



Continental Device India Pvt. Limited

An IATF 16949, ISO9001 and ISO 14001/ISO 45001 Certified Company



NPN SILICON PLANAR EPITAXIAL TRANSISTORS

MPSA44
MPSA45



TO-92

TO-92 Leaded
Plastic Package
RoHS compliant

FEATURES:

1. High Voltage Transistors
2. Complementary of MPSA93 is MPSA94

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

PARAMETER	SYMBOL	MPSA44	MPSA45	UNIT
Collector–Emitter Voltage	V_{CEO}	400	350	V
Collector Base Voltage	V_{CBO}	500	400	V
Emitter Base Voltage	V_{EBO}	6.0		V
Collector Current Continuous	I_C	300		mA
Power Dissipation	P_D	625		W
Derate Above 25°C		5.0		nW/°C
Power Dissipation	P_D	1.5		W
Derate Above 25°C		12		nW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150		°C

THERMAL CHARACTERISTICS

Junction to Case	$R_{th\ j-c}$	83.3	°C
Junction to Ambient	$R_{th\ j-a}$	200	°C

MPSA44_45
Rev04_22052023EM



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

PARAMETER		SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Collector Emitter Voltage	MPSA44	V_{CEO}	$I_C = 1mA, I_B = 0$	400	--	--	V
	MPSA45			350	--	--	V
Collector Emitter Voltage	MPSA44	V_{CES}	$I_C = 100\mu A, V_{BE} = 0$	500	--	--	V
	MPSA45			400	--	--	V
Collector Base Voltage	MPSA44	V_{CBO}	$I_C = 100\mu A, I_E = 0$	500	--	--	V
	MPSA45			400	--	--	V
Emitter Base Voltage		V_{EBO}	$I_E = 10\mu A, I_C = 0$	6	--	--	V
Collector Cut-Off Current	MPSA44	I_{CBO}	$V_{CB} = 400V, I_E = 0$	--	--	100	nA
	MPSA45		$V_{CB} = 320V, I_E = 0$	--	--	100	nA
Collector Cut-Off Current	MPSA44	I_{CES}	$V_{CB} = 400V, V_{BE} = 0$	--	--	500	nA
	MPSA45		$V_{CB} = 320V, V_{BE} = 0$	--	--	500	nA
Emitter Cut-Off Current		I_{EBO}	$V_{EB} = 4V, I_C = 0$	--	--	100	nA

DYNAMIC CHARACTERISTICS

DC Current Gain	h_{FE}^1	$V_{CE} = 10V, I_C = 1mA$	40	--	--	
		$V_{CE} = 10V, I_C = 10mA$	50	--	200	
		$V_{CE} = 10V, I_C = 50mA$	45	--	--	
		$V_{CE} = 10V, I_C = 100mA$	40	--	--	
Collector Emitter Saturation Voltage	$V_{CE(sat)}^1$	$I_C = 1mA, I_B = 0.1mA$	--	--	0.40	V
		$I_C = 10mA, I_B = 1mA$	--	--	0.50	V
		$I_C = 50mA, I_B = 5mA$	--	--	0.75	V
Base Emitter Saturation Voltage	$V_{BE(sat)}^1$	$I_C = 10mA, I_B = 1mA$	--	--	0.75	V

DYNAMIC CHARACTERISTICS

Output Capacitance	C_{obo}	$V_{CB}=20V, I_E=0, f=1MHz$	--	--	7	pF
Input Capacitance	C_{ibo}	$V_{EB}=0.5V, I_C=0, f=1MHz$	--	--	130	pF
Small Signal Current Gain	h_{fe}	$V_{CE}=10V, I_C=10mA, f=1MHz$	2	--	--	

Note:

1. Pulse test: Pulse Width <300 us, Duty Cycles ≤ 2%



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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

