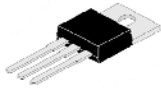


Complementary Silicon Power Transistors

15 AMP, 60–80 VOLT, 75 WATT

NPN 2N6487 2N6488

PNP 2N6490 2N6491



TO-220

**TO-220 Leaded
Plastic Package
RoHS compliant**

FEATURES:

- DC Current Gain Specified to 15 Amperes –
 $h_{FE} = 20-150 @ I_C = 5.0A$
 $h_{FE} = 5.0 \text{ (Min) } @ I_C = 15A$
- Collector–Emitter Sustaining Voltage – @ 200 mAdc
 $V_{CEO(sus)} = 60V(\text{Min}) : 2N6487, 2N6490$
 $V_{CEO(sus)} = 80V(\text{Min}) : 2N6488, 2N6491$
- High Current Gain — Bandwidth Product
 $f_T = 5.0 \text{ MHz (Min) } @ I_C = 1.0A$
- TO–220 Compact Package

APPLICATIONS: designed for use in general–purpose amplifier and switching applications

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

PARAMETER	SYMBOL	VALUE		UNIT
		2N6487/2N6490	2N6488/2N6491	
Collector-Emitter Voltage	V_{CEO}	60	80	V
Collector–Base Voltage	V_{CB}	70	90	V
Emitter-Base Voltage	V_{EB}	5.0		V
Collector Current Continuous	I_C	15		A
Base Current	I_B	5.0		A
Total Power Dissipation @T _C = 25°C	P_D	75		W
Derate above 25°C		0.6		W/°C
Total Power Dissipation @T _A = 25°C	P_D	1.8		W
Derate above 25°C		0.014		W/°C
Operating and Storage Junction Temperature Range	T _J , T _{stg}	-65 to +150		°C
Thermal Resistance, Junction–to–Case	R _{θJC}	1.67		°C/W
Thermal Resistance, Junction to Ambient	R _{θJA}	70		°C/W

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

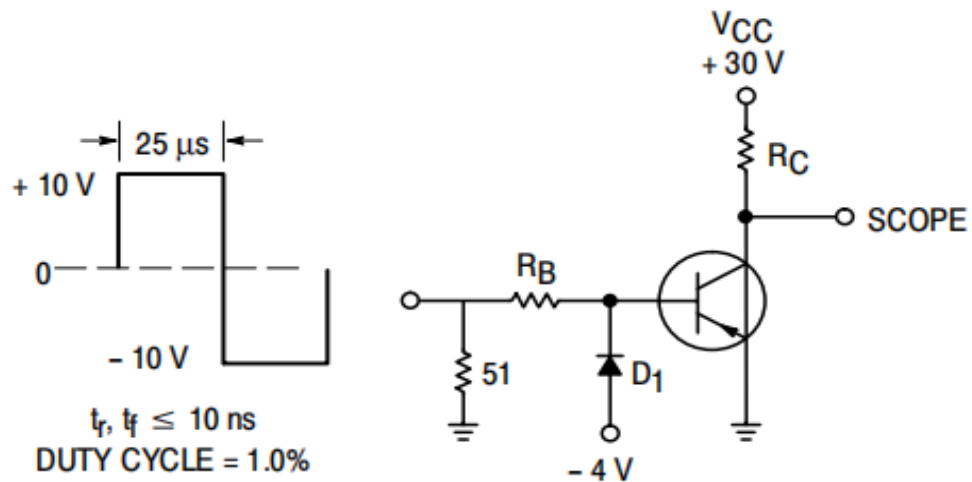
PARAMETER		SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Collector Emitter Sustaining Voltage ¹	2N6487 2N6490	V _{CEO(sus)}	I _C = 200mA, I _B = 0	60	--	--	V
	2N6488 2N6491			80	--	--	
Collector–Emitter Sustaining Voltage ¹	2N6487 2N6490	V _{CEX}	I _C = 200mA, V _{BE} = 1.5V	70	--	--	V
	2N6488 2N6491			90	--	--	
Collector Cutoff Current	2N6487 2N6490	I _{CEO}	V _{CE} = 30V, I _B = 0	--	--	1.0	mA
	2N6488 2N6491		V _{CE} = 40V, I _B = 0	--	--	1.0	
Emitter Cutoff Current	2N6488 2N6491	I _{CEX}	V _{CE} = 65V, V _{EB(off)} = 1.5V	--	--	500	μA
	2N6488 2N6491		V _{CE} = 85V, V _{EB(off)} = 1.5V	--	--	500	
	2N6488 2N6491		V _{CE} = 60V, V _{EB(off)} = 1.5V T _C = 150°C	--	--	5.0	
	2N6488 2N6491		V _{CE} = 80V, V _{EB(off)} = 1.5V T _C = 150°C	--	--	5.0	
Emitter Cutoff Current		I _{EBO}	V _{BE} = 5.0V, I _C = 0	--	--	1.0	mA
ON CHARACTERISTICS							
DC Current Gain	h _{FE}	I _C = 5.0A, V _{CE} = 4.0V	20	--	150		
		I _C = 15A, V _{CE} = 4.0V	5.0	--	--		
Collector–Emitter Saturation Voltage	V _{CE(sat)}	I _C = 5.0A, I _B = 0.5A	--	--	1.3	V	
		I _C = 15A, I _B = 5.0A	--	--	3.5		
Base–Emitter On Voltage	V _{BE(on)}	I _C = 5.0A, V _{CE} = 4.0V	--	--	1.3	V	
		I _C = 15A, V _{CE} = 4.0V	--	--	3.5		
DYNAMIC CHARACTERISTICS							
Current Gain – Bandwidth Product ²	f _T	I _C = 1.0A, V _{CE} = 4.0V, f _{test} = 1.0 MHz	5.0	--	--	MHz	
Small–Signal Current Gain	h _{fe}	I _C = 1.0A, V _{CE} = 4.0V, f = 1.0 kHz)	25	--	--		

