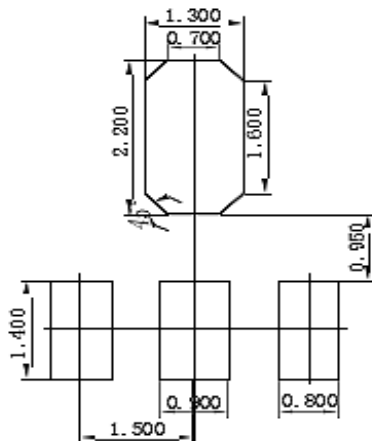


All dimensions are in mm

### PIN CONFIGURATION

1. Base
2. Collector
3. Emitter

### SOT-89 Suggested Pad Layout

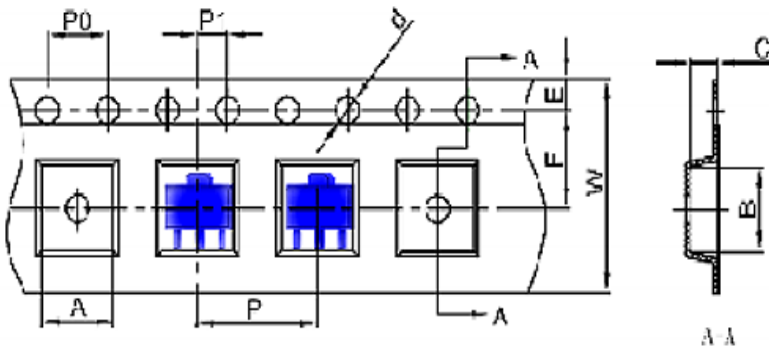


**Note:**

1. Controlling dimensions: in millimeters.
2. General Tolerance:  $\pm 0.05$ mm
3. The pad layout is for reference purposes only.

## SOT-89 Tape and Reel

### SOT-89 Embossed Carrier Tape

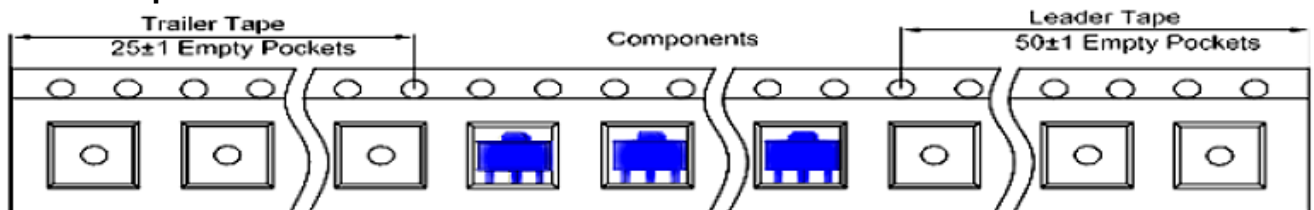


SOT-89 Parts are shipped in tape. The carrier tape is made from a disposable (carbon filled) polycarbonate resin. The cover tape is a multi-layer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-Static sprayed agent. These reeled parts in standard option are shipped with 3000 units per 7" or 17.8cm diameter reel. The reels are clear in color and are made of polystyrene plastic (anti-static coated)

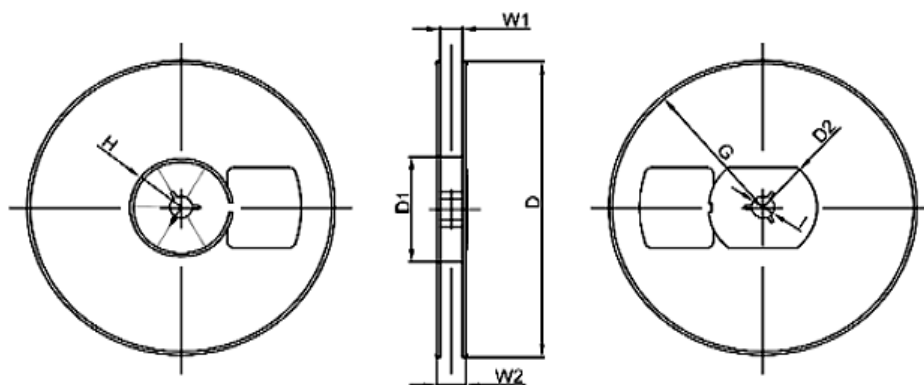
Dimensions are in millimeter

Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-89-3L	4.85	4.45	1.85	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

### SOT-89 Tape Leader and Trailer



### SOT - 89 Reel



Dimensions are in millimeter

Reel Option	D	D1	D2	G	H	I	W1	W2
7" Dia	Ø180.00	60.00	R32.00	R86.50	R30.00	Ø13.00	13.20	16.50

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
1000 pcs	7 inch	10,000 pcs	203×203×195	40,000 pcs	438×438×220	

