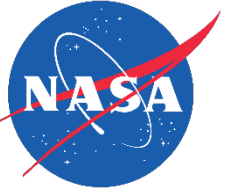


NASA-STD-8739.11 Tutorial

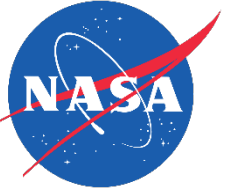
M3 – Non-hermetic Hybrids

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Acronyms [*modify as needed*]

AEC	Automotive Electronics Council	MEAL	Mission Environment, Application, and Lifetime
COTS	Commercial-Off-The-Shelf	MIL-SPEC	Military Specification
Cpk	Process Capability Index	NASA	National Aeronautics and Space Administration
DLA	Defense Logistics Agency	NEPP	NASA Electronic Parts & Packaging (Program)
DoD	Department of Defense	NESC	NASA Engineering & Safety Center
DPPM	Defective Parts Per Million	NSC	NASA Safety Center
EEEE	Electrical, Electronic, Electromechanical, Electro-Optical	PPAP	Production Part Approval Process
EOL	End-Of-Line	PSW	Part Submission Warrant
ETW	Electronics Technology Workshop	QML	Qualified Manufacturers List
FIT	Failure-In-Time	QPL	Qualified Product List
FMEA	Failure Mode and Effects Analysis	RHA	Radiation Hardness Assurance
GSFC	Goddard Space Flight Center	SMA	Safety and Mission Assurance
IL	In-Line	SMD	Standard Microcircuit Drawing
ILPM	Industry Leading Parts Manufacturer	SME	Subject Matter Expert
JEDEC	Joint Electron Device Engineering Council	SPC	Statistical Process Control



Changes from EEE-INST-002

- Completely new section.
- Screening and Qualification Tables are from MIL-PRF-38534 (Appendix D)

Definitions

Non-hermetic device - A device which has all or some of the elements not hermetically sealed

- a. **Cavity non-hermetic device** - A cavity device having construction utilizing non-hermetic (polymeric) seals.
- b. **Non-cavity non-hermetic device** – A non-cavity device having construction utilizing molding compounds or other materials encapsulation the internal elements.
- c. **Open non-hermetic device** – A open device having construction with minimal or no protection of the internal elements.
- d. **Open architecture device (OA)** – A single substrate with hermetically sealed hybrid or multichip cavity(s) in which all bare die, chip and wire, or flip chip are mounted in the hermetically sealed area. Non-hermetic packaged components integral to the substrate (resistors, capacitors, coils, transformers, and transistors) which are typically mounted on printed circuit boards are not hermetically sealed.

Classes

Non-hermetic device - A device which has all or some of the elements not hermetically sealed

- a. **Cavity non-hermetic device** - A cavity device having construction utilizing non-hermetic (polymeric) seals.
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Definitions

Class L:

- Highest quality class provided for in this appendix.
- Temperature range of -55°C to +125°C or as specified in the device specification.

Class F:

- Standard quality class provided for in this appendix.
- Temperature range of -55°C to +125°C, or a lesser range as specified by the acquisition document, e.g. SMD, SCD, or catalog.

Compliant RHA devices will meet the additional performance requirements of appendix G.

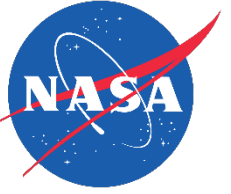


Table 1. Hybrid Non-Hermetic Microcircuit

Table 1. HYBRID NON-HERMETIC MICROCIRCUIT REQUIREMENTS 1/

Assurance Level	Monolithic Microcircuit Type	Specification	Use As Is	Element Evaluation 3/	Screening 4/	LAT 5/	DPA
Level 1	QML Class L	MIL-PRF-38534				X	X
	QML Class F 2/	MIL-PRF-38534			X	X	X
	SCD	VICD, SCD		X	X	X	X
Level 2	QML Class L and F	MIL-PRF-38534			X 6/		X
	Commercial, Automotive, SCD	VICD, SCD, AEC-Q104		X	X	X	X
Level 3	QML Class L, F	MIL-PRF-38534					X
	Commercial, Automotive, SCD	VICD, SCD, AEC-Q104		R	R		X

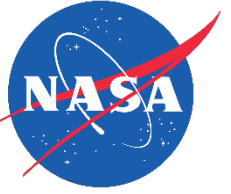
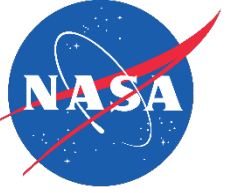


Table 1. Hybrid Non-Hermetic Microcircuit - DPA

Table 1. HYBRID NON-HERMETIC MICROCIRCUIT REQUIREMENTS 1/

Assurance Level	Monolithic Microcircuit Type	Specification	Use As Is	Element Evaluation 3/	Screening 4/	LAT 5/	DPA
Level 1	QML Class L	MIL-PRF-38534				X	X
	QML Class F 2/	MIL-PRF-38534			X	X	X
	SCD	VICD, SCD		X	X	X	X
Level 2	QML Class L and F	MIL-PRF-38534			X 6/		X
	Commercial, Automotive, SCD	VICD, SCD, AEC-Q104		X	X	X	X
Level 3	QML Class L, F	MIL-PRF-38534					X
	Commercial, Automotive, SCD	VICD, SCD, AEC-Q104		R	R		X



Send email to address
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