Micro USB2.0 Receptacle 5Pos Water Proof

1. Introduction

1.1 Testing was performed on the Receptacle for Micro USB2.0 Receptacle 5Pos Water Proof Connector to determine if it meets the requirements of Product Specification, 108-61243 Rev.A1.

1.2 Scope

This report covers the electrical, mechanical and environmental performance requirements of the Receptacle for Micro USB2.0 5Pos Water Proof Connector.

The qualification testing was performed between 09 JUN, 2014 and 30 JUN, 2014.

1.3 Conclusion

The Receptacle for Micro USB2.0 5Pos Water Proof Connector meets the electrical, mechanical and environmental performance requirements of Product Specification, 108-61243 Rev.A1.

1.4 Test Samples

The test samples were randomly selected from normal current production lots, and the following

Part numbers were used for test:

Description	Part Number
Receptacle For Micro USB2.0 5Pos Water Proof Connector, B-Type	2108877
Plug For 5Pos , B-Type	-
Sealing	2108883

Revised Per ECR-

2. Test Contents

Para.	Test Items	Requirements	Procedures
3.5.1	Examination of Product	No physical damage	Visual inspection No physical damage
		Electrical Requirements	
3.5.2	Contact Resistance （Low Level）	Initial, 50mΩ Max. After test, ΔR=±10mΩ Max.	Mate connector with dry circuit(20mV Max., 100mA Max.). 4-wire measurement is required. Resistance of termination wires shall be deducted from the reading. (FiG.4)
3.5.3	Insulation Resistance	Initial, 1000MΩ Min. After test, 100MΩ Min.	Apply 500VDC with un-mating condition between adjacent contacts for 1 minute. [IEC 60512-3-1]
3.5.4	Dielectric withstanding Voltage	No voltage breakdown.	Apply 500VAC between all adjacent contacts in un-mating condition and 700VAC between V-bus pin & reinforcement(GND) in mating condition for 1 minute. [IEC 60512-4-1]
3.5.5	Temperature Rise	After test, 30°C Max.	Contact series, Mate connector and measure the temperature rise at the rated current after 2hours. [EIA-364-70A]
		Mechanical Requirements	
3.5.6	Mating force	2~25N	Measure force to mate at a rate of 12.5mm per minute maximum.
3.5.7	Un-mating force	8~20N .	Measure force to un-mate at a rate of 12.5mm per minute maximum.
3.5.8	Durability	No physical damage and shall meet requirements of subsequent tests.	10,000 cycles. - Mechanically Operated : 500 cycle/hour with lubricant at the lock lever mating area - Manually Operated : 200 cycle/hour
3.5.9	Vibration	No physical damage. No change to performance. No discontinuity greater than 1.0 microsecond.	Apply for 2 hours in each 3 mutually perpendicular axes(total 6 hours). Frequency=10-55-10Hz (Sweep time :1 minute max.) Amplitude=1.5mm, Current=100mA [EIA-364-28F Condition Ⅰ]
3.5.10	Random Vibration	No physical damage. No change to performance. No discontinuity greater than 1.0 microsecond.	Apply for 15 minutes in each 3 mutually perpendicular axes(total 45 minutes). Frequency=50-2,000Hz Power spectral density=0.02g2/Hz Current=100mA [EIA-364-28F Condition V Test Letter A]

Para.	Test Items	Requirements	Procedures
3.5.11	Shock	No physical damage. No change to performance. No discontinuity greater than 1.0 microsecond.	Apply 3 successive shocks in each direction along the 3 mutually perpendicular axes(total 18 shocks) Pulse shape=half sine Peak acceleration=490m/s2(50G) Duration of pulse=11ms [EIA-364-27B Condition Ⅰ]
3.5.12	Reverse Mating Strength	50N Min.	Apply a force to the connector in reverse mating condition at a rate of 12.5mm per minute maximum until the breakdown occurs or connector is inserted.
3.5.13	Soldering Strength	80N Min.	Apply a force to the connector in each parallel direction(X & Y) with PCB at a rate of 12.5mm per minute maximum until the breakdown of connector or soldering parts occurs. (Fig.5)
3.5.14	Compulsory Insertion Strength	250N Min.	Apply a force to the mated connector at a rate of 12.5mm per minute maximum until the breakdown occurs.
3.5.15	Swing wrenching durability with 1kgf (Set condition test)	No physical damage and shall meet requirements of subsequent tests.	Apply 1kgf, 10,000 cycles of swing wrenching force in each direction (horizontal & vertical) at a rate of 100mm per minute maximum. (Fig.6)
3.5.16	Swing wrenching durability with 10kgf (Set condition test)	No physical damage and shall meet requirements of subsequent tests.	Apply 10kgf, 10 cycles of swing wrenching force in each direction (horizontal & vertical) at a rate of 100mm per minute maximum. (Fig.7)
Environmental Requirements			
3.5.17	Dry cold (steady state)	No physical damage and shall meet requirement of subsequent test.	-40°C±3°C for 96 hours Recovery period 2 hours at ambient atmosphere. [MIL-STD-202 Method 108]
3.5.18	Dry heat (steady state)	No physical damage and shall meet requirement of subsequent test.	+85°C±2°C for 96 hours Recovery period 2 hours at ambient atmosphere. [MIL-STD-202 Method 108]
Para.	Test Items	Requirements	Procedures
3.5.19	Thermal Shock (change of temperature)	No physical damage and shall meet requirement of subsequent test.	Ta=-40°C for 2 hours; then change of temp.=25°C , 5minute max.; then Tb=+85°C for 2 hours. After 20cycles, cool to ambient for 2 hours.
3.5.20	Damp heat (steady state)	No physical damage and shall meet requirement of subsequent test.	120 hours at Temp. 85°C±2°C, R/H 85±5%; After test, cool to ambient temp. for 2 hours.