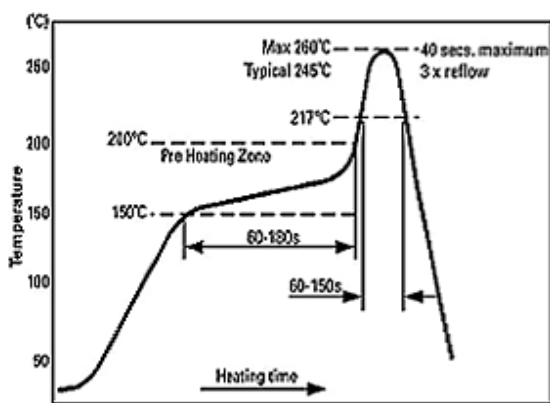
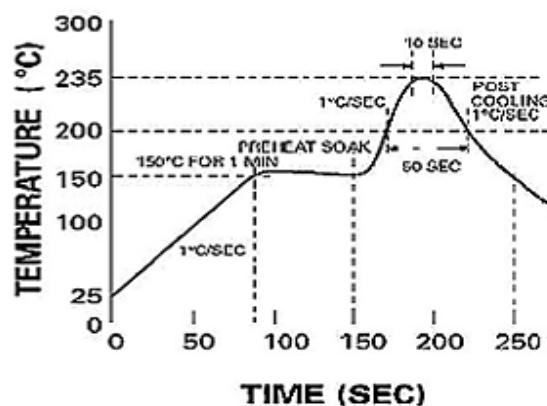


Figure 2



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
– 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.



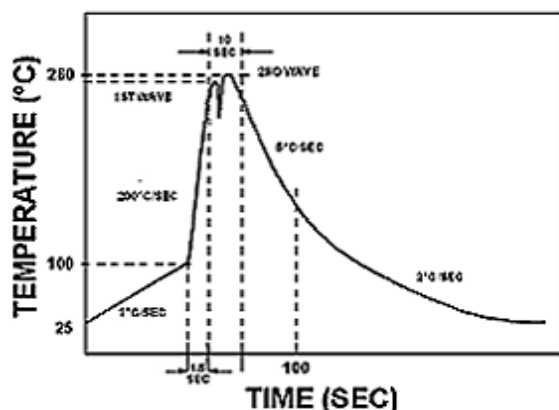
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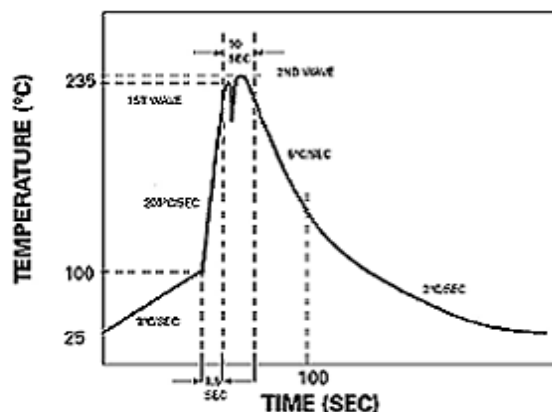


Recommended Wave Solder Profiles

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.



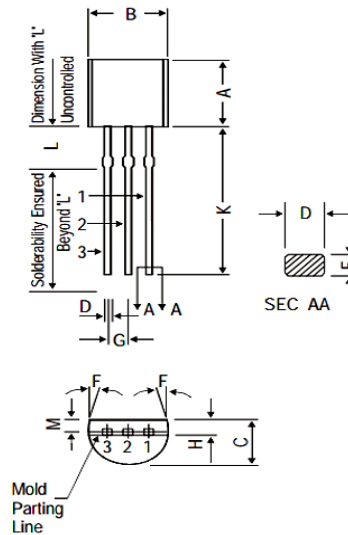
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PACKAGE DETAIL

TO-92 Leaded Plastic Package

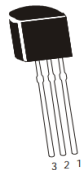


DIM	MIN	MAX
A	4.32	5.33
B	4.45	5.20
C	3.18	4.19
D	0.41	0.55
E	0.35	0.50
F	5 DEG	
G	1.14	1.40
H	1.20	1.40
K	12.70	--
L	1.98	2.082
M	1.03	1.20

