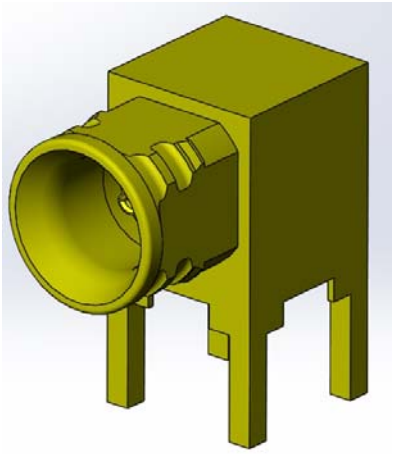
Project Number: Design Qualification Test Report	Tracking Code: 1364204_Report_Rev_1
Requested by: Alvin Wang	Date: 2/28/2018
Part #: MMCX7-J-P-GF-RA-TH1/RF179-73SP4-73SP4-0406	
Part description: MMCX7/RF179	Tech: Tony Wagoner
Test Start: 1/24/2018	Test Completed: 1/25/2018



DESIGN QUALIFICATION TEST REPORT

MMCX7/RF179
MMCX7-J-P-GF-RA-TH1/RF179-73SP4-73SP4-0406

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
2/28/2018	**1**	**Initial Issue**	**KH**

CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to IS0 10012-l and ANSI/NCSL 2540-1, as applicable.

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SCOPE

To perform the following tests: Design Qualification test. Please see test plan.

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) After soldering, the parts to be used for LLCR testing were cleaned according to TLWI-0001.
4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
5) The automated procedure is used with aqueous compatible soldering materials.
6) Parts not intended for testing LLCR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Solder Information: Lead Free
9) Samtec Test PCBs used: PCB-103846-TST

FLOWCHARTS

Mechanical Shock/Random Vibration/Event Detection

Group 1
MMCX7-J-P-GF-RA-TH1
RF179-73SP4-73SP4-0406
60 Points

Step	Description
1.	Nanosecond Event Detection (Mechanical Shock) (1)
2.	Nanosecond Event Detection (Random Vibration) (2)

(1) Nanosecond Event Detection (Mechanical Shock)
Use EIA-364-87 for Nanosecond Event Detection:
Test Condition = F (50 nanoseconds at 10 ohms)
Use EIA-364-27 for Mechanical Shock:
Test Condition = C (100 G Peak, 6 milliseconds, Half Sine)
Number of Shocks = 3 Per Direction, Per Axis, 18 Total

(2) Nanosecond Event Detection (Random Vibration)
Use EIA-364-87 for Nanosecond Event Detection:
Test Condition = F (50 nanoseconds at 10 ohms)
Use EIA-364-28 for Random Vibration:
Condition = VB (7.56 gRMS Average, 2 Hours/Axis)

Mechanical Shock/Random Vibration/LLCR

Group 1
MMCX7-J-P-GF-RA-TH1
RF179-73SP4-73SP4-0406
8 Assemblies

Step	Description
1.	LLCR (1)
2.	Mechanical Shock (2)
3.	Random Vibration (3)
4.	LLCR (1) Max Delta = 15 mOhm

(1) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(2) Mechanical Shock = EIA-364-27
Test Condition = C (100 G Peak, 6 milliseconds, Half Sine)
Number of Shocks = 3 Per Direction, Per Axis, 18 Total

(3) Random Vibration = EIA-364-28
Condition = VB (7.56 gRMS Average, 2 Hours/Axis)

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

MECHANICAL SHOCK (Specified Pulse):

1) Reference document: EIA-364-27, *Mechanical Shock Test Procedure for Electrical Connectors*
2) Test Condition A
3) Peak Value: 50 G
4) Duration: 11 Milliseconds
5) Wave Form: Half Sine
6) Velocity: 12.3 ft/s
7) Number of Shocks: 3 Shocks / Direction, 3 Axis (18 Total)

VIBRATION:

1) Reference document: EIA-364-28, *Vibration Test Procedure for Electrical Connectors*
2) Test Condition VII, Letter D
3) Power Spectral Density: 0.04 G^2 / Hz
4) G 'RMS': 3.10
5) Frequency: 50 to 2000 Hz
6) Duration: 15 Minutes per axis (45 Minutes total)

NANOSECOND-EVENT DETECTION:

1) Reference document: EIA-364-87, *Nanosecond-Event Detection for Electrical Connectors*
2) Prior to test, the samples were characterized to assure the low nanosecond event being monitored will trigger the detector.
3) After characterization it was determined the test samples could be monitored for 50 nanosecond events

LLCR:

1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
    a. <= +5.0 mOhms: ---------- Stable
    b. +5.1 to +8.0 mOhms: ---------- Minor
    c. +8.1 to +10.0 mOhms:---------- Acceptable
    d. +10.1 to +50.0 mOhms: ---------- Marginal
    e. +50.1 to +2000 mOhms: ---------- Unstable
    f. >+2000 mOhms:---------- Open Failure

RESULTS

LLCR Shock & Vibration Group (8 signal and 8 ground LLCR test points)

Signal pin

- **Initial ---------- 266.96 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms ---------- 8 Points ---------- Stable**
  - **+5.1 to +8.0 mOhms ---------- 0 Points ---------- Minor**
  - **+8.1 to +10.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+10.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

Ground pin

- **Initial ---------- 11.44 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms ---------- 8 Points ---------- Stable**
  - **+5.1 to +8.0 mOhms ---------- 0 Points ---------- Minor**
  - **+8.1 to +10.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+10.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

Mechanical Shock & Random Vibration:

- **Shock**
  - **No Damage ---------- ---------- Pass**
  - **50 Nanoseconds ---------- ---------- Pass**
- **Vibration**
  - **No Damage ---------- ---------- Pass**
  - **50 Nanoseconds ---------- ---------- Pass**

DATA SUMMARIES

LLCR Shock &Vibration Group:

1). A total of 8 signal and 8 ground points were measured.
2). EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3). The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ---------- Stable
   b. +5.1 to +8.0 mOhms:---------- Minor
   c. +8.1 to +10.0 mOhms:---------- Acceptable
   d. +10.1 to +50.0 mOhms:---------- Marginal
   e. +50.1 to +2000 mOhms ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

	LLCR Measurement Summaries by Pin Type			
Date	1/24/2018	1/25/2018		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	32	32		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Shock-Vib**	**Delta**	**Delta**
	Pin Type 1: Ground			
Average	11.23	0.16		
St. Dev.	0.18	0.08		
Min	10.93	0.00		
Max	11.44	0.31		
Summary Count	8	8		
Total Count	8	8		
	Pin Type 2: Signal			
Average	264.27	0.89		
St. Dev.	1.10	0.61		
Min	263.40	0.21		
Max	266.96	1.72		
Summary Count	8	8		
Total Count	8	8		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**16**	**0**	**0**	**0**	**0**	**0**

Nanosecond Event Detection:

Shock and Vibration Event Detection Summary	
Contacts tested	16
Test Condition	C, 100g's, 6ms, Half-Sine
Shock Events	0
Test Condition	V-B, 7.56 rms g
Vibration Events	0
Total Events	0

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: MO-11
Description: Switch/Multimeter
Manufacturer: Keithley
Model: 3706
Serial #: 120169
Accuracy: See Manual
… Last Cal: 09/11/2017, Next Cal: 09/11/2018

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 04/22/2017, Next Cal: 04/22/2018

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 07/18/2017, Next Cal: 07/18/2018

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 10/31/2017, Next Cal: 10/31/2018