

# DESIGN TIP

International Rectifier 233 Kansas Street El Segundo CA 90245 USA

## Hand-Soldering SO-8 MOSFETs

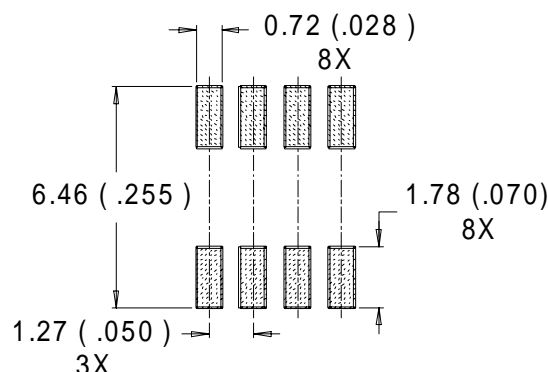
by David Jauregui

Hand-soldering SO-8 MOSFETs to a printed circuit board (PCB) may cause damage if not done properly. This Design Tip describes how to properly hand-solder SO-8 devices to PCBs.

### The SO-8 Footprint

An SO-8 MOSFET must be mated to a proper PCB footprint in order to minimize the chances of mechanical failure. International Rectifier's minimum recommended footprint is shown below.

#### RECOMMENDED FOOTPRINT



### Grounding

MOSFETs are sensitive to electrostatic discharge (ESD). Proper grounding prevents device failure caused by ESD. The workbench, workmats and the soldering equipment must be grounded. Personnel must also be grounded via a grounded wrist strap. The PCB power and ground bus lines must also be grounded, when no live voltage is present.

### Recommended Equipment

Proper equipment is important for good solder joints. You'll need a temperature controlled soldering iron, such as the Pace ST-20A with a fine point soldering iron tip (Pace 1/16" chisel, single point), and low melting-point solder and flux, Kester Sn60Pb40 "44" Rosin Core, or similar.

### Attaching and Soldering

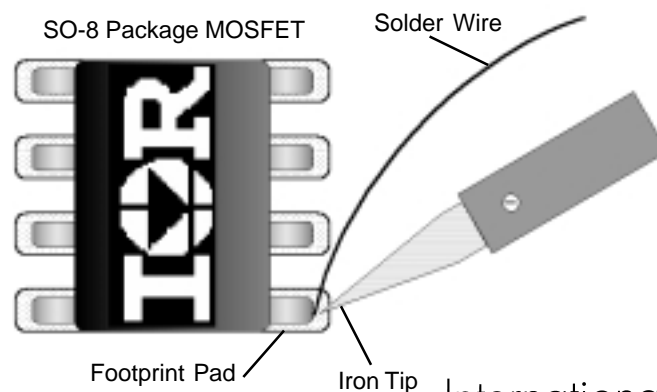
There are two *essential* points to ensure reliable results and prevent thermal shock: **The soldering iron tip temperature**

**should be about 300°C, and the tip must not directly touch device lead.** The SO-8 device should first be tack-soldered to the board so it will stay within the boundaries of its footprint. Tin the gate pad on the PCB. Then align the device to its footprint. Next, heat the gate pad just enough to re-flow solder between the gate pad and the gate lead. The soldering iron tip should be applied to the device footprint when soldering. Feed the solder at the device lead and pad junction. Soldering time should not exceed what is necessary to flow solder into the joint. Solder one lead at a time, alternating between drain and source leads, leaving the gate lead last. Since the gate lead is tack-soldered to the PCB, you must re-solder the gate to the pad properly for a reliable joint. Finally, remove all flux residue with flux remover.

### De-Soldering

If a device must be removed, de-soldering is necessary. A suitable de-soldering tip is the Pace SOIC-8 Surface Mount Removal Tip. However, there is no guarantee that the device will not be destroyed. Reusing the same device is not recommended.

Avoid over-heating the board to prevent de-laminating the PCB foil traces. Maintaining a clean PCB footprint is important to reduce mechanical failure. Once the device is out, remove excess solder and any leftover residue.



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