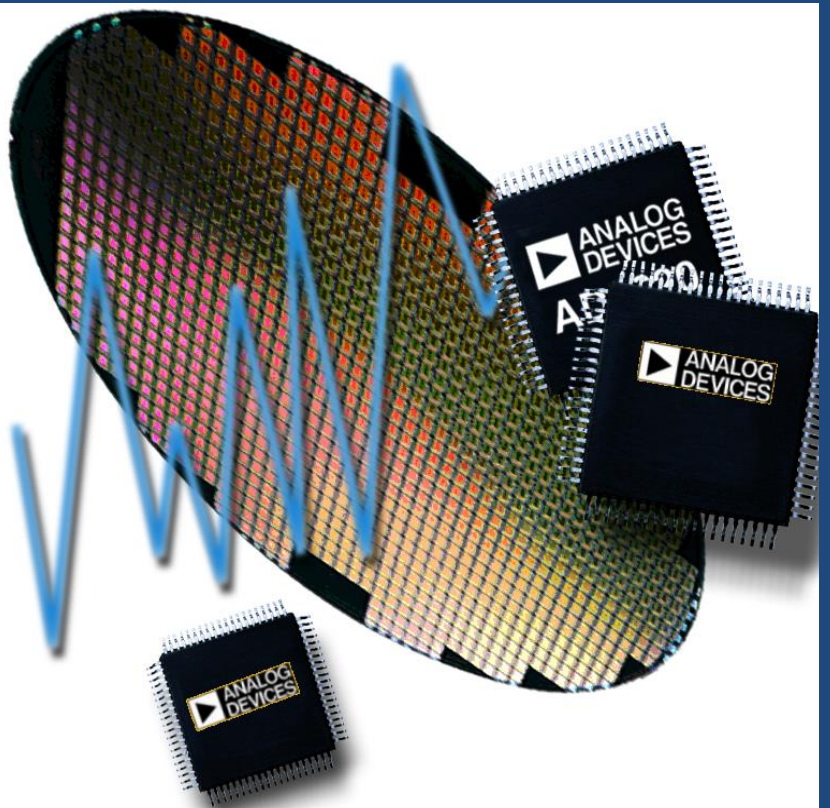


# Analog Devices Welcomes Hittite Microwave Corporation

NO CONTENT ON THE ATTACHED DOCUMENT HAS CHANGED





# ***Reliability Report***

<b>Report Title:</b>	<b>Qualification Test Report</b>
<b>Report Type:</b>	<b>See Attached</b>
<b>Date:</b>	<b>See Attached</b>

# QUALIFICATION TEST REPORT

QTR: 04004 REV: 03

## QUALITY POLICY

Hittite  
Microwave  
Corporation  
is committed to:

- *Be a supplier of products of the highest quality*
- *Advance the state-of-the-art of the technology supporting our products*
- *Enhance our competitive position with superior products*

Hittite's quality  
policy recognizes  
responsibilities of  
every individual to:

- *Take the initiative to promote quality*
- *Create an environment where highest standards are maintained*
- *Participate in continuous improvement practices*

***PART TYPE: RF SWITCH***  
***WAFER PROCESS: ED MESFET4***  
***PACKAGE QSOP-16 LEAD***

HMC241QS16

HMC245QS16

HMC274QS16

HMC603QS16

## 1.0 Introduction

This qualification procedure is designed to satisfy the tests required for Device Initial Qualification testing of Hittite parts in a plastic MSOP 8 lead surface mount package. A complete data sheet for the HMC241QS16 can be found at [www.hittite.com](http://www.hittite.com).

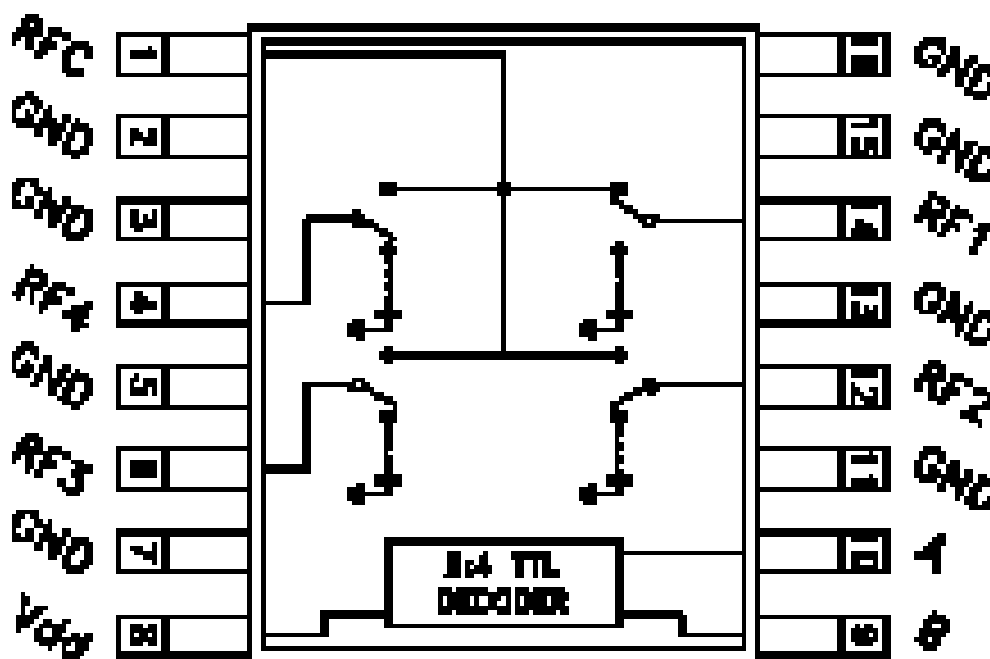
The qualification plan has five subgroups:

