Surface Mount Technology (SMT) Releasable Poke-In Connectors

1. SCOPE

1.1. Content

This specification defines performance, tests, and quality requirements for SMT releasable poke-in connectors used with the 22 to 18 AWG solid copper wire, 20 to 18 AWG pre-bond stranded wire, and 20 to 18 AWG stranded wire.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the 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, the latest edition of the document applies. 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 (TE) Documents

114-32113 Application Specification: SMT Releasable Poke-In Connectors

501-134043 Qualification Test Report: SMT Releasable Poke-In Connectors

109-197 Test Specifications vs EIA and IEC Test Methods

2.2. Industry Documents

EIA-364, “Electrical Connector/Socket Test Procedures Including Environmental Classifications”

JEDC JESD 22-B102, “Solderability”

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. Ratings

Voltage: 600 VDC/VAC for all position sizes

Current: 5 amperes maximum with 22 AWG wire
7 amperes maximum with 20 AWG wire
9 amperes maximum with 18 AWG wire

Temperature: -40° to 105°C

3.3. Performance and Test Description

Product is designed to meet the electrical, mechanical, and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

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3.4. Test Requirements and Procedures Summary

TEST DESCRIPTION	REQUIREMENT	PROCEDURE
Initial Examination of Product	Meets requirements of product drawing.	EIA-364-18 Visual and dimensional (C of C) inspection per product drawing.
Final Examination of Product	Meets visual requirements.	EIA-364-18 Visual inspection.
ELECTRICAL		
Low Level Contact Resistance (LLCR)	18 milliohms maximum initial ΔR 5 milliohms maximum	EIA-364-23 Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage.
Withstanding Voltage	One minute hold with no breakdown or flashover	EIA-364-20, Condition I 1-, 2-, and 3-position: 1800 VAC at sea level. Select load 3-position (center position void): 2200 VAC at sea level. Test between adjacent contacts.
T-Rise Verses Current	30°C maximum temperature rise 22 AWG: 5.0 amperes 20 AWG: 7.0 amperes 18 AWG: 9.0 amperes	EIA-364-70, Method I Stabilize at a single current level until 3 readings at 5-minute intervals are within 1°C.
MECHANICAL		
Solderability, Surface Mount	Solderable area shall have a minimum of 95% solder coverage.	JEDC JESD22-B102 Subject contacts to solderability.
Resistance to Reflow Soldering Heat	Housing shall be free of deformation and fusion. See note.	109-201, Condition B
Random Vibration	No discontinuities of 1 microsecond or longer duration. See note.	EIA-364-28, Test Condition VII, Condition Letter D Subject mated specimens (see Figure 3) to 3.10 Gs rms between 20 to 500 Hz. 15 minutes in each of 3 mutually perpendicular planes. See Figure 4 for typical setup.
Mechanical Shock	No discontinuities of 1 microsecond or longer duration. See note.	EIA-364-27, Condition H Subject mated specimens (see Figure 3) to 30 Gs half-sine shock pulses of 11 milliseconds duration. Apply 3 shocks in each direction along 3 mutually perpendicular planes, 18 total shocks. See Figure 4 for typical setup.
Durability	See note.	Subject connector assembly to 5-wire insertion and 4-wire extraction cycles. One full cycle consists of the following actions: 1. To insert wire, depress contact wire release button. 2. To retain wire, release contact wire release button. 3. To release wire, depress contact release button.

Wire Insertion Force	15.6 N [3.5 lbf] maximum for solid wire Note: Only 18 AWG solid wire shall be subjected to wire insertion force testing.	EIA-364-13 Measure force necessary to insert wires at a maximum rate of 12.7 mm [.5 in.] per minute. Wire release button shall not be depressed as wire is inserted.
Wire Retention Force	22.24 N [5.0 lbf] minimum	EIA-364-13 Measure force necessary to extract wire at a maximum rate of 12.7 mm [.5 in.] per minute.
Thermal Shock	See note.	EIA-364-32, Test Condition VIII Subject specimens to 25 cycles between -40° and 105°C.
Humidity/Temperature Cycling	See note.	EIA-364-31, Method IV Subject specimens to 10 cycles (10 days) between 25° and 65°C at 80 to 100% RH.
Temperature Life	See note.	EIA-364-17, Method A, Test Condition 4 Subject specimens to 105°C for 648 hrs.

NOTE
Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the product qualification and re-qualification test sequence given in Figure 2.

