National Aeronautics and Space Administration

EEE-INST Unified and Updates (NEPP) Program

Noman A. Siddiqi (Jacobs Technologies, Sr. Parts Engineer)
Chris Green (NASA GSFC Code 562, Associate Branch Head)
Bruce Meinhold (SSAI ESES III Group Manager/SME, Parts, Packaging, Advanced Technologies)

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NASA Goddard Space Flight Center
Electrical Engineering Division

NASA-STD-8739.11

- To provide standardized EEE parts guidelines for multi-center use throughout NASA community.
- Develop NASA-STD-8739.11. NASA EEE Parts Qualification, Screening and Derating Standard
- Incorporate new EEE parts commodities not covered by EEE-INST-002.
- Update shall be based on NASA-STD-8739.10 Electrical, Electronic, and Electromechanical (EEE) Parts Assurance Standard released June 2017.

Updates:

- NASA STD- 8739-11
- Assumptions Manufacturer have already performed qualification testing to nearest military specification for their product.
- Table 1 of each section covers test flows for EEE parts Grade Level 1, 2, 3 and 4
- Screening flows for EEE parts.
- No qualification testing. EEE Part acceptance will be based on Lot Acceptance testing (LAT).
- DPA required based on EEE Part Grade Levels as described in Table1..
- SCD, Automotive and Commercial grade parts screening and LAT as described in Table1 of each section.

NASA STD 8793-11

- Similar format as EEE-INST-002 with general instructions section and commodity sections.
- Commodity Section Format --

  Introduction
  - Brief description of the commodity.
  - General guidelines and important usage factors for the commodity.

  Tables
  - Table 1 - Overall requirements for each level
  - Table 2 - Screening (100%)
  - Table 3 - Lot Acceptance Testing (LAT), (sample)
  - Table 4 - Derating criteria

Example of Table 1 Requirements

Table 1. MONOLITHIC INTEGRATED CIRCUIT REQUIREMENTS 1/, 2/

Quality Level	Monolithic Microcircuit Type	Specification	Use As Is	Screening per Table 2	LAT per Table 3	DPA
Level 1	QML Classes V, Y, S	MIL-PRF-38535	X			
	QML Classes; Q, B, M **3/**	MIL-PRF-38535		X	X	
	SCD	VICD, SCD		X	X	X
Level 2	QML Classes V, Y, S	MIL-PRF-38535	X			
	QML Classes; Q, B, M	MIL-PRF-38535		R **4/**		
	Automotive, Commercial, SCD	VICD, SCD, AEC-Q100		X	X	X
Level 3	QML Classes: V, Y, S	MIL-PRF-38535	X			
	QML Classes; Q, B, M	MIL-PRF-38535		X **4/**		
	Automotive, Commercial, SCD	VICD, SCD, AEC-Q100		X		X
Level 4	QML Classes: V, Y, S, Q, B, M	MIL-PRF-38535	X			
	Automotive, Commercial, SCD	VICD, SCD, AEC-Q100	X			

Notes:

1/ The character "X" designates a requirement. The character "R" designates a recommendation.

2/ Plastic Encapsulated Microcircuit (PEM) not included in this section. Devices that are encapsulated in plastic shall use the guidance in PEM section.

3/ QML Class Q, Class B, and Class M are not acceptable for Level 1 projects, except when there is no QML source of supply for Class V, Class Y or Class S device.

4/ PIND required unless already performed by manufacturer.

Qualification vs. LAT

- Qualification:
  - The manufacturer characterize the part for mechanical, electrical, and environmental conditions before they release part to the market.
  - The performance of the part shall be consistent with the part specification.
  - Periodic qualification testing performed by the manufacturer to assure the design and processes are consistent from lot to lot.

- Lot Acceptance Testing (LAT):
  - LAT consisting of mechanical, electrical, and environmental inspections on sample quantity of parts from the procured flight lot.
  - LAT intended to verify that the part performance is consistent with its specifications and demonstrated reliability of part lot for intended application, and mission life requirement.

SCD vs. Automotive, Commercial

- Source Control Drawing (SCD):
  - Document that provides description including configuration, part number, marking, environmental, functional / performance characteristics, LAT and acceptance criteria for custom, commercial items or vendor developed items for a specific use in design that provides application critical or unique characteristics.

- Automotive, Commercial:
  - Parts complied with Automotive Electronics Council documents and come from manufacturer's self certified production line. Manufacturer responsible to test and maintain the quality of parts and meet all data book specifications.
  - Parts that are commercial off-the-shelf (COTS) conform to manufacturer's self certified production line. COTS parts are available to manufacturer's specification data sheet and are controlled by a test program as described in the manufacturer's catalog or data sheet.

NASA-STD-8739.11 NASA EEE Parts Qualification, Screening and Derating Standard

- NASA "Standard": NASA-STD-8739.11, is in development process.
  - Six sections have been uploaded to OSMA SharePoint site
    - C4 Crystals.
    - F3 Fuses.
    - M2 Hermetic Hybrids Microcircuits
    - M3 Monolithic Microcircuits
    - M5 Plastic Encapsulated Microcircuits (PEMs).
    - M7 Non-Hermetic and open cavity Hybrid Microcircuits.
    - R1 Relays.

Proposed EEE-INST-003 Sections

Part Category	Document Section
General Instructions for All Part Categories	1
Capacitors	C1
Capacitors, Base Metal Electrode	C2
Connectors and Contacts	C3
Crystals	C4
Crystal Oscillators	C5
Detectors	D1
Fiber Optics and Passive Components (Fiber, Cables, Connectors, and Assemblies)	F1
Filters	F2
Fuses	F3
Heaters	H1
Magnetics	M1
Microcircuits, Hybrid	M2
Microcircuits, Monolithic	M3

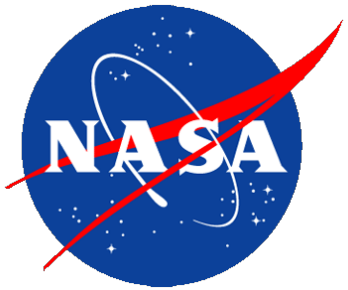
Part Category	Document Section
Microcircuits, ASICs and Programmable Devices	M4
Microcircuits, Monolithic Plastic Encapsulated	M5
Microcircuits, RF	M6
Microcircuits, Hybrid Plastic Encapsulated	M7
Motors	M8
Optoelectronic Devices	O1
Printed Circuit Boards	P1
Relays, Electromagnetic	R1
Resistors	R2
Semiconductor Devices, Discrete	S1
Semiconductor Devices, Plastic Encapsulated	S2
Switches	S3
Temperature Sensors	T1
Wire and Cable	W1

New sections are highlighted in blue.

Path Forward

- NASA Review committee under NEPP has been formed to discuss the sections uploaded on OSMA SharePoint site.
  - NASA Review committee has approved Monolithic Microcircuit Section M3.
  - Plan to follow next:
    - M2 Hermetic Hybrids Microcircuits
    - M7 Non-Hermetic and open cavity Hybrid Microcircuits.

- Any questions?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Why EEE-INST-002 update needed?

- EEE-INST-002 History
  - Addendum released April 2008.
  - Original document released May 2003.
  - Based on GSFC 311-INST-001 Rev A released August 1, 1996.
  - Based on MIL-STD-975 and GSFC PPL.
- Only addresses EEE Part Quality Levels 1, 2, and 3.
- Correct errors, inconsistencies, and confusing notes.
- Address increasing usage of commercial and automotive parts.
- Address additional parts commodities.