



MSL1 Qualification Report

QFN Ceramic Air Cavity Surface Mount Package Styles

Description

This qualification report will detail the selected product and testing used to qualify our QFN ceramic air cavity packages to a moisture reflow sensitivity classification level of MSL1 per IPC/JEDEC J-STD-020E. Samples from 2 non-consecutive build lots were electrically tested before and after being subjected to the procedure specified in J-STD-020E, classification level MSL1. Visual inspection and acoustic microscope inspection (CSAM) was performed before and after moisture soak and reflow per MSL1 levels specified by IPC/JEDEC J-STD-020E. No degradation in product performance was seen.

Product Selected

Samples from 2 non-consecutive build lots of the below product was selected;



The CMD191C4 is a 4-10 GHz GaAs MMIC driver amplifier housed in a ceramic, air cavity leadless surface mount package. The CMD191C4 is ideally suited for complex communications systems where small size and high linearity are needed. The device delivers 20 dB of gain with a corresponding output 1 dB compression point of greater than +21 dBm. The CMD191C4 is a 50 ohm matched design which eliminates the need for external DC blocks and RF port matching.

Please refer to our product datasheets for detailed device information.



Qualification Tests & Results, CMD191C4, Test Lot #1 & #2

CMD191C4, Test Lot #1				
Test Description	Parameter	Specification	Measured Data	Result
Initial Electrical	Gain	17.0 dB Minimum	21.03 dB (Average)	PASS
	Output P1 dB	18.5 dBm Minimum	19.58 dBm Minimum	PASS
Initial Visual Inspection	40x External Visual	Section 5.3 of J-STD-020E	Visual	PASS
	CSAM	Section 5.3 of J-STD-020E	Visual	PASS
Bake	24hrs min @ 125°C +5°/-0°	Section 5.4 of J-STD-020E	Post bake visual	PASS
Moisture Soak	MSL1	Section 5.5 of J-STD-020E	Post soak visual	PASS
Reflow	3x reflow	Section 5.6 of J-STD-020E	Post reflow visual	PASS
Final External Inspection	40x External Visual	Section 5.7 of J-STD-020E	Visual	PASS
Final Acoustic Microscopy	CSAM	Section 5.9 of J-STD-020E	Visual	PASS
Final Electrical	Gain	20.0 dB Nominal	21.07 dB (Average)	PASS
	Output P1 dB	18.5 dBm Minimum	19.63 dBm Minimum	PASS

CMD191C4, Test Lot #2				
Test Description	Parameter	Specification	Measured Data	Result
Initial Electrical	Gain	17.0 dB Minimum	20.19 dB (Average)	PASS
	Output P1 dB	18.5 dBm Minimum	19.21 dBm Minimum	PASS
Initial Visual Inspection	40x External Visual	Section 5.3 of J-STD-020E	Visual	PASS
	CSAM	Section 5.3 of J-STD-020E	Visual	PASS
Bake	24hrs min @ 125°C +5°/-0°	Section 5.4 of J-STD-020E	Post bake visual	PASS
Moisture Soak	MSL1	Section 5.5 of J-STD-020E	Post soak visual	PASS
Reflow	3x reflow	Section 5.6 of J-STD-020E	Post reflow visual	PASS
Final External Inspection	40x External Visual	Section 5.7 of J-STD-020E	Visual	PASS
Final Acoustic Microscopy	CSAM	Section 5.9 of J-STD-020E	Visual	PASS
Final Electrical	Gain	20.0 dB Nominal	20.49 dB (Average)	PASS
	Output P1 dB	18.5 dBm Minimum	19.46 dBm Minimum	PASS



Analysis of Test Results

The test results show that a minimum change in electrical performance was seen following the moisture soak/reflow procedure. This change is within our MSA specification tolerance and does not constitute a failure.

Conclusions

- ◆ All material passed the criteria specified in Section 6.0 of IPC/JEDEC J-STD-020E, therefore the conclusion of this qualification testing is that our 4x4mm QFN ceramic air cavity surface mount package style is qualified to a moisture/reflow sensitivity classification level of MSL1 per the IPC/JEDEC J-STD-020E.
- ◆ The materials, designs, and manufacturing processes of our 3mm & 5mm QFN ceramic air cavity surface mount package styles are identical to the above qualified 4mm QFN package, therefore the 3mm & 5mm QFN ceramic air cavity surface mount package styles are Qualified by Similarity.