



Continental Device India Limited

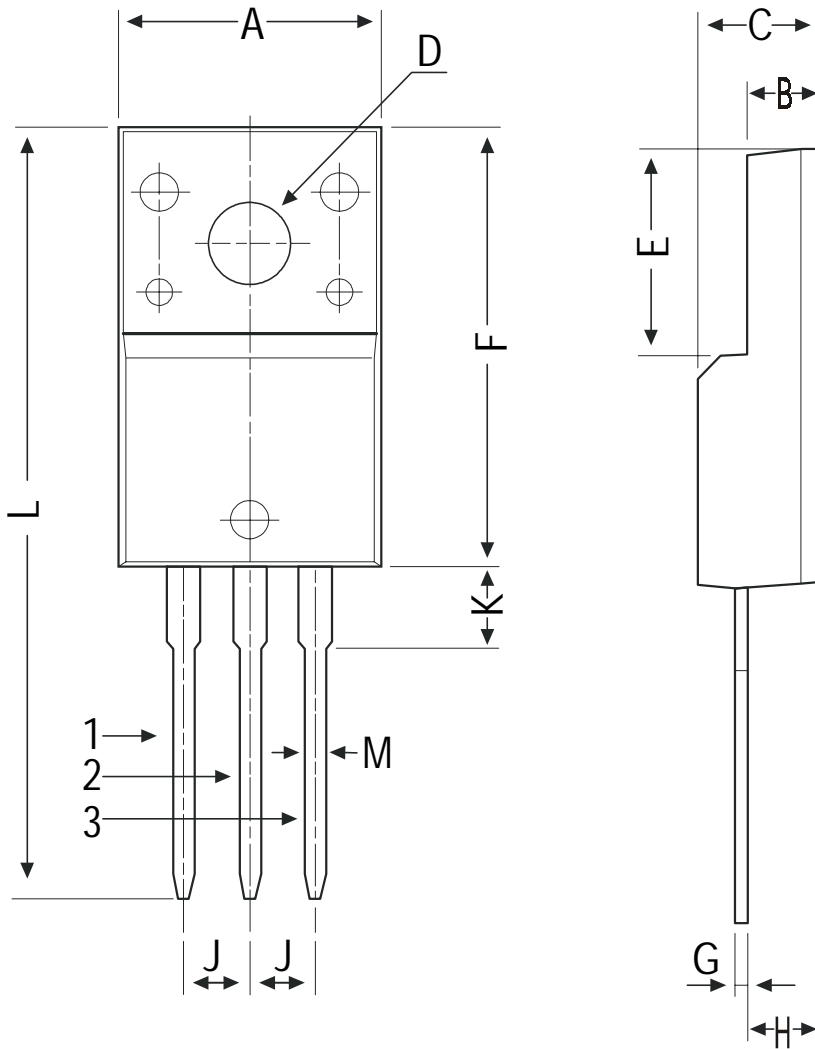
An ISO/TS 16949, ISO 9001 and ISO 14001 Certified Company



# **TO-220FP (3 leads) Thru-hole Fully Isolated Plastic Package**

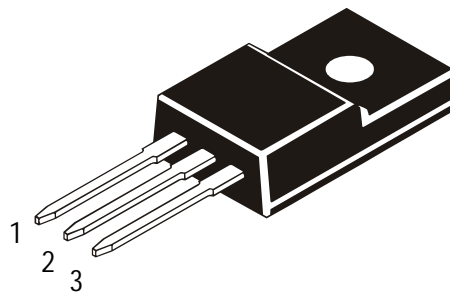
## **Package Outline, Tube Packing, Packaging and Handling Information**

## TO-220FP Fully Isolated Plastic Package



DIM	MIN	MAX
A	9.96	10.36
B	2.60	3.00
C	4.50	4.90
D	3.10	3.30
E	7.90	8.20
F	16.87	17.27
G	0.45	0.50
H	2.56	2.96
J	2.34	2.74
K	—	3.08
L	—	30.05
M	—	0.80