3.5.21	Salt spray	No physical damage and shall meet requirement of subsequent test.	48 hours spray, At temp. 35±2 °C R/H 90~95%, Salt Na-Cl mist 5% After test wash parts and return to room ambient for 2 hours. [EIA-364-26B]
3.5.22	Solder-ability	Solderable area shall have a minimum of 95% solder coverage.	255°C±5°C of lead free soler pot temperature, for 5+0/-0.5 seconds.
3.5.23	Resistance to Reflow Heat	No mechanical damage allowed.	Temperature profile ; as shown in Fig.3 24hours at temp. 85±2 °C, R/H 85±5%. Recovery : 0.5 hours at ambient atmosphere; then apply Reflow 3 times. (Fig.3)
3.5.24	Waterproof IPX-5	Protected against water jets	Water projected at all angles through a 6.3mm nozzle at a flow rate of 12.5 liters/min at a pressure of 30kN/m2 for 3 minutes from a distance of 3 meters.(Fig.8)
3.5.25	Waterproof IPX-8	Protected against water submersion	Submersion for 30 minutes at a depth of 1.5 meters. (Fig.8)

Fig. 2 (End)

3. Product Qualification Test Sequence

Para.	Test Examination	Test Group														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Test Sequence (a)														
3.5.1	Examination of Product	1,11	1	1	1	1,9	1,5	1,3	1,5	1,5	1,9	1,7	1,5	1,7	1,6	1,6
3.5.2	Contactresistance (Low Level)	2,8				2,6	2,4		2,4	2,4			2,4	2,4	3	3
3.5.3	Insulation resistance										2,5	2,5				
3.5.4	Dielectric withstanding Voltage										3,6	3,6				
3.5.5	Temperature Rise												3			
3.5.6	Mating force	3,7														
3.5.7	Un-mating force	4,6														
3.5.8	Durability	5														
3.5.9	Vibration					3										
3.5.10	Random Vibration					4										
3.5.11	Shock					5										
3.5.12	Reverse Mating Strength		2													
3.5.13	Soldering Strength			2												
3.5.14	Compulsory Insertion Strength				2											
3.5.15	Swing wrenching durability with 1kgf														2	
3.5.16	Swing wrenching durability with 10kgf															2
3.5.17	Dry cold (steady state)								3							
3.5.18	Dry heat (steady state)									3						
3.5.19	Thermal Shock										4					
3.5.20	Damp heat(steady state)											4				
3.5.21	Salt spray						3									
3.5.22	Solder-ability							2								
3.5.23	Resistance to Reflow Heat													3		
3.5.24	Waterproof IPX-5	9				7					7			5	4	4
3.5.25	Waterproof IPX-8	10				8					8			6	5	5

(a) Numbers indicate sequence in which the tests are performed.

Fig. 3 (End)

