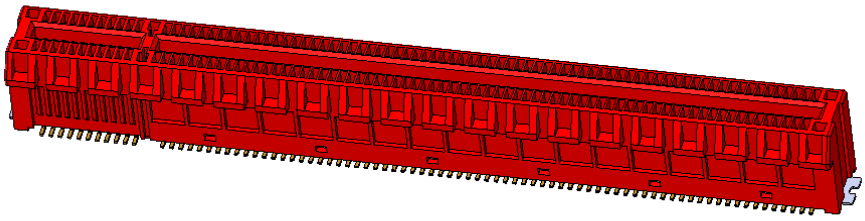
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PRODUCT SPECIFICATION

TITLE	DOC No.	DSPC-002529
PCIe 6.0 CEM Connector Specification	REVISION : 01	PAGE : 1/14
	DATE : 05/27/2025	AUTHORIZED BY : Ray

PCIe 6.0 CEM Connector Specification





JPC
connectivity

PRODUCT SPECIFICATION

TITLE	DOC No.	DSPC-002529
PCIe 6.0 CEM Connector Specification	REVISION : 01	PAGE : 2/14
	DATE : 05/27/2025	AUTHORIZED BY : Ray

1.0 SCOPE

This specification is applicable to the performance, testing, and quality requirements of the connector.

2.0 APPLICABLