PNP SILICON PLANAR TRANSISTORS

2N4030 2N4031
2N4032 2N4033

TO-39

TO-39
Metal Can Package
RoHS compliant

FEATURE:

1. This product is available in AEC-Q101 Compliant and PPAP Capable also.

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

APPLICATIONS: 2N4030 And 2N4033 Are PNP Small Signal General Purpose AMLIFIER, TRANSISTORS.

ABSOLUTE MAXIMUM RATINGS (Ta = 25 ℃ Unless otherwise specified)

PARAMETER	SYMBOL	2N4030, 4032	2N4031, 4033	UNIT
Collector Emitter Voltage	V_{CEO}	60	80	V
Collector Base Voltage	V_{CBO}	60	80	V
Emitter Base Voltage	V_{EBO}	5.0		V
Collector Current	I_{CM}	1.0		A
Power Dissipation @ Ta=25ºC	P_D	800		mW
Derate Above 25ºC		4.6		mW/°C
Power Dissipation@ Tc=25ºC	P_D	4		W
Derate Above 25ºC		22.85		mW/°C
Operating And Storage Junction Temperature Range	T_j, T_{stg}	-65 to +200		°C

ELECTRICAL CHARACTERISTICS at (Ta = 25 ℃ Unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector Emitter Breakdown Voltage	2N4030, 4032	BV_{CEO} [1]	I_C=10mA,I_B=0	60	--	--	V
	2N4031, 4033			80	--	--	V
Collector Base Breakdown Voltage	2N4030, 4032	BV_{CBO}	I_C=10µA, I_E =0	60	--	--	V
	2N4031, 4033			80	--	--	V
Emitter Base Breakdown Voltage		BV_{EBO}	I_E=10µA, I_C =0	5	--	--	V
Collector Leakage Current	2N4030, 4032	I_{CBO}	V_{CB}=50V, I_E=0	--	--	50	nA
	2N4030, 4032		V_{CB}=50V, T_A=150ºC	--	--	50	µA
	2N4031, 4033		V_{CB}=60V, I_E=0	--	--	50	nA
	2N4031, 4033		V_{CB}=60V, T_A=150ºC	--	--	50	µA
Emitter Leakage Current		I_{EBO}	V_{EB}=5V, I_C=0	--	--	10	µA
Collector Emitter Saturation Voltage	2N4030, 4032	$V_{CE(Sat)}$ [1]	I_C=150mA,I_B=15mA	--	--	0.15	V
			I_C=500mA,I_B=50mA	--	--	0.5	V
			I_C=1A,I_B=100mA	--	--	1.0	V

ELECTRICAL CHARACTERISTICS at (Ta = 25 ℃ Unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Base Emitter Saturation Voltage		$V_{BE(Sat)}$ [1]	I_C=150mA,I_B=15mA	--	--	0.9	V
Base Emitter on Voltage	2N4030, 4032	$V_{BE(on)}$ [1]	I_C=500mA, V_{CE}=0.5V	--	--	1.1	V
			I_C=1A, V_{CE}=1V	--	--	1.2	V
DC Current Gain	2N4030, 4031	h_{FE} [1]	I_C=100mA, V_{CE}=5V	30	--	--	
	2N4032, 4033			75	--	--	
	2N4030, 4031		I_C=100mA,V_{CE}=5V	40	--	120	
	2N4032, 4033			100	--	300	
	2N4030, 4031		I_C=500mA,V_{CE}=5V	25	--	--	
	2N4032, 4033			70	--	--	
	2N4030, 4031		I_C=100mA,V_{CE}=5V, Ta=-55ºC	15	--	--	
	2N4032, 4033			40	--	--	
	2N4030		I_C=1A, V_{CE}=5V	15	--	--	
	2N4031			10	--	--	
	2N4032			40	--	--	
	2N4033			25	--	--	
Transition Frequency	2N4030, 4031	f_T	I_C=50mA, V_{CE}=10V, f=100MHz	100	--	400	MHz
	2N4032, 4033			150	--	500	MHz
Output Capacitance		C_{ob}	V_{CB}=10V,I_E=0,f=1MHz	--	--	20	pF
Input Capacitance		C_{ib}	V_{BE}=0.5V,I_C=0,f=1MHz	--	--	110	pF
Turn on Time		t_{on}	I_C=500mA, I_{B1}=50mA	--	--	100	ns
Storage Time		t_s	I_C=500mA, I_{B1}=I_{B2}=50mA	--	--	350	ns
Fall Time		t_f	I_C=500mA,I_{Bl}=I_{B2}=50mA	--	--	50	ns

Note:

