LM5050-1 Failure

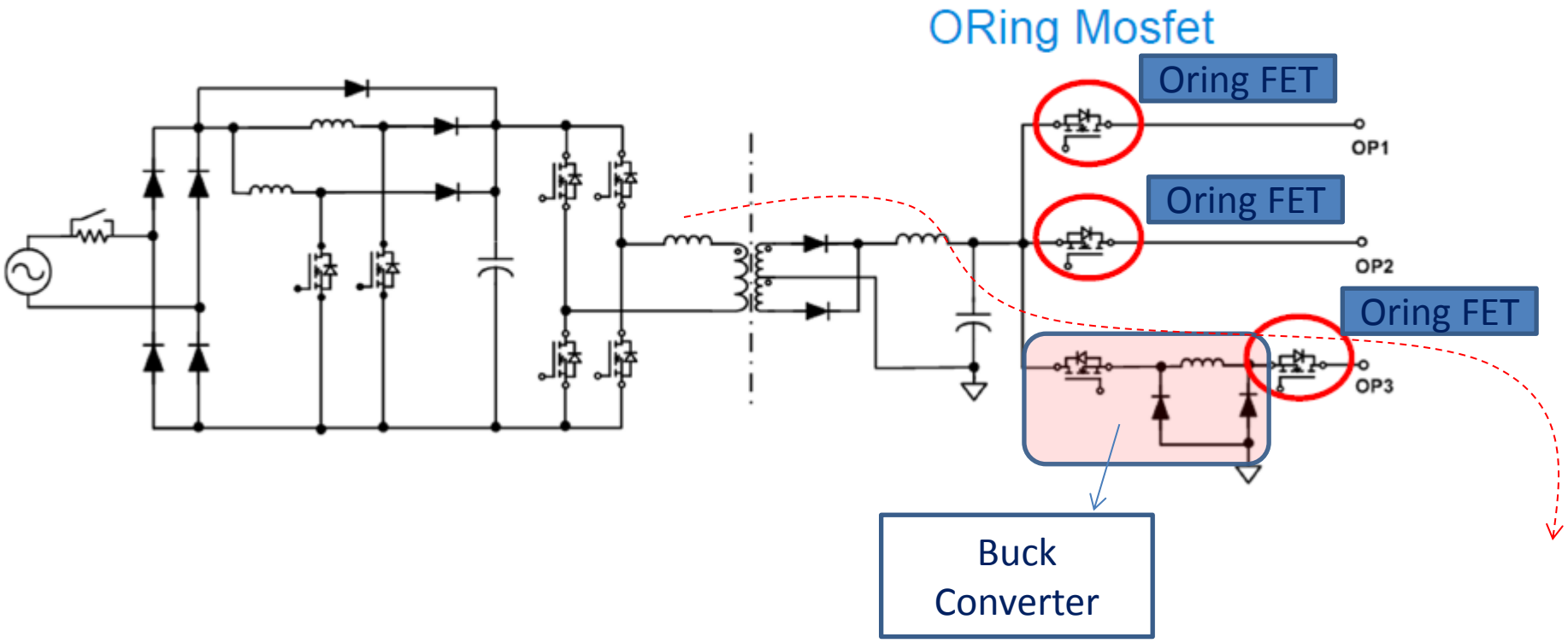
TW
16Jan/2018

Description:

Customer found the devices were damaged during production Testing (power on). The IN, OUT and OFF pin of the LM5050-1 would be damaged and become low impedance. The defective rate is about 30%. The production line is pending now.

