

SOT404 - a surface mountable TO220

The SOT404 outlines combines the power handling capabilities of the TO220 package with the production advantages of surface mounting technology.

In many SMD outlines heat generated in the chip has to be dissipated via the leads. Their small cross-sectional area and the great length from the chip to the pcb results in very large values of thermal resistance. This has meant that, in practice, only the lowest power applications could use surface mounted drivers.

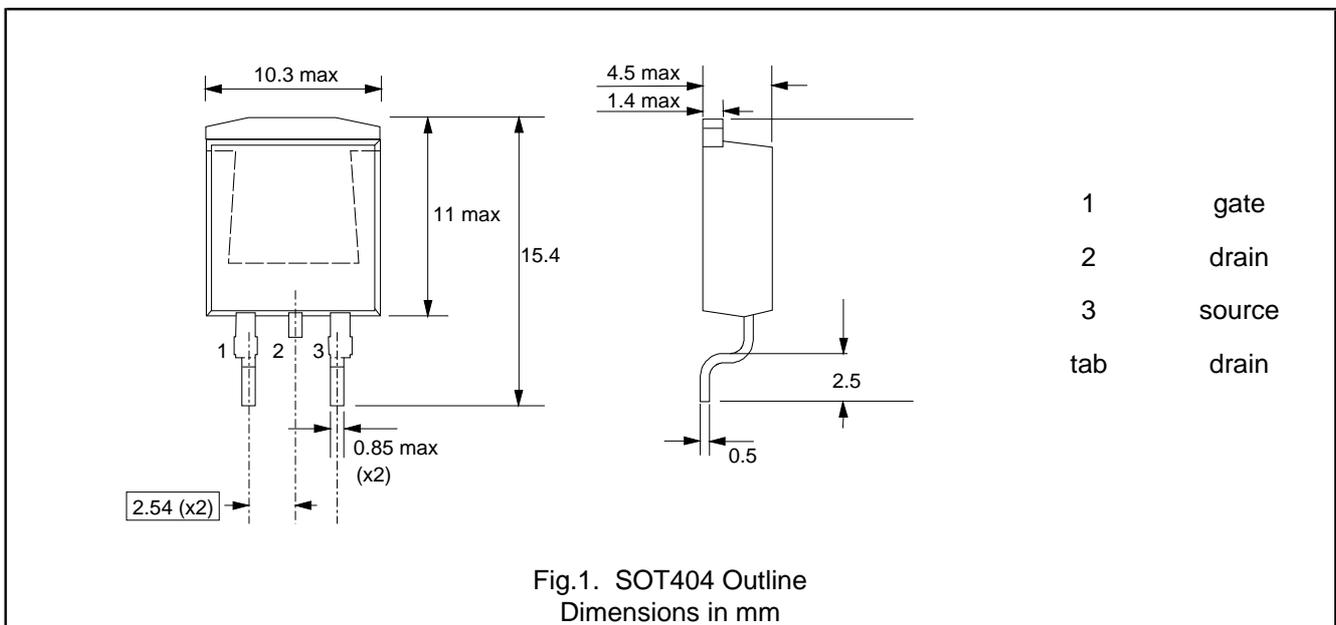
However, the SOT404 removes this limitation. It has the same structure as the well established TO220. In particular the chip is mounted on a large copper header which conducts the heat from the chip directly through the back of the device to the pcb.

The outline of SOT404 is shown in Fig. 1. Its general size and shape match that of TO220 but there is no mounting tag, the leads have been preformed and the mounting surfaces have been lead tin plated to ensure

good solderability.

Figure 2 shows the minimum recommended pcb layout. Increasing the dimensions of the track under the back of the device will improve thermal conduction from mounting base to heatsink. However, to make best use of the power handling of SOT404 it is recommended that copper clad aluminium is used for the pcb. Typical values of thermal resistance are shown in Table 1.

SOT404 can be safely assembled using an infra-red reflow soldering process which has a time / temperature profile matching that shown in Fig. 3. The curves in Fig. 3 conform in general to those in CECC00802:1991. Other soldering processes can be safely used but, as with all surface mount components, care should be taken to ensure that the temperature inside the device is kept low enough and that undue stress is avoided by restricting the rate at which the temperature is changed.



