Mini RF III Switching Coax Connector

The product described in this document has not been fully tested to ensure conformance to the requirements outlined herein. Tyco Electronics makes no representation on warranty, express or implied, that the product will comply with these requirements. Further, Tyco Electronics reserves the right to change these requirements based on the results of additional testing and evaluation. Contact Tyco Electronics Engineering for further information, if necessary.

1 SCOPE

1.1 Content

This specification covers performance, test and quality requirements for the Tyco Electronics* Pico Switching Coax Connector. This connector provides a path for a high frequency signal via a normally closed switch that can be opened by a probe, diverting the signal to the probe. Such a probe is typically applied for production or service testing purposes.

1.2 Qualification

When tests are performed on subject product, procedures specified in this specification shall be used. All inspections shall be performed using applicable inspection plan and product drawing.

2 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extend specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements in this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between requirements of this specification and the referenced documents, this specification shall take precedence.

2.1 Tyco Electronics Documents

114-19113	Application Specification
501-160045	Qualification Test Report

2.2 Tyco Electronics Drawing

C-2081956	RF Switch

2.3 Other Documents

IEC 60512	Basic testing procedures and measuring methods for electromechanical components for electronic equipment.
IEC 60068	Basic environmental testing procedures.
MIL-STD-202	Test method standard, Electronic and electrical component parts
EIA 364	Electrical Connector Performance Test Standards

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3 REQUIREMENTS

3.1 Design and Construction

Products shall be of design, construction and physical dimensions as specified on the applicable product drawing.

3.2 Materials and Finish

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.3 Technology Parameters:

A.	Frequency Range:	DC~11GHz
B.	Characteristic Impedance:	50+/-5 Ω
C.	VSWR:	1.2 Max. @DC~3GHz 1.3 Max. @3~6GHz 1.5 Max. @6~11GHz
D.	Insertion Loss -NC State	-0.1dB Max.@DC~3GHz -0.2dB Max.@3~6GHz -0.5dB Max.@6~11GHz
E.	Isolation -NO State	-20dB Min.@DC~3GHz -15dB Min.@3~6GHz -10dB Min.@6~11GHz
F.	Operating Temperature Range:	-40 °C to 85 °C
G.	Operating Humidity:	95% R.H.MAX

3.4 Ratings

A.	Voltage Rating:	60 VAC (R.M.S)
B.	Power:	2 W
C.	Initial Insulation Resistance	500 M Ohm
D.	Withstand Voltage	300V AC 1 Min.
E.	Contact Resistance Inner Contact Outer Contact	 70m ohm Max. (Without conductor resistance) 20 m ohm Max.
F.	Durability:	100 test cycles

3.5 Performance and Test Description

The product is designed to meet electrical, mechanical and environmental performance specified in this paragraph as tested per test sequence specified in Paragraph 3.7.
Unless otherwise specified, all tests are performed at ambient environmental conditions per IEC specification 60068-1 clause 5.3 and are performed with connectors in unmated condition.

VISUAL			
Para	**Test Description**	**Performance Requirement or Severity**	**Procedures**
	Visual examination	Meets applicable requirements specified on product drawing, customer drawing, and application specification.	Visual, dimensional and functional per applicable inspection-plan. In accordance with IEC 60512-1-1.
ELECTRICAL			
Para	**Test Description**	**Performance Requirement or Severity**	**Procedures**
	Contact resistance	Inner contact : Initial 70mΩ Max. After 100mΩ Max. Ground contact : Initial 20mΩ Max. After 50mΩ Max. Max. open voltage 20 mV. Max. current 100 mA DC.	In accordance with EIA 364-23/IEC 60512-2-1. Testing by the voltage dropping method with the low level current. See Figure1 and Figure 2, Body Resistance is eliminated here.
	Insulation resistance	Initial: 500 MΩ min. After: 100 MΩ min. Test voltage: 200 VDC. Duration: 1 minute. Measure between contact and shield.	In accordance with EIA 364-21/IEC 512-3-1.
	Dielectric withstanding voltage	No break-down or flash-over. Test voltage: 300 VAC. Duration: 1 minute. Test between contact and shield.	In accordance with EIA364-20/IEC 60512-2-4a.
	VSWR (NC)	1.2 Max. @DC~3GHz 1.3 Max. @3~6GHz 1.5 Max. @6~11GHz	In accordance with EIA-364-108 / IEC 60512-25-5. See figure 3
	Insertion Loss (NC)	-0.1dBMax. @DC~3GHz -0.2dBMax. @3~6GHz -0.5dBMax. @6~11GHz	In accordance with EIA-364-101 / IEC 60512-25-2. See figure 3
	Isolation	-20dBMin.@DC~3GHz -15dBMin. @3~6GHz -10dBMin. @6~11GHz	In accordance with EIA-364-101 / IEC 60512-25-2. See figure 4
MECHANICAL			
Para	**Test Description**	**Performance Requirement or Severity**	**Procedures**

