



## 1.Introduction

### 1.1 Objective

Testing was performed on the nano SIM hinge type connector to determine if it meets the requirement of product specification, 108-140327

### 1.2 Scope

This report covers the electrical, mechanical and environment performance requirements of the nano SIM hinge type connector.

The qualification testing was performed between 28APR2023 and 25MAY2023.

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 nano SIM hinge type connector meets the electorical, mechanical and enviromental performance requirements of design objective, 108-140327

### 1.4 Test samples

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

Product Part No.	Description
2452796-1	nano SIM hinge type connector

Appendix 1

## 2. Test contents

Para.	Test Items	Requirements	Judgment
2.1	Examination of product	Visual inspection No physical damage	Acceptable
Electrical Requirements			
2.2	Contact resistance (Low level)	Mate connector with dry circuit (20mV, 100mA max.)  4-wire measurement required  Resistance of termination wires shall be deducted from the reading  Refer to fig.4 for measurement method  (IEC 60512-3-1)	Acceptable
2.3	Insulation resistance	Unmated connector with 100 VDC between adjacent contact for 1 minute (IEC 60512-3-1)	Acceptable
2.4	Dielectric withstanding voltage	Unmated connector with 500 VAC between adjacent contact for 1 minute (IEC 60512-3-1)	Acceptable
2.5	Temperature rise	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 (EIA-364-70A)	Acceptable

Fig. 1 (CONT.)

Para.	Test Items	Requirements	Judgment
<b>Mechanical Requirements</b>			
2.6	Lock force	Card inserts connector Operation speed: 10mm/min	Acceptable
2.7	Un-Lock force	Pull out of the card from Connector Operation speed: 10mm/min	Acceptable
2.8	Durability (1500 cycle)	<p><b>【Operation speed】</b>            Mechanically operated: 500 cycles/hour            Manually operated: 200 cycles/hour</p> <p>including pause between mate/un-mate to 1500 cycles</p> <p>After every 10 (max.) cycles blow with dry air</p>	Acceptable
<b>Environmental Requirements</b>			
2.9	Vibration	<p>Apply for 2 hours in each 3 mutually perpendicular axes (total 6 hours)</p> <p>Frequency=10-55-10 Hz (Sweep time: 1 minute max.)</p> <p>Amplitude=1.52mm, Current=100mA</p> <p>[EIA-364-28E Condition I]</p>	Acceptable
2.10	Shock	<p>Apply 3 successive shocks in each direction along the 3 mutually perpendicular axes (total 18 shocks)</p> <p>Pulse shape=half sine</p> <p>Peak acceleration=490m/s<sup>2</sup> (50G)</p> <p>Duration of pulse=11ms</p> <p>[EIA-364-27B Condition I]</p>	Acceptable

Fig. 1 (CONT.)

Para.	Test Items	Requirements	Judgment
2.11	Temperature life	+85°C for 98 hours; recovery period 1-2hours under ambient atmospheric conditions  (IEC60068-2-2Bb)	Acceptable
2.12	Thermal shock (Change of temperature)	T <sub>a</sub> = - 40 °C for 30 min; then change of temp=25°C, maximum 5 min; then T <sub>b</sub> =+85°C for 30min for 26cycles  Recovery: 2 hours at ambient atmosphere  (IEC60068-2-14 Test Na)	Acceptable
2.13	Humidity - temperature cycling	Temp 25-65°C, RH 90-95% for 10 cycles  Recovery: 2 hours at ambient atmosphere  (EIA-364-31)	Acceptable
2.14	Salt spray	48 hours spray at temp.35°±2°C, R/H 90-95%, Salt NaCl mist 5%  After test, parts and cards are washed and return to room ambient for 2 hours	Acceptable
2.15	SO2 gas	10±3ppm, Damp 75% at 40±2°C, 48hours	Acceptable
2.16	Solderability	Peak temperature: 240°C±5°C Reflow time (230°C min.): 25~50 seconds	Acceptable

Fig. 1 (END)

### 3. Product Qualification Test Sequence

Para.	Test Examination	Test Group								
		A	B	C	D	E	F	G	H	I
		Test Sequence (a)								
3.5.1	Examination of product	1,9	1,7	1,5	1,5	1,3	1,10	1,9	1,8	1,3
3.5.2	Contact resistance (Low level)	2,6	2,4,6	2,4	2,4		2,7		2,5,7	
3.5.3	Insulation resistance							2,7		
3.5.4	Dielectric withstanding voltage							3,8		
3.5.5	Temperature rise					2				
3.5.6	Lock force	3,7					3,8			
3.5.7	Un-Lock force	4,8					4,9			
3.5.9	Durability	5					5	4	3	
3.5.10	Vibration		3							
3.5.11	Shock		5							
3.5.12	Temperature life						6			
3.5.13	Thermal shock (Change of temperature)							5	4	
3.5.14	Humidity-temperature cycling							6	6	
3.5.15	Salt spray			3						
3.5.16	SO2 gas				3					
3.5.17	Solderability									2

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

Fig. 2

## 4. Test Results

Measure Item	n	Unit	Results				Requirement	Judgment
			Max.	Min.	Ave.	Sig.		