4. Test Results

Group	Test Item	N	Condition	Test Result				Requirement	Conclusion
				Max	Min	Ave	Unit		
1	Examination of Product	3	initial	No physical damage			N/A	No abnormalities	Meet spec
	Contact resistance (Low Level)	3	initial	29.00	23.80	26.55	mΩ	50mΩ Max.	Meet spec
	Mating force	3	initial	11.50	10.80	11.07	N	2-25N	Meet spec
	Un-mating force	3	initial	13.20	11.20	12.07	N	8-20N	Meet spec
	Durability	3	final	No physical damage			N/A	No abnormalities	Meet spec
	Un-mating force	3	final	14.60	13.20	13.83	N	2-25N	Meet spec
	Mating force	3	final	17.70	12.80	16.00	N	8-20N	Meet spec
	Contact resistance (Low Level), ΔR	3	final	2.30	-2.90	-0.02	mΩ	ΔR: +/-10mΩ Max.	Meet spec
	Waterproof IPX-5	3	final	No Leakage			/	No abnormalities	Meet spec
	Waterproof IPX-8	3	final	No Leakage			/	No abnormalities	Meet spec
	Examination of Product	3	final	No physical damage			N/A	No abnormalities	Meet spec
2	Examination of Product	3	initial	No physical damage			N/A	No abnormalities	Meet spec
	Reverse Mating Strength	3	final	225.5	177.6	207.7	N	50N Min.	Meet spec
3	Examination of Product	3	initial	No physical damage			N/A	No abnormalities	Meet spec
	Soldering Strength	3	final	-X	>450N still no peeling off		N	80N Min.	Meet spec
		3	final	-Y	300.7	279.1	287.5		
4	Examination of Product	3	initial	No physical damage			N/A	No abnormalities	Meet spec
	Compulsory Insertion Strength	3	final	>415.5	>449.0	>438.4	N	250N Min.	Meet spec
5	Examination of Product	3	initial	No physical damage			N/A	No abnormalities	Meet spec
	Contact resistance (Low Level)	3	initial	30.77	23.22	26.11	mΩ	50mΩ Max.	Meet spec
	Vibration	3	final	No discontinuity greater than 1.0 microsecond occurred			N/A	No abnormalities	Meet spec
	Random Vibration	3	final	No discontinuity greater than 1.0 microsecond occurred			N/A	No abnormalities	Meet spec
	Shock	3	final	No discontinuity greater than 1.0 microsecond occurred			N/A	No abnormalities	Meet spec
	Contact resistance (Low Level), ΔR	3	final	3.45	-5.04	-0.25	mΩ	ΔR: +/-10mΩ Max.	Meet spec

Fig. 4 (to be continued)

Group	Test Item	N	Condition	Test Result				Requirement	Conclusion
				Max	Min	Ave	Unit		
5	Waterproof IPX-5	3	final	No Leakage			/	No abnormalities	Meet spec
	Waterproof IPX-8	3	final	No Leakage			/	No abnormalities	Meet spec
	Examination of Product	3	final	No physical damage			N/A	No abnormalities	Meet spec
6	Examination of Product	3	initial	No physical damage			N/A	No abnormalities	Meet spec
	Contact resistance (Low Level)	3	initial	27.24	21.98	24.97	mΩ	50mΩ Max.	Meet spec
	Salt spray	3	final	No physical damage			N/A	No abnormalities	Meet spec
	Contact resistance (Low Level), ΔR	3	final	3.67	-3.57	0.23	mΩ	ΔR: +/-10mΩ Max.	Meet spec
	Examination of Product	3	final	No physical damage			N/A	No abnormalities	Meet spec
7	Examination of Product	3	initial	No physical damage			N/A	No abnormalities	Meet spec
	Solder-ability	3	final	>95% Soldering Coverage			N/A	No abnormalities	Meet spec
	Examination of Product	3	final	No physical damage			N/A	No abnormalities	Meet Spec
8	Examination of Product	3	initial	No physical damage			N/A	No abnormalities	Meet Spec
	Contact resistance (Low Level)	3	initial	26.77	23.51	25.21	mΩ	50mΩ Max.	Meet Spec
	Dry cold (steady state)	3	final	No physical damage				No abnormalities	Meet Spec
	Contact resistance (Low Level), ΔR	3	final	5.41	-1.83	2.05	mΩ	ΔR: +/-10mΩ Max.	Meet Spec
	Examination of Product	3	final	No physical damage			N/A	No abnormalities	Meet spec
9	Examination of Product	3	initial	No physical damage			N/A	No abnormalities	Meet Spec
	Contact resistance (Low Level)	3	initial	26.88	23.56	25.34	mΩ	50mΩ Max.	Meet Spec
	Dry heat (steady state)	3	final	No physical damage			N/A	No abnormalities	Meet Spec
	Contact resistance (Low Level), ΔR	3	final	6.35	-2.81	0.61	mΩ	ΔR: +/-10mΩ Max.	Meet Spec
	Examination of Product	3	final	No physical damage			N/A	No abnormalities	Meet spec
10	Examination of Product	3	initial	No physical damage			N/A	No abnormalities	Meet spec
	Insulation resistance	3	initial	6.9	1.98	3.81	10^{10}Ω	1000MΩ Min.	Meet spec
	Dielectric withstanding Voltage	3	initial	500VAC Un-mating	No flashover, No breakdown		N/A	No abnormalities	Meet Spec
				700VAC Mating	No flashover, No breakdown		N/A	No abnormalities	Meet Spec

Fig. 4 (to be continued)

