

108-78515
TE Connector
DisplayPort™ Receptacle
Lead Free Version

1. Scope:

1.1 Contents:

This specification covers the requirements for product performance, test methods and quality requirements of TE Display Port receptacle connectors.

These connectors are printed circuit board mounted receptacle connectors.

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

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. 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 referenced documents, this specification shall take precedence.

2.1 Reference documents

- A. EIA-364 Electrical Connector/Socket Test Procedures Including Environmental Classifications
- B. IEC61000-4-2 International Electrotechnical Commission for Electrostatic Discharge Immunity Test Procedures
- C. VESA DisplayPort Standard

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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:

A. Contact:

Copper alloy: gold plating on contact area

tin plating on solder area, all over nickel plating

B. Housing:

Thermoplastic, black, UL94V-0

C. Shell:

Copper alloy, Nickel plating or tin cover nickel plating

3.3 Ratings:

A. Voltage Rating : 40 vac (rms)

B. Current Rating : Signal application only, 0.5 ampere maximum per contact

C. Temperature Rating : -40°C to +85°C unless limited by cable or overmold

3.4 Performance Requirements and Test Descriptions:

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Fig.1. Unless otherwise specified all tests shall be performed at ambient environmental conditions per TE Specification 109-1

3.5 Test Requirements

Para.	Test Items	Test condition	Requirement	
Electrical Requirements				
3.5.1	Low Level Contact Resistance	Mated connectors Contact: measured by dry circuit, 20 maximum, and 10mA. Shell: measured by open circuit, 5 Volts maximum, 100mA. (ANSI/EIA-364-23)	Contact: Change from initial value = 30 mΩ maximum Shell: Change from initial value = 50 mΩ maximum	
3.5.2	Dielectric Strength	Unmated connectors, apply 500 Volts AC (RMS.) between adjacent terminal and ground. (ANSI/EIA 364-20,Method 301) Mated connector, apply 300 Volts AC (RMS.) between adjacent terminal and ground.	No Breakdown	
3.5.3	Insulation Resistance	Unmated connectors, apply 500 Volts DC between adjacent terminal and ground. (ANSI/EIA 364-21,Method 302)	Unmated: 100 MΩ minimum	
		Mated connectors, apply 150 Volts DC between adjacent terminal and ground.	Mated: 10 MΩ minimum	
3.5.4	Contact Current Rating	55 °C, maximum ambient 85 °C, maximum temperature change (ANSI/EIA-364-70,TP-70)	0.5 A minimum	
3.5.5	Applied Voltage Rating	40 Volts AC (RMS.) continuous maximum, on any signal pin with respect to the shield.	No Breakdown	
3.5.6	Electrostatic Discharge	Test unmated connectors from 1 kVolt to 8 kVolts in 1 kVolt steps using 8mm ball probe. (IEC61000-4-2)	No evidence of discharge to contacts at 8kVolts	
Mechanical Requirements				
3.5.7	Vibration	Amplitude: 1.52 mm P-P or 147 m/s ² {15G} Sweep time: 50-2000-50Hz in 20 minutes. Duration: 12 times in each of X, Y, Z axes (Total of 36 times) Electrical load: DC 100 mA current must be conducted during the test. (ANSI/EIA-364-28 Condition III Method 5A)	Appearance	No Damage
			Contact Resistance	Contact: Change from initial value: 30 mΩ maximum. Shell Part: Change from initial value: 50 mΩ maximum.
			Discontinuity	1 μs maximum.

Para.	Test Items	Test condition	Requirement	
3.5.8	Durability	Measure contact and shell resistance after the following. Automatic cycling: 10,000 cycles at 100 ± 50 cycles per hour (ANSI/EIA-364-09)	Contact Resistance	Contact: Change from initial value: $30 \text{ m}\Omega$ maximum. Shell Part: Change from initial value: $50 \text{ m}\Omega$ maximum.
			Discontinuity	$1 \mu\text{s}$ maximum.
3.5.9	Insertion / withdrawal force (no latches)	Insertion and withdrawal speed: 25 mm / minute. (ANSI/EIA-364-13)	Withdrawal force	9.8 N {1.0kgf} minimum 39.2 N {4.0kgf} maximum
			Insertion force	44.1 N {4.5kgf} maximum
Environmental Requirements				
3.5.10	Thermal Shock	10 cycles of: a) -55°C for 30 minutes b) $+85^\circ\text{C}$ for 30 minutes (ANSI/EIA-364-32, Condition I)	Appearance	No Damage
			Contact Resistance	Contact: Change from initial value: $30 \text{ m}\Omega$ maximum. Shell Part: Change from initial value: $50 \text{ m}\Omega$ maximum.
3.5.11	Humidity	A) Mate connectors together and perform the test as follows: Temperature : $+25$ to $+85^\circ\text{C}$ Relative Humidity : 80 to 95% Duration : Four cycles (96 hours) Upon completion of the test, specimens must be conditioned at ambient room conditions for 24 hours, after which the specified measurements must be performed. (ANSI/EIA-364-31)	Appearance	No Damage
			Contact Resistance	Contact: Change from initial value: $30 \text{ m}\Omega$ maximum. Shell Part: Change from initial value: $50 \text{ m}\Omega$ maximum.
		B) Unmate connectors and perform the test as follows: Temperature : $+25$ to $+85^\circ\text{C}$ Relative Humidity : 80 to 95% Duration : Four cycles (96 hours) Upon completion of the test, specimens must be conditioned at ambient room conditions for 24 hours, after which the specified measurements must be performed. (ANSI/EIA-364-31)	Appearance	No Damage
			Dielectric Withstanding Voltage and Insulation Resistance	Conform to item of Dielectric Withstanding Voltage and Insulation Resistance