All Dimensions are in mm

PIN CONFIGURATION

1. COLLECTOR
2. BASE
3. EMITTER

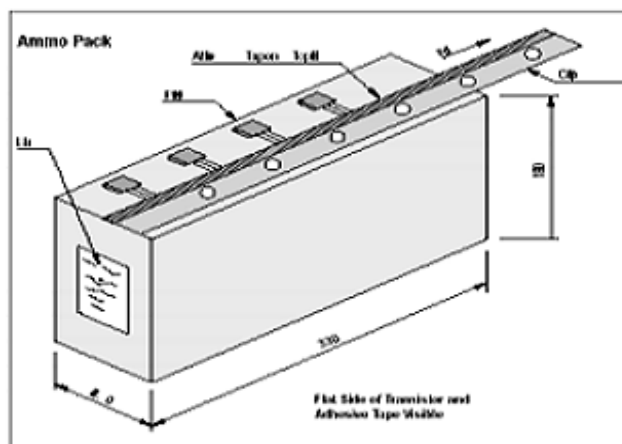
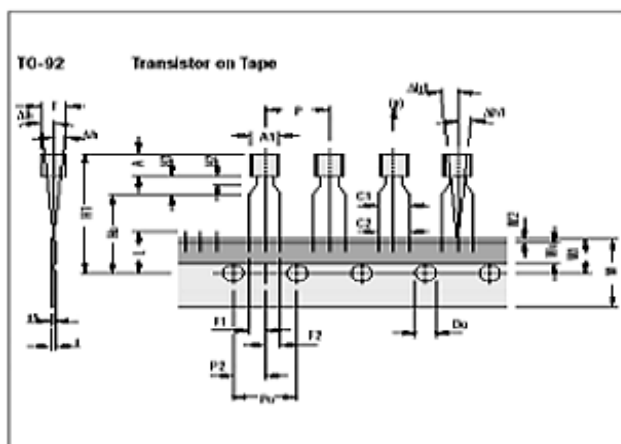


Packing Details

PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
TO-92 Bulk	1K/polybag	200 gm/1K pcs	3" x 7.5" x 7.5"	5K	17" x 15" x 13.5"	80K	23 kgs
TO-92 T&A	2K/ammo box	645 gm/2K pcs	12.5" x 8" x 1.8"	2K	17" x 15" x 13.5"	32K	12.5 kgs

MPSA44_45
Rev04_22052023EM

TO-92 Tape and Ammo Pack



All dimensions are in mm

Tape Specifications

ITEM	SYMBOL	SPECIFICATION			
		MIN.	NOM.	MAX.	TOL.
BODY WIDTH	A1	4.45		5.20	
Body Height	A	4.32		5.33	
Body thickness	T	3.18		4.19	
Pitch of component ^{cr}	P		12.7		±1.0
Feed hole pitch ⁵¹	Po		12.7		±0.3
Feed hole centre to component centre ⁵²	P2		6.35		±0.4
Comp. alignment, side view ⁵³	Dh		0	1.0	
Comp. alignment, front view ⁵³	Dh1		0	1.3	
Tape width ^{cr}	W		18		±0.5
Hole-down tape width ^{cr}	Wo		6		±0.2
Hole position	W1		9		±0.7-0.5
Hole-down tape position	W2	0.0		0.7	
Lead wire clinch height	Ho		16		±0.5
Component height	H1			24.0	
Length of snipped leads	L			11.0	
Feed hole diameter ^{cr}	Do		4		±0.2
Total tape thickness ⁵⁴	t			1.2	
Lead-to-lead distance ^{cr}	F1, F2	2.4		2.7	
Stand off	H2	0.45		1.45	
Clinch height	H3			3.0	
Lead parallelism ^{cr}	C1-C2			0.22	
pull-out force	(p)	6N			

Note:

1. Maximum alignment deviation between leads not to be greater BODY W then 0.20 mm.
2. Maximum non-cumulative variation between tape feed holes shall not exceed 1 mm in 20 pitches.
3. Hold down tape not to exceed beyond the edge(s) carrier tape and there shall be no exposure of adhesive
4. No more than 3 consecutive missing components is permitted
5. A tape trailer, having at least three feed holes is required after Ho the last component
6. Splices shall not interfere with the sprocket feed holes

*1 Cumulative pitch error 1.0 mm/20 pitch.

*2. To be measured at bottom of clinch.

*3. At top of body.

*4. t1=0.3-0.6 mm

*5. Critical Dimension.



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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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