	Engage and Disengage Force	Mating Force: 30N (3Kgf) Max Unmating Force： 5~30N (0.5~3Kgf) Force to fully depress switch contact. Speed: 25+/-3 mm/minute.	In accordance with IEC 60512-7-13b.
	Allowed Push Force	1.5~2.5N (0.15~0.25Kgf) When push the switch of the connector from on-state to off-state by a test probe with the required force along the axis direction, it is needed to get 15dB isolation at 6GHz is measured.	See figure 5.
	Durability	Mate 100 testing cycles. No functional damage. Contact resistance meet requirement. Speed: 25+/-3 mm/minute.	In accordance with IEC 60512-9-1.
	Adhered of Electrode Terminal	No excoriation of electrode terminal Force: F1=40N Time:5+/-1s	In accordance with IEC 60512-5-8b. See figure 5.
	Vibration	No physical damage. Contact resistance meet requirement. Contact discontinuity 1 μs max. Apply the following vibration conditions to the mating connector. During the testing, run 100mA DC to check electrical discontinuity. Frequency:10Hz → 100Hz → 10Hz/approx. 20minutes. Half amplitude, Peak value of acceleration: 3mm or 60m/s²(6G). Directions, cycle:3 mutually perpendicular direction,3 cycles for each direction.	In accordance with IEC 60512-6-4.
	Shock	No physical damage. Contact resistance meet requirement. Contact discontinuity 1 μs max. The object of this test procedure is to detail a standard method to assess the ability of a connector to withstand specified severity of mechanical shock. Test Current:100mA. Peak value of acceleration:750m/s²(75G) Duration:6ms Wave form: half sinusoidal Directions, cycle: 6 mutually perpendicular direction, 3cycles about each direction	In accordance with EIA 364-27 Condition A / IEC 60512-6-3.

ENVIRONMENTAL			
Para	**Test Description**	**Performance Requirement or Severity**	**Procedures**
	Humidity	No physical damage. Contact resistance, Insulation Resistance, Dielectric withstanding voltage meet requirements. Test is done without mating adaptor, apply the following environment to the mating connector. Temperature: 60℃. Humidity: 95%R.H. Duration: 96 hours(50hours*).	In accordance with MIL-STD-202, Method 103Test Condition B Note: The condition is under the "*"value when test is done with adaptor. Measurements should be done within 2hours.
	Thermal Shock	No physical damage. Contact resistance, Insulation Resistance, Dielectric withstanding voltage meet requirements. Apply the following environment to the mating connector as following: - 50℃(30min) ~25℃(5max) ~ 90℃(30min) ~ 25℃(5max) Transition time: 5min. MAX Cycles: 50 Cycles	In accordance with MIL-STD-202, Method107 Test Condition see requirement
	Solderability	At least 95% covered by a continuous new solder coating. Apply the following environment to the mating connector Temperature: 245±5℃ Duration: 3~5 second Test sample should be observed by the magnification of 10times after the test.	In accordance with IEC 60068-2-20 test Ta.
	Resistance to soldering heat	No physical damage. Coplanarity of the solder tail should be not beyond 0.10mm According to the following conditions to test connector. 1. Infrared reflow soldering, the peak temperature of 260 degrees Celsius, reference temperature curve, and the requirements of the SMT2 time; 2. electric soldering iron, requires 300 degrees 5 seconds, 350 degrees below 3 seconds.	In accordance with EIA-JRX-0102-102 § 3.3.4. See paragraph 3.6.5
	Salt Spray	No physical damage. Contact resistance meet requirement. Mated connector Temperature: 35±2℃ Relative Humidity: 90~98%R.H Salt water density: 5±1% Duration: 48 hours for contact area	In accordance with EIA 364-26 Test Condition A