1. Pulse Test: Pulse Width ≤300μs, Duty Cycle ≤2%
2. For PNP device voltage and current values will be negative (-).

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

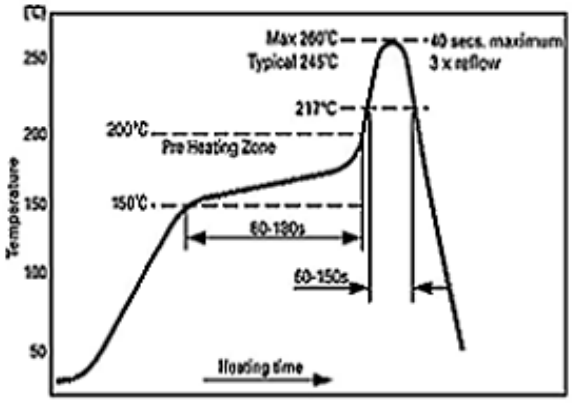
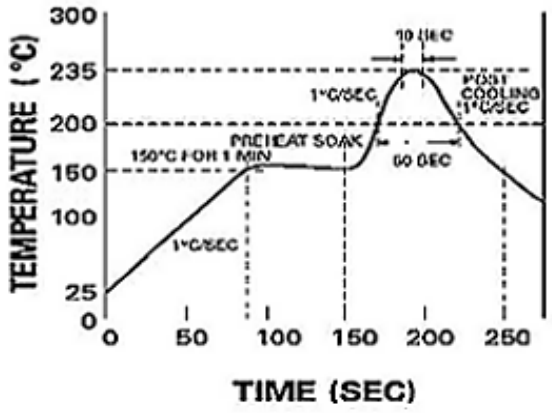


Figure 2

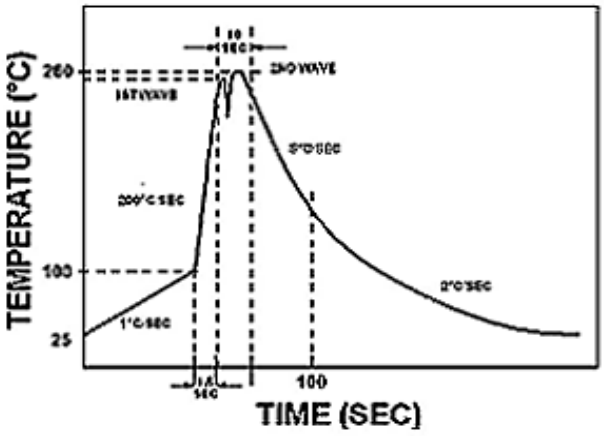


Reflow profiles in tabular form

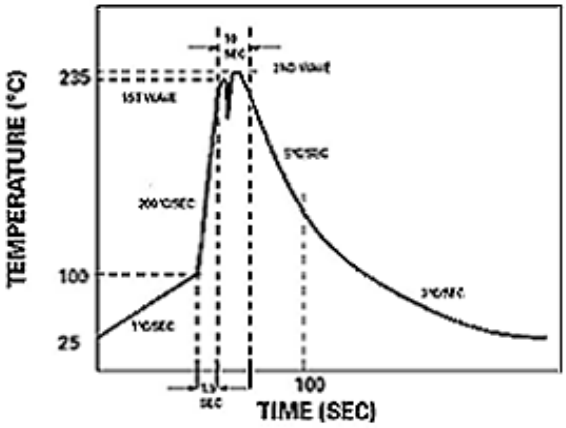
Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~3°C/second	~3°C/second
Preheat – Temperature Range – Time	 150-170°C 60-180 seconds	 150-200°C 60-180 seconds
Time maintained above: – Temperature – Time	 200°C 30-50 seconds	 217°C 60-150 seconds
Peak Temperature	235°C	260°C max.
Time 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

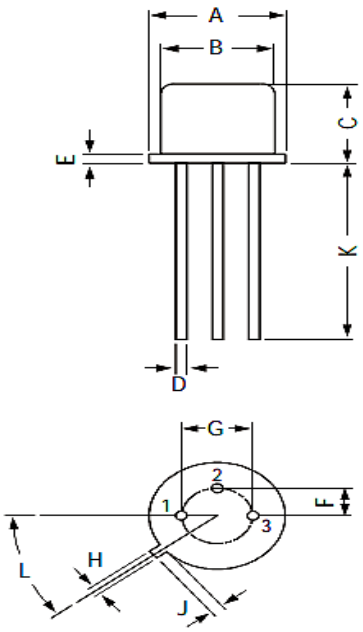


Wave Profiles in Tabular Form

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

PACKAGE DETAILS

TO-39 Metal Can Package

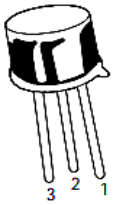


DIM	MIN	MAX
A	8.50	9.39
B	7.74	8.50
C	6.09	6.60
D	0.40	0.53
E	--	0.88
F	2.41	2.66
G	4.82	5.33
H	0.71	0.86
J	0.73	1.02
K	12.700	--
L	42°	48°

All dimensions are in mm

PIN CONFIGURATION

1. Emitter
2. Base
3. Collector



Packing Detail

PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
TO-39	500 pcs/polybag	540 gm/500 pcs	3" x 7.5" x 7.5"	20K	17" x 15" x 13.5"	32K	40 kgs

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

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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