PCI Express Gen4 Connector

1. SCOPE

1.1. Contents

This specification covers the performance, tests and quality requirements for the TE PCI Express Gen4 15u" gold /gold flash plating 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 Documents

- 501-60088-1: Qualification Test Report For 15u" Gold and Gold Flash Plating Parts.

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: 50 volts AC/DC.
B. Current: 1.1 amperes.
C. Temperature: -40 to 85°C.

3.4. Performance Requirement and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions per EIA-364.

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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 inspection per product drawing.
ELECTRICAL		
Low level contact resistance.	30 mΩ maximum.	EIA-364-23, Refer to Figure 3 Measure by dry circuit, 20 mV max open circuit at 100 mA max.
Dielectric withstanding voltage.	1 minute hold with no breakdown or flashover.	EIA 364-20C Method B Test between adjacent contacts of unmated connector assemblies. Voltage: 500 VAC, Current leakage: 0.5 mA max.
Insulation resistance.	1000 MΩ minimum.	EIA-364-21 After 500 V DC for 1 minute, measure the insulation resistance between the adjacent contacts of unmated connector assemblies.
MECHANICAL		
Mating force.	1.15 N per contact pair maximum.	EIA-364-13 Measure force necessary to mate the connector assemblies at a max of 12.5 mm/minute.
Unmating force.	0.15 N per contact pair minimum.	EIA-364-13 Measure force necessary to unmate the connector assemblies at a max of 12.5 mm/minute.
Durability.	See NOTE 1	EIA-364-09 Mate and unmated connector assemblies for 50 cycles at a maximum rate of 200 cycles/hour.
Durability (preconditioning)	See NOTE 1	EIA-364-09 Mate and unmated connector assemblies for 20 cycles at a maximum rate of 200 cycles/hour.
Reseating.	See NOTE 1	Manually unplug/plug the connector. Perform 3 such cycles.
Vibration, random.	No discontinuities of 1 µs or longer duration. See NOTE 1	EIA-364-28, Test condition VII, Test letter D Subject mated connectors to 3.1 g's RMS. 15 minutes in each of three mutually perpendicular planes.
Physical Shock	No discontinuities of 1 µs or longer duration. See NOTE 1	EIA-364-27B Condition H Pulse shape: half sine. Peak acceleration: 490 m/s2 (50g). Duration of pulse: 11 ms. Apply 3 shocks in each direction of 3 mutual perpendicular axes, total of 18 shocks

ENVIRONMENTAL		
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. Solder Temperature: 245 ±5°C. Solder Immersion Time: 5 ±0.5 s.
Resistance to reflow soldering heat.	No physical damage shall occur.	Moisture Soak precondition ：85°C, 60%RH for 168 hours. Pre Heat：150~200°C, 60~180sec.Peak Temp.：260+0/-5°C, 20~40sec. Ramp to peak：3°C max. per second Ramp to cool down ：6°C max. per second Time over liquids (217°C) ：60~150 sec Duration：3 cycles TE Connectivity spec. 109-201, Test condition B, Refer to Figure 3.
Temperature life.	See NOTE 1	EIA-364-17, Method A, Test condition 4 Subject mated Connector 105°C for 168 hours.
Temperature life (Preconditioning).	See NOTE 1	EIA-364-17, Method A, Test condition 4 Subject mated Connector 105°C for 92 hours.
Thermal shock.	See NOTE 1	EIA-364-32, Condition I Subject mated specimens to 10 cycles between -55 and 85°C
Thermal disturbance	⊿R=20 mΩ Max. (Final)	Cycle the connector or socket between 15 °C ± 3 °C and 85 °C ± 3 °C, as measured on the part. Ramps should be a minimum of 2 °C per minute, and dwell times should insure that the contacts reach the temperature extremes (a minimum of 5 minutes). Humidity is not controlled. Perform 10 such cycles.
Humidity-temperature cycling.	See NOTE 1	EIA-364-31, Method III, Condition B Subject mated specimens to 10 cycles (10 days) between 25 and 65°C at 90 to 95% R.H.
MFG	⊿R=20 mΩ Max. (Final)	Mated connector. 30℃, 70% R.H. 5 Days Cl2 : 10±3 ppb NO2: 200±50 ppb H2S : 10±5ppb SO2: 100ppb EIA-364-65, class IIA
Contact current rating/ Temperature rise.	1.1 A per pin minimum. The temperature rise above	EIA-364-70, Method 2 The sample size is a minimum of three

	ambient shall not exceed 30°C. The ambient condition is still air at 25°C.	mated connectors. The sample shall be soldered on a PC board with the appropriate footprint. Wire the eight power pins (B1, B2, B3, A2, A3, B8, A9, and A10) and the eight nearest ground pins (A4, B4, B7, A12, B13, A15, B16, and B18) in a series circuit. The mated add-in card is included in this circuit. The add-in card shall have 1 oz. copper traces and its mating geometry shall conform to the applicable PCI Express drawings. A thermocouple of 30 AWG or less shall be placed on the card edge finger pad (pins B2 and A9) as close to the mating contact as possible. Conduct a temperature rise vs. current test.