3.6 Additional Test and Measuring Details

3.6.1 Contact resistance

Contact resistance shall be measured as indicated in figure 1 and 2.
Contact path bulk of connected parts is not included in the requirement.

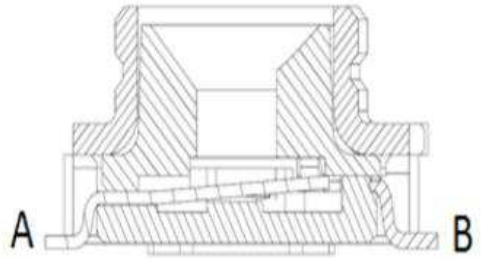


Figure 1. Inner Contact RAB

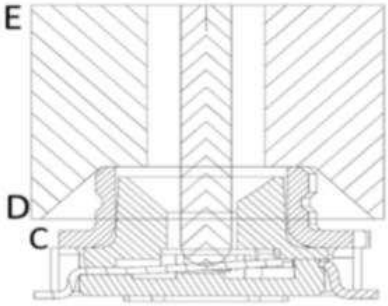


Figure 2. Ground Contact RCE - RDE

3.6.2 VSWR and Insertion Loss

Measurement system is as following figure 3 and tested by network analyzer.

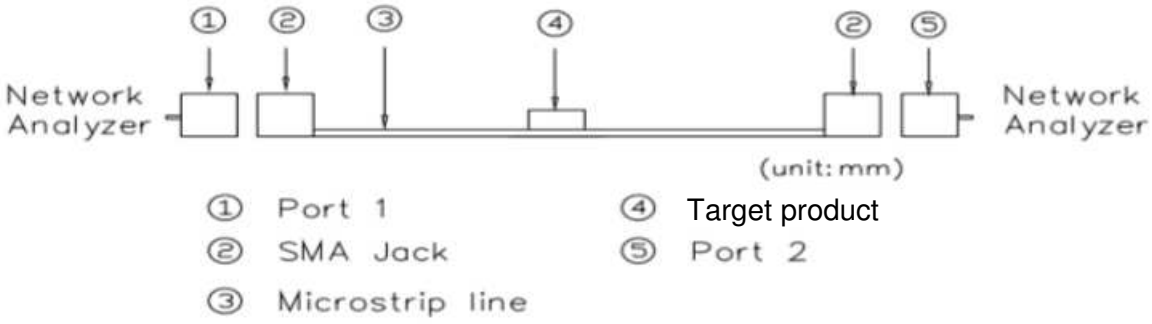


Figure 3. Test Frame

3.6.3 Isolation

Measurement system is as following figure 4 and tested by network analyzer.
Note: the manual testing probe should be inserted to the mating portion of the receptacle completely during the testing.

