PFR-075 Title: ESA HV tripping on PCB during hot TV

Assembly : FM1 IDPU	**SubAssembly : PCB SN004**	
Component : 28V current limiter	**Units Affected:**	**Units fixed:**
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Failure Occurred During (Check one √)

X Functional test □ Qualification test □ S/C Integration □ Launch operations □ Other (Flight Assy)

Environment when failure occurred:

□ Ambient	□ Vibration	□ Shock	□ Acoustic
□ Thermal	□ Vacuum	X Thermal-Vacuum	□ EMI/EMC

Problem Description

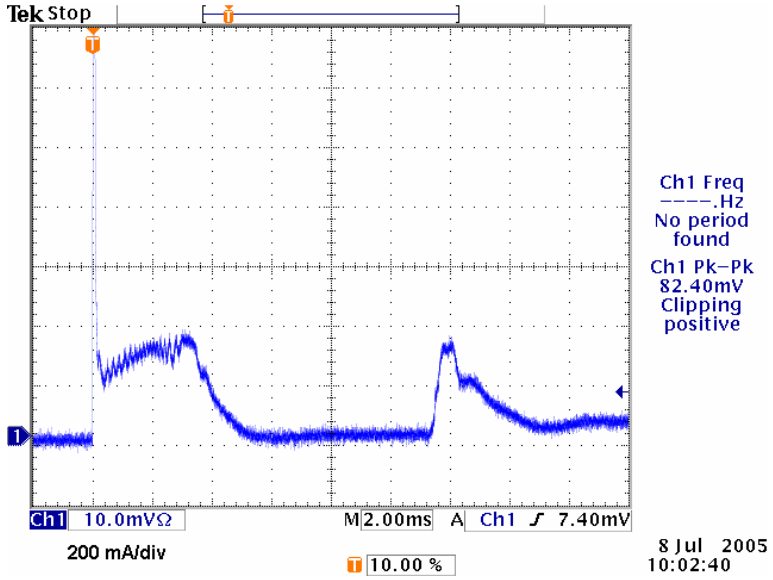
(In this section it is important to document the specific symptoms which exhibited the problem. In the event we see it happen again, we would like to know as much as possible.)

During the last hot cycle of FM1 suite thermal vacuum, the ESA HV tripped off during turn on.

Analyses Performed to Determine Cause

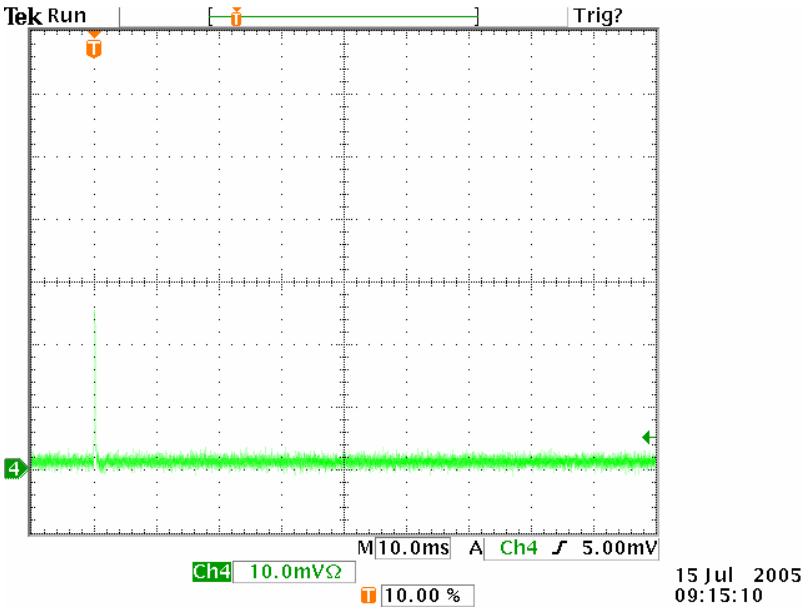
(How do we know how the failure happened? Was it a bad part, bad handling, what?)

It was evident on the FM1 GSE 404 APID page that the ESA tripped off because the 28V supply monitor was off. An inrush profile was taken of the ESA Low Voltage turn on using ESA FM2. (see scope plot below)



The profile includes 2 current spikes where the second current inrush ended approximately 15ms after turn on. The PCB can only ignore transient inrush for about 9-10ms. With the inrush at around 400mA and 12ms after turn on, the PCB will certainly trip off because the current threshold is set to 250mA.

A scope plot was also taken from the ESA FM2 Calibration during the HV Turn on. This is shown below.



This plot shows a 1.3Amp inrush when turning on the HV FETs on the ESA HV Motherboard. This will also cause the PCB to trip off the ESA supplies. This was the problem that was observed in Thermal Vacuum.

Corrective Action/ Resolution

(How do we fix the unit? And how do we make sure it doesn't happen again?)

The inrush problem will require an operational fix. Now that the ESA inrush is characterized, the PCB supplies must be forced on during ESA LV and HV turn on and HV level adjustment. The force on of the current trips should be removed after for normal operations.

Acceptance:
MAM: Ron Jackson_____; MSE: Ellen Taylor_____

PM: Peter Harvey_____; Cognizant Engineer_____

Date of Closure_____