

DUAL 4FF MICRO SD 3IN2 CONNECTOR

1. Introduction

1.1 Objective

Testing was performed on the DUAL 4FF MICRO SD 3IN2 CONNECTOR to determine if it meets the requirement of design objective, 108-140083

1.2 Scope

This report covers the electrical, mechanical and environment performance requirements of the DUAL 4FF MICRO SD 3IN2 CONNECTOR.

The qualification testing was performed between 11AUG2015 and 31AUG2015.

The following documents form a part of this specification to the extent specified herein. In the event of conflict between the requirements of the 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 DUAL 4FF MICRO SD 3IN2 CONNECTOR meets the electorical, mechanical and enviromental performance requirements of design objective, 108-140083

1.4 Product description

The DUAL 4FF MICRO SD 3IN2 CONNECTOR is designed to make a connection between a 4FF SIM, micro SD and printed circuit board or dual 4FF SIM and printed circuit board.

1.5 Test samples

Samples were taken randomly from mass production samples. The follwing samples were used.

Part number	Description
2290741-1	DUAL 4FF MICRO SD 3IN2 CONNECTOR
TB-1736	Test card (4FF SIM)
TB-1942	Test card (micro SD)

Fig.1

2. Test contents

Para.	Test items	Requirements	Judgment
2.1	Examination of product	<ul style="list-style-type: none"> <li>• Visual inspection</li> <li>• No physical damage</li> </ul>	Acceptable
Electrical requirements			
2.2	Contact resistance (low level)	<ul style="list-style-type: none"> <li>• Initial contact resistance: 50mΩ Max.</li> <li>• Contact resistance after group testing: 100mΩ Max.</li> <li>• Contact resistance includes also the bulk resistance due to terminal</li> <li>• After any environmental test for every contact</li> <li>• Initial detect switch resistance: 100mΩ Max.</li> <li>• Detect switch resistance after group testing: 200mΩ Max.</li> <li>• Mate connector with dry circuit (20mV, 100mA Max.) at min. deflection position</li> <li>• 4-wire measurement required</li> </ul> <p>(IEC 60512-2-1)</p>	Acceptable
2.3	Insulation resistance	<ul style="list-style-type: none"> <li>• 1000MΩ Min.</li> <li>• Unmated connector with 100 VDC between adjacent contact for 1 minute</li> </ul> <p>(IEC 60512-3-1)</p>	Acceptable
2.4	Dielectric strength	<ul style="list-style-type: none"> <li>• No voltage breakdown</li> <li>• Unmated connector with 500 VAC between adjacent contact for 1 minute</li> </ul> <p>(IEC 60512-3-1)</p>	Acceptable
2.5	Temperature rise	<ul style="list-style-type: none"> <li>• 30°C Max. under loaded rating current (0.3A)</li> <li>• Contacts series-, apply test current of loaded rating current of the circuit</li> <li>• Measure the temperature rising by probing on soldered areas of contacts</li> <li>• After the temperature becomes stabilized deduct ambient temperature from the measured</li> </ul>	Acceptable

Fig. 2 (Cont.)

