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## HDMI Connector

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### 1. SCOPE

#### 1.1. Contents

This specification covers the performance, tests and quality requirements for the TE Connectivity HDMI connector.

#### 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 DOCUMENT

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 Documents

- TEC-109-201: Component Heat Resistance to Lead-Free Reflow Soldering.
- 501-118019: Qualification Test Report.

#### 2.2. Commercial Standard

- EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications.
- JESD22-B102D: Solderability Test Method.

### 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. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

#### 3.3. Ratings

- A. Voltage: 40 volts AC.
- B. Current: 0.5 amperes.
- C. Temperature: -20 to 85°C.

#### 3.4. Performance Requirement 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 per EIA-364.

## 3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of product.	Meets requirements of product drawing.	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing.
ELECTRICAL		
Low level contact resistance.	Initial Contact: 30 mΩ max. Shell: 50 mΩ max.  After test (ΔR) (Change from initial value) Contact: 30 mΩ max. Shell: 50 mΩ max.	EIA-364-23. Contact: measure by dry circuit, 20 mV maximum, 10 mA.  EIA-364-06 Shell: measure by open circuit, 5 V maximum, 100 mA.
Dielectric withstanding voltage.	1 minute hold with no breakdown, flashover or 0.5 mA maximum leakage.	EIA-364-20, Condition I. 500 volts AC at sea level. Test between adjacent contacts of unmated specimens.
Insulation resistance.	Unmated: 100 MΩ min. Mated: 10 MΩ min.	EIA-364-21. Unmated connectors, apply 500 Volts DC between adjacent contact or ground. Mated connectors, apply 150 Volts DC between adjacent contact or ground.
TMDS signals time domain impedance.	Connector Area: 100 Ω ±15%. Transition Area: 100 Ω ±15%. Cable Area: 100 Ω ±10%.	EIA-364-108 Rise time ≤ 200 psec (10% to 90%). Signal to Ground pin ratio per HDMI designation. Differential Measurement Specimen Environment Impedance = 100 Ω differential. Source-side receptacle connector mounted on a Controlled impedance PCB fixture.
TMDS signals time domain cross talk FEXT.	5% max.	EIA-364-90 Rise time ≤ 200 psec (10% to 90%). Signal to Ground pin ratio per HDMI designation. Differential Measurement Specimen Environment Impedance = 100 Ω differential. Source-side receptacle connector mounted on a Controlled impedance PCB fixture. Driven pair and victim pair.
Contact current rating.	Less than 30°C temperature rise.	EIA 364-70. Contact series-wired and apply load with 0.5 amperes minimum to the circuit. Place a thermocouple through a small hole in the housing as close to the contacts as possible.
Applied voltage rating.	No breakdown.	40 VAC (rms.) continuous maximum, on any signal pin with respect to the shield.
MECHANICAL		
Mating force.	4.5 Kgf (44.1 N) max.	EIA-364-13. Measure force necessary to mate specimens with test boards at a maximum rate of 25 mm per minute.
Unmating force.	4 Kgf (39.2 N) max. 1 Kgf (9.8 N) min.	EIA-364-13. Measure force necessary to unmate specimens with test boards at a maximum rate of 25 mm per minute.

Figure 1 (continued)

Test Description	Requirement	Procedure
<b>MECHANICAL</b>		
Durability.	See <b>NOTE</b>	EIA-364-9. Mate and unmate specimens with test boards for 10000 cycles at a maximum rate of 100±50 cycles per hour.
Vibration, sinusoidal.	No discontinuities of 1 microsecond or longer duration. See <b>NOTE</b>	EIA-364-28 Condition III Amplitude: 1.52mm P-P or 147m/s <sup>2</sup> {15G} Sweep time: 50-2000-50Hz in 20 minutes. Duration : 12 times in each (total of 36 Times) X, Y, Z axes. Electrical load : DC100mA current shall be Flowed during the test.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See <b>NOTE</b>	EIA-364-27, Condition A. Subject mated specimens to 50 G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
<b>ENVIRONMENTAL</b>		
Solderability.	The inspected area of each lead must have 95% solder coverage minimum.	JESD22-B102D, Condition C. Steam Aging Preconditioning: 93 +3/-5°C, 8 hours ±15 min. Reflow Temperature: 230-245°C Reflow Time: 50-70 s.
Resistance to reflow soldering heat.	See <b>NOTE</b>	TEC-109-201, Method B, Condition B. Preheat Temp.: 150-200°C, 60-180 s. Time over liquidus (217°C): 60-150 s. Peak Temp.: 260 +0/-5°C, 20-40 s. Duration: 3 cycles.
Thermal shock.	See <b>NOTE</b>	EIA-364-32D Test condition I Subject mated connectors to 10 cycles (half hour/cycle) between -55°C and 85°C.
Humidity.	See <b>NOTE</b>	EIA-364-31B Test condition A Subject mated connectors to 96 hours (4 cycles) at 25°C to 85°C with 80% to 95% RH.
Temperature life.	See <b>NOTE</b>	EIA-364-17B test condition 3, method C Subject mated connectors to 85±2°C for 500 hours.
Salt spray.	No evident corrosion.	Subject mated specimens to 5% salt at 35°C for 24 hours. After test, rinse the specimens with water and recondition the room temperature for 1 hour.

