Proc sess Qualification Report
CMDS GaN1

QUALIFICATION TEST REPORT

Wafer Process: GaN1
Drawing No.: 102576

CMD218
CMD218C4
CMD219
CMD219C4
CMD276C4
CMD277C4
CMD278C4
CMD290
Introduction

The definition of a qualification family, as defined by EIA/JESD47 Stress Driven Qualification of Integrated Circuits, is all devices that use the same wafer fabrication technology, wafer fabrication process and wafer fabrication site. This qualification report will outline the screening that was performed to satisfy the reliability requirements for a GaN MMIC amplifier using Custom MMIC’s GaN1 wafer process.

Products Selected

All screening identified as die level was performed on a foundry Standard Evaluation Circuit (SEC). The SEC is a single-stage X-band amplifier, centered at 10GHz, based on a 4x100um cell, 4 mil thick die. All accelerated life testing was performed under RF drive (3dB gain compression).

All screening identified as package level was performed on the CMD219C4. The CMD219C4 is a broadband MMIC GaN low noise amplifier housed in a leadless 4x4 mm QFN package. The CMD219C4 is ideally suited for microwave radios and C-band applications where small size and high input power survivability are needed. The broadband device delivers greater than 22.5 dB of gain with a corresponding output 1 dB compression point of +17 dBm and a noise figure of 1 dB. The CMD219C4 features a RF input power survivability of greater than 5 Watts.

Please refer to our product datasheets for detailed device information.
**Process Qualification Report**

**CMDS GaN1 Process**

### Table 1: Qualification Tests & Results

<table>
<thead>
<tr>
<th>Test</th>
<th>Test Vehicle</th>
<th>Test Conditions</th>
<th>Criteria</th>
<th>Inspection</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burn-In</td>
<td>DIE</td>
<td>100°C baseplate, RF @ 10GHz, Vds@30V, 110 hours</td>
<td>N/A</td>
<td>Visual</td>
<td>PASSED</td>
</tr>
<tr>
<td>RF Life Test</td>
<td>DIE</td>
<td>110°C baseplate, RF @ 10GHz, Vds @ 30V</td>
<td>1dB drop in Pout</td>
<td>Electrical</td>
<td>2500 hours</td>
</tr>
<tr>
<td>RF Stability</td>
<td>DIE</td>
<td>100°C baseplate, RF @ 10GHz, Vds @ 20V</td>
<td>≤ ± 0.01 dB variation in Pout</td>
<td>Electrical</td>
<td>1.0E+02 hours</td>
</tr>
<tr>
<td>Arrhenius Summary</td>
<td>DIE</td>
<td>RF @ 10GHz, Vds @ 30V, Pin = 3dB compression, Te @ 200°C Activation Energy = 1.92eV</td>
<td>MTTF</td>
<td>Electrical</td>
<td>10E+7 hours</td>
</tr>
<tr>
<td>ESD Classification</td>
<td>4mm QFN</td>
<td>Class 1A per MIL-STD-883, Method 3015, 499Volts.</td>
<td>Datasheet Parameters</td>
<td>Electrical</td>
<td>PASSED</td>
</tr>
<tr>
<td>Moisture Sensitivity</td>
<td>4mm QFN</td>
<td>24 hour bake @ 125°C Moisture soak: 168 hrs at 85°C &amp; 85% RH 3X Reflow at 235°C</td>
<td>Per J-STD-020E, MSL1</td>
<td>CSAM,</td>
<td>PASSED</td>
</tr>
</tbody>
</table>

### Conclusions

- A failure rate of 100 FIT is calculated at a junction temperature of 200°C and a confidence level of 60% confidence.
- All material passed the criteria specified in the above Table 1. The conclusion of this reliability screening is that our GaN1 wafer process is qualified to the specified environmental tests.