Para.	Test items	Requirements	Judgment
Mechanical requirements			
2.6	Tray mating force	<ul style="list-style-type: none"> <li>• 10N Max.</li> <li>Tray inserts connector without card</li> <li>• No mechanical damage for connector</li> <li>• Operation speed 10 mm/min.</li> <li>• Measure the force to insert the tray in the connector</li> </ul>	Acceptable
2.7	Tray unmating force	<ul style="list-style-type: none"> <li>• Initial : 5~10N</li> <li>After test : 3N Min.</li> <li>Pull out of the tray from connector without card</li> <li>• No mechanical damage for connector</li> <li>• Operation speed 10 mm/min.</li> <li>• Measure the pull out force from connector</li> </ul>	Acceptable
2.8	Tray push out force	<ul style="list-style-type: none"> <li>• 14N MAX.</li> <li>• No mechanical damage for connector</li> <li>• Operation speed 10 mm/min.</li> <li>• Measure the maximum force during tray ejection operation without card</li> </ul>	Acceptable
2.9	Durability	<ul style="list-style-type: none"> <li>• Contact resistance: 100mΩ Max.</li> <li>• Detect switch resistance: 200mΩ Max.</li> <li>• No mechanical damage for connector</li> <li>• Mating contacts at 500 cycles/hour, including pause between mate/unmate to 2000 cycles</li> <li>• After every 100 (Max.) cycles blow with dry air</li> </ul>	Acceptable
2.10	Vibration	<ul style="list-style-type: none"> <li>• Discontinuity during testing &lt;1μs with all contacts in series</li> <li>• No mechanical damage</li> <li>• No change to performance</li> <li>• Contact resistance: 100mΩ Max.</li> <li>• Detect switch resistance: 200mΩ Max.</li> <li>• Frequency: 10 - 55 - 10 Hz</li> <li>• Traversed in 1 minute</li> <li>• amplitude 2 hours each of 6 mutually perpendicular</li> </ul>	Acceptable
2.11	Shock	<ul style="list-style-type: none"> <li>• Discontinuity during testing &lt;1μs with all contacts in series</li> <li>• No mechanical damage</li> <li>• No change to performance</li> <li>• Contact resistance: 100mΩ Max.</li> <li>• Detect switch resistance: 200mΩ Max.</li> <li>• Pulse shape=half sine</li> <li>• Peak acceleration =50G</li> <li>• Duration of pulse=11ms</li> <li>• Apply 3 shocks in each direction along the 3 mutually perpendicular axes (18 shocks)</li> </ul> <p>(IEC60068-2-27Ea)</p>	Acceptable

Fig. 2 (Cont.)

Para.	Test items	Requirements	Judgment
Environmental requirements			
2.12	Temperature life	<ul style="list-style-type: none"> <li>•No mechanical damage</li> <li>•No change to performance</li> <li>•Contact resistance: 100mΩ Max.</li> <li>•Detect switch resistance: 200mΩ Max.</li> <li>•+85±2°C for 96 hours; recovery period 1-2hours under ambient atmospheric conditions</li> </ul> <p>(IEC60068-2-2Bb)</p>	Acceptable
2.13	Thermal shock	<ul style="list-style-type: none"> <li>•No mechanical damage</li> <li>•No change to performance</li> <li>•Contact resistance: 100mΩ Max.</li> <li>•Detect switch resistance: 200mΩ Max.</li> <li>•26 cycle at T<sub>a</sub> = -40 °C for 0.5 hours; then change of temp=25°C Max. 5 minute; then T<sub>b</sub>=+85°C for 0.5 hours; then cool to ambient</li> <li>•Recovery: 2 hours at ambient atmosphere</li> </ul>	Acceptable
2.14	Humidity - temperature cycling	<ul style="list-style-type: none"> <li>•No change to performance</li> <li>•Contact resistance: 100mΩ Max.</li> <li>•Detect switch resistance: 200mΩ Max.</li> <li>•Insulation resistance should be measured</li> <li>•Measure the resistance without opening the mating after test</li> <li>•Temp 25-65°C,</li> <li>•RH 90-95% for 10 cycles</li> <li>•Cold shock -10°C performed</li> </ul> <p>(EIA-364-31)</p>	Acceptable
2.15	Salt spray	<ul style="list-style-type: none"> <li>•No mechanical damage</li> <li>•No change to performance</li> <li>•Contact resistance: 100mΩ Max.</li> <li>•Detect switch resistance: 200mΩ Max.</li> <li>•Temp: 35±2°C</li> <li>•RH 90 - 95%</li> <li>•Concentration: 5±1% (PH 6.5 - 7.2)</li> <li>•Operating time: 48 hours</li> </ul>	Acceptable
2.16	Solderability	<ul style="list-style-type: none"> <li>•No mechanical damage</li> <li>•No change to performance</li> <li>•Solderable area shall have a minimum 95% solder</li> <li>•Peak temperature 240°C</li> <li>•Reflow time(230°C MIN): 25~50 seconds</li> </ul>	Acceptable

Fig. 2 (Cont.)