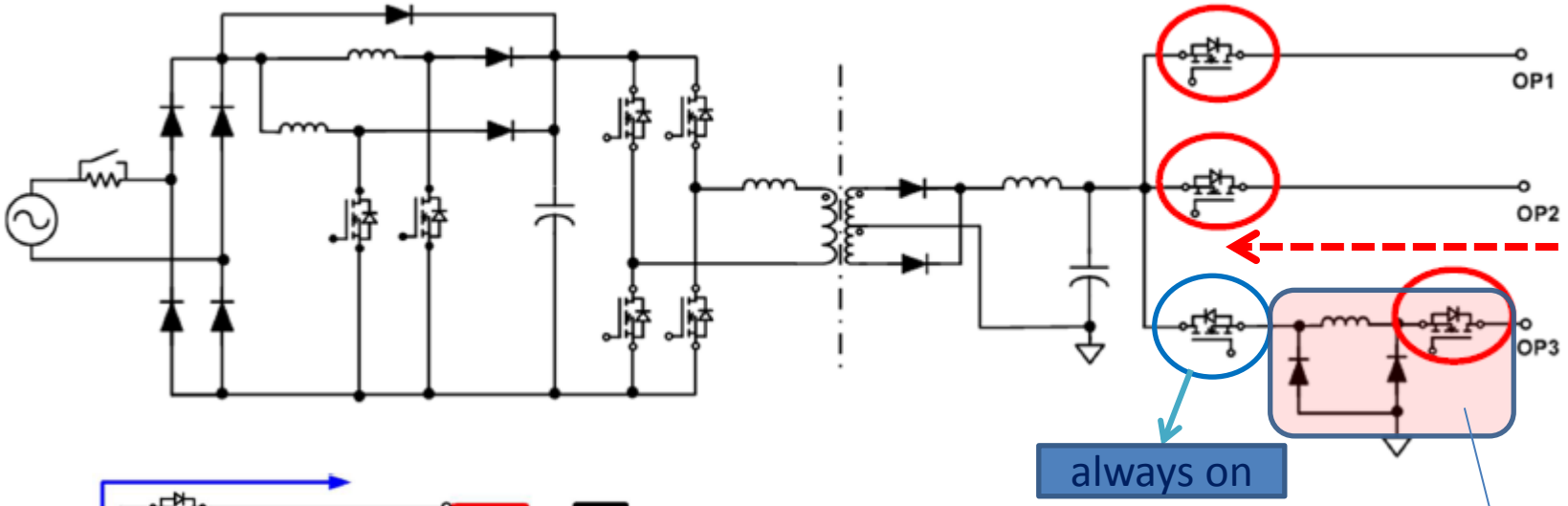
After replacing with new device, the behavior is normal.

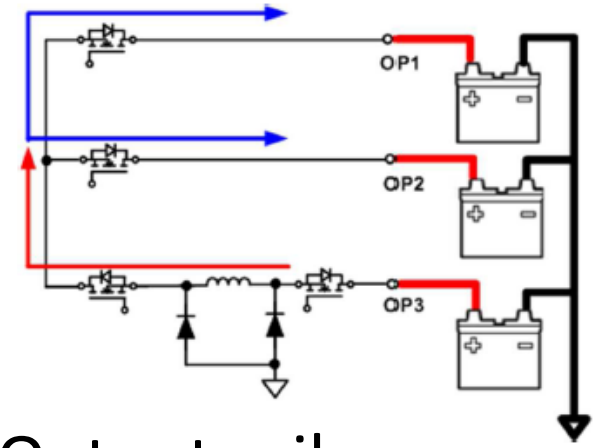
Working Mode A
OP1 & OP2: Oring Mode
OP3: Oring + Buck Mode



**Output rails are connected to Battery

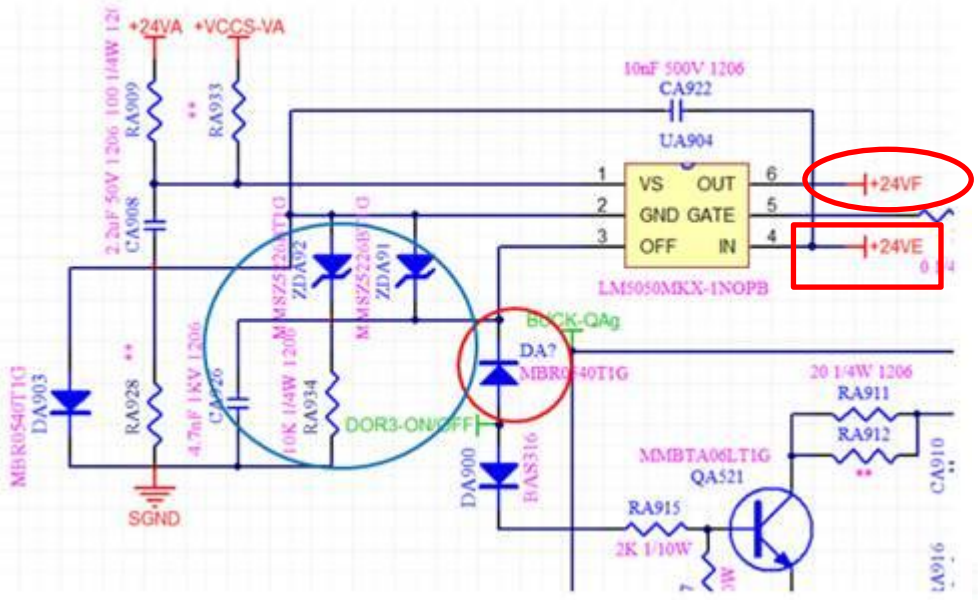
Working Mode B
OP1 & OP2: Oring Mode
OP3: Buck Mode