Group	Test Item	N	Condition	Test Result				Requirement	Conclusion
				Max	Min	Ave	Unit		
10	Thermal Shock	3	final	No physical damage			N/A	No abnormalities	Meet Spec
	Insulation resistance	3	final	5.61	1.02	2.77	$10^{10}\Omega$	100MΩ Min.	Meet Spec
	Dielectric withstanding Voltage	3	initial	500VAC Un-mating	No flashover , No breakdown		N/A	No abnormalities	Meet Spec
				700VAC Mating	No flashover , No breakdown		N/A	No abnormalities	Meet Spec
	Waterproof IPX-5	3	final	No Leakage			/	No abnormalities	Meet spec
	Waterproof IPX-8	3	final	No Leakage			/	No abnormalities	Meet spec
	Examination of Product	3	final	No physical damage			N/A	No abnormalities	Meet spec
11	Examination of Product	3	initial	No physical damage			N/A	No abnormalities	Meet spec
	Insulation resistance	3	initial	5.97	2.98	4.77	$10^{10}\Omega$	1000MΩ Min.	Meet spec
	Dielectric withstanding Voltage	3	initial	500VAC Un-mating	No flashover , No breakdown		N/A	No abnormalities	Meet Spec
				700VAC Mating	No flashover , No breakdown		N/A	No abnormalities	Meet Spec
	Damp heat(steady state)	3	final	No physical damage			N/A	No abnormalities	Meet spec
	Insulation resistance	3	final	4.21	1.04	1.99	$10^{10}\Omega$	100MΩ Min.	Meet spec
	Dielectric withstanding Voltage	3	initial	500VAC Un-mating	No flashover , No breakdown		N/A	No abnormalities	Meet Spec
				700VAC Mating	No flashover , No breakdown		N/A	No abnormalities	Meet Spec
	Examination of Product	3	final	No physical damage			N/A	No abnormalities	Meet spec
12	Examination of Product	3	initial	No physical damage			N/A	No abnormalities	Meet spec
	Contact resistance (Low Level)	3	initial	30.50	23.59	25.22	mΩ	50mΩ Max.	Meet spec
	Temperature Rise	3	final	9.9	6.78	7.95	°C	30°C Max.	Meet spec
	Contact resistance (Low Level), ΔR	3	final	4.44	-4.72	1.20	mΩ	ΔR: +/-10mΩ Max.	Meet spec
	Examination of Product	3	final	No physical damage			N/A	No abnormalities	Meet spec

Fig. 4 (to be continued)

Group	Test Item	N	Condition	Test Result				Requirement	Conclusion
				Max	Min	Ave	Unit		
13	Examination of Product	3	initial	No physical damage			N/A	No abnormalities	Meet spec
	Contact resistance (Low Level)	3	initial	27.63	22.34	26.08	mΩ	50mΩ Max.	Meet spec
	Resistance to Reflow Heat	3	final	No physical damage			N/A	No abnormalities	Meet spec
	Contact resistance (Low Level), ΔR	3	initial	2.84	-3.27	-1.27	mΩ	50mΩ Max.	Meet spec
	Waterproof IPX-5	3	final	No Leakage			/	No abnormalities	Meet spec
	Waterproof IPX-8	3	final	No Leakage			/	No abnormalities	Meet spec
	Examination of Product	3	final	No physical damage			N/A	No abnormalities	Meet Spec
14	Examination of Product	3	initial	No physical damage			N/A	No abnormalities	Meet spec
	Swing wrenching durability with 1kgf	3	final	-H -V	Rec. No damage on Both horizontal and Vertical axes		N/A	No abnormalities	Meet Spec
	Contact resistance (Low Level)	3	final	27.8	20.6	25.79	mΩ	50mΩ Max.	Meet Spec
	Waterproof IPX-5	3	final	No Leakage			/	No abnormalities	Meet spec
	Waterproof IPX-8	3	final	No Leakage			/	No abnormalities	Meet spec
	Examination of Product	3	final	No physical damage			N/A	No abnormalities	Meet Spec
15	Examination of Product	3	final	No physical damage			N/A	No abnormalities	Meet spec
	Swing wrenching durability with 10kgf	3	final	-H -V	Rec. No damage on Both horizontal and Vertical axes		N/A	No abnormalities	Meet Spec
	Contact resistance (Low Level)	3	final	24.4	20.4	23.13	mΩ	50mΩ Max.	Meet Spec
	Waterproof IPX-5	3	final	No Leakage			/	No abnormalities	Meet spec
	Waterproof IPX-8	3	final	No Leakage			/	No abnormalities	Meet spec
	Examination of Product	3	final	No physical damage			N/A	No abnormalities	Meet Spec

Fig. 4 (End)