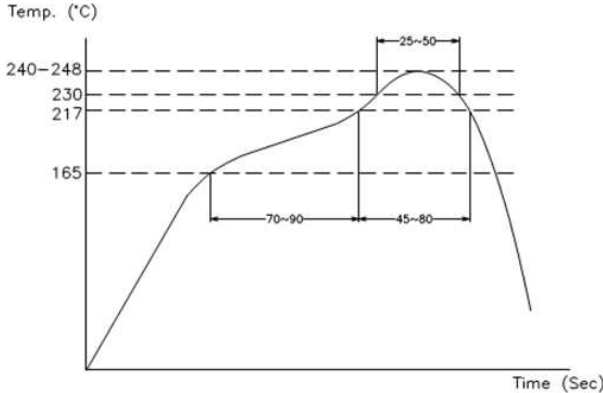
Para.	Test items	Requirements	Judgment
Environmental requirements			
2.17	Resistance to reflow heat	<ul style="list-style-type: none"> <li>•No mechanical damage</li> <li>•No change to performance</li> </ul> 	Acceptable
2.18	Resistance to loading force on slider	<ul style="list-style-type: none"> <li>•No mechanical damage</li> <li>•No change to performance</li> <li>•Fix the tray after tray insertion to the connector. Push the slider with 40N force and hold on for 15 seconds.</li> </ul>	Acceptable

Fig. 2 (End)

3. Product qualification test sequence

Para.	Test Examination	Test Group								
		1	2	3	4	5	6	7	8	9
		Test Sequence (a)								
2.5.1	Examination of product	1,11	1,7	1,5	1,3	1,3	1,12	1,9	1,8	1,4
2.5.2	Contact resistance (low level)	2,7	2,4,6	2,4			2,8		2,5,7	
2.5.3	Insulation resistance							2,7		
2.5.4	Dielectric withstanding voltage							3,8		
2.5.5	Temperature rise					2				
2.5.6	Tray mating force	3,8					3,9			
2.5.7	Tray unmating force	4,9					4,10			
2.5.8	Tray push out force	5,10					5,11			
2.5.9	Durability	6					6	4	3	
2.5.10	Vibration		3							
2.5.11	Shock		5							
2.5.12	Temperature life						7	5	4	
2.5.13	Thermal shock							6	6	
2.5.14	Humidity-temperature cycling									
2.5.15	Salt spray			3						
2.5.16	Solderability				2					
2.5.17	Resistance to Reflow heat									2
2.5.18	Resistance to loading force on slider									3

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

Fig. 3

4. Test result summary

Test item	Unit	Result					Requirements	Judge-ment	
		N	Max.	Min.	Ave.	Sig.			
Test group 1									
Examination of product	-	3	No abnormalities				No abnormalities	Accept-able	
Contact resistance (Low level) Initial	4FF	mΩ	18	18.50	8.97	12.31	4.39	Contact : 50mΩ Max.(initial) Detect switch : 100mΩ Max.(initial)	Accept-able
	micro SD		24	11.85	9.57	10.36	0.64		Accept-able
	Detect switch		3	14.03	11.83	12.58	1.26		Accept-able
Tray mating force	N	3	4.7	4.3	4.53	0.21	10N Max.	Accept-able	
Tray unmating force	N	3	6.9	6.3	6.67	0.32	5~10N	Accept-able	
Tray push out force	N	3	10.5	8.9	9.66	0.77	14N Max.	Accept-able	
Contact resistance (Low level) after durability	4FF	mΩ	18	18.85	9.25	13.49	3.64	Contact : 100mΩ Max.(final) Detect switch : 200mΩ Max.(final)	Accept-able
	micro SD		24	13.27	9.61	10.92	1.06		Accept-able
	Detect switch		3	19.07	13.87	17.17	2.87		Accept-able
Tray mating force	N	3	3.5	3.5	3.50	0.00	10N Max.	Accept-able	
Tray unmating force	N	3	4.8	4.6	4.70	0.10	3N Min.	Accept-able	
Tray push out force	N	3	6.7	6.0	6.42	0.41	14N Max.	Accept-able	
Examination of product after test	-	3	No abnormalities				No abnormalities	Accept-able	

