

**Inverted Card Edge Through Board Connector, PN 2213188-x**

**1. SCOPE**

1.1. Content

This specification defines performance, tests, and quality requirements for the TE Connectivity (TE) Inverted Card Edge Through Board Connector, PN 2213188-x.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Table 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

**2. APPLICABLE DOCUMENTS AND FORMS**

The following documents and forms constitute a part of this specification to the extent specified herein. Unless otherwise indicated, the latest edition of the document applies.

2.1. TE Documents

- [102-950](#): Quality Specification (Qualification of Separable Interface Connectors)
- [114-32054](#): Application Specification (Inverted Card Edge and Inverted Poke-In Connectors)
- [501-134035](#): Qualification Test Report (Inverted Card Edge Connector Qualification Testing)

2.2. Industry Documents

- EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- IEC-60512: Electronic Equipment – Tests and Measurements

2.3. Reference Document

[109-197](#): Test Specification (TE Test Specifications vs. EIA and IEC Test Methods)

**3. REQUIREMENTS**

3.1. Design and Construction

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

3.2. Ratings

- Voltage: 400 volts AC/DC
- Current: 3 amperes
- Temperature: -40° to 130°C

3.5. Test Requirements and Procedures Summary

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing and Application Specification 114-32054.	EIA-364-18. Visual examination and dimensional (C of C) inspection per product drawing.
Final examination of product.	Meets visual requirements.	EIA-364-18. Visual examination.

Test Description	Requirement	Procedure
<b>ELECTRICAL</b>		
Low Level Contact Resistance (LLCR).	10 milliohms maximum initial. 20 milliohms maximum final.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 1.
Insulation resistance.	1000 megohms minimum initial. 500 megohms minimum final.	EIA-364-21. 500 ± 10% volts DC, 2 minute hold. Test between adjacent contacts.
Withstanding voltage.	One minute hold with no breakdown or flashover.	EIA-364-20, Condition I. 1800 volts AC at sea level. Test between adjacent contacts.
Temperature rise vs. current.	30°C maximum temperature rise at specified current.	EIA-364-70, Method 1. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C. See Figure 2.
<b>MECHANICAL</b>		
Solderability, SMT test.	Solderable area shall have a minimum of 95% solder coverage.	J-STD_002D, Test S1 Subject contacts to solderability.
Random vibration. (Office)	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition VII, Test Condition Letter D. Subject mated specimens to 3.10 G's rms between 20 to 500 Hz. Fifteen minutes in each of 3 mutually perpendicular planes. See Figure 3.
Mechanical shock. (Office)	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Test Condition H. Subject mated specimens to 30 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. See Figure 3.
Durability.	See Note.	EIA-364-9. Mate and unmate specimens for 5 cycles at a maximum rate of 500 cycles per hour.
Mating force.	45 N [10.11 lbf] max	EIA-364-13, Method A. Measure force necessary to mate specimens at a maximum rate of 12.7 mm per minute.
Unmating force.	4 N [0.8992 lbf] min	EIA-364-13, Method A. Measure force necessary to unmate specimens at a maximum rate of 12.7 mm per minute.

Table 1 cont.

ENVIRONMENTAL		
Thermal shock.	See Note.	EIA-364-32, Method A, Test Condition I, Test Duration A. Subject specimens to 5 cycles between -40 and 130°C with 30 minute dwells at temperature extremes and 1 minute maximum transition between temperatures.
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 with -10°C cold shock.
Temperature life.	See Note.	EIA-364-17, Method A, Test Condition 4, Test Time Condition B. Subject mated specimens to 130°C for 500 hours.

Table 1 end



**NOTE**

Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in table 2.

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (b)				
	1	2	3	4	5
	Test Sequence (a)				
Initial examination of product	1	1	1	1	1
LLCR	2,5		2,5	4,7	3,6
Insulation resistance				2,8	
Withstanding voltage				3,9	
Temperature rise vs. current			3,6		
Solderability, dip test		2			
Random/Sinusoidal vibration	3				
Mechanical shock	4				
Durability					4
Mating force					2
Unmating force					5
Thermal shock				5	
Humidity/temperature cycling				6	
Temperature life			4		
Final examination of product	6	3	7	10	7

Table 2



**NOTE**

- (a) Numbers indicate sequence in which tests are performed.
- (b) Specimens shall be prepared in accordance with applicable instruction sheets and shall be selected at random from current production. Each test group shall consist of the following:

Specimen Selection		
Sample Qty	Part Number	Tested With PCB type
Test Group 1		
5	2213188-3	0.72 mm (0.8 mm -10%) test PCB
5	2213188-3	0.9 mm (1.0 mm -10%) test PCB
5	2213188-3	1.1 mm (1.0 mm +10%) test PCB
5	2213188-4	1.44 mm (1.6 mm -10%) test PCB
5	2213188-4	1.76 mm (1.6 mm +10%) test PCB
Test Group 2		
5	2213188-1	No PCB needed
Test Group 3		
5	2213188-1	0.72 mm (0.8 mm -10%) test PCB
5	2213188-1	0.9 mm (1.0 mm -10%) test PCB
5	2213188-1	1.1 mm (1.0 mm +10%) test PCB
5	2213188-2	1.44 mm (1.6 mm -10%) test PCB
5	2213188-2	1.76 mm (1.6 mm +10%) test PCB
Test Group 4		
5	2213188-1	0.72 mm (0.8 mm -10%) test PCB
5	2213188-1	0.9 mm (1.0 mm -10%) test PCB
5	2213188-1	1.1 mm (1.0 mm +10%) test PCB
5	2213188-2	1.44 mm (1.6 mm -10%) test PCB
5	2213188-2	1.76 mm (1.6 mm +10%) test PCB
Test Group 5		
5	2213188-1	0.72 mm (0.8 mm -10%) test PCB
5	2213188-1	0.9 mm (1.0 mm -10%) test PCB
5	2213188-1	1.1 mm (1.0 mm +10%) test PCB
5	2213188-2	1.44 mm (1.6 mm -10%) test PCB
5	2213188-2	1.76 mm (1.6 mm +10%) test PCB

