

1.Introduction

1.1 Objective

Testing was performed on the MICRO-SD SOCKET to determine if it meets the requirement of product specification, 108-78951

1.2 Scope

This report covers the electrical, mechanical and environment performance requirements of the MICRO-SD SOCKET.

The qualification testing was performed between 10MAY2012 and 01JUN2012.

The following documents form a part of this specification to the extent specified herein. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

1.3 Conclusion

The MICRO-SD SOCKET meets the electorical, mechanical and enviromental performance requirements of design objective, 108-78951

1.4 Test samples

Samples were taken randomly from prototype samples. The follwing samples were used.

Product Part No.	Description
2201778-1	MICRO-SD SOCKET

Appendix 1

Para.	Test Items	Requirements	Procedures
2.1	Examination of Product	No physical damage	Visual inspection No physical damage
Electrical Requirements			
2.2	Contact Resistance (Low Level)	Initial Contact Resistance 40 mΩ Max. Max Contact Resistance after group testing 80 mΩ Max. Initial and final SW Contact Resistance 400 mΩ Max. Contact resistance includes also the bulk resistance due to terminal. After any environmental test for every contact	Mate Connector with Dry circuit (20mV, 100mA Max.) at min. deflection position. (IEC 60512-2-1)
2.3	Dielectric withstanding Voltage	No voltage breakdown. Current leakage : 1mA Max.	Unmated Connector with 500 VAC between adjacent contact for 1 minute (IEC 60512-3-1)
2.4	Insulation Resistance	1000MΩ Min. (Initial) 100 MΩ Min. (Final)	Unmated Connector with 500 VDC between adjacent contact for 1 minute (IEC 60512-3-1)
2.5	Temperature Rise	30°C Max under loaded rating Current.(0.5A)	Contacts series-,apply test current of loaded rating current of the circuit ,and measure the temperature rising by probing on soldered areas of contacts, after the temperature becomes stabilized Deduct ambient temperature from the measured value.

Fig. 1 (CONT.)

Para.	Test Items	Requirements	Procedures
Mechanical Requirements			
2.6	Durability	Contact resistance: 80 mΩ Max.	Mating contacts at 4-10 cycles/minute, including pause between mate/unmate to 10000 cycles. After every 10 (Max.) cycles blow with dry air.
2.7	Wrongly insertion test Card upside down (signal pads pointing away from PWB)	20 N Min.	Card is guide so that the slider mechanism is pushed inwards and the wrong card insertion prevent feature is by passed.
Environmental Requirements			
2.8	Dry cold (steady state)	Contact resistance: 80 mΩ Max.	- 40°C for 96hours; recovery period 1-2hours under ambient atmospheric conditions. (IEC60068-2-1Ab)
2.9	Dry heat (steady state)	Contact resistance: 80 mΩ Max.	+85°C for 96 hours; recovery period 1-2hours under ambient atmospheric conditions (IEC60068-2-2Bb)
2.10	Thermal Shock (Change of temperature)	Contact resistance: 80 mΩ Max.	25 cycle at $T_a = - 55\text{ }^{\circ}\text{C}$ for 0.5 hours; then change of temp= $25\text{ }^{\circ}\text{C}$ Maximum 5 min; then $T_b=+85\text{ }^{\circ}\text{C}$ for 0.5 hours; then cool to ambient. Recovery: 2 hours at ambient atmosphere.
2.11	Dump heat (cyclic)	Contact resistance: 80 mΩ Max.	Mated Dummy card(PCB), $-10\sim 65\text{ }^{\circ}\text{C}$, $80\sim 98\text{ }^{\circ}\text{R.H.}$ 10 cycles MIL-STD-202 Method 106

Fig. 1 (CONT.)

Para.	Test Items	Requirements	Procedures
2.12	Salt spray	Contact resistance: 80 mΩ Max.	48 hour spray, at temp.35°±2°C R/H 90-95% Salt NaCl mist 5% After test wash parts and return to room ambient for 1-2 hours (IEC 60068-2-11 Test)
2.13	Mixed Gas	Contact resistance: 80 mΩ Max.	96 hours H ₂ S 0.1 ppm+SO ₂ 0.5 ppm At temp. 25°±1°C R/H 75 ±3 % After test return to ambient temp for 1-2hours. (IEC 60068-2-60 Test IEC60512-11-7)
2.14	Vibration (random)	Discontinuity during testing < 1 μs with all contacts in series No mechanical damage No change to performance Contact resistance: 80 mΩ Max.	Frequency:10 - 100 Hz; 3 m ² /s ³ (0.0132 g ² /Hz) ; 100 - 500 Hz; -3dB/Oct. for: 3 x 60 min (X- Y- and Z-axis)
2.15	Shock (specified pulse)	Discontinuity during testing < 1 μs with all contacts in series No mechanical damage No change to performance Contact resistance: 80 mΩ Max.	Pulse shape=half sine Peak acceleration =50G Duration of pulse=11ms Apply 3 shocks in each direction along the 3 mutually perpendicular axes (18 shocks) (IEC60068-2-27Ea)
2.16	Solderability	Wet Solder Coverage : 90% Min.	Solder Temperature : 245±3 °C Immersion Duration : 3±0.5 seconds Solder : Su-3Ag-0.5Cu Flux : RMA25%
2.17	Resistance to Reflow Soldering Heat	Tested housing shall show no evidence of deformation or fusion of housing and no physical damage.	Test connector on PCB. Pre-Heat 150~180°C : 90±30sec. Heat 230°C : 30±10sec. Heat Peak 255°C

