



Resistor Study for High Power Pulse Applications (New – FY13)

Description:

In space applications, small high voltage (HV) systems are commonly used, such as in detector bias systems, mass spectroscopy systems, and spacecraft propulsion. The obsolescence of carbon composition resistors has left the need for a viable replacement in high power pulse applications. Currently, the use of standard mil-spec parts in these applications often result in derating violations, which are resolved at the PCB or project office level. A literature review and research study is proposed to fully investigate the applicable use of mil-spec resistors (film, foil, wirewound) for high power pulse applications. This work will provide NASA with information on the pulse capability of these resistors, set guidelines for the use of these resistors in pulse applications, and identify gaps in product availability vs. application need for future study.

FY13 Plans:

- Perform a literature review on the pulse capability of mil-spec parts.
- Obtain current available pulse testing/performance data from the manufacturers for mil-spec parts
- Obtain feedback from designers on their current needs and difficulties with currently supplied hi-rel product
- Potentially perform construction analysis on commercial (non-military) resistors, such as pulse withstanding chip resistors and carbon film resistors, and identify major differences between these resistors and mil-spec resistors.

Schedule/Costs:

Resistor Study for High Power Pulse Applications	2013								
	J	F	M	A	M	J	J	A	S
Perform literature study on the pulse capability of mil-spec resistors	→								
Obtain pulse testing/performance data from the manufacturers for mil-spec parts		→							
Obtain designer feedback on resistor performance needs and issues they encounter with hi-rel product			→						
Perform construction analysis on commercial (non-military) resistors designed for pulse applications and identify major differences between these resistors and mil-spec resistors					→				
Write summary report with recommendations and guidelines for the use of mil-spec parts in pulse applications, and identify gaps in product availability vs. application need for future study							→		
Quarterly Status Report			X			X			X

Deliverables:

Prepare the following documents:

- Summary of the literature review performed, detailing the applicable use of mil-spec resistors in high power pulse applications.
- Matrix and set of guidelines on the use of mil-spec parts for pulse applications.

NASA and Non-NASA Organizations/Procurements:

Lead Center/PI: GSFC/Susana Douglas, Code 562