Note:

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%
2. f_T = |h_{fe}| • f_{test}.
3. For PNP devices voltage and current values will be (-)

TEST CIRCUIT AND DIAGRAMS

Switching Time Test Circuit



R_B AND R_C VARIED TO OBTAIN DESIRED CURRENT LEVELS.
FOR PNP, REVERSE ALL POLARITIES.

D_1 MUST BE FAST RECOVERY TYPE,

TYPICAL CHARACTERISTICS CURVES

Fig 1: Power Derating

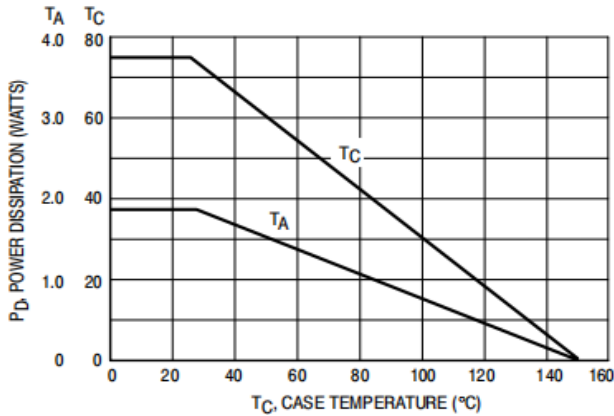


Fig 4: Turn-On Time

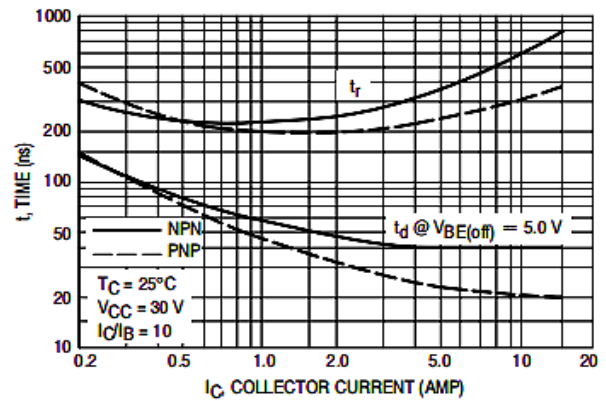


Fig 2: Active-Region Safe Operating Area

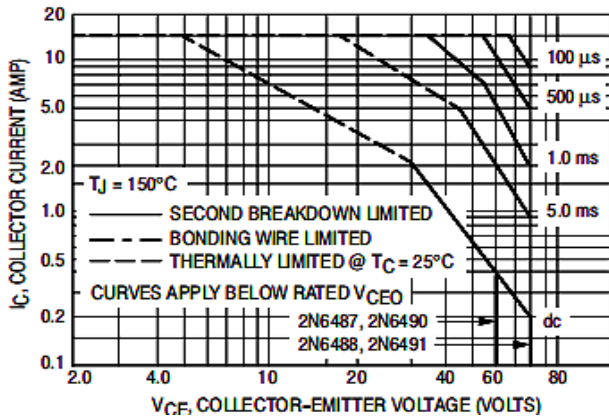
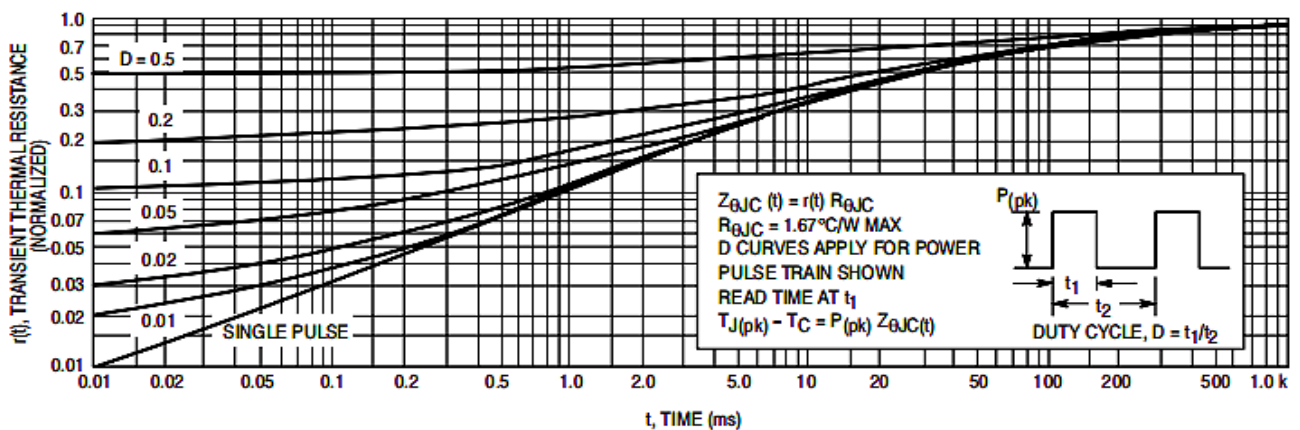
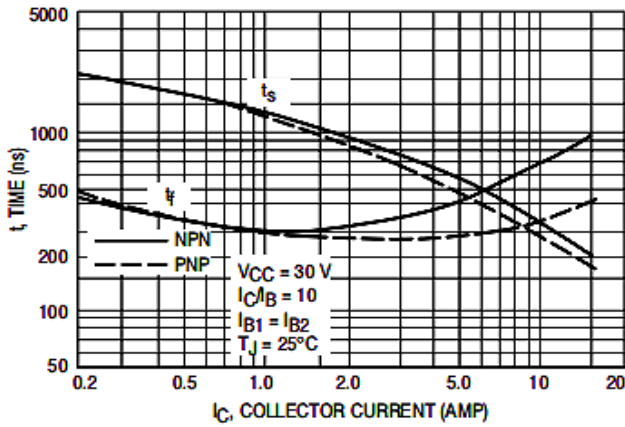