Fig. 1 (End)

3. Product Qualification Test Sequence

Test Examination	Test Group									
	1	2	3	4	(b)5	6	7	8	9	10
	Test Sequence (a)									
Examination of Product	1	1	1	1	1	1	1	1	1	1
Contact Resistance (Low Level)	2,8	2,5	2,4	2,4	2,6	2,4				
Dielectric withstanding Voltage	4,7									
Insulation Resistance	3,6									
Temperature Rise							2			
Durability						3				
Wrongly insertion force								2		
Dry cold (steady state)		3								
Dry heat (steady state)		4								
Thermal Shock(Change of temperature)					3					
Damp heat (cyclic)	5									
Salt spray			3							
Mixed Gas				3						
Vibration (random)					4					
Shock (specified pulse)					5					
Solderability									2	
Resistance to Reflow Soldering Heat										2

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

(b) Discontinuities shall nit take place in this test group, during tests.

Fig.2

4. Test Results

Conditions	Measure Item	n	Unit	Results				Requirement	Judgment
				Ave.	Max.	Min.	Sig.		
Test group 1									
Signal Contact									
Initial	Examination of Product	10	-	No abnormalities				No abnormalities	Acceptable
	Contact Resistance (Low Level)	80	mΩ	15.40	20.40	12.35	1.78	40mΩ Max.	Acceptable
	Insulation Resistance	10	Ω	9.56x10 ⁹ Min.				1000MΩ Min.	Acceptable
	Dielectric withstanding Voltage	10	-	No abnormalities				No abnormalities	Acceptable
After Damp heat (cyclic)	Insulation Resistance	10	Ω	1.45x10 ⁹ Min.				1000MΩ Min.	Acceptable
	Dielectric withstanding Voltage	10	-	No abnormalities				No abnormalities	Acceptable
	Contact Resistance (Low Level)	80	mΩ	18.11	29.60	13.85	4.05	80mΩ Max.	Acceptable
Switch (SW1 – Vss)									
Initial	Examination of Product	10	-	No abnormalities				No abnormalities	Acceptable
	Contact Resistance (Low Level)	10	mΩ	28.30	30.90	26.50	1.74	400mΩ Max.	Acceptable
	Insulation Resistance	10	Ω	4.24x10 ¹⁰ Min.				1000MΩ Min.	Acceptable
	Dielectric withstanding Voltage	10	-	No abnormalities				No abnormalities	Acceptable
After Damp heat (cyclic)	Insulation Resistance	10	Ω	1.53x10 ⁹ Min.				1000MΩ Min.	Acceptable
	Dielectric withstanding Voltage	10	-	No abnormalities				No abnormalities	Acceptable
	Contact Resistance (Low Level)	10	mΩ	29.73	31.80	27.70	1.32	400mΩ Max.	Acceptable

Fig. 3 (CONT.)

Conditions	Measure Item	n	Unit	Results				Requirement	Judgment
				Ave.	Max.	Min.	Sig.		
Test group 2									
Signal Contact									
Initial	Examination of Product	10	-	No abnormalities				No abnormalities	Acceptable
	Contact Resistance (Low Level)	80	mΩ	15.35	19.59	11.97	1.64	40mΩ Max.	Acceptable
Final	Contact Resistance (Low Level)	80	mΩ	19.58	26.02	13.98	2.90	80mΩ Max.	Acceptable
Switch (SW1 – Vss)									
Initial	Examination of Product	10	-	No abnormalities				No abnormalities	Acceptable
	Contact Resistance (Low Level)	10	mΩ	27.51	30.50	26.16	1.55	400mΩ Max.	Acceptable
Final	Contact Resistance (Low Level)	10	mΩ	40.46	48.00	35.45	3.82	400mΩ Max.	Acceptable

Conditions	Measure Item	n	Unit	Results				Requirement	Judgment
				Ave.	Max.	Min.	Sig.		
Test group 3									
Signal Contact									
Initial	Examination of Product	10	-	No abnormalities				No abnormalities	Acceptable
	Contact Resistance (Low Level)	80	mΩ	15.74	20.41	12.35	1.90	40mΩ Max.	Acceptable
After Salt spray	Contact Resistance (Low Level)	80	mΩ	14.65	19.82	12.26	1.73	80mΩ Max.	Acceptable
Switch (SW1 – Vss)									
Initial	Examination of Product	10	-	No abnormalities				No abnormalities	Acceptable
	Contact Resistance (Low Level)	10	mΩ	44.03	58.73	32.63	7.36	400mΩ Max.	Acceptable
After Salt spray	Contact Resistance (Low Level)	10	mΩ	56.52	140.38	35.12	37.03	400mΩ Max.	Acceptable

Fig. 3 (CONT.)

Conditions	Measure Item	n	Unit	Results				Requirement	Judgment
				Ave.	Max.	Min.	Sig.		
Test group 4									
Signal Contact									
Initial	Examination of Product	10	-	No abnormalities				No abnormalities	Acceptable
	Contact Resistance (Low Level)	80	mΩ	15.02	18.61	12.76	1.60	40mΩ Max.	Acceptable
Final	Contact Resistance (Low Level)	80	mΩ	15.02	20.76	11.59	2.01	80mΩ Max.	Acceptable
Switch (SW1 – Vss)									
Initial	Examination of Product	10	-	No abnormalities				No abnormalities	Acceptable
	Contact Resistance (Low Level)	10	mΩ	39.05	47.93	31.41	5.59	40mΩ Max.	Acceptable
Final	Contact Resistance (Low Level)	10	mΩ	46.34	63.83	32.00	10.75	80mΩ Max.	Acceptable

Conditions	Measure Item	n	Unit	Results				Requirement	Judgment
				Ave.	Max.	Min.	Sig.		
Test group 5									
Signal Contact									
Initial	Examination of Product	10	-	No abnormalities				No abnormalities	Acceptable
	Contact Resistance (Low Level)	80	mΩ	15.34	19.60	12.23	1.72	40mΩ Max.	Acceptable
After Thermal Shock	Thermal Shock	80	mΩ	16.16	24.78	11.45	2.99	80mΩ Max.	Acceptable
During vibration, shock	Circuit Continuity	80	-	No Discontinuity				Discontinuity < 1 μs with all contacts	Acceptable
Final	Contact Resistance (Low Level)	80	mΩ	16.61	23.95	11.40	3.70	80mΩ Max.	Acceptable
Switch (SW1 – Vss)									
Initial	Examination of Product	10	-	No abnormalities				No abnormalities	Acceptable
	Contact Resistance (Low Level)	10	mΩ	39.39	49.98	26.47	7.46	400mΩ Max.	Acceptable
After Thermal Shock	Contact Resistance (Low Level)	10	mΩ	62.48	94.13	39.29	14.56	400mΩ Max.	Acceptable
Final	Contact Resistance (Low Level)	10	mΩ	59.38	95.72	33.23	18.66	400mΩ Max.	Acceptable

Fig. 3 (CONT.)

Conditions	Measure Item	n	Unit	Results				Requirement	Judgment
				Ave.	Max.	Min.	Sig.		
Test group 6									
Signal Contact									
Initial	Examination of Product	10	-	No abnormalities				No abnormalities	Acceptable
	Contact Resistance (Low Level)	80	mΩ	15.20	18.14	12.11	1.30	40mΩ Max.	Acceptable
After Durability	Contact Resistance (Low Level)	80	mΩ	20.31	25.81	10.81	3.58	80mΩ Max.	Acceptable
Switch (SW1 – Vss)									
Initial	Examination of Product	10	-	No abnormalities				No abnormalities	Acceptable
	Contact Resistance (Low Level)	10	mΩ	26.82	31.11	23.41	2.56	400mΩ Max.	Acceptable
After Durability	Contact Resistance (Low Level)	10	mΩ	40.20	48.68	35.17	4.17	400mΩ Max.	Acceptable

Conditions	Measure Item	n	Unit	Results				Requirement	Judgment
				Ave.	Max.	Min.	Sig.		
Test group 7									
Initial	Examination of Product	10	-	No abnormalities				No abnormalities	Acceptable
Final	Temperature Rise	10	°C	1.32	1.45	1.15	0.10	30°C Max.	Acceptable

Conditions	Measure Item	n	Unit	Results				Requirement	Judgment
				Ave.	Max.	Min.	Sig.		
Test group 8									
Initial	Examination of Product	10	-	No abnormalities				No abnormalities	Acceptable
Final	Wrongly insertion force	10	N	45.5	48.8	40.3	2.6	20N Min.	Acceptable

Conditions	Measure Item	n	Unit	Results	Requirement	Judgment
Initial	Appearance	5	-	Wet solder coverage : 90% Min.	Wet solder coverage:90% Min.	Acceptable
Final	Examination of Product	5	-	No abnormalities	No abnormalities	Acceptable

Conditions	Measure Item	n	Unit	Results	Requirement	Judgment
Final	Examination of Product	24	-	No abnormalities	No abnormalities	Acceptable

Fig. 3 (END)