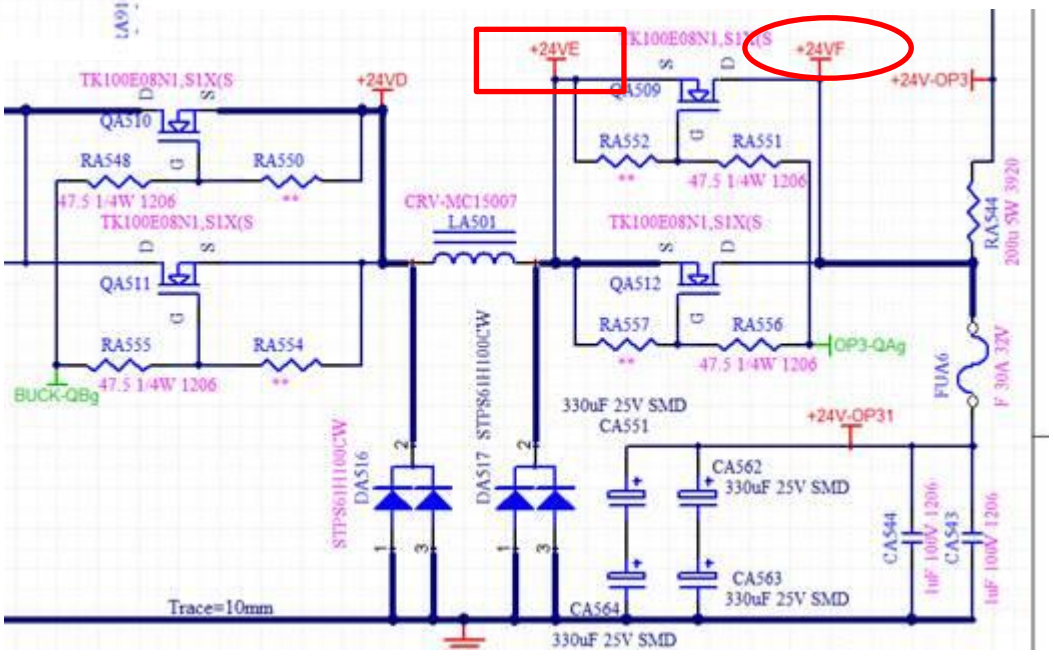




**Output rails are connected to Battery

Schematic


+24VA
+VCCS-VA
10nF 500V 1206
CA922
UA904
VS
OUT
GND
GATE
OFF
IN
+24VF
+24VE
LM5050MKX-1NOPB
BUCK-QAg
DA?
MBR0540T1G
20 1/4W 1206
RA911
RA912
MMBTA06LT1G
QA521
RA915
2K 1/10W
DOR3-ON/OFF
BAS316
SGND


+24VE
+24VF
+24V-OP3
+24VD
TK100E08N1,S1X(S
QA510
QA509
RA548
RA550
RA552
RA551
47.5 1/4W 1206
CRV-MC15007
LA501
QA511
QA512
RA555
RA554
RA557
RA556
OP3-QAg
BUCK-QBg
330uF 25V SMD
CA551
+24V-OP31
STPS61H100CW
DA516
DA517
CA562
CA563
CA564
Trace=10mm
RA544
FUA6

Test Waveform @ BUCK mode

C1 Pin6-pn2
Out to GND
C2 Pin4-pin2
IN to GND
C3 PIN6-PIN4
OUT to IN
C4 PIN3-PIN2
OFF to GND

Summary

- From waveform, the voltage stress between the OUT pin and VS pin is 55V. Is that any problem?

- There is a negative 1V between the OFF to GND pin. Is there any problem with OFF pin from stress's point of view?

Summary

- Do you have any suggestion on the schematic to enhance the stress capability?
- We are still trying to figure out the root cause!