Para.	Test Items	Test condition	Requirement	
3.5.12	Thermal Aging	<p>Mate connectors and expose to $(+105 \pm 2)^\circ\text{C}$ for 250 hours.</p> <p>Upon completion of the exposure period, the test specimens must be conditioned at ambient room conditions for one to two hours after which the specified measurements must be performed.</p> <p>(ANSI/EIA-364-17, Condition 4, Method A)</p>	Appearance	No Damage
			Contact Resistance	<p>Contact: Change from initial value: $30 \text{ m}\Omega$ maximum.</p> <p>Shell Part: Change from initial value: $50 \text{ m}\Omega$ maximum.</p>
3.5.13	Resistance to Soldering Heat	<p>Case of Manual Soldering</p> <p>Temperature: 380 ± 5 centigrade for 3 ± 1 second.</p> <p>To be no deformation by the top of iron at soldering times.</p>	Tested housing shall show no evidence of deformation or fusion of housing and no physical damage.	
3.5.13	Resistance to Reflow Soldering Heat	<p>Test connector on PCB.</p> <p>Pre-Heat 150 to 180 centidegrade: 90 ± 30 seconds</p> <p>Heat 230 centigrade minimum: 30 ± 10 seconds</p> <p>Peak: 250 ± 5 centigrade maximum</p> <p>Refer to Figure 3</p>	Tested housing shall show no evidence of deformation or fusion of housing and no physical damage.	

NOTE

Shall meet visual requirement, show no physical damage and shall meet requirement of additional tests as specified in Test Sequence in Figure 2.

Figure 1 (end)

3.6 Product Qualification and Requalification Test Sequence

Test of Examination	Test Group(a)					
	1	2	3	4	5	6
Test Sequence (b)						
Low Level Contact Resistance	1,4	1,4,6	1,4,6	2,4		
Dielectric Strength				1,5		
Vibration			5			
Durability	2	2	2	3		
Thermal Shock		3				
Humidity		5				
Thermal Aging	3		3			
Resistance to Soldering Heat					1	
Resistance to Reflow Soldering Heat						1

(a) See Para 4.1.A

- NOTE**
- (b) Numbers indicate sequence in which tests are performed
 - (c) Tests not listed in the table above will be performed individually

Figure 2

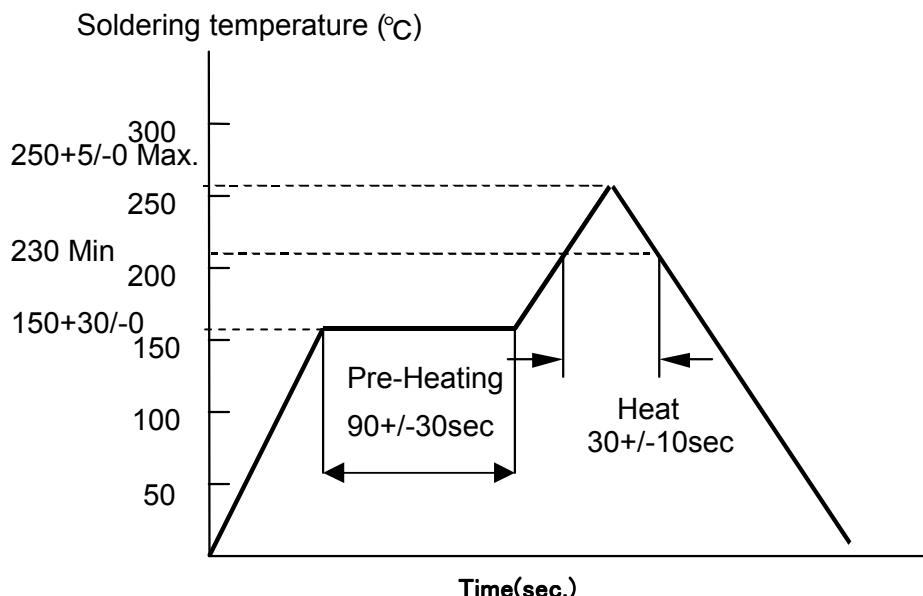


Figure 3 Temperature profile of reflow soldering

4 QUALITY ASSURANCE PROVISIONS

4.1 Qualification Testing

A. Sample Selection

Sample shall be prepared in accordance with applicable Instruction Sheet and shall be selected at random from current production Test group shall each consist of 13 connectors.

B. Test Sequence

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

4.2 Requalification Testing

If changes significantly affecting form, fit or function are made to be 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 requirement of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmitted.

4.4 Quality Conformance Inspection

Applicable TE quality inspection plan will 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.

Applicable part number and description

Part Number	Description
□-2013655-□	External DisplayPort Right Angle SMT Standard
□-2013659-□	External DisplayPort Right Angle TH Standard
□-2013946-□	External DisplayPort Right Angle TH Offset 0.96mm Reverse
□-2040175-□	External DisplayPort Right Angle SMT Standard Mylar Option
□-2040247-□	External DisplayPort Right Angle SMT Standard SMT-leg with Flange
□-2040519-□	External DisplayPort Right Angle SMT Standard SMT-leg with Flange
□-2040204-□	External DisplayPort Right Angle SMT Standard TH-leg with Flange
□-2040451-□	External DisplayPort Right Angle TH STD 2-Row

Appendix 1