Fig 3: Thermal Response



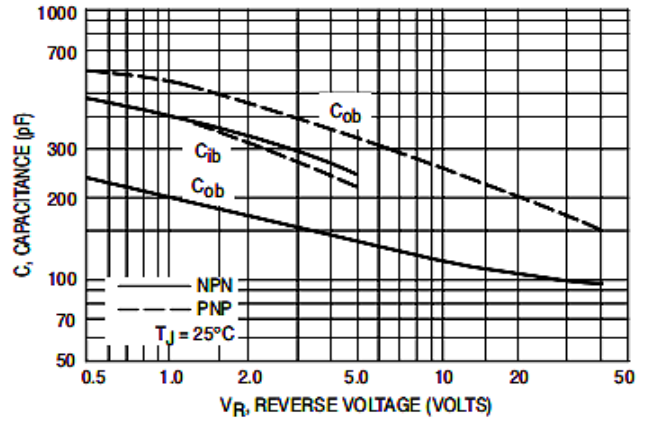
TYPICAL CHARACTERISTICS CURVES

Fig 5: Typical Small-Signal Current Gain



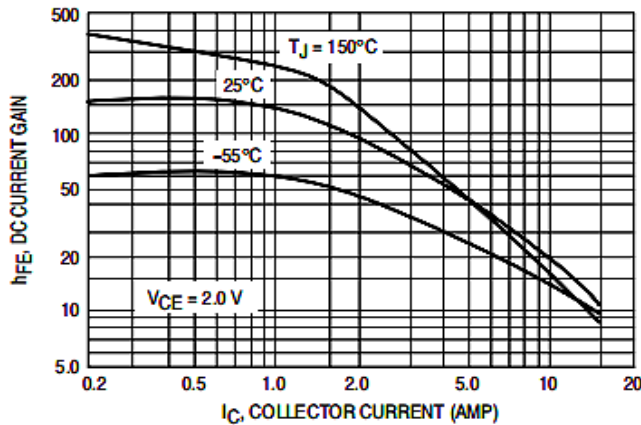
NPN 2N6487, 2N6488

Fig 8: Typical Capacitance

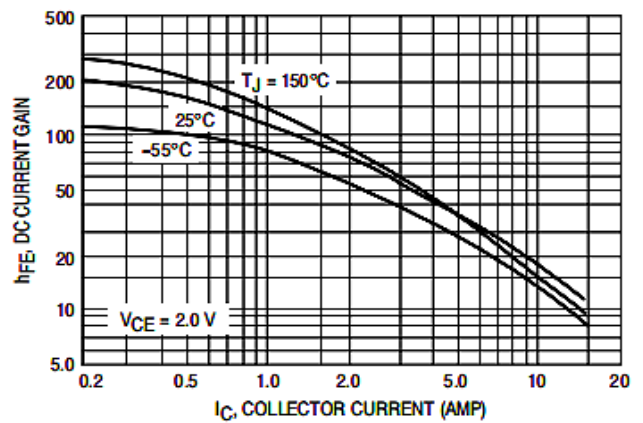


PNP 2N6490, 2N6491

Fig 6: DC Current Gain

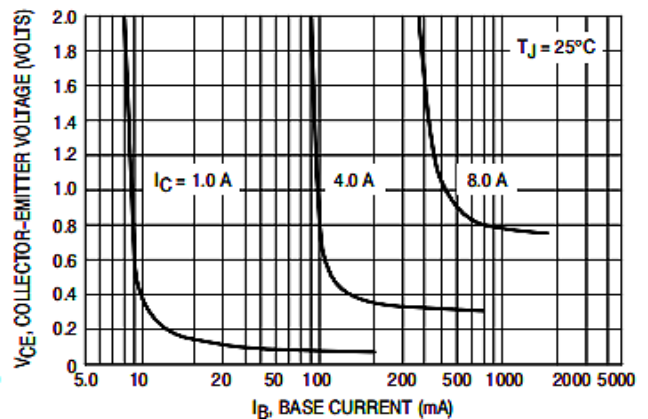
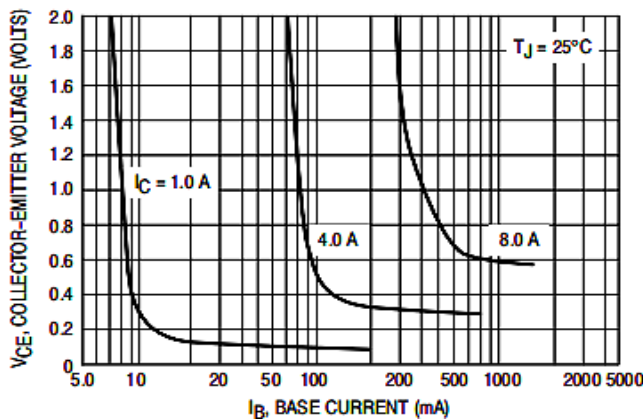