Figure 1

3.5. Product Qualification and Re-Qualification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)							
	1	2	3	4	5	6	7	8
	TEST SEQUENCE (b)							
Initial Examination of Product	1	1	1	1	1	1	1	1
LLCR	2,5	2,4,6						
Withstanding Voltage			2,5					
T-Rise Versus Current						2		
Solderability, Surface Mount							2	
Resistance to Reflow Soldering Heat								2
Random Vibration	3							
Mechanical Shock	4							
Durability				2				
Wire Insertion Force					2			
Wire Retention Force	6			3				
Thermal Shock			3					
Humidity/Temperature Cycling		3	4					
Temperature Life		5						
Final Examination of Product	7	7	6	4	3	3	3	3

(a) See Figure 3 for specimen selection.

(b) Numbers indicate sequence in which tests are performed.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable instruction sheets and shall be selected at random from current production. See Figure 3.

WIRE			CONNECTOR POSITIONS	TEST GROUP							
SIZE (AWG)	TYPE (UL 1007)			1	2	3	4	5	6	7	8
				NUMBER OF CONNECTORS TESTED							
22	Single Strand	Solid	2	15	15	N/A	5	N/A	3	N/A	N/A
20	Single Strand	Solid		15	15	N/A	5	N/A	3	N/A	N/A
	7 Strands	Prebond		N/A	15	N/A	5	N/A	3	N/A	N/A
	7 Strands	Stranded		N/A	15	N/A	5	N/A	3	N/A	N/A
18	Single Strand	Solid		15	15	N/A	5	5	3	N/A	N/A
	16 Strands	Prebond		15	15	N/A	5	N/A	3	N/A	N/A
	16 Strands	Stranded		15	15	15	5	N/A	3	N/A	N/A
No Wire	—	—		N/A	N/A	N/A	N/A	N/A	N/A	5	5
18	16 Strands	Stranded	3	N/A	N/A	N/A	N/A	N/A	15	N/A	N/A

Figure 3

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

4.2. Re-Qualification Testing

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

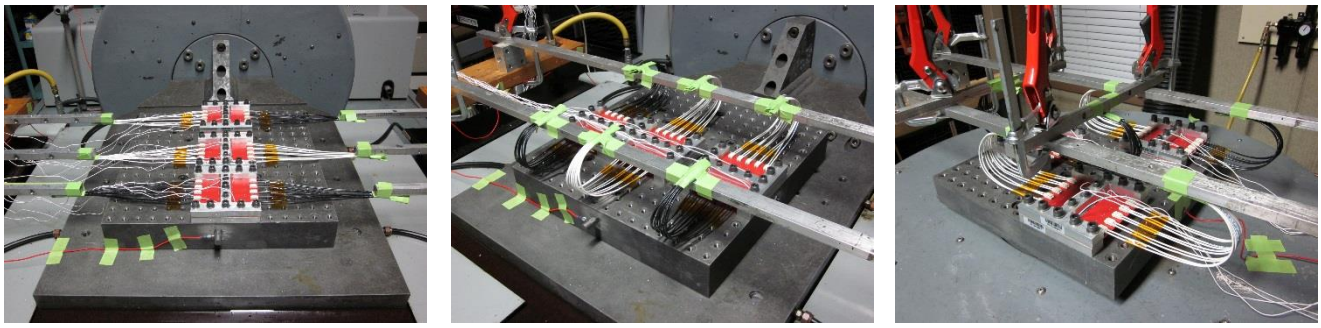
4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. 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 re-submitted for qualification. Testing to confirm corrective action is required before re-submittal.

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.

Typical Random Vibration Setup



Typical Mechanical Shock Setup

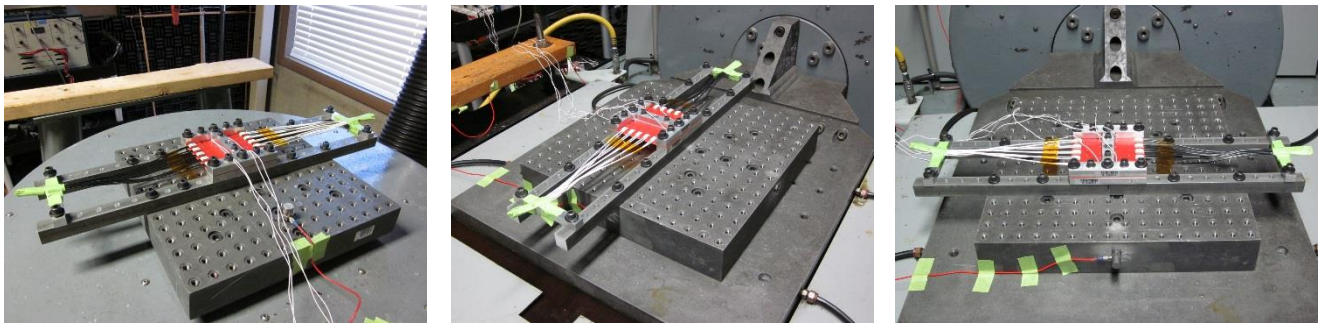


Figure 4