NASA-STD-8739.11 Tutorial

M2 - Hybrids

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Acronyms [*modify as needed*]

AEC	Automotive Electronics Council
COTS	Commercial-Off-The-Shelf
Cpk	Process Capability Index
DLA	Defense Logistics Agency
DoD	Department of Defense
DPPM	Defective Parts Per Million
EEEE	Electrical, Electronic, Electromechanical, Electro-Optical
EOL	End-Of-Line
ETW	Electronics Technology Workshop
FIT	Failure-In-Time
FMEA	Failure Mode and Effects Analysis
GSFC	Goddard Space Flight Center
IL	In-Line
ILPM	Industry Leading Parts Manufacturer
JEDEC	Joint Electron Device Engineering Council

MEAL	Mission Environment, Application, and Lifetime
MIL-SPEC	Military Specification
NASA	National Aeronautics and Space Administration
NEPP	NASA Electronic Parts & Packaging (Program)
NESC	NASA Engineering & Safety Center
NSC	NASA Safety Center
PPAP	Production Part Approval Process
PSW	Part Submission Warrant
QML	Qualified Manufacturers List
QPL	Qualified Product List
RHA	Radiation Hardness Assurance
SMA	Safety and Mission Assurance
SMD	Standard Microcircuit Drawing
SME	Subject Matter Expert
SPC	Statistical Process Control

Major Changes from EEE-INST-002

EEE-INST-002

Table 1 HYBRID MICROCIRCUIT REQUIREMENTS 1/, 2/

Part Designation	Use As Is	Screen in Accordance with Table 2	Qualify in Accordance with Table 3	Element Evaluation in Accordance with Table 4
Level 1:				
1) Class K		X		
2) Class H **3/**		X		
3) Non-QML **4/, 5/**		X	X	X
Level 2:				
1) Class K		X		
2) Class H		X		
3) Non-QML **5/, 6/**		X	X	X
Level 3:				
1) Class K	X			
2) Class H		X		
3) Non-QML **6/**		X		

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Table 1. HYBRID MICROCIRCUIT REQUIREMENTS 1/

Assurance Level	Hybrid Microcircuit Type	Specification	Use As Is	Element Evaluation /4	Screening /5	LAT	DPA /7
Level 1	QML Class K	MIL-PRF-38534				X 6/	X
	QML Class H, **2/**	MIL-PRF-38534			X 3/	X	X
	QML Class E (based on Class K)	MIL-PRF-38534			X 8/	X 8/	X 8/
	SCD	VICD, SCD		X	X	X	X
Level 2	QML Class K	MIL-PRF-38534					X
	QML Class H	MIL-PRF-38534			X 3/		X
	QML Class E (based on Class K or H)	MIL-PRF-38534			X 8/	X 8/	X 8/
	Commercial, Automotive, SCD	VICD, SCD, AEC-Q104		X	X	X	X
Level 3	QML Classes K, H, D, E, G	MIL-PRF-38534					X
	Commercial, Automotive, SCD	VICD, SCD, AEC-Q104		R	R		X

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From M.2 Overview

Additional actions that are recommended to reduce the risk of product non-conformances include conducting a pre-seal (pre-cap) visual inspection IAW MIL-STD-883 Test Method 2017, and a review of manufacturer assembly and test documentation as part of a Customer Source Inspection (CSI). For projects with a very low risk tolerance, lot-specific QCI testing, per IAW MIL-PRF-38534 Group C, is recommended.

Table 1. Hybrid Microcircuit Requirements – Class E

Table 1. HYBRID MICROCIRCUIT REQUIREMENTS 1/

Assurance Level	Hybrid Microcircuit Type	Specification	Use As Is	Element Evaluation /4	Screening /5	LAT	DPA /7
Level 1	QML Class K	MIL-PRF-38534				X 6/	X
	QML Class H, 2/	MIL-PRF-38534			X 3/	X	X
	QML Class E (based on Class K)	MIL-PRF-38534			X 8/	X 8/	X 8/
	SCD	VICD, SCD		X	X	X	X
Level 2	QML Class K	MIL-PRF-38534					X
	QML Class H	MIL-PRF-38534			X 3/		X
	QML Class E (based on Class K or H)	MIL-PRF-38534			X 8/	X 8/	X 8/
	Commercial, Automotive, SCD	VICD, SCD, AEC-Q104		X	X	X	X
Level 3	QML Classes K, H, D, E, G	MIL-PRF-38534					X
	Commercial, Automotive, SCD	VICD, SCD, AEC-Q104		R	R		X

Exception needs to be reviewed by Project PCB

Table 1. Hybrid Microcircuit Requirements – DPA

Table 1. HYBRID MICROCIRCUIT REQUIREMENTS 1/

Assurance Level	Hybrid Microcircuit Type	Specification	Use As Is	Element Evaluation /4	Screening /5	LAT	DPA /7
Level 1	QML Class K	MIL-PRF-38534				X 6/	X
	QML Class H, 2/	MIL-PRF-38534			X 3/	X	X
	QML Class E (based on Class K)	MIL-PRF-38534			X 8/	X 8/	X 8/
	SCD	VICD, SCD		X	X	X	X
Level 2	QML Class K	MIL-PRF-38534					X
	QML Class H	MIL-PRF-38534			X 3/		X
	QML Class E (based on Class K or H)	MIL-PRF-38534			X 8/	X 8/	X 8/
	Commercial, Automotive, SCD	VICD, SCD, AEC-Q104		X	X	X	X
Level 3	QML Classes K, H, D, E, G	MIL-PRF-38534					X
	Commercial, Automotive, SCD	VICD, SCD, AEC-Q104		R	R		X

No “Use-As-Is. All AL 1-3 applications need DPA’s to verify construction requirements.

Table 1. Hybrid Microcircuit Requirements – Element Evals

Table 1. HYBRID MICROCIRCUIT REQUIREMENTS 1/

Assurance Level	Hybrid Microcircuit Type	Specification	Use As Is	Element Evaluation /4	Screening /5	LAT	DPA /7
Level 1	QML Class K	MIL-PRF-38534				X 6/	X
	QML Class H, 2/	MIL-PRF-38534			X 3/	X	X
	QML Class E (based on Class K)	MIL-PRF-38534			X 8/	X 8/	X 8/
	SCD	VICD, SCD		X	X	X	X
Level 2	QML Class K	MIL-PRF-38534					X
	QML Class H	MIL-PRF-38534			X 3/		X
	QML Class E (based on Class K or H)	MIL-PRF-38534			X 8/	X 8/	X 8/
	Commercial, Automotive, SCD	VICD, SCD, AEC-Q104		X	X	X	X
Level 3	QML Classes K, H, D, E, G	MIL-PRF-38534					X
	Commercial, Automotive, SCD	VICD, SCD, AEC-Q104		R	R		X

4/ Element Evaluation per MIL-PRF-38534, Appendix C, Section C.3.

Send email to address below for questions

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