



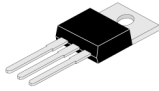
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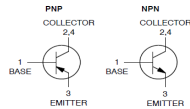


6 Amp PLASTIC POWER TRANSISTORS

NPN TIP41 A/B/C
PNP TIP42, A/B/C



TO-220



TO-220 Leaded
Plastic Package
RoHS compliant

FEATURES:

1. 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. Complementary Silicon Transistors intended for a wide variety of Switching and Amplifier Applications
2. Series and Shunt Regulators
3. Driver and Output stages of Hi-Fi Amplifiers

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

DESCRIPTION	SYMBOL	TIP41	TIP41A	TIP41B	TIP41C	UNIT
		TIP42	TIP42A	TIP42B	TIP42C	
Collector Emitter Voltage	V_{CEO}	40	60	80	100	V
Collector Base Voltage	V_{CBO}	40	60	80	100	V
Emitter Base Voltage	V_{EBO}	5				V
Collector Current Continuous	I_C	6				A
Collector Current Peak	I_{CM}	10				A
Base Current	I_B	2				A
Power Dissipation upto	$T_c=25^\circ\text{C}$	65				W
	Derate above 25°C	520				mW/°C
Power Dissipation upto	$T_a=25^\circ\text{C}$	2				W
	Derate above 25°C	16				mW/°C
Unclamped Inductive Load Energy	E^1	62.5				mJ
Storage Temperature	T_{stg}	150				°C
Junction Temperature	T_j	- 65 to +150				°C

THERMAL RESISTANCE

Junction to Case	$R_{\theta(j-c)}$	1.92	°C/W
Junction to Ambient in free air	$R_{\theta(j-a)}$	62.5	°C/W

Note:

1. $I_C=2.5A$, $L=20mH$, $P.R.F.=10Hz$, $V_{cc}=10V$, $R_{BE}=100\Omega$

TIP41_ TIP42
Rev2_07082023EM



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ELECTRICAL CHARACTERISTICS at $T_a = 25\text{ }^\circ\text{C}$

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	MAX	UNIT
Collector Emitter Voltage	* V_{CEO}	$I_C=30\text{mA}, I_B=0$	40	--	V
			60	--	V
			80	--	V
			100	--	V
Collector Cut off Current	I_{CEO}	$V_{CE}=30\text{V}, I_B=0$	--	0.7	mA
		$V_{CE}=60\text{V}, I_B=0$	--	0.7	mA
Collector Cut off Current	I_{CES}	$V_{CE}=V_{CEO(max)}, V_{BE}=0$	--	0.4	mA
Emitter Cut off Current	I_{EBO}	$V_{EB}=5\text{V}, I_C=0$	--	1	mA
DC Current Gain	* h_{FE}	$I_C=0.3\text{A}, V_{CE}=4\text{V}$	30		
		$I_C=3\text{A}, V_{CE}=4\text{V}$	15	75	
Collector Emitter Saturation Voltage	* $V_{CE(sat)}$	$I_C=6\text{A}, I_B=0.6\text{A}$	--	1.5	V
Base Emitter on Voltage	* $V_{BE(on)}$	$I_C=6\text{A}, V_{CE}=4\text{V}$	--	2	V

*Pulse Test : Pulse width $\leq 300\text{ms}$, Duty Cycle $\leq 2\%$

DYNAMIC CHARACTERISTIC

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	MAX	UNIT
Small Signal Current Gain	h_{fe}	$I_C=0.5\text{A}, V_{CE}=10\text{V}, f=1\text{KHz}$	20	--	
Transition Frequency	f_T	$I_C=0.5\text{A}, V_{CE}=10\text{V}, f=1\text{MHz}$	3	--	MHz

SWITCHING CHARACTERISTICS

DESCRIPTION	SYMBOL	TEST CONDITION	TYP	UNIT
Turn On Time	t_{on}	$V_{CC}=30\text{V}, I_C=6\text{A},$	0.6	ms
Turn Off Time	t_{off}	$I_{B1}=I_{B2}=0.6\text{A}, R_L=5\text{W}$	1.4	ms

TIP41_ TIP42
Rev2_07082023EM

TYPICAL CHARACTERISTICS CURVES

Figure 1. Power Derating

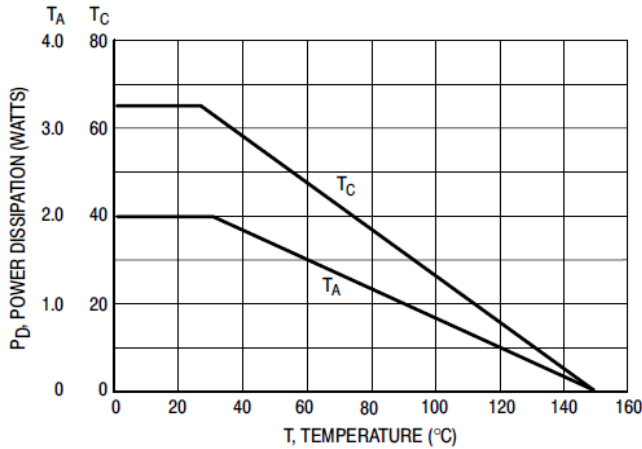


Figure 2. Switching Time Test Circuit

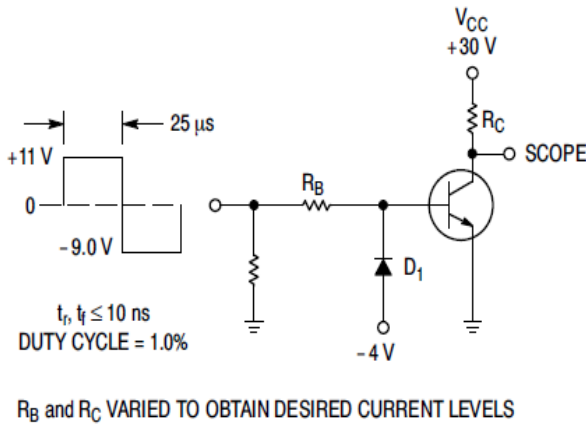
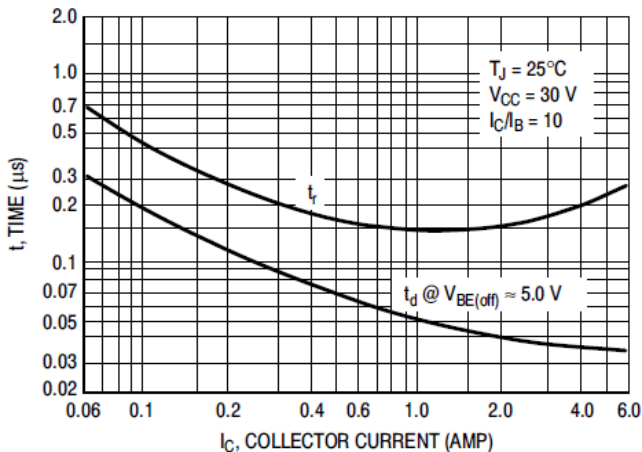


Figure 3. Turn-On Time



TIP41_TIP42
Rev2_07082023EM

Figure 4. Active-Region Safe Operating Area

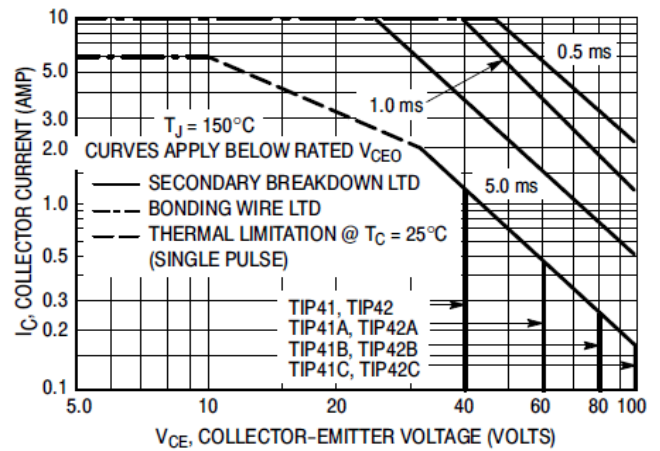


Figure 5. Turn-Off Time

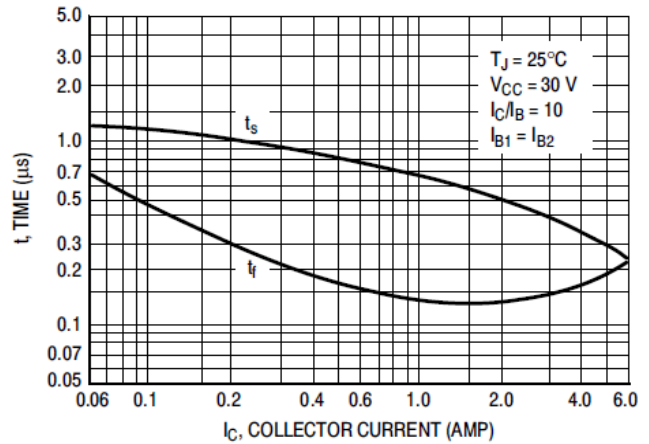
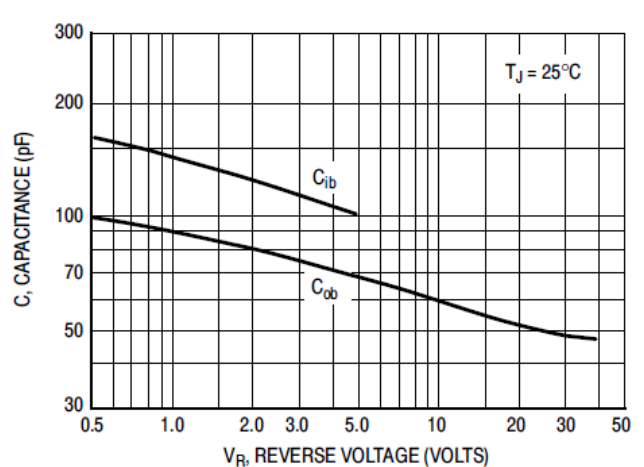
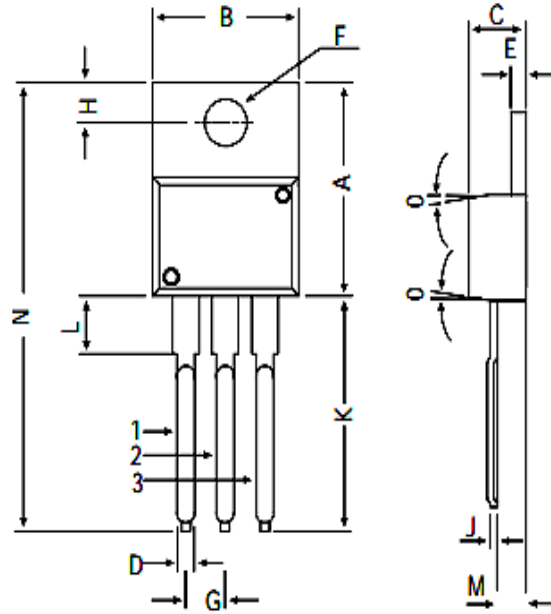


Figure 6. Capacitance



PACKAGE DETAILS

TO-220 Plastic Package

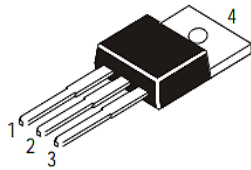


DIM	MIN.	MAX.
A	14.42	16.51
B	9.63	10.67
C	3.56	4.83
D	--	0.90
E	1.15	1.40
F	3.75	3.88
G	2.29	2.79
H	2.54	3.43
J	--	0.56
K	12.70	14.73
L	2.80	4.07
M	2.03	2.92
N	--	31.24
O	7°	

All Dimensions are in mm

Pin Configurations:

1. Base
2. Collector
3. Emitter
4. Collector



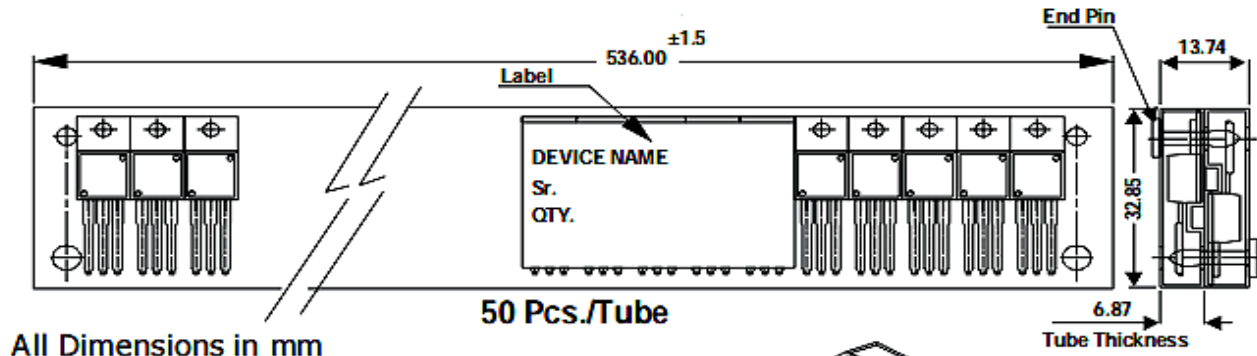


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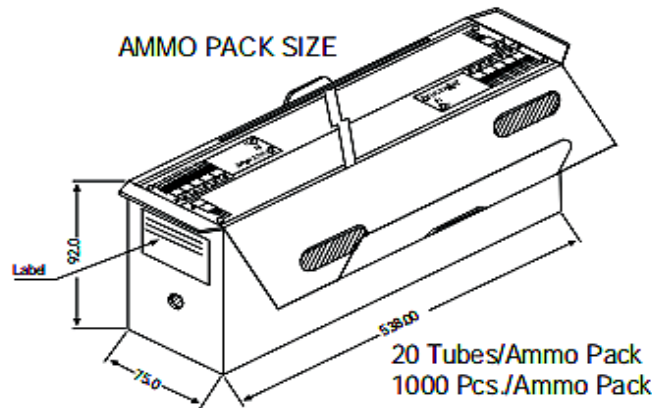
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TO-220 Tube Packing



AMMO PACK SIZE



Packing Detail

PACKAGE	STANDARDPACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	GrWt
TO-220	200 pcs/polybag	396 gm/200 pcs	3" x 7.5" x 7.5"	1.0K	17" x 15" x 13.5"	16.0K	36 kgs
	50 pcs/tube	120 gm/50 pcs	3.5" x 3.7" x 21.5"	1.0K	19" x 19" x 19"	10.0K	29 kgs

TIP41_ TIP42
Rev2_07082023EM

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

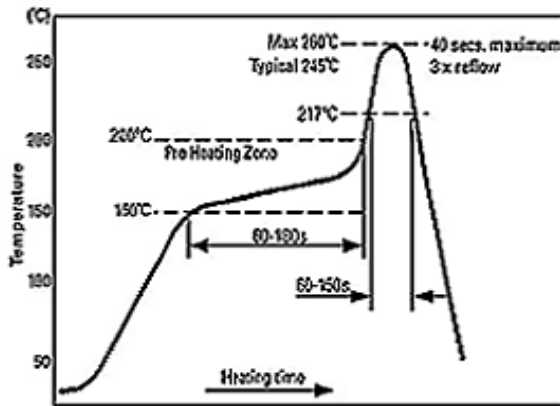
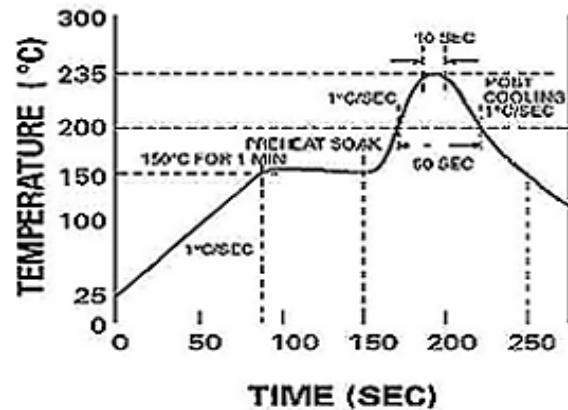


Figure 2



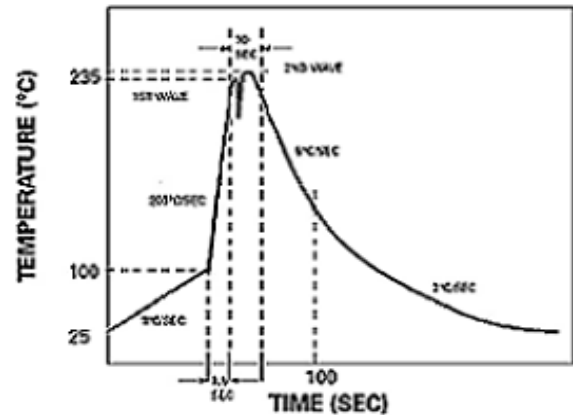
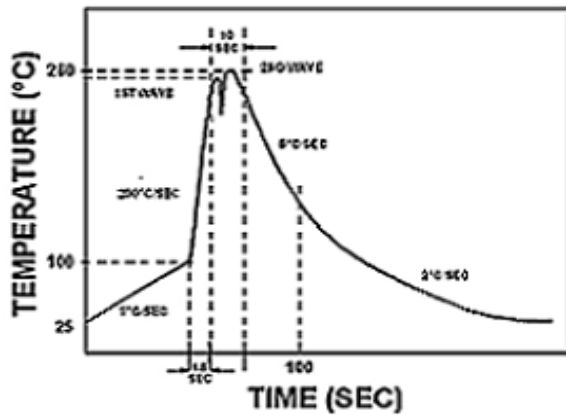
Reflow profiles in tabular form

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 Pe	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 Pe	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

TIP41_ TIP42
Rev2_07082023EM



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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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TIP41_ TIP42
Rev2_07082023EM