Test group A								
Examination of product	3	-	No abnormalities				No abnormalities	Acceptable
Contact resistance	18	mΩ	75.51	31.77	51.38	16.33	100 mΩ MAX	Acceptable
Lock force	3	N	3.68	2.61	3.07	0.55	15N MAX	Acceptable
Un-Lock force	8	N	4.41	2.57	3.49	0.92	0.5N MIN	Acceptable
Durability	3	—	No discontinuity				No abnormalities	Acceptable
Contact resistance	18	mΩ	78.51	32.01	52.58	15.91	150mΩ MAX	Acceptable
Lock force	3	N	1.42	0.96	1.21	0.23	15N MAX	Acceptable
Un-Lock force	3	N	1.47	0.99	1.25	0.24	0.5N MIN	Acceptable
Examination of product	3	-	No abnormalities				No abnormalities	Acceptable

Test group B								
Examination of product	3	-	No abnormalities				No abnormalities	Acceptable
Contact resistance	3	mΩ	68.43	35.49	51.54	14.99	100 mΩ MAX	Acceptable
Vibration	3	—	No discontinuity				1μs MAX	Acceptable
Contact resistance	18	mΩ	70.12	34.15	52.41	15.55	150mΩ MAX	Acceptable
Shock	3	-	No discontinuity				1μs MAX	Acceptable
Contact resistance	18	mΩ	70.03	36.24	52.86	15.59	150mΩ MAX	Acceptable
Examination of product	3	-	No abnormalities				No abnormalities	Acceptable

Test group C								
Examination of product	3	-	No abnormalities				No abnormalities	Acceptable
Contact resistance	3	mΩ	68.51	31.94	48.98	14.35	100mΩ MAX	Acceptable
Contact resistance after salt spray	18	mΩ	71.65	34.53	52.65	14.52	150mΩ MAX	Acceptable
Examination of product	3	-	No abnormalities				No abnormalities	Acceptable

Fig. 3 (CONT.)

Measure Item	n	Unit	Results				Requirement	Judgment
			Max.	Min.	Ave.	Sig.		

Test group D								
Examination of product	3	-	No abnormalities				No abnormalities	Acceptable
Contact resistance	18	mΩ	68.06	36.81	52.04	14.87	100mΩ MAX	Acceptable
Contact resistance after SO2 gas	18	mΩ	74.65	37.33	55.18	15.92	150mΩ MAX	Acceptable
Examination of product	3	-	No abnormalities				No abnormalities	Acceptable

Test group E								
Examination of product	3	-	No abnormalities				No abnormalities	Acceptable
Temperature rise	3	°C	6.19	6.01	6.10	0.09	30°C MAX	Acceptable
Examination of product	3	-	No abnormalities				No abnormalities	Acceptable

Test group F								
Examination of product	3	-	No abnormalities				No abnormalities	Acceptable
Contact resistance	18	mΩ	69.79	36.00	44.59	14.98	100mΩ MAX	Acceptable
Mating force	3	N	3.75	2.47	3.13	0.64	15N MAX	Acceptable
Un-mating force	3	N	4.39	2.68	3.56	0.86	0.5N MIN	Acceptable
Durability	3	—	No discontinuity				No abnormalities	Acceptable
Contact resistance after Temperature life	18	mΩ	69.55	38.12	46.82	14.69	150mΩ MAX	Acceptable
Mating force	3	N	1.08	0.62	0.86	0.23	15N MAX	Acceptable
Un-mating force	3	N	1.21	0.69	0.95	0.26	0.5N MIN	Acceptable
Examination of product	3	-	No abnormalities				No abnormalities	Acceptable

Fig. 3 (CONT.)

Measure Item	n	Unit	Results				Requirement	Judgment
			Max.	Min.	Ave.	Sig.		

Test group G								
Examination of product	3	-	No abnormalities				No abnormalities	Acceptable
Insulation resistance	3	Ω	269 x 10 <sup>13</sup> Ω min.				1000MΩ Min.	Acceptable
Dielectric strength	3	-	No abnormalities				No abnormalities	Acceptable
Insulation resistance after Durability, Thermal shock and Humidity-temperature cycling	3	Ω	121 x 10 <sup>12</sup> Ω min.				1000MΩ Min.	Acceptable
Insulation resistance after Durability, Thermal shock and Humidity-temperature cycling	3	-	No abnormalities				No abnormalities	Acceptable
Insulation resistance after Durability, Thermal shock and Humidity-temperature cycling	3	-	No abnormalities				No abnormalities	Acceptable

Test group H								
Examination of Product	3	-	No abnormalities				No abnormalities	Acceptable
Contact resistance	18	mΩ	68.91	35.31	52.08	15.43	100mΩ MAX	Acceptable
Durability	3	-	No discontinuity				No abnormalities	Acceptable
Contact resistance after Thermal shock	18	mΩ	69.19	33.30	52.33	16.00	150mΩ MAX	Acceptable
Contact resistance after Humidity-temperature cycling	18	mΩ	69.98	30.38	52.46	16.66	150mΩ MAX	Acceptable
Examination of product	3	-	No abnormalities				No abnormalities	Acceptable

Fig. 3 (CONT.)



Measure Item	n	Unit	Result	Requirement	Judgment
Test group I					
Examination of product	-	3	No abnormalities	No abnormalities	Acceptable
Solderability	-	3	More than 95% of tested area was covered with wet solder	Minimum 95% solder	Acceptable
Examination of product after test	-	3	No abnormalities	No abnormalities	Acceptable

Fig. 3 (END)