Group 1 (End)

Test item	Unit	Result					Requirements	Judge-ment	
		N	Max.	Min.	Ave.	Sig.			
Test group 2									
Examination of product	-	3	No abnormalities				No abnormalities	Accept-able	
Contact resistance (Low level) Initial	4FF	mΩ	18	18.53	8.23	11.75	4.43	Contact : 50mΩ Max.(initial) Detect switch : 100mΩ Max.(initial)	Accept-able
	micro SD		24	12.81	9.50	10.16	0.88		Accept-able
	Detect switch		3	22.15	13.73	16.75	4.68		Accept-able
Vibration	-	3	No abnormalities				1μs Max.	Accept-able	
Contact resistance (Low level) after vibration	4FF	mΩ	18	18.29	8.19	11.68	4.41	Contact : 100mΩ Max. Detect switch : 200mΩ Max.	Accept-able
	micro SD		24	10.70	9.40	9.92	0.45		Accept-able
	Detect switch		3	33.06	26.91	29.15	3.40		Accept-able
Shock	-	3	No abnormalities				1μs Max.	Accept-able	
Contact resistance (Low level) after shock	4FF	mΩ	18	18.23	7.93	11.64	4.37	Contact : 100mΩ Max.(final) Detect switch : 200mΩ Max.(final)	Accept-able
	micro SD		24	10.65	9.52	10.02	0.45		Accept-able
	Detect switch		3	61.05	47.02	55.78	7.64		Accept-able
Examination of product after test	-	3	No abnormalities				No abnormalities	Accept-able	

Test item	Unit	Result					Requirements	Judge-ment	
		N	Max.	Min.	Ave.	Sig.			
Test group 3									
Examination of product	-	3	No abnormalities				No abnormalities	Accept-able	
Contact resistance (Low level) Initial	4FF	mΩ	18	18.52	8.98	12.23	4.49	Contact : 50mΩ Max.(initial) Detect switch : 100mΩ Max.(initial)	Accept-able
	micro SD		24	10.59	9.47	9.89	0.32		Accept-able
	Detect switch		3	14.92	10.25	12.17	2.44		Accept-able
Contact resistance (Low level) after salt spray	4FF	mΩ	18	30.67	11.52	17.75	6.23	Contact : 100mΩ Max.(final) Detect switch : 200mΩ Max.(final)	Accept-able
	micro SD		24	22.03	11.16	14.72	3.39		Accept-able
	Detect switch		3	50.83	41.10	46.40	4.92		Accept-able
Examination of product after test	-	3	No abnormalities				No abnormalities	Accept-able	

Group 2,3 (End)



Test item	Unit	N	Result	Requirements	Judge-ment
Test group 4					
Examination of product	-	3	No abnormalities	No abnormalities	Accept-able
Solderability	-	3	More than 95% of tested area was covered with wet solder	Minimum 95% solder	Accept-able
Examination of product after test	-	3	No abnormalities	No abnormalities	Accept-able

Test item	Unit	Result					Requirements	Judge-ment	
		N	Max.	Min.	Ave.	Sig.			
Test group 5									
Examination of product	-	3	No abnormalities				No abnormalities	Accept-able	
Temperature rise	4FF	°C	3	1.8	1.2	1.45	0.18	30°C Max.	Accept-able
	micro SD		3	2.2	1.4	1.77			0.26
Examination of product after temperature rise	-	3	No abnormalities				No abnormalities	Accept-able	

Group 4,5 (End)

Test item		Unit	Result					Requirements	Judge-ment
			N	Max.	Min.	Ave.	Sig.		
Test group 6									
Examination of product		-	3	No abnormalities				No abnormalities	Accept-able
Contact resistance (Low level) Initial	4FF	mΩ	18	19.31	8.52	12.43	4.60	Contact : 50mΩ Max.(initial) Detect switch : 100mΩ Max.(initial)	Accept-able
	micro SD		24	15.90	9.37	10.63	1.68		Accept-able
	Detect switch		3	12.54	11.19	11.66	0.76		Accept-able
Tray mating force		N	3	5.2	4.1	4.57	0.57	10N Max.	Accept-able
Tray unmating force		N	3	6.7	6.4	6.60	0.17	5~10N	Accept-able
Tray push out force		N	3	9.4	8.7	9.05	0.33	14N Max.	Accept-able
Contact resistance (Low level) after durability	4FF	mΩ	18	26.01	11.67	18.30	5.04	Contact : 100mΩ Max. Detect switch : 200mΩ Max.	Accept-able
	micro SD		24	28.01	10.82	16.10	5.17		Accept-able
	Detect switch		3	66.58	49.47	58.42	8.58		Accept-able
Contact resistance (Low level) after temperature life	4FF	mΩ	18	31.38	10.61	20.90	7.80	Contact : 100mΩ Max.(final) Detect switch : 200mΩ Max.(final)	Accept-able
	micro SD		24	29.68	9.98	15.81	5.30		Accept-able
	Detect switch		3	69.82	54.18	62.02	7.82		Accept-able
Tray mating force		N	3	3.5	3.3	3.43	0.12	10N Max.	Accept-able
Tray unmating force		N	3	4.8	4.1	4.40	0.36	3N Min.	Accept-able
Tray push out force		N	3	7.2	5.7	6.20	0.89	14N Max.	Accept-able
Examination of product after test		-	3	No abnormalities				No abnormalities	Accept-able

Group 6 (End)

Test item	Unit	Result					Requirements	Judge-ment
		N	Max.	Min.	Ave.	Sig.		
Test group 7								
Examination of product	-	3	No abnormalities			No abnormalities	Accept-able	
Insulation resistance	MΩ	3	19900 Min.			1000MΩ Min.	Accept-able	
Dielectric withstanding voltage	-	3	No voltage breakdown			No voltage breakdown	Accept-able	
Insulation resistance	MΩ	3	3230 Min.			1000MΩ Min.	Accept-able	
Dielectric withstanding voltage	-	3	No voltage breakdown			No voltage breakdown	Accept-able	
Examination of product after test	-	3	No abnormalities			No abnormalities	Accept-able	

Test item	Unit	Result					Requirements	Judge-ment	
		N	Max.	Min.	Ave.	Sig.			
Test group 8									
Examination of product	-	3	No abnormalities			No abnormalities	Accept-able		
Contact resistance (Low level) Initial	4FF	mΩ	18	18.72	8.74	12.06	4.45	Contact : 50mΩ Max.(initial) Detect switch : 100mΩ Max.(initial)	Accept-able
	micro SD		24	10.89	9.52	10.25	0.47		Accept-able
	Detect switch		3	20.04	12.16	15.72	4.00		Accept-able
Contact resistance (Low level) after durability and thermal shock	4FF	mΩ	18	18.81	9.24	12.68	4.23	Contact : 100mΩ Max. Detect switch : 200mΩ Max.	Accept-able
	micro SD		24	11.91	9.46	10.43	0.83		Accept-able
	Detect switch		3	60.31	43.74	51.76	8.30		Accept-able
Contact resistance (Low level) after humidity-temperature cycling	4FF	mΩ	18	18.46	9.13	12.51	4.27	Contact : 100mΩ Max.(final) Detect switch : 200mΩ Max.(final)	Accept-able
	micro SD		24	17.72	9.52	11.40	2.22		Accept-able
	Detect switch		3	39.56	31.80	35.81	3.89		Accept-able
Examination of product after test	-	3	No abnormalities			No abnormalities	Accept-able		

Group 7,8 (End)

Test item	Unit	N	Result	Requirements	Judge-ment
Test group 9					
Examination of product	-	3	No abnormalities	No abnormalities	Accept-able
Resistance to reflow heat	-	3	No mechanical damage	No mechanical damage	Accept-able
Resistance to loading force on slider	-	3	No mechanical damage	No mechanical damage	Accept-able
Examination of product after test	-	3	No abnormalities	No abnormalities	Accept-able

Group 8 (End)