

## SPRING FINGER

"The product may not perform according to the product specification if precautions have not been taken in the application to provide mechanical stability of the connector in relation to its mating parts".

### 1 SCOPE

#### 1.1 Content.

This specification covers performance, test and quality requirements for a Tyco Electronics\* Spring Finger.

Applicable product description and part numbers are as shown in Appendix 1.

#### 1.2 Qualification.

When tests are performed on subject product, procedures specified in this specification shall be used. All inspections shall be performed using applicable inspection plan and product drawing.

### 2 APPLICABLE DOCUMENTS.

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

#### 2.1 Tyco Electronics Documents.

501-19147                      Test report of "Spring finger"

#### 2.2 Tyco Electronics Drawings.

C-1551281                      Customer drawing of "Spring finger LEFT"  
C-1551401                      Customer drawing of "Spring finger RIGHT"

Dr. W. Jansen

DATE: 22 Mar 10

APVD: D. Jooren

DATE 22 Mar 10

### **2.3 Other Documents.**

109-5000	Test Specification, General Requirements for Test Methods
IEC 60512	Basic testing procedures and measuring methods for electromechanical components for electronic equipment.
IEC 60068	Basic environmental testing procedures.

## **3 REQUIREMENTS.**

### **3.1 Design and Construction:**

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

### **3.2 Material and Finish:**

Contact material:	- TiCu.
Plating Mating side:	- Post-plated with nickel and selective gold.
Plating solder side:	- Post-plated with nickel and selective gold.

### **3.3 Ratings:**

A.	Voltage:	50 V max.
B.	Current:	0,5 A max.
C.	Operating temperature:	-25°C to 70°C
	Storage temperature:	-40°C to 85°C
D.	Durability:	10 cycles

**3.4 Performance and Test description:**

The product is designed to meet electrical, mechanical and environmental performance specified in this paragraph as tested per test sequence specified in par. 3.6.

Unless otherwise specified, all tests are performed at ambient environmental conditions per IEC specification 60068-1 clause 5.3. and are performed with connectors in mated conditions.

Test Pad Finish: Au-finish

V I S U A L			
Par.	Test Title	Performance / Severity Requirements	Procedure
3.4.1	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 acc. with IEC 60512-1-1 Magnification 10x
E L E C T R I C A L			
3.4.2	Termination resistance	Max. open voltage 20mV. Max. current 100 mA DC. All contacts to be measured. <u>Requirement:</u> Initial: 30 mΩ max. ΔR: 20 mΩ max.	In acc. with IEC 60512-2-1  Measuring points shall be as indicated in figure 1, Ref. par. 3.5.1.
M E C H A N I C A L			
Par.	Test Title	Performance / Severity Requirements	Procedure
3.4.3	Contact normal force (Per contact)	Normal force shall be measured: 1. at contact position 1,6mm (upper working range from PCB) (min. deflection) <u>Requirement:</u> 0.2 N min. 2. at contact position 1,2 mm (lower working range from PCB) (max. deflection) <u>Requirement:</u> 0.8 N max.	Normal force test equipment

