

COMPRESSIVE CONNECTOR

"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 TE* Compressive SMD Board to Board connector. The connector is designed to make a connection between a contact surface and a Printed Wire Board (PWB). The connector is soldered to the PWB and can connect to a flex foil or PWB. The support structure to compress the contacts of the connector to the correct working height has to be provided by the customer.

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 extend 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 TE Documents.

501-19149 Test report of "Keypad connector"

2.2 TE Drawings

C-1551246 Customer drawing of "Keypad connector"

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APVD:

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2.3 Other Documents.

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

A.	Contact material:	- Copper alloy.
	Plating Mating side:	- Post-plated with nickel and selective gold.
	Plating solder tabs:	- Post-plated with nickel and selective gold.
B.	Housing material:	- Glass filled Liquid Crystal Polymer (LCP).

3.3 Ratings:

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

VISUAL			
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
ELECTRICAL			
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.
3.4.3	Insulation resistance	Minimum 100 MΩ, after the testing 100 V DC	In acc. with IEC 60512-3-1
3.4.4	Dielectric strength	No voltage breakdown 1000 V AC	In acc. with IEC 60512-3-2

MECHANICAL			
Par.	Test Title	Performance / Severity Requirements	Procedure
3.4.5	Contact normal force (Per contact)	Normal force shall be measured: 1. at contact position nominal +0,10mm (upper working range) (min. deflection) <u>requirement:</u> 0,2 N min. 2. at contact position nominal -0,10 mm (lower working range) (max. deflection) 0,5 N max. See also figure 4 in Par. 3.5.3 See C-drw for height instruction.	Normal force test equipment (force / deflection curve)
3.4.6	Durability	5 cycles	Mate contact with 3s/cycle
3.4.7	Connector peel strength	Load 1 N / contact	A load in max 5 mm/min applied to the whole side of the connector on PWB. All four directions along PWB.

3.4.8	Vibration (random)	Connector to be mounted in test-frame, contact position at nominal deflection. Frequency: 10 - 100 Hz; 3 m2/s3 (0.0132 g2/Hz) ;100 - 500 Hz; -3dB/Oct. for: 3 x 60 min (X- Y- and Z-axis) <u>Requirement:</u> No mechanical damage Discontinuity <1us	In acc. with IEC60068-2-64
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ENVIRONMENTAL			
Par.	Test Title	Performance / Severity Requirements	Procedure
3.4.9	Rapid change of temperature	Connector to be mounted in test-frame, contact position at 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
3.4.10	Dry heat	Connector to be mounted in test-frame, contact position at 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
3.4.11	Cold	Connector to be mounted in test-frame, contact position at 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
3.4.12	Damp/heat cyclic	Connector to be mounted in test-frame, contact position at 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
3.4.13	Storage (Alternating Temperature)	Contacts not loaded. -40/85°C Temperature change 1°C/min. 8 hrs. per cycle - Number of cycles: 10 <u>Requirement:</u> forces as per par. 3.4.3	DIN IEC 60068-2-14 Nb
3.4.14	Resistance to soldering heat (convection)	Contacts not loaded. 3 cycles of convection soldering heat-curve as specified in figure 5. (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

Chemical			
Par.	Test Title	Performance / Severity Requirements	Procedure
3.4.15	Mixed Flowing Gas Corrosion	Connector to be mounted in test-frame, contact position at nominal deflection. SO ₂ : 200 ppb NO ₂ : 200 ppb H ₂ S: 10 ppb Cl ₂ : 10 ppb 25°C; 75% Rel. Humidity; 10 days Requirement : 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 2.

Bulk-resistance of circuits outside the connector, PCB tracks 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).

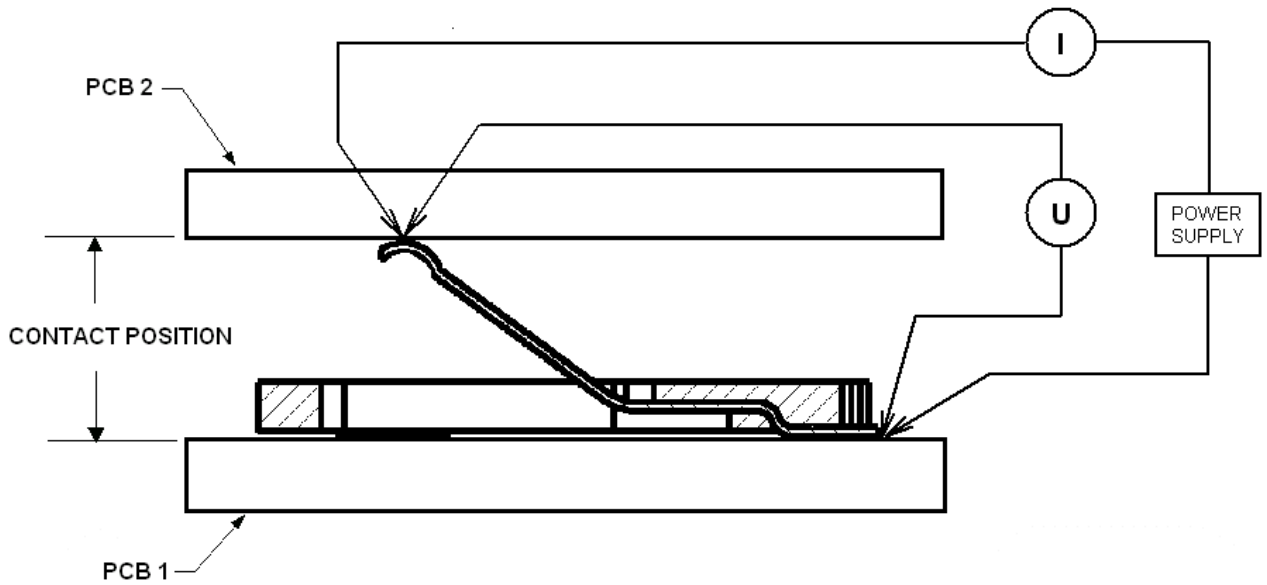


Figure 2

3.5.2 Test frames

Test-frames shall provide mechanical stability of the connector in relation to its mating parts.

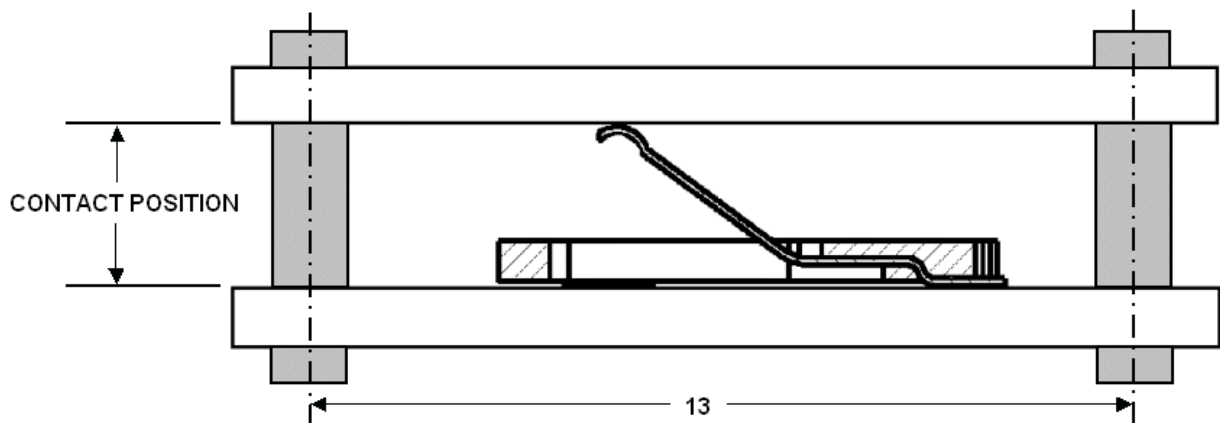


Figure 3

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

3.5.3 Normal Force

Normal force shall be measured at contact position as indicated in figure 4.

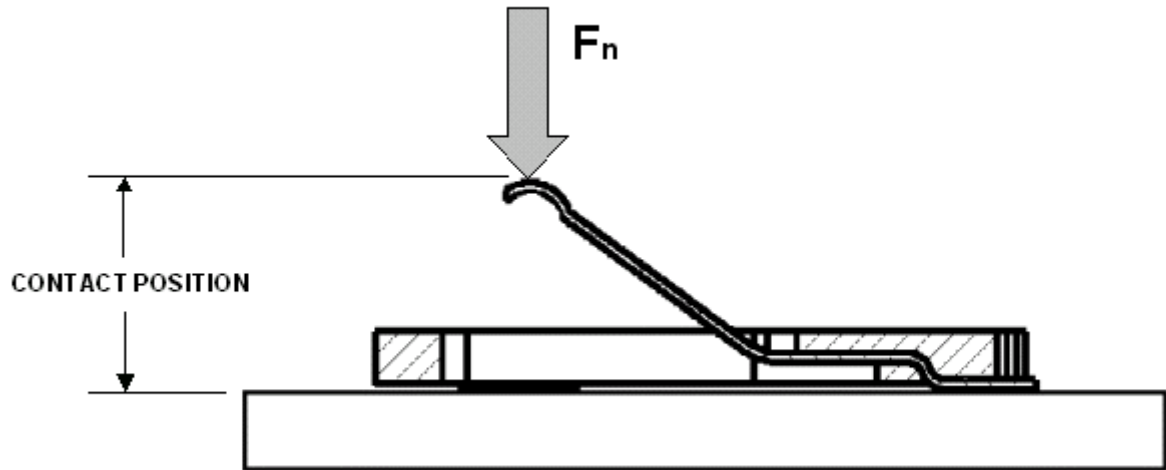


Figure 4

3.5.4 Resistance to soldering-heat

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

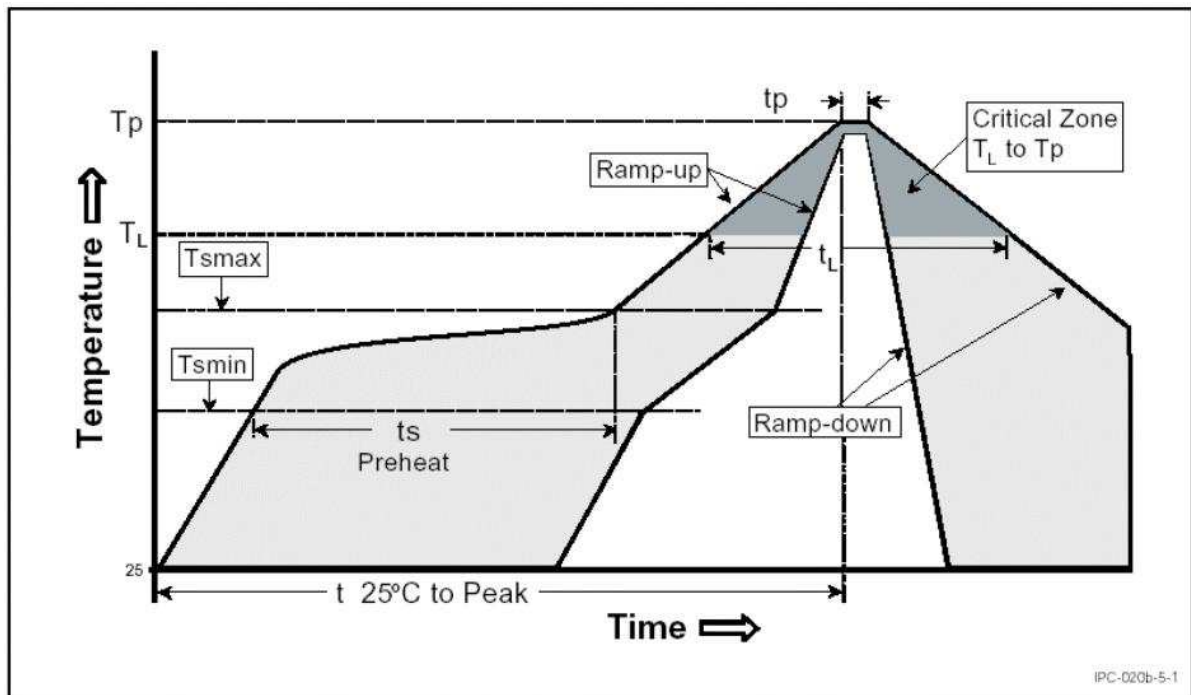


Figure 5

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 ¹⁾	480 s max.

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

3.6 Product Qualification and Requalification Test Sequence.

Test or examination	TEST - GROUP (a)			
	1	2	3	4
	TEST - SEQUENCE (b)			
Examination of product	1, 9	1, 18	1	1, 6
Termination resistance	3, 8	3, 7, 9, 11, 13, 15		3, 5
Insulation resistance	4	4, 16		
Dielectric strength	5	5, 17		
Contact normal force			3	
Durability	6			
Connector peel strength			4	
Vibration (random)				4
Rapid change of temperature		6		
Dry heat		8		
Cold		10		
Damp / heat cyclic		12		
Storage (alternating temp)		14		
Soldering heat	2	2	2	2
Mixed Flowing Gas Corrosion	7			

(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	4
Compressive Connector	5	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 PWB.

B. Test sequence

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

4.2 Requalification 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 TE 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.