**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 Figure 2.

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group										
	A	B	C	D	E	F	G	H	I	J	K
	Test Sequence (a)										
Examination of product.	1, 7	1, 9	1, 6	1, 5	1, 5	1, 5	1, 5	1, 3	1, 3	1,4	1,4
Low level contact resistance.		2, 8	2, 5	2, 4	2, 4	2, 4	2, 4				
Dielectric withstanding voltage.	3, 6										
Insulation resistance.	2, 5										
TMDS signals time domain impedance.										2	
TMDS signals time domain cross talk FEXT.										3	
Contact current rating.											2
Applied voltage rating.											3
Mating force.		3, 7									
Unmating force.		4, 6									
Durability.		5									
Vibration, sinusoidal.			3								
Mechanical shock.			4								
Solderability.									2		
Resistance to reflow soldering heat.								2			
Thermal shock.				3							
Humidity.	4				3						
Temperature life.						3					
Salt spray.							3				

**NOTE** (a) See paragraph 4.1.A.  
 (b) Numbers indicate sequence in which test 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. All test groups shall each consist of a minimum of 5 specimens.

B. Test Sequence

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

4.2. Requalification Testing

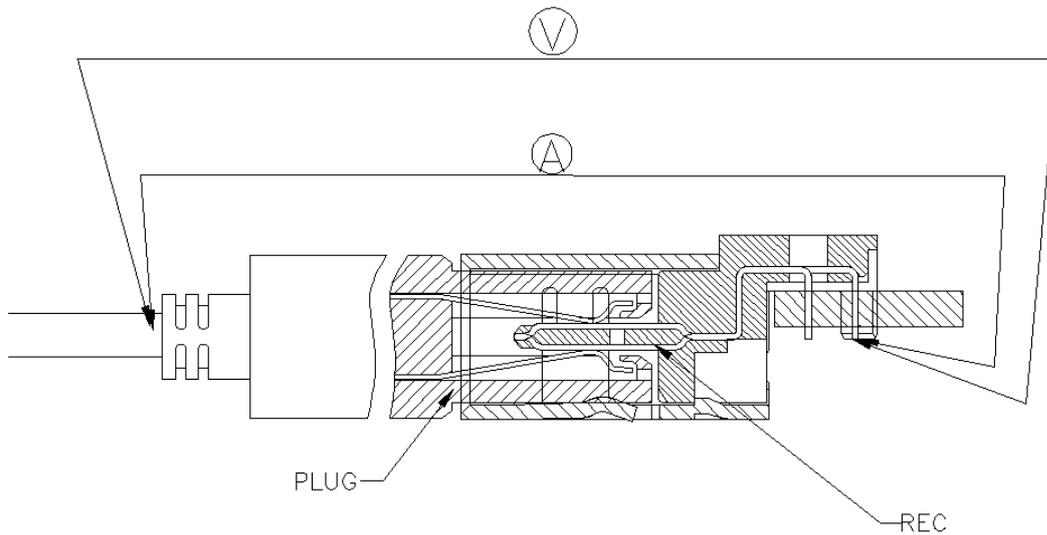
If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that the product meets the requirements 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 resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

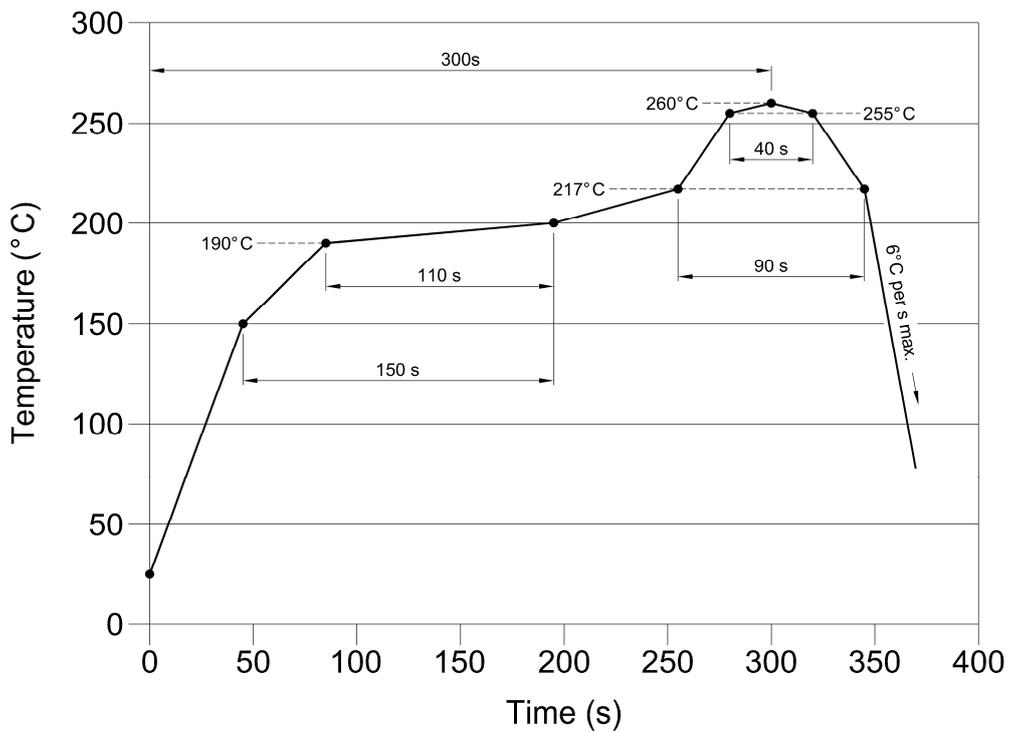
4.4. Quality Conformance Inspection

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.



Low Level Contact Resistance Measurement Points

Figure 3



Temperature Profile of Reflow Soldering

Figure 4