

UF4SC120023B7S

1200V 23mO Normally-Off Gen4 SiCFET in D2PAK-7L

Package Type: D2PAK-7L
Process Technology: SiC, Si
Date Issued: 5/22/2024
Document Number: QF4SGJ1M-PQ030 rev B

TEST NAME	TEST STANDARD AND CONDITIONS	# SAMPLES x # LOTS	TEST RESULTS
ESD Human Body Model (ESD HBM)	ANSI/ESDA/JEDEC JS-001, TA = 25 °C	3x3 lots	Class 3A
ESD Charge Device Model (ESD CDM)	ANSI/ESDA/JEDEC JS-002, TA = 25 °C	3x3 lots	Class C3
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020: Classification Temperature Tc = 245 °C	77pcs x 3 lots x 5 tests	MSL 1
High Temperature Gate Bias (HTGB)	JESD22-A108: T _J = 175°C, V _{GS} = +20V, 1000 hrs	77pcs x 3 lots	Pass
High Temperature Reverse Bias (HTRB)	MIL-STD-750-1 M1038 Method A: T _J = 175°C, V _{DS} = 80% V _{DS,MAX} = 960V 1000 hrs	77pcs x 3 lots	Pass
High Humidity, High Temperature Reverse Bias (H3TRB) [†]	JESD22-A101C: T _A = 85°C, 85% RH, V _{GS} = 0V, V _{DS} = 100V, 1000 hrs <i>Preconditioned to MSL 1 per JESD22-A113</i>	77pcs x 3 lots	Pass
Autoclave/Pressure Cooker Test (AC/PCT) [†]	JESD22-A102: 121°C, RH = 100%, 96 hrs, 15psig <i>Preconditioned to MSL 1 per JESD22-A113</i>	77pcs x 3 lots	Pass
Temperature Cycling (TC) [†]	JESD22-A104: 1000 cycles, -55°C to +150°C, 2 cycles/hour, <i>Preconditioned to MSL 1 per JESD22-A113</i>	77pcs x 3 lots	Pass
Intermittent Operating Life (IOL) [†]	MIL-STD-750 Method 1037: ΔT _J ≥ 125°C, 3000 cycles (5 minutes on/ 5 minutes off) <i>Preconditioned to MSL 1 per JESD22-A113</i>	77pcs x 3 lots	Pass
Conclusion	This part meets Qorvo's product qualification requirements, and the AEC-Q101 Rev D standard.		

†: Indicates MSL Preconditioning and Reflow prior to reliability testing

Qualification Samples:

QF4SGJ1M – UF4SC120023B7S – 2 Lots

QF4SGK1M – UF4SC120030B7S – 1 Lot

Products Qualified by Similarity:

UF4SC120023B7S

ESD Qualification Report

Package Type: D2PAK-7L
Process Technology: SiC, Si
Qualification Number: AW1048 ESD testing
Date Issued: 10/18/2018
Document Number: QF4SGJ1M-PQ030 rev B

Model	HBM	All Pins Tested
Class Rating	Class 3A, >4000V, <8000 V	
Test Specification	JS-001 Table 2B	

Model	CDM	All Pins Tested
Class Rating	Class C3 Pass >1000V	
Test Specification	JS-002	

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Reliability Evaluation

The FIT rate data presented below is determined according to JEDEC Standard JESD 85 and is calculated from the HTRB and HTGB Burn-In sample size.

FIT = 2.608 failures per billion device hours

MTTF = 43,771.03 years

From the equations:

$$\lambda_{Hours} = \frac{X^2(\alpha, \nu)}{2 \times D \times H \times A_f}$$

$$FIT = \lambda_{Hours} \times 10^9$$

$$MTTF_{hours} = 1/\lambda_{Hours}$$

and

$$A_f = e^{\frac{E_a}{k} \left(\frac{1}{T_{use}} - \frac{1}{T_{test}} \right)}$$

Where:

X^2 = Chi-Squared probability function for a given Confidence level (α) and Degree of Freedom ($\nu=2r+2$, where r = the number of failures in the test population)

D = Number of Devices in the test population

H = Test hours per device

A_f = Acceleration Factor from the Arrhenius equation

E_a = Activation Energy (eV),

T_{use} = standardized use temperature

T_{test} = Temperature of Stress Test

k = Boltzmann's Constant

Our calculations are based on the HTGB and HTRB burn-in data.

D = 231 pcs for each HTRB and HTGB

H = 1000 hours for each HTRB and HTGB

α = 0.6 (60% Confidence Interval)

r = 0 failures

E_a = 0.7eV

T_{use} = 55°C or 328K

T_{test} = 175°C or 448K