NPN 2N6487, 2N6488



PNP 2N6490, 2N6491

Fig 7: Collector Saturation Region

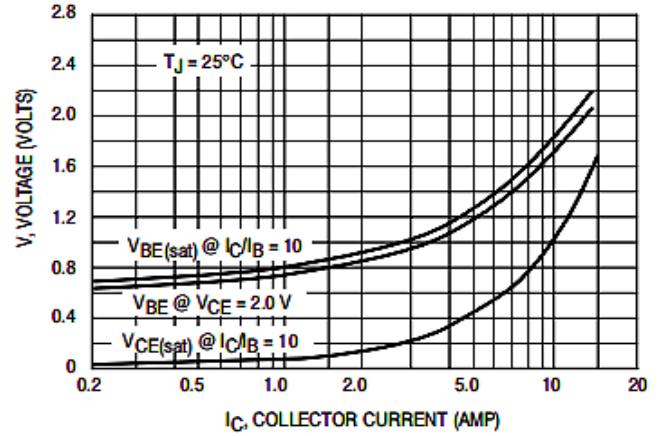
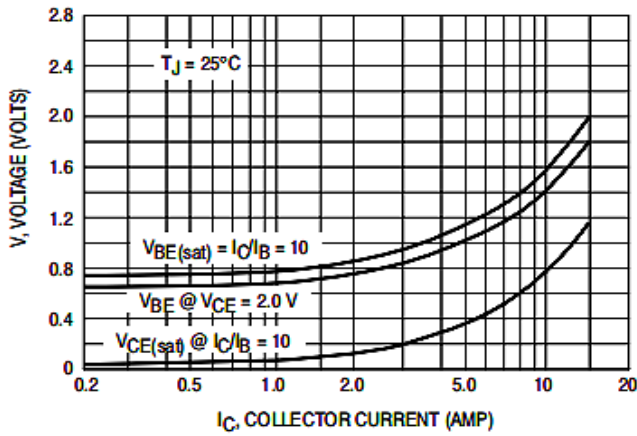


