1 Scope:

1.1 Content:

This specification covers the requirements for product performance, test methods and quality assurance provisions of the TE connectivity Low Force Scalable Spring Finger.

2 Applicable Documents:

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.

2.1 TE connectivity Documents:

2.1.1 109-5000: Test Specification, General Requirements for Test Methods

2.1.2 501-115070-*: Qualification Test Report

2.2 TE connectivity Drawings:

C-2199248/C-2199249/C-2199250 Customer drawing of Scalable Spring Finger

2.3 Commercial standards and specifications:

A: Test Methods for Electronics Component Parts: MIL-STD-202.

3 Requirements:

3.1 Design and Construction:

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

3.2 Material:

Copper alloy for Type B & Type C, SUS301 for Type A.

Under plating: Ni 2μm MIN.

Contact Area: Gold 0.5μm MIN

Soldering Area: Gold Flash

3.3 Ratings:

3.3.1. Voltage Rating: 15 V Max.

3.3.2. Current Rating: 2.0A

3.3.3 Operating Temperature Range: -30°C to 85°C

3.3.4. Storage Temperature Range: -5°C to 85°C

3.3.5. Storage Humidity Range: 15~70 %RH

3.4 Performance requirements and test descriptions:

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in ***section 3.5***. All tests shall be performed in the room temperature, unless otherwise specified.

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3.5 Test Requirements and Procedures Summary:

3.6.1 Examination:

Test Description	Requirement	Procedures
Visual examination of product	Meets requirements of product drawing and applicable instructions on customer drawing, and application specification.	Visual, dimensional and functional per applicable inspection plan. In according with IEC 60512-1-1 Magnification 10x

3.6.2 Electrical

Test Description	Requirement	Procedures
Low level contact resistance (LLCR)	25mΩ Max for Type B/C (Initial), 75 mΩ Max for Type A (Initial), 50mΩ Max for Type B/C (Final) 100mΩ Max for Type B/C (Final)	Subject mated connector to 20mV Max. open circuit at 100mA. Need to exclude wire resistance from measurement. (Fig.2) Per EIA 364-23
Temperature rise	After tests maximum increase of contact temperature, 30°C max.	Measured at maximum rated current. Per EIA 364-70,Method 2

3.6.3 Environmental

Test Description	Requirement	Procedures
Damp heat	No change to performance Contact resistance: Max. 50mOhm for Cu alloy / 100mOhm for SST Normal Force performance.	Temp 25-55 °C, RH 90-100% for 18 cycles of 24 hours each. The typical cycle in temp 25°C -> 55°C in 3 hours then maintain at 55°C for 9 hours Temp +55°C -> +25°C in 3 hours, maintain at 25°C for 9 hours. Recovery at 25°C. R/H 75% for 2 hours Mated tests: 10 mA (voltage is defined by current and resistance) IEC 60068-2-30 Db
Vibration	No mechanical damage. No change to performance. Discontinuity <1us Max. 50mOhm	Frequency: 10 - 100 Hz: 3 m2/s3 100 - 500 Hz: -3dB/Oct. for: 3 x 60 min (X- Y- and Z-axis) in minimum deflection position. IEC60068-2-64Fh
Shock	No mechanical damage. No change to performance. Discontinuity<1us Max. 50mOhm	Pulse shape half sine, peak acceleration 50 G, pulse 11 ms, 3 shocks in both directions in XYZ axis IEC60068-2-27Ea
Nitric Acid Vapour test	Requirements: see Document ID: DTY11017- EN-2.0.	2 Hours 69±2 % concentration acid Acc. Document ID: DTY11017-EN- 2.0: Guideline for porosity testing of gold coated metallic connector springs – Nitric acid vapour test Blank cutting edges have to be sealed. IEC 600068-2-78
Solderability	Soldering area shall have a minimum of 95% solder coverage.	245±3℃, for 2-3 seconds,
Resistance to reflow soldering heat	No cosmetic damage and shall meet requirement of subsequent test.	Test with reflow profile for soldering heat resistance described in Figure 1 through oven 3 times.
thermal shock	No change to performance Contact resistance: Max. 50mOhm for Cu alloy / 100mOhm for SST Normal Force performance.	-40° /+85° C, transition time 5 minutes max, 25 cycles. Duration time: 30 minutes. Recovery: 2 hours at 25° C, RH 75%. In accordance with IEC 68-2-14-N.

3.6.4 Mechanical

Test Description	Requirement	Procedures
Contact force at maximum working height (minimum deflection) low force scalable family	0.2N Min.	Compress spring to max. Working height to PWB surface. Force must be measured from return curve. Spring force-deflection curve described. Have to be fulfilled after 3 reflow cycles.
Contact force at minimum working height (maximum deflection) low force scalable family	1N + 20% Max.	Compress spring to max. Working height to PWB surface. Force must be measured from return curve. Spring force-deflection curve described. Have to be fulfilled after 3 reflow cycles.
Durability (Life cycle) Low Force Scalable Family	No functional damage Contact resistance : 50mΩ Max. Normal force should meet spec	1x max working range + 5000 x 50% working range Mate contact at max.20 matings per minute to 5000 cycles with rigid actuator shaft. Vertical direction deflection to a ½ of working height.
Durability (Spring dynamic test) Low Force Scalable Family	No functional damage Contact resistance : 50mΩ Max. Normal force should meet spec	1x max working range + 10000 x 50% working range Mate contact at max.20 matings per minute to 10000 cycles with rigid actuator shaft. Cycles for Maximum deflection case. Vertical direction deflection to a 1/2 of working height. Max. 20% loss of initial force. No technical function only to check the maximum lifetime.
Peeling Strength	3 N (Type A&B) 9 N (Type C)	Test method according STR retention force of contact.（in Figure 4）
Push Strength	10 N Min.	Test method according STR peeling strength force of contact. (in Figure 3）

3.6.5 Product Qualification Test Sequence

Test group	a	b	c	d	e	f	g	h	i	j	k	m	n
Sample size	5	5	5	5	10	10	10	10	10	10	5	5	5
Visual examination of product	1,7	1,7	1,3	1,7	1,3	1,3	1,3	1,3	1,5	1,7	1,3	1,3	1,7
Low level contact resistance	2,6	2,4		2,4					2,4	2,4			2,6
Temperature rise			2										
Damp heat	4												
Vibration		3											
Shock				3									
Nitric Acid Vapour test					2								
Solderability						2							
Resistance to reflow soldering heat							2						
Contact force	3,5							2					3,5
Durability (Life cycle)									3				
Durability (Spring dynamic test)										3			
Peeling Strength											2		
Thermal Shock													4
Push Strength												2	

Numbers indicate sequence in which the tests are performed.

4. Quality Assurance Provisions

4.1 Qualification Testing

4.1.1 Specimen Selection: Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production.

4.1.2 Test Sequence : Qualification inspection shall be verified by testing specimens as specified.

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

4.3 Acceptance : Acceptance is based on verification that the product meets the requirements. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmitted.

4.4 Quality Conformance Inspection: The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification。

5. Figures

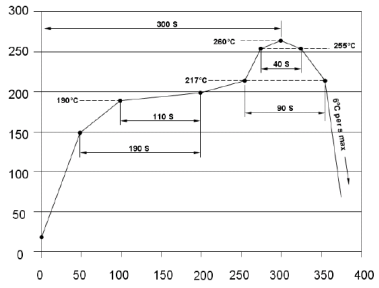


Figure 1 Resistance to soldering reflow heat test condition

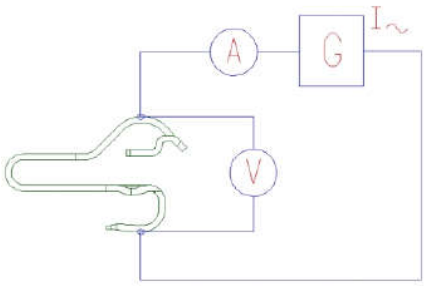


Figure 2 Measuring method of contact resistance

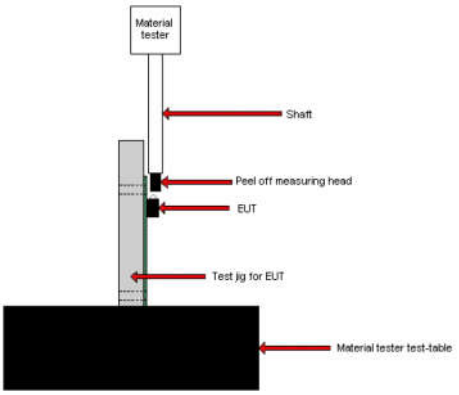


Figure 3 Push strength measurement method

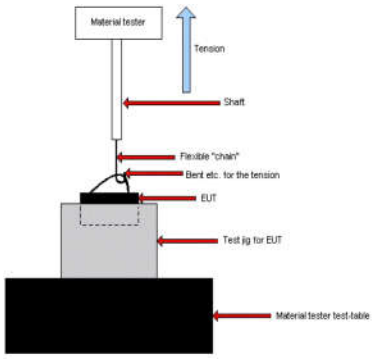


Figure 4 Peeling Strength Measurement method