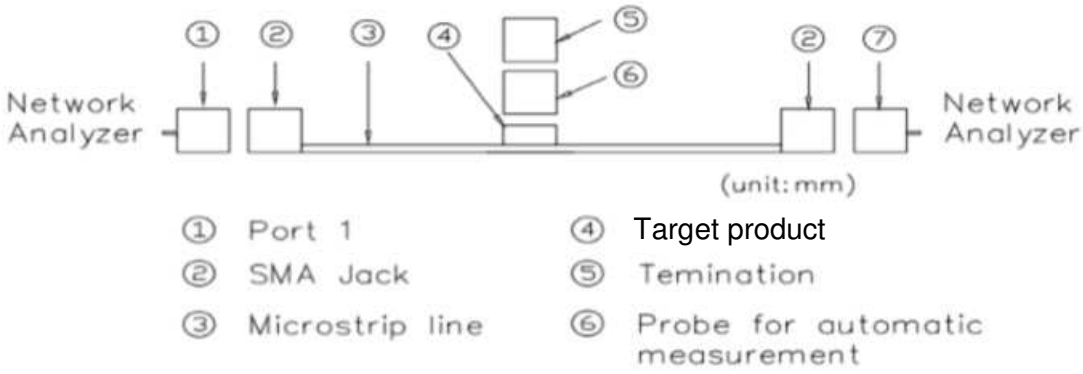


Figure 4. Test Frame for Isolation

3.6.4 Allowed Push Force and Adhered of Electrode Terminal

Soldering the sample with test PCB

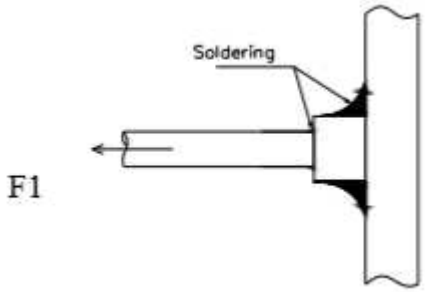


Figure 5. Test Structure for Isolation

3.6.5 Recommended Reflow Soldering Condition/SMT

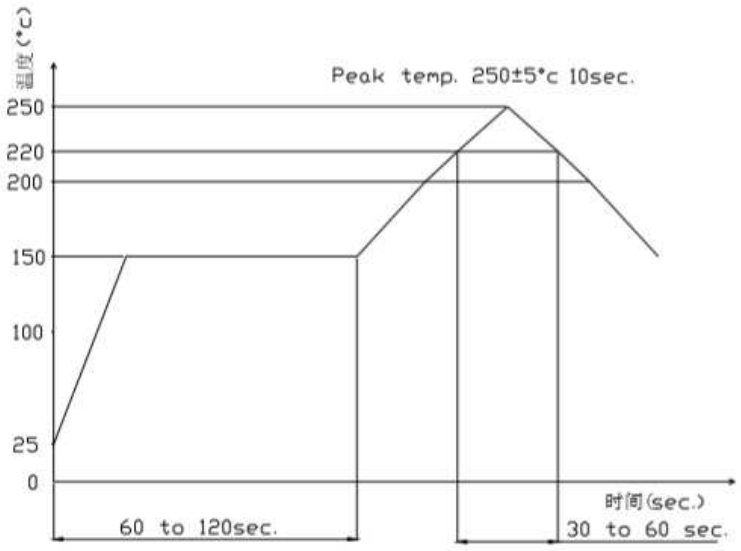


Figure 6. Recommended Temp.&Time of Reflow Soldering

3.7 Product Qualification and Requalification Test Sequence

Test or examination	TEST-GROUP (a)									
	A	B	C	D	E	F	G	H	I	J
	TEST-SEQUENCE (b)									
Visual examination	1,11	1	1,3	1	1	1,6	1	1,3	1,3	1,5
Contact resistance	2,12			2,4	2,4	2,7	2,7			2,4
Insulation resistance	3					3,8	3,8			
Dielectric Withstanding Voltage	4					4,9	4,9			
VSWR	5,13									
Insertion Loss	6,14									
Isolation	7,15									
Mating/un-mating Force	8,10									
Allowed Push Force		2,4								
Durability	9	3								
Adhered of Electrode Terminal			2							
Vibration				3						
Shock					3					
Humidity						5				
Thermal Shock							5			
Solderability								2		
Resistance to soldering heat									2	
Salt Spray										3

(a) See paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Sample QTY=5pcs for each group

3.8 Usage Precaution

3.8.1 Connection/ disconnection of connectors

A) To mate the connectors, the mating axis of both connectors must be aligned, and the connectors can be mated fully, until they can't be moved. Not allowed in a very tilt mating angle and do not bend coaxial cable in the measuring procedure, otherwise you'll get a not good test data.