1. Electrical Characterization
2. Temperature Cycling
3. Autoclave
4. HAST
5. ESD Characterization

## 1.1 General Description

The ED MESFET4 process is an advanced 0.6 micron enhancement/depletion mode MESFET process with an integrated power MESFET and three thick global metal interconnect layers. This process supports RF applications up to Ku-band and mixed mode applications of LSI complexity. The three metal layers are encapsulated in a high performance interlayer dielectric that allows tremendous wiring flexibility and packaging simplicity. The process includes precision nichrome resistors and very high value MIM capacitors.

The HMC241QS16 is a low-cost non-reflective SP4T switch in a 16-lead QSOP package. Covering DC - 3.5 GHz, this switch offers high isolation and has a low insertion loss of 0.5 dB at 2 GHz. The switch offers a single positive bias and true TTL/CMOS compatibility. A 2:4 decoder is integrated on the switch requiring only 2 control lines and a positive bias to select each path, replacing 8 control lines normally required by GaAs SP4T switches.



Functional Diagram

## 2.0 Summary of Results

All testing has been completed. There were no failures in any subgroup. The device meets the requirements for Device Initial Qualification testing. The device was characterized as ESD sensitivity level Class 0

PARA	TEST	QTY IN	QTY OUT	PASS/FAIL	NOTES
3.1	Sample Selection	183	183	Pass/No Failures	
3.2	Initial Electrical Characterization (+25)	183	183	Pass/No Failures	
3.3	Initial Electrical Characterization (H/C)	45	45	Pass/No Failures	
3.4	Temperature Cycling Exposure	45	45	Complete	
3.5	Electrical Test	45	45	Pass/No Failures	
3.6	Autoclave Exposure	45	45	Complete	
3.7	Electrical Test	45	45	Pass/No Failures	
3.8	HAST Exposure	45	45	Pass/No Failures	
3.9	Electrical Test	45	45	Pass/No Failures	
3.10	ESD Exposure	3	3	Complete	
3.11	Electrical Test	3	3	Class 0	250 Volt

### 3.0 Procedure

**3.1 Sample Selection:** Using parts from stock that met acceptance test requirements, a minimum of 183 parts were obtained from stock and divided into 5 subgroups:

6. (45) Electrical Characterization
7. (45) Temperature Cycling
8. (45) Autoclave
9. (45) HAST
10. (3) ESD

**3.2 Pre-Test Screening:** Baseline electrical test was performed on all the parts from 3.1 at +25C per the device ATP. The test read and recorded 100% of the data. There were no failures in this initial test. The test data is presented in Appendix A.

**3.3 Electrical Characterization:** Electrical test was performed on 45 parts from subgroup 1 at -55C and +85C per the device ATP. The test read and recorded 100% of the data. There were no failures in this subgroup. A report with a full set of all test data for -55, +25 and +85C data was created. The test data is presented in Appendix A.

**3.4 Temperature Cycling:** Temperature cycling exposure was performed on 45 parts from subgroup 2 per JESD22-A104-A condition B (-65 to +150) for a minimum of 500 cycles. This test was performed by Assurance Technology Corp. in Chelmsford, MA. A certificate of testing is presented in Appendix A.

**3.5 Electrical Test:** Electrical test was performed on 45 parts from subgroup 2 at +25C per the device ATP. The test read and recorded 100% of the data. There were no failures in this subgroup. A report with a full set of all test data was created. The test data is presented in Appendix A.

**3.6 Autoclave:** Autoclave exposure was performed on 45 parts from subgroup 3 per JESD22-A102-B condition C (+121 C, 100% RH, 15 PSI) for a minimum of 96 hours.

**3.7 Electrical Test:** Electrical test was performed on 45 parts from subgroup 3 at +25C per the device ATP. Electrical testing was performed no sooner than 2 hours and no later than 48 hours after exposure. The test read and recorded 100% of the data. There were no failures in this subgroup. A report with a full set of all test data was created. The test data is presented in Appendix A.

**3.8 Highly Accelerated Stress Test (HAST):** HAST exposure was performed on 45 parts from subgroup 4 per JESD22-A110-B condition C (+130 C, 85% RH, 33 PSI) for a minimum of 44 hours.

**3.9 Electrical Test:** Electrical test was performed on 45 parts from subgroup 4 at +25C per the device ATP. Electrical testing was performed no sooner than 2 hours and no later than 48 hours after exposure. The test read and recorded 100% of the data. There were no failures in this subgroup. A report with a full set of all test data was created. The test data is presented in Appendix A.

**3.10 ESD Stress Test (HBM):** ESD exposure was performed on 3 parts from subgroup 5 per MIL-STD-883 Method 3015. This test was performed by Amkor Test Services in Santa Clara, CA. A certificate of testing is presented in Appendix A.

**3.11 Electrical Test:** Electrical test was performed on 3 parts from subgroup 5 at +25C per the device ATP. The test read and recorded 100% of the data. The parts were characterized as Class 0 sensitivity. These devices typically have a 250 volt HBM threshold.