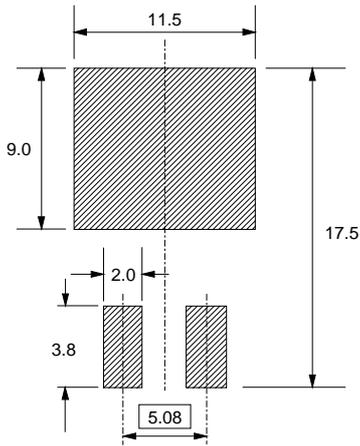


Fig.2. SOT404 - minimum pcb footprint
Dimensions in mm

Typical thermal resistance for:	K/W
Junction to mounting base (26 mΩ 60 V MOSFET)	0.7
Mounting base to ambient (FR4 pcb with pads of Fig. 2)	50
Mounting base to ambient (FR4 with pad of 500 mm ²)	40
Mounting base to Aluminium (copper clad aluminium)	0.6

Table 1 SOT404 - Typical thermal resistance values

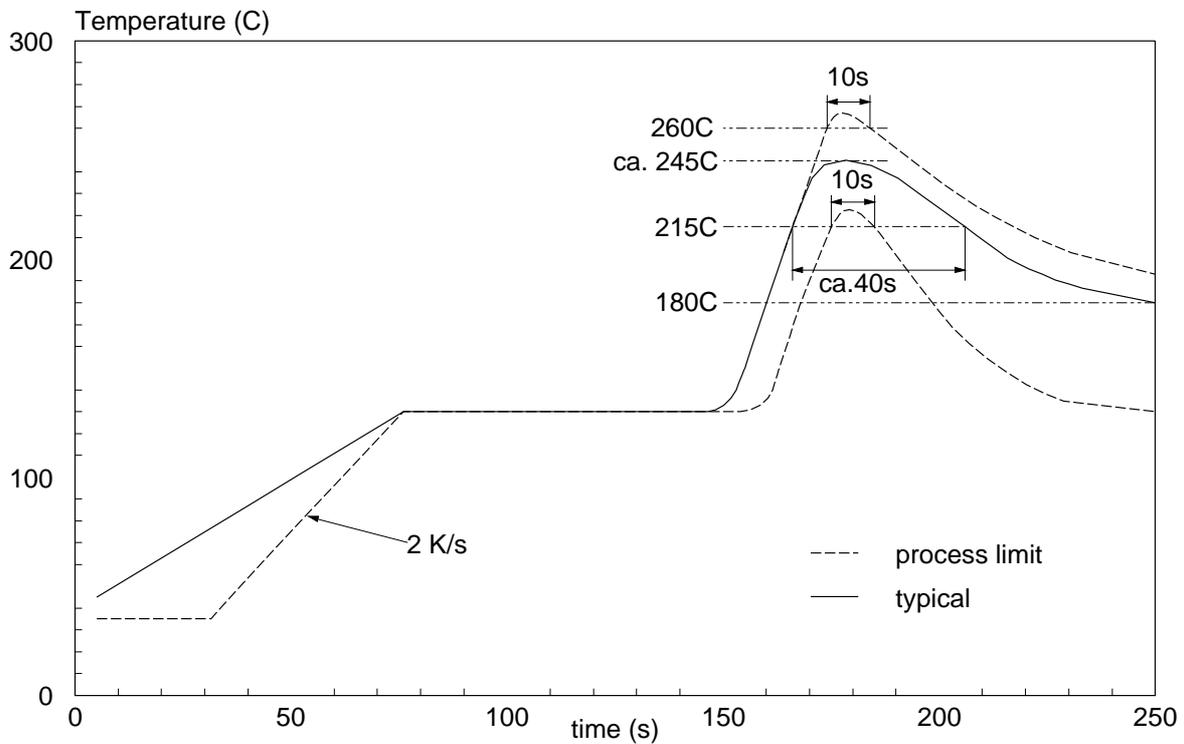


Fig. 3. Recommended Infra-red Soldering Profile

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