PLASTIC POWER TRANSISTORS

TIP31, A, B, C NPN
TIP32, A, B, C PNP

TO-220

TO-220
Leaded Plastic Package
RoHS compliant

APPLICATIONS:

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

ABSOLUTE MAXIMUM RATINGS (at T_a = 25 °C unless otjerwise specified)

DESCRIPTION	SYMBOL	TIP31 / TIP32	TIP31A / TIP32A	TIP31B / TIP32B	TIP31C / TIP32C	UNIT
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	3				A
Collector Current Peak	I_{CM}	5				A
Base Current	I_B	1				A
Power Dissipation upto Tc=25ºC	P_D	40				W
Power Dissipation Derate above Tc 25ºC		320				mW/ºC
Power Dissipation upto Ta=25ºC	P_D	2				W
Power Dissipation Derate above Ta 25ºC		16				mW/ºC
Unclamped Inductive Load Energy	*E	32				mJ
Operating and Storage Junction Temperature	T_j , T_{stg}	-65 to +150				**ºC**
THERMAL RESISTANCE						
Junction to Case	$R_{th\ (j-c)}$	3.125				ºC/W
Junction to Ambient in free air	$R_{th\ (j-a)}$	62.5				ºC/W

Note:

* I_C=1.8A, L=20mH, P.R.F.=10Hz, V_{CC}=10V, R_{BE}=100W

ELECTRICAL CHARACTERISTICS (T_a=25°C unless specified otherwise)

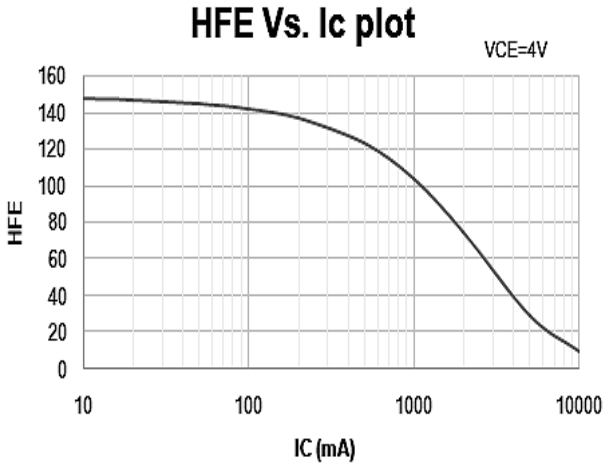
PARAMETER		SYMBOL	TEST CONDITIONS	VALUE		UNIT
				MIN	MAX	
Collector Emitter sustaining Voltage	TIP31/32	*$V_{CEO(SUS)}$	I_C=30mA, I_B=0	40	--	V
	TIP31A/32A			60	--	V
	TIP31B/32B			80	--	V
	TIP31C/32C			100	--	V
Collector Cut off Current	TIP31,A/32,A	I_{CEO}	VCE=30V, IB=0	--	0.3	mA
	TIP31 B,C/32 B,C		VCE=60V, IB=0	--	0.3	mA
Collector Cut off Current		I_{CES}	V_{CE}=V_{CEO}(max),V_{BE}	--	0.2	mA
Emitter Cut off Current		I_{EBO}	V_{EB}=5V, I_C=0	--	1.0	mA
DC Current Gain		*h_{FE}	I_C=1A, V_{CE}=4V	25	--	--
			I_C=3A, V_{CE}=4V	10	60	
Collector Emitter Saturation Voltage		*$V_{CE(SAT)}$	I_C=3A,I_B=375mA	--	1.2	V
Base Emitter on Voltage		*$V_{BE(ON)}$	I_C=3A, V_{CE}=4V	--	1.8	V

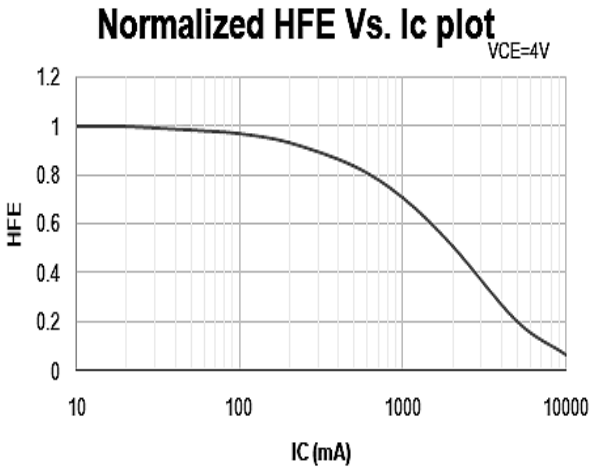
*Pulse Test : Pulse width ≤300us, Duty Cycle <2%