TYPICAL CHARACTERISTICS CURVES

NPN 2N6487, 2N6488

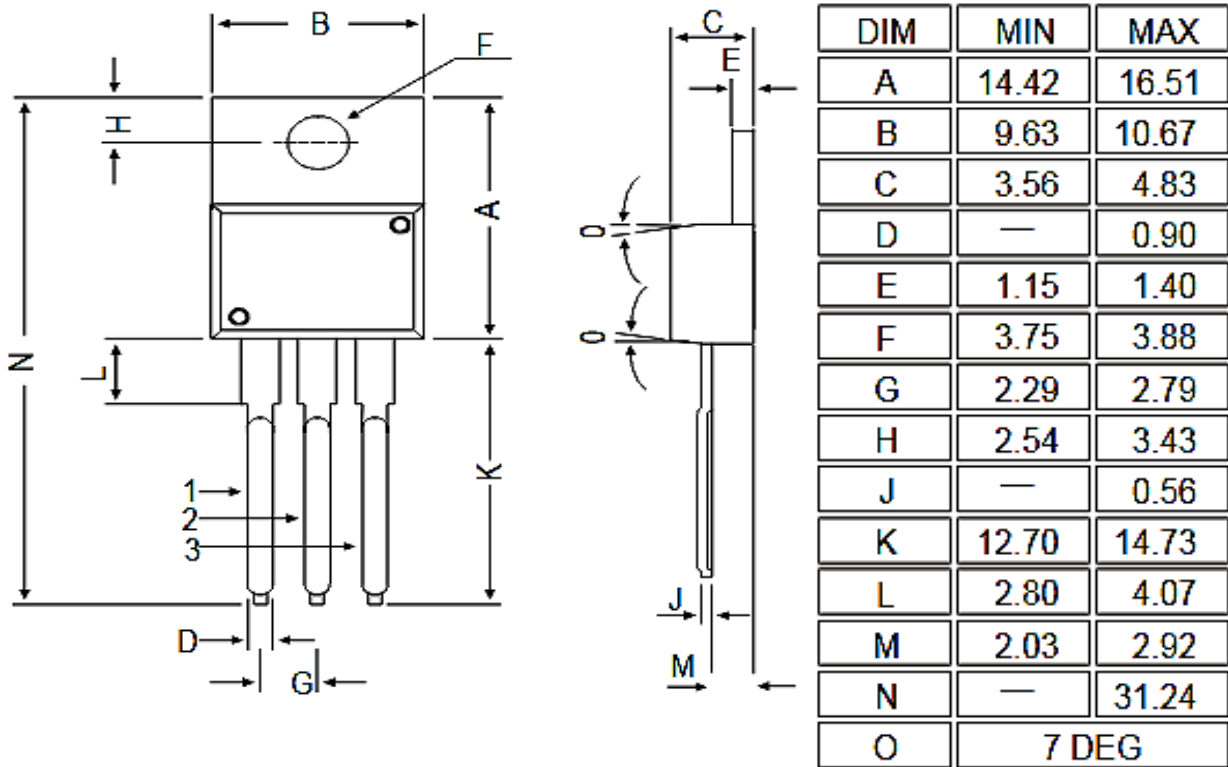
PNP 2N6490, 2N6491

Fig 9: "On" Voltages



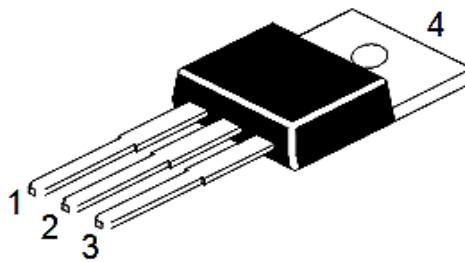
PACKAGE DETAILS

TO-220 Leaded Plastic Package

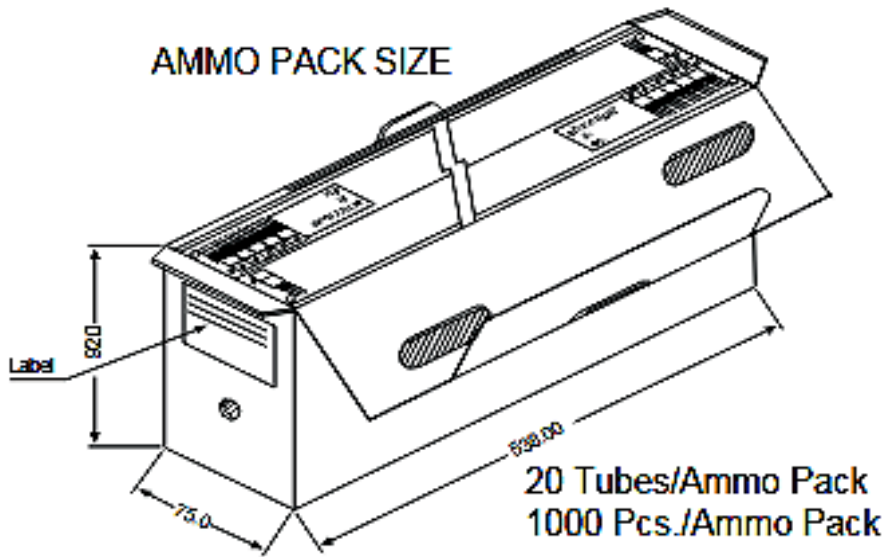
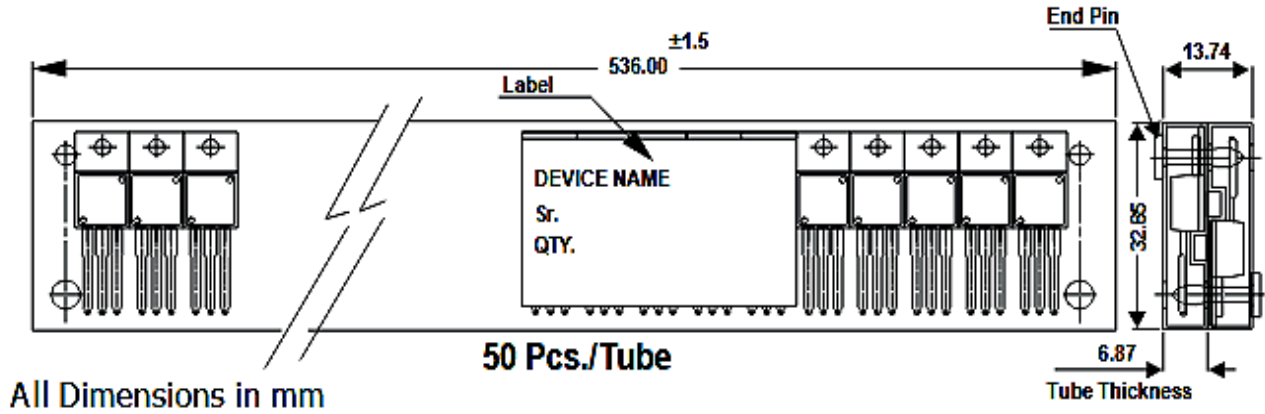


PIN CONFIGURATIONS

1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR



TO-220 Tube Packing



Packing Detail

PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr.Wt.
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



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



Continental Device India Pvt. Limited

An IATF 16949, ISO9001 and ISO 14001 Certified Company



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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