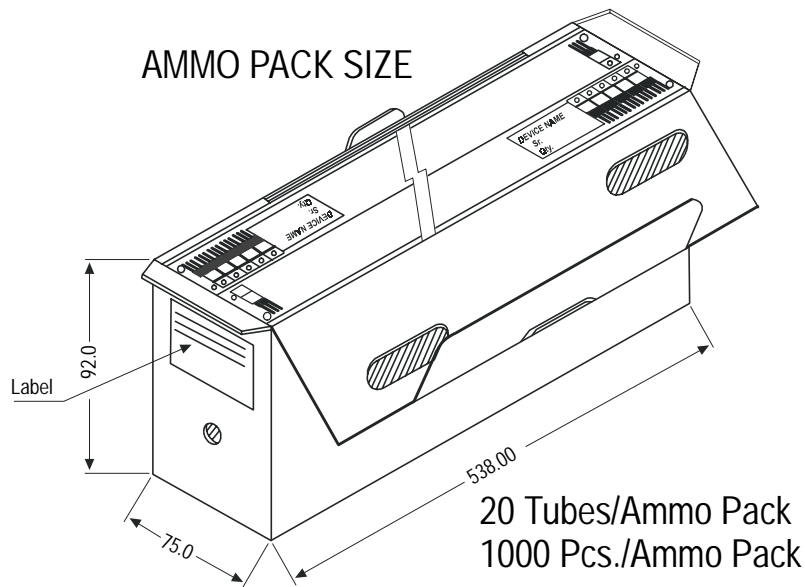
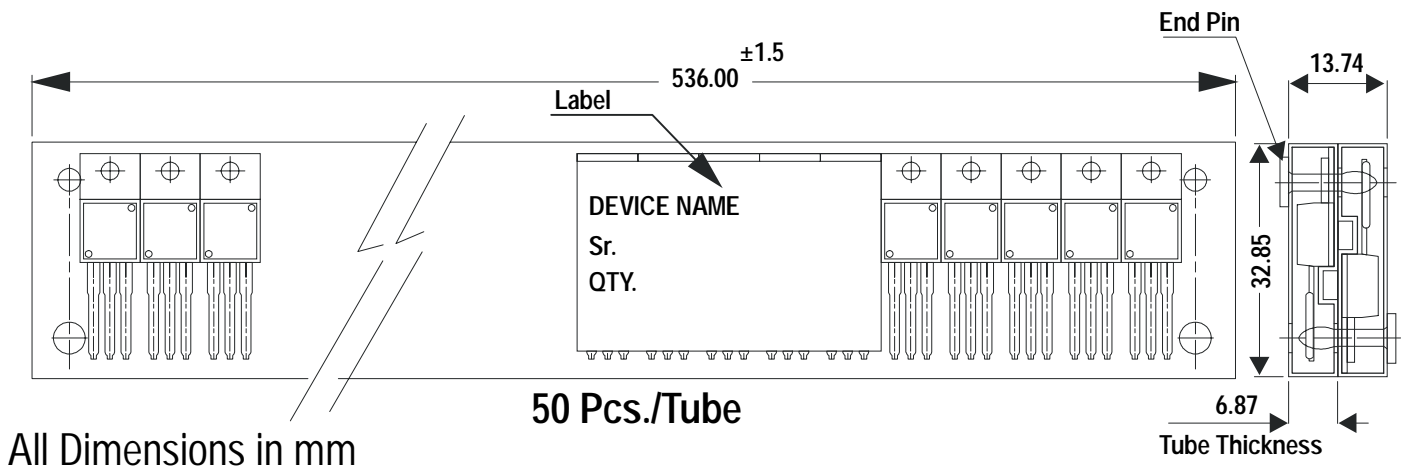
All dimensions in mm.



### Pin Configuration

1. Base
2. Collector
3. Emitter

### TUBE PACKING FOR TO-220FP



### Packing Detail

PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
TO-220FP	200 pcs/polybag 50 pcs/tube	396 gm/200 pcs 135 gm/50 pcs	3" x 7.5" x 7.5" 3.5" x 3.7" x 21.5"	1K 1K	17" x 15" x 13.5" 19" x 19" x 19"	16K 10K	36 kgs 28 kgs

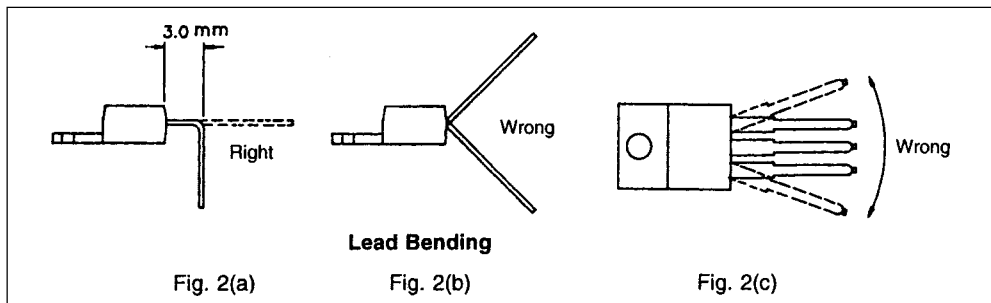
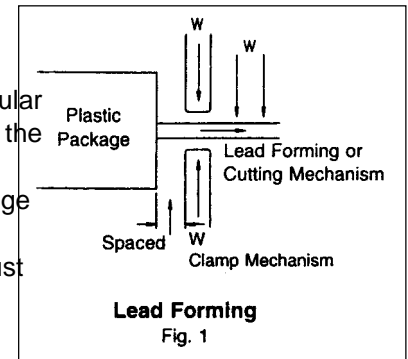
## Precautions for physical handling of Power Plastic Transistors (TO-126, TO-220, TO-220FP, TO-3P)

It is a fundamentally accepted fact that a higher junction operating temperature accelerates failure. Circuit designers, must therefore ensure minimum temperature rise keeping in view Safe Operating Area (SOA) characteristics as well as suitable mounting on a properly designed heat sink. When mounting power transistors certain precautions must be taken in operations such as bending of leads, mounting of heat sink, soldering and removal of flux residue. If these operations are not carried out correctly, the device can be damaged or reliability compromised.