Table 3

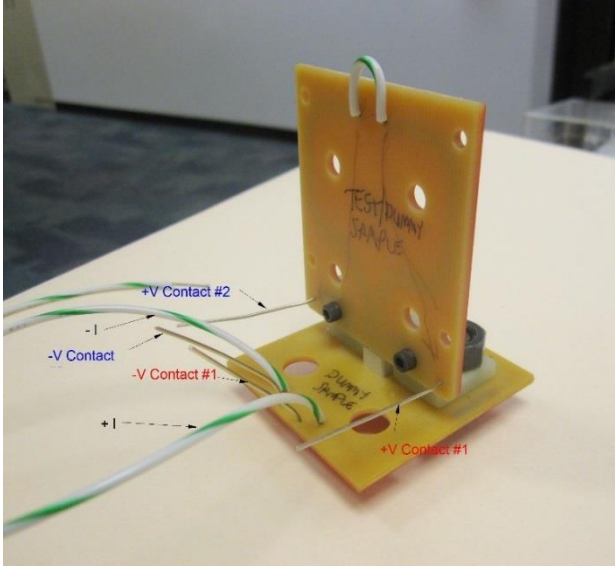


Figure 1  
LLCR Measurement Points

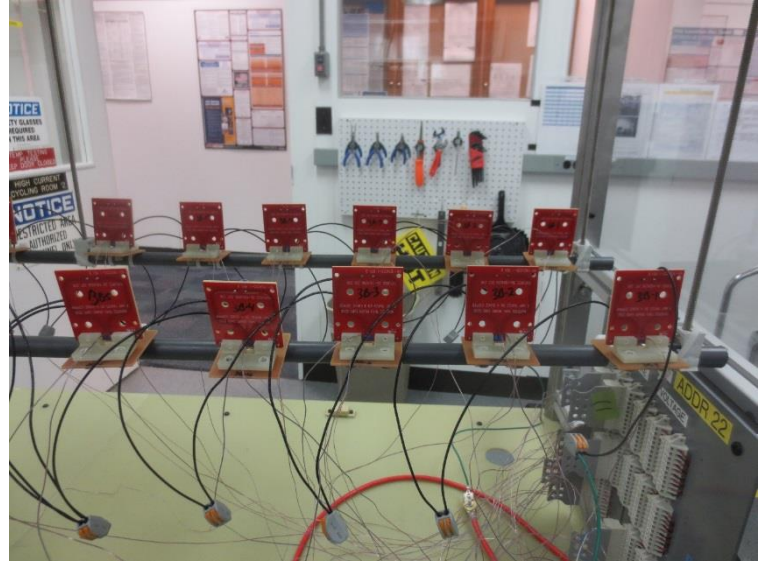


Figure 2  
Temperature Rise Set Up

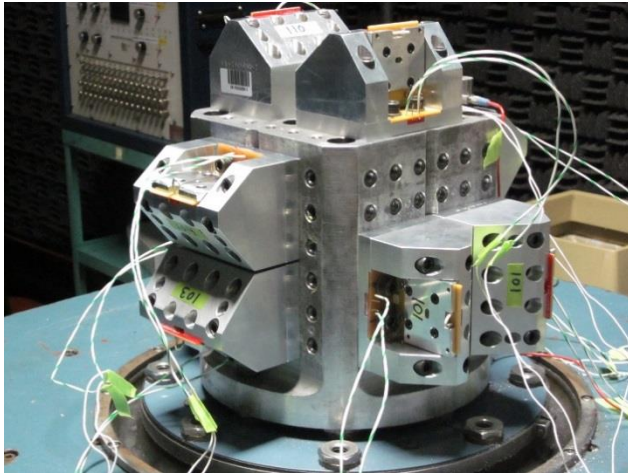


Figure 3a  
Vibration and Mechanical Shock Mounting Fixture

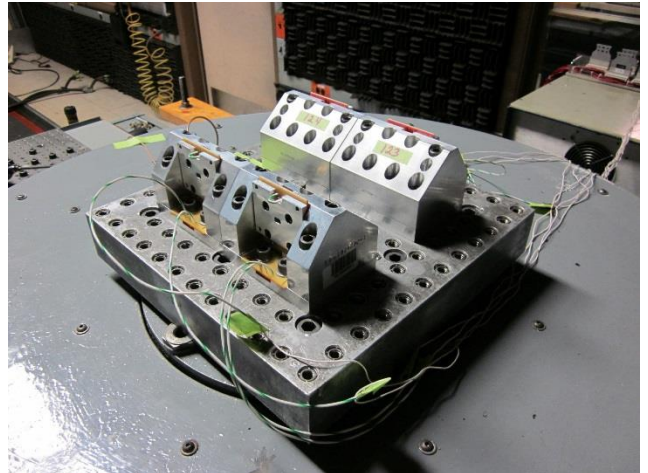


Figure 3b  
Vibration and Mechanical Shock Mounting Fixture