

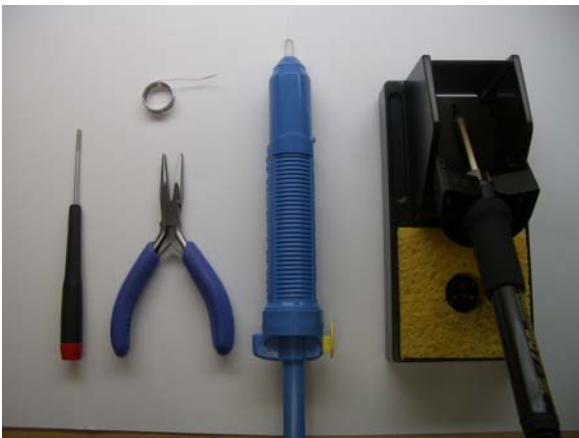
# SHS MOSFET Replacement Instructions

## Morningstar Corporation

### rev 1.0.0



This document outlines the procedures necessary to replace defective MOSFETS on the SHS charge controller circuit board. These instructions assume that the SHS controller has been completely removed from the system. Remove all wiring and conduit connections before proceeding. This document is for qualified technicians. Exercise caution when working with live circuits in PV systems.



#### **Tools Required:**

Soldering iron, solder

Solder sucker and/or solder wick

Needle-nose pliers or tweezers

Small flat head screw driver

Replacement FET(s): SHS 6 - Part # IRFZ44ES; SHS 10 – Part # IRF3205S

#### **Remove plastic back plate**

Turn SHS controller over exposing the back cover plate.

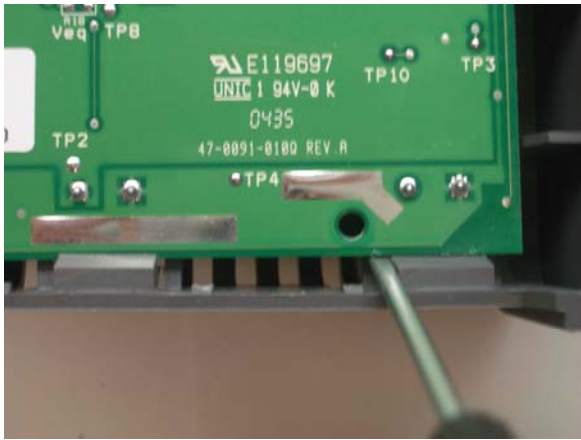


Wedge the small flat head screw driver between the edge of the back plate and side of the controller casing. Gently apply leverage on the screw driver until the edge of the back plate clears the small retainer tabs. The plate can be easily removed after one side has been completely freed of the retainer tabs.



### **Removing the circuit board**

The circuit board is also held in place by retainer tabs. After the back cover has been completely removed, the circuit board will need to be gently pried free in the same manner. Start with the larger tabs on the same side of the controller that the green wiring terminals located on.



After the edge of the circuit board has been free of all three large tabs, switch to the opposite edge. The opposite edge only has two small tabs in the center.



After the circuit board is free from all the tabs, gently remove it from the controller casing being careful not to bend or break off the green wiring terminals.



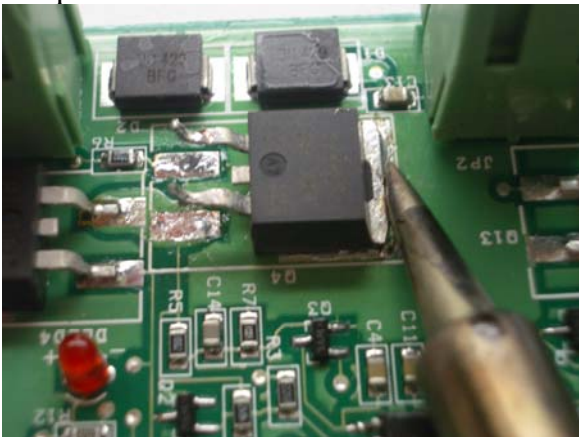
### **Removing the damaged MOSFET**

Locate the MOSFET on the topside of the circuit board that needs replacing. Using a soldering iron set to a temperature of around 700°F-750°F, start by unsoldering the two smaller pins and use solder wick or a solder sucker to remove the excess solder from the

pads on the circuit board. Bend each pin up after it has been unsoldered to keep it clear of the pad.



Next, unsolder the large tab on the MOSFET. Due to the large size of the pad, a longer heating time will be required. It may be beneficial to use a larger soldering iron tip for this part.



After the MOSFET has been completely removed, remove any excess solder that may remain.



## Replacing the MOSFET

The MOSFET part numbers differ between the SHS 6 model and SHS 10 model, so make sure the correct part number is used when obtaining the replacement component. Place the replacement MOSFET on the pads making sure it is centered. Solder one of the small pins down first to hold it in place and then move on to the rest. It may be necessary to gently apply pressure down on the MOSFET when soldering the large tab to ensure that it is seated flat against the pad. Be sure enough solder is applied to evenly cover the base of the tab.



After the circuit board has cooled, carefully place it back in the controller casing and snap it into the plastic retainer tabs. Make sure it is securely seated before putting the back cover on. Reconnect controller and verify its proper operation.