B) To disconnect connectors, please disengage them along the axis direction of mating hole, until they're separated completely. With the point of insertion of allowed and when force is applied as shown in Figure 7.

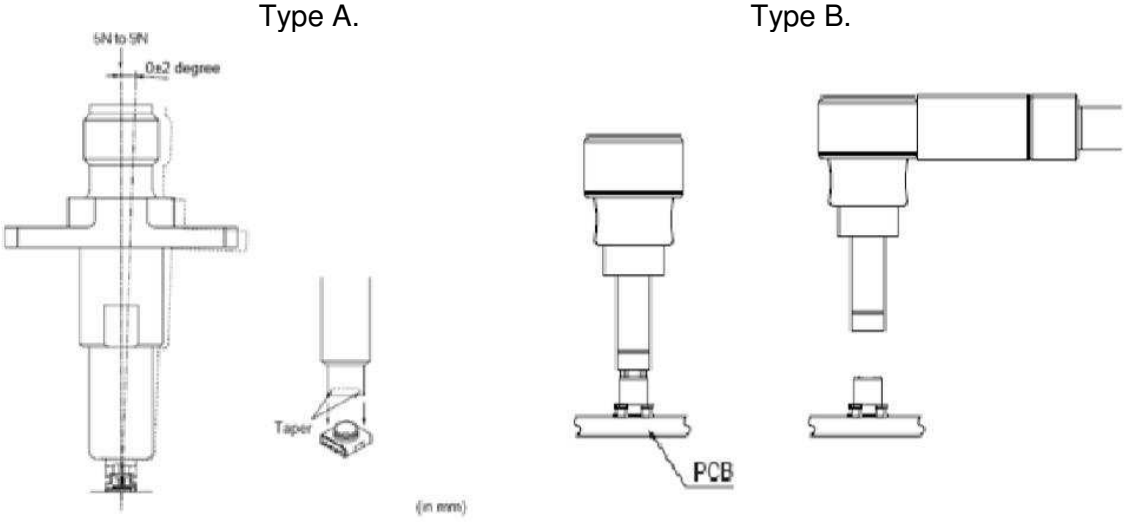


Figure 7.

3.8.2 Precautions

A) Please mount this product at the position so that stress by wrap and/or bend of the PCB may not apply to it.
B) Please avoid the cleaning of this product
C) The product can' t be in the long-time compression and the pressure on surface no more than 2Kgf. Please refer to figure 8

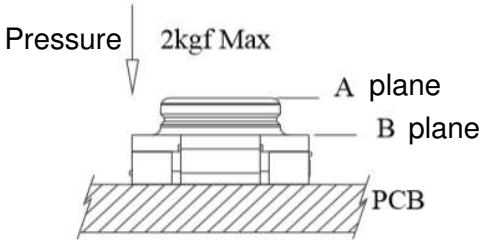


Figure 8.

3.8.3 Storage condition

Use this product within 6 months after receipt
Condition: Temp: -10~+40℃
Humidity:15~85%

4 QUALITY ASSURANCE PROVISIONS

4.1 Qualification testing

A. Sample selection

Samples shall be prepared in accordance with applicable instructions and shall be selected at random from current production.
Unless otherwise specified, all test-groups shall consist of a minimum of 5 connectors of which all contacts shall be tested.

B. Test sequence

Qualification inspection shall be verified by testing samples as specified in paragraph 3.6.

4.2 Requalification testing

If changes significantly affecting form, fit or function are made to product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of original testing sequence as determined by product, quality and reliability engineering.

4.3 Acceptance

Acceptance is based upon verification that product meets requirements of paragraph 3.4. Failures attributed to equipment, test set-up, applied customer components or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for requalification. Testing to confirm corrective action is required before resubmittal.

4.4 Quality conformance inspection

Applicable Tyco Electronics quality inspection plan will specify sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with applicable product drawing and this specification.