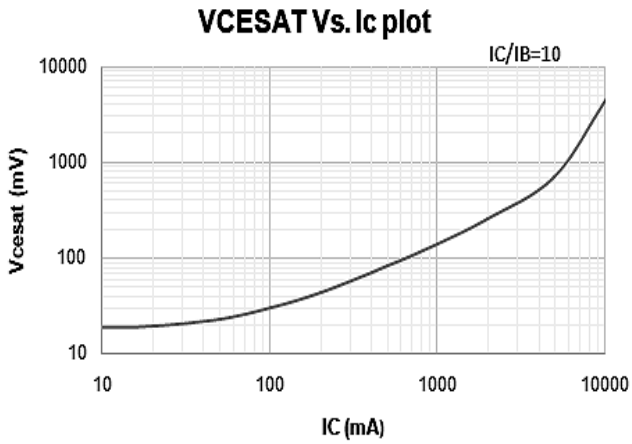
DYNAMIC CHARACTERISTIC

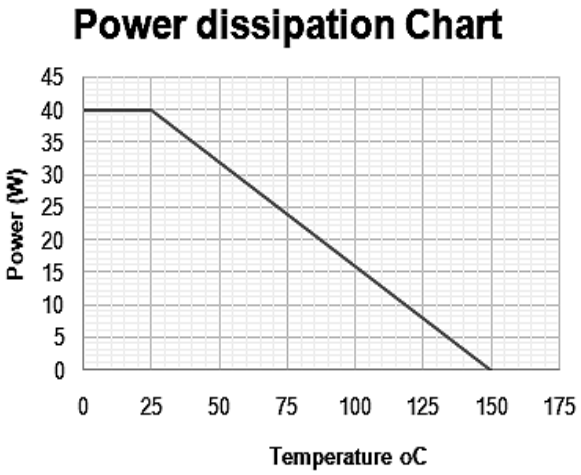
Small Signal Current Gain	hfe	I_C=0.5A,V_{CE}=10V, f=1KHz	20	--	
Transition Frequency	f_T	I_C=0.5A,V_{CE}=10V, f=1MHz	3	--	MHz

CHARACTERISTIC CURVES



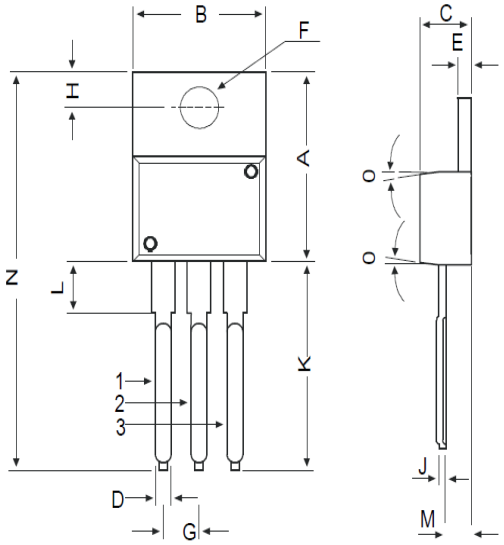






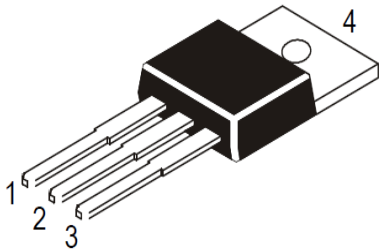
PACKAGE DETAILS

TO-220 Plastic Package



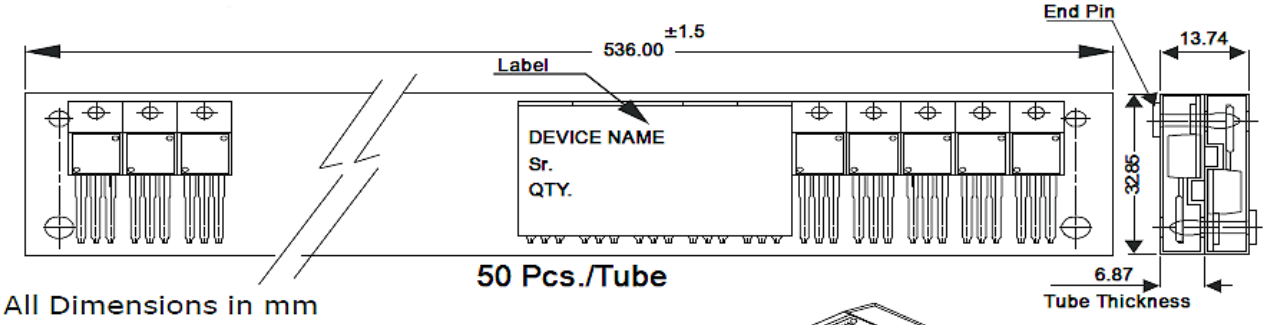
DIM	MIN	MAX
A	14.42	16.51
B	9.63	10.67
C	3.56	4.83
D	—	0.90
E	1.15	1.40
F	3.75	3.88
G	2.29	2.79
H	2.54	3.43
J	—	0.56
K	12.70	14.73
L	2.80	4.07
M	2.03	2.92
N	—	31.24
O	7 DEG	

All diminsions in mm.

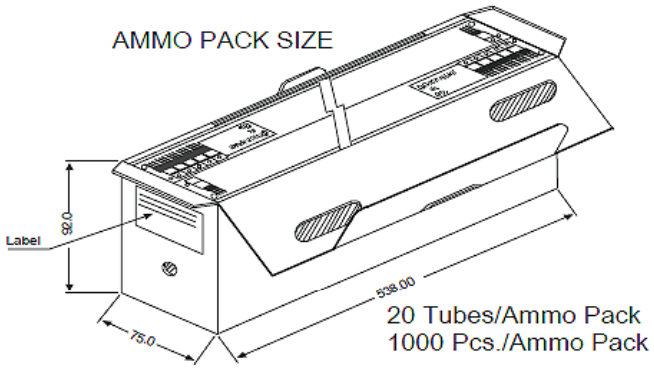


Pin Configuration
1. Base
2. Collector
3. Emitter
4. Collector

TO-220 Tube Packing



All Dimensions in mm



Packing Details

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