### 1. Bending and cutting leads

The bending or cutting of the leads requires the following precautions:

- 1.1 When bending the leads they must be clamped tightly between the package and the bending point to avoid strain on the package (in particular in the area where the leads enter the resin). This also applies to cutting the leads (Fig. 1).
- 1.2 The leads must be bent at a minimum distance of 3 mm from the package (Fig. 2a).
- 1.3 The leads should not be bent at an angle of more than 90° and they must be bent only once (Fig. 2b).
- 1.4 The leads must never be bent laterally (Fig. 2c).
- 1.5 Check that the tool used to cut or form the leads does not damage them or ruin their surface finish.



### 2. Mounting on printed circuit

During mounting operations be careful not to apply stress to the power transistor

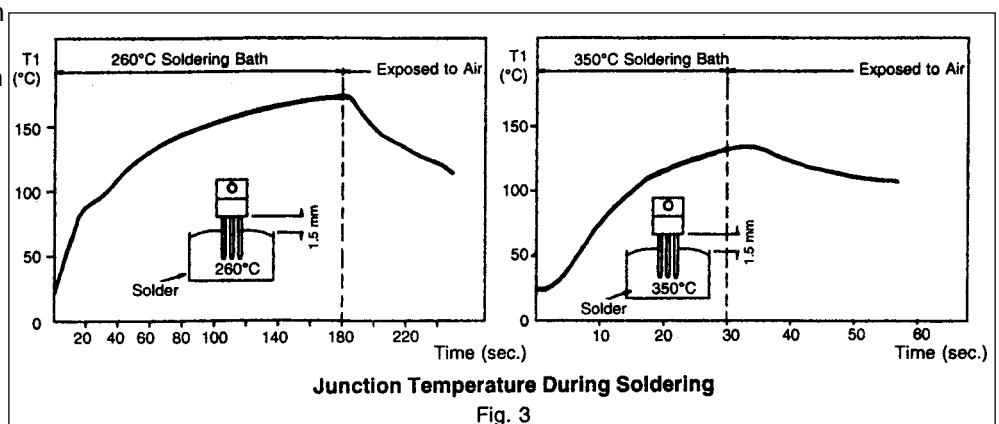
- 2.1 Adhere strictly to the pin spacing of the transistor to avoid forcing the leads.
- 2.2 Leave a suitable space between printed circuit and transistor; if necessary use a spacer
- 2.3 When fixing the device to the printed circuit do not put mechanical stress on the transistor. For this purpose the device should be soldered to the printed circuit board after the transistor has been fixed to the heat sink and the heat sink to the printed circuit board.

### 3. Soldering

In general a transistor should never be exposed to high temperature for any length of time. It is therefore preferable to use soldering methods where the transistor is exposed to the lowest possible temperatures for a short time.

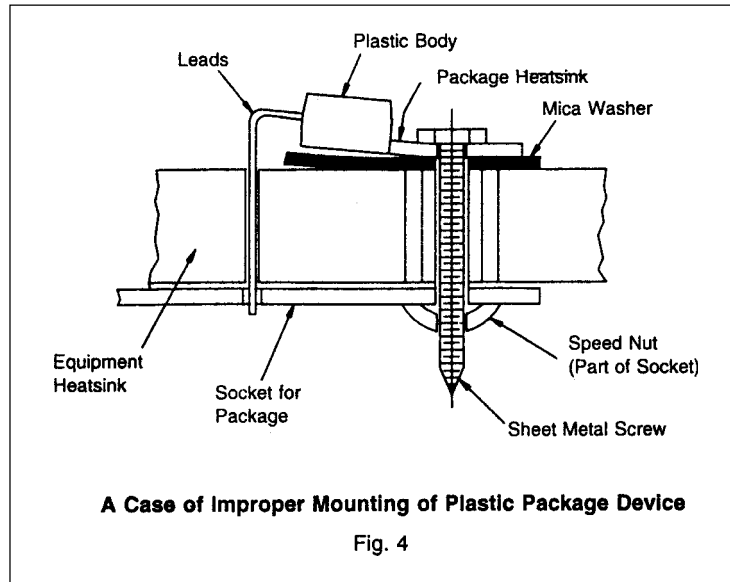
- 3.1 Tolerable conditions are 260°C for 10 sec or 350°C for 3 sec. The graphs in fig. 3 give an idea of the excess junction temperature during the soldering process for a TO-220. It is also important to use suitable fixes for the tin baths to avoid deterioration of the leads or of the package resin.
- 3.2 An excess of residual flux between the pins of the transistor or in contact with the resin can reduce the long-term reliability of the device. The solvent for removing excess fluid must be chosen with care. The use of

solvents derived from trichloroethylene is not recommended on plastic packages because the residue can cause corrosion. Recommended solvents are freon or isopropyl alcohol.



#### 4. Mounting on Heat sink

To exploit best the performance of power transistor a heat sink with  $R_{th}$  suitable for the power that the transistor will dissipate must be used.



### Disclaimer

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