Figure 1

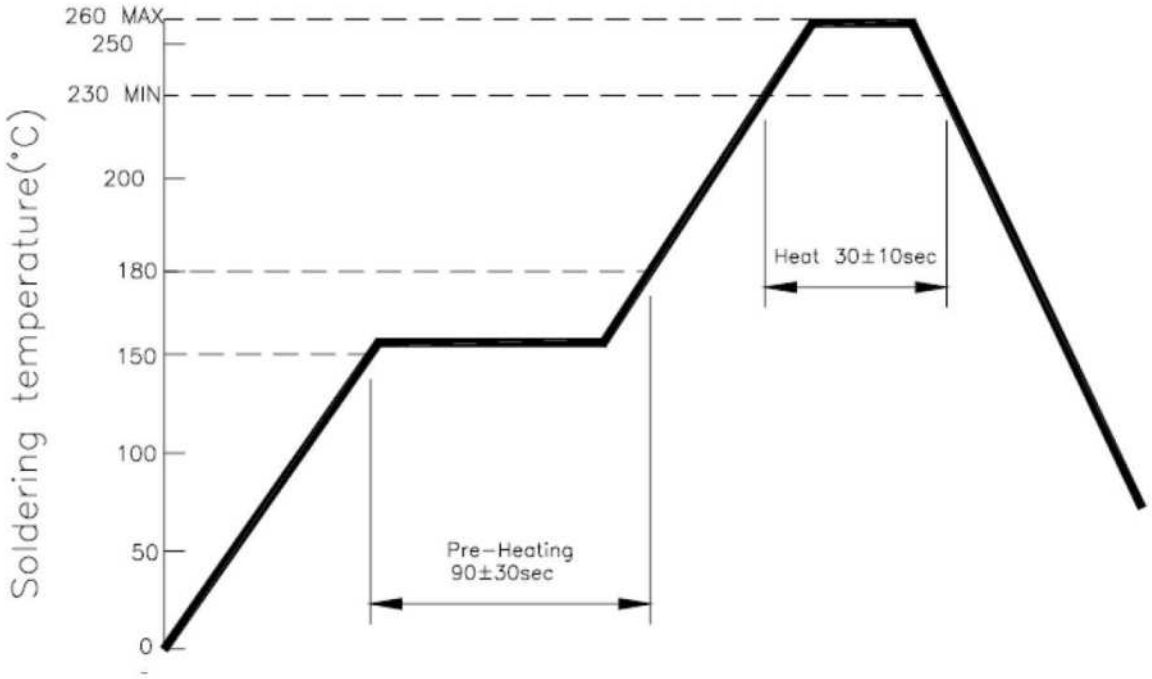
Note 1：Shall meet visual requirements, show no physical damage, and meet requirement of additional tests as specified in the test sequence in Figure 2

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group								
	A	B	C	D	E	F	G	H	I
	Test Sequence (a)								
Examination of product.	1, 9	1, 8	1, 9	1, 9	1, 8	1, 3	1, 11	1, 3	1, 3
Low level contact resistance.	3, 7	2, 5, 7	2, 5, 8	2, 5, 8			2,5,7,9		
Dielectric withstanding voltage.					2, 6				
Insulation resistance.					3, 7				
Mating force.	2, 6								
Unmating force.	4, 8								
Durability.	5	3							
Durability (preconditioning)			3	3			3		
Reseating.		6	7				10		
Vibration, random.				6					
Physical Shock				7					
Solderability.						2			
MFG							6		
Resistance to reflow soldering heat									2
Temperature life.		4							
Thermal disturbance							8		
Temperature life (Preconditioning).				4			4		
Thermal shock.			4		4				
Humidity-temperature cycling.			6		5				
Contact current rating/ Temperature rise.								2	

NOTE （a）Numbers indicate sequence in which tests are performed.

Figure 2



Temperature Profile of Reflow Soldering

Figure 3