### 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

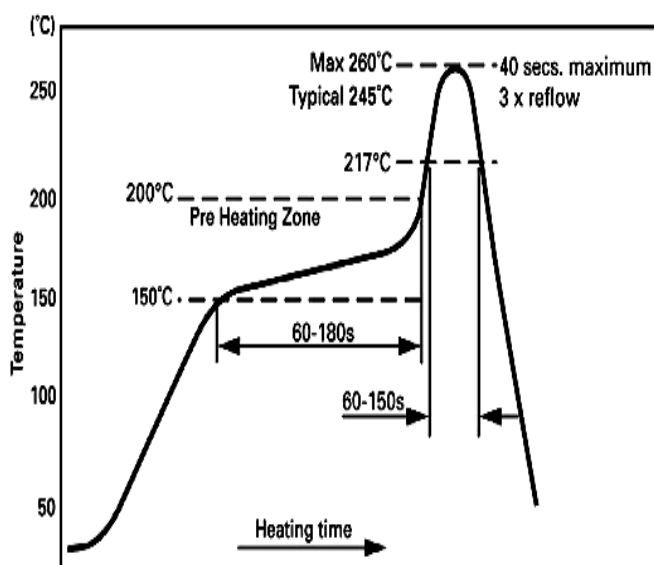
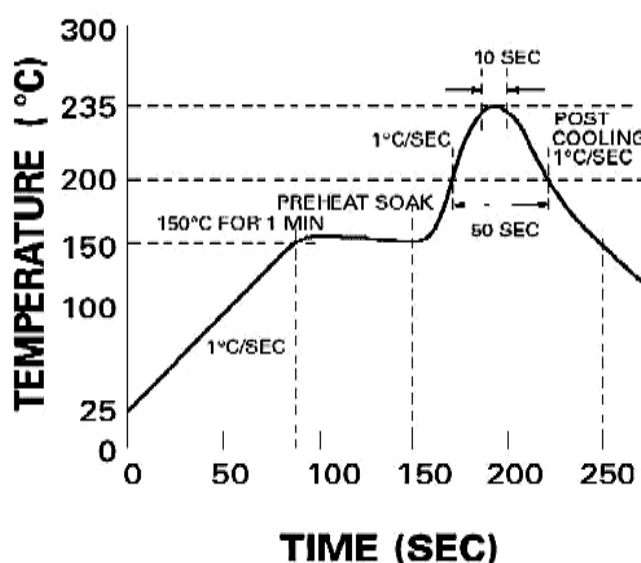


Figure 2



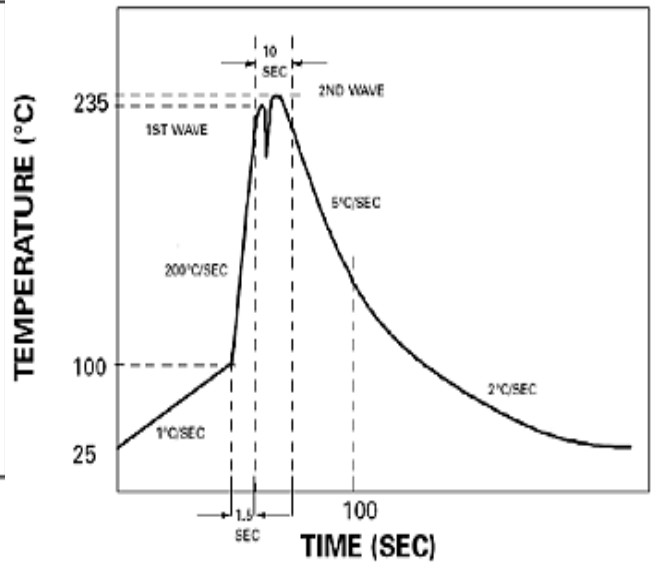
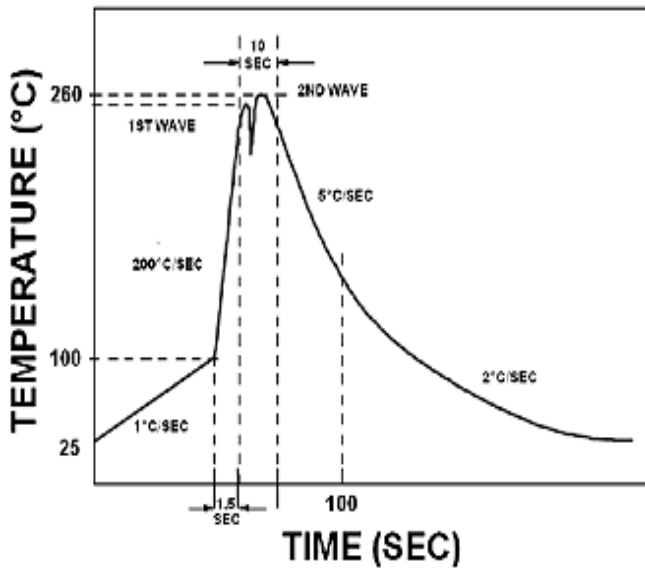
Reflow profiles in tabular form

Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~3°C/second	~3°C/second
<b>Preheat</b>		
Time maintained above:		
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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