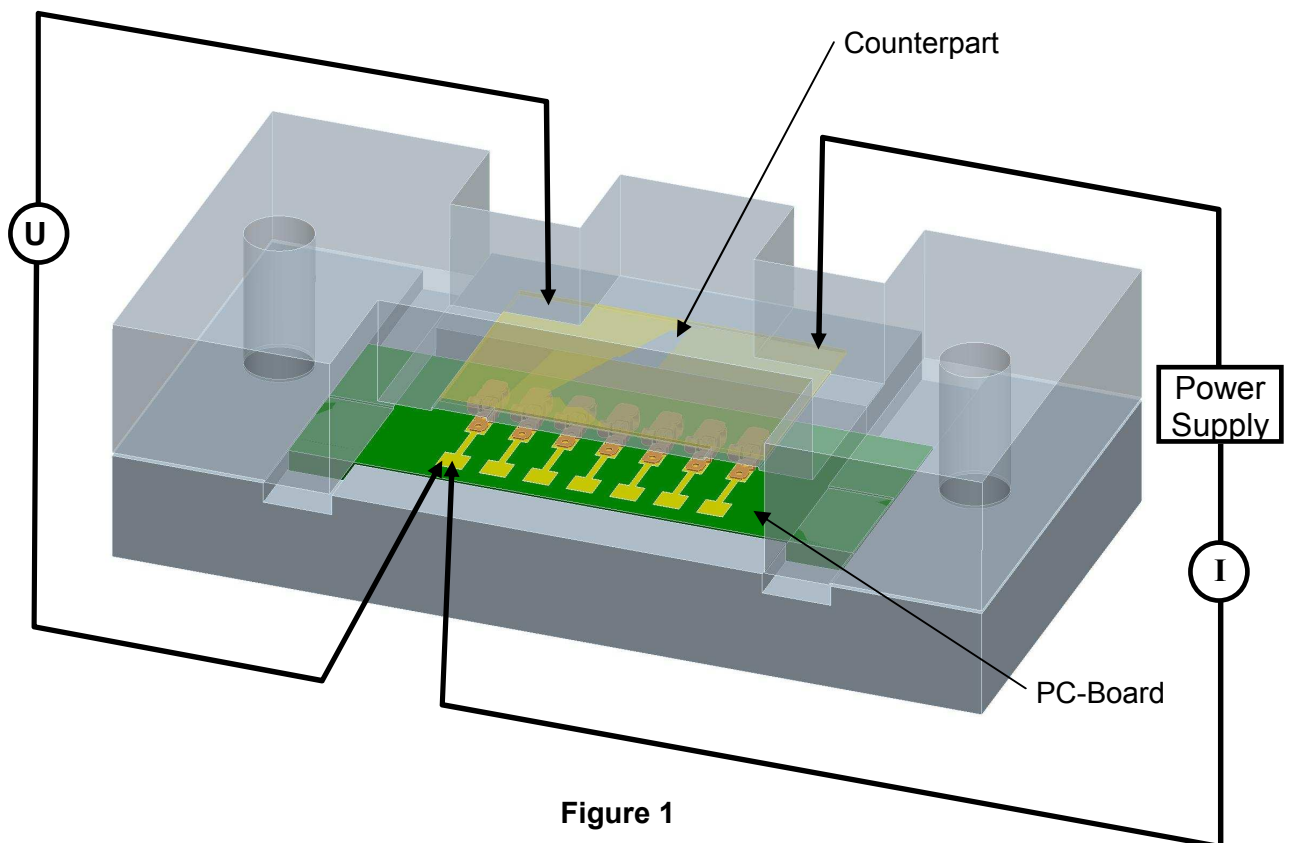
ENVIRONMENTAL			
Par.	Test Title	Performance / Severity Requirements	Procedure
3.4.4	Rapid change of temperature	Connector to be mounted in test-frame, contact position at 1,4 mm nominal deflection. -40°/85°C, 1 hrs / 1 hrs, Transition time: <30 sec. Number of cycles: 100 Recovery time: 1 hour <u>Requirement</u> : termination resistance as per par. 3.4.2	In acc. with IEC 60512-11-4
3.4.5	Dry heat	Contact position at 1,4 mm nominal deflection. Temperature: 85°C Duration: 1000 hrs. Recovery time: 1 hour <u>Requirement</u> : termination resistance as per par. 3.4.2 / forces as per par. 3.4.3	In acc. with IEC 60512-11-9
3.4.6	Cold	Contact position at 1,4 mm nominal deflection. Temperature -40°C Duration 16 hrs. Recovery time: 1 hours <u>Requirement</u> : termination resistance as per par. 3.4.2	In acc. with IEC 60512-11-10
3.4.7	Damp/heat cyclic	Contact position at 1,4 mm nominal deflection. 25/55°C 12 hrs / 12 hrs (= 1 cycle) RH 95% Number of cycles: 5 <u>Requirement</u> : termination resistance as per par. 3.4.2	In acc. with IEC 60512-11-12
3.4.8	Resistance to soldering heat (IR/convection)	3 cycles of IR soldering heat-curve as specified in figure 2. (unmated) <u>Requirements</u> : No cracks, chips or melting.	In acc. With IPC/JEDEC J-STD-020B with increased T peak Ref. Par. 3.5.4
3.4.9	Mixed Gas	SO <sub>2</sub> : 200 ppb NO <sub>2</sub> : 200 ppb H <sub>2</sub> S: 10 ppb Cl <sub>2</sub> : 10 ppb 25 °C; 75 % Rel. Humidity; 10 days Contact position 1,40 mm (nominal) Connection on massive Au contact surface <u>Requirement</u> : Termination resistance as per par. 3.4.2	In acc. With IEC 60068-2-60 Method 4

**3.5 Additional testing details.**

**3.5.1 Termination resistance**

Termination resistance shall be measured as indicated in figure 1.

Bulk-resistance of circuits outside the connector, such as counterpart contact pads, PC-Board pads and wire for series connection, are not included in the requirement and therefore shall be measured and documented separately for reference (in case of significant influence).



**Figure 1**

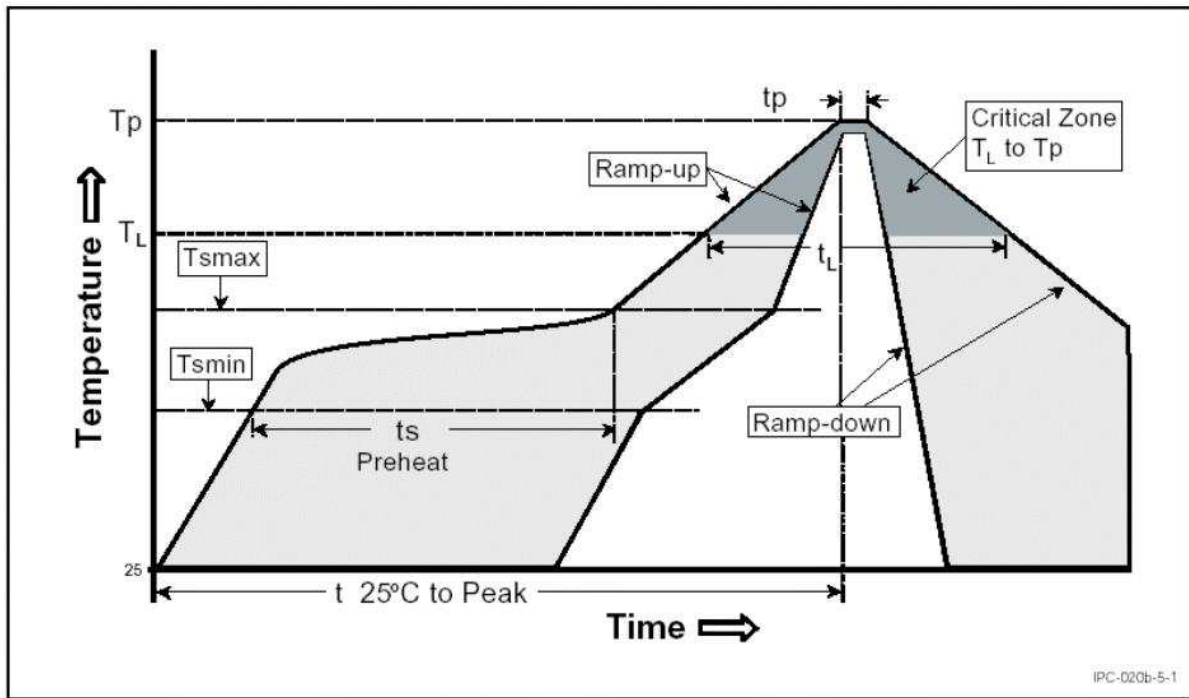
**3.5.2 Testframes**

Test-frames shall provide mechanical stability of the connector in relation to its mating parts and shall cover the requirements specified in the Tyco application specification.

During Vibration, an electrical circuit is checking that no electrical contact interruptions occur that exceed the requirement.

**3.5.3 Resistance to soldering-heat.**

Resistance to soldering-heat test shall cover the IR-soldering heat-curve as indicated in figure 5 Ref. IPC/JEDEC J-STD-020B with increased T peak.



**Figure 2**

Method of heat transfer	a) Forced hot air convection (reflow) b) Vapour Phase soldering
Average temperature gradient in preheating	3.0 K/s
Temperature gradient in reflow	3.0 K/s
Preheating condition	max.200°C/ max. 180s
Time above 200°C	not defined
Time above 217°C	60 – 150s
Time above 230°C	not defined
Peak temperature	max 260°C
Temperature gradient in cooling	max. 6 K/s
Total reflow profile duration <sup>1)</sup>	480 s max

1) time measured from T = 40°C in preheating up to T = 100°C in cooling

**3.6 Product Qualification and Regualification Test Sequence.**

Test or examination	1	2	3
	TEST - SEQUENCE (b)		
Examination of product	1, 3, 9	1, 10	1, 6
Termination resistance	5,7	4,8	3, 5
Contact normal force	4, 8	3,9	
Rapid change of temperature	6		
Dry heat		5	
Cold		6	
Damp / heat cyclic		7	
Resistance to soldering heat	2	2	2
Mixed Gas			4

- (a) See par. 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.

Sample description	Number of samples in test groups		
	1	2	3
Spring Finger	5	5	5

#### **4 QUALITY ASSURANCE PROVISIONS.**

##### **4.1 Qualification testing.**

###### **A. Sample selection**

Samples shall be prepared in accordance with applicable instructions and shall be selected at random from current production.

Samples shall be soldered on PCB.

###### **B. Test sequence**

Qualification inspection shall be verified by testing samples as specified in par. 3.6.

##### **4.2 Regualification testing.**

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

##### **4.3 Acceptance.**

Acceptance is based upon verification that product meets requirements of par. 3.4. Failures attributed to equipment, test set-up, applied customer components or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for requalification. Testing to confirm corrective action is required before resubmittal.

##### **4.4 Quality conformance inspection.**

Applicable Tyco Electronics quality inspection plan will specify sampling acceptable quality level to be used.

Dimensional and functional requirements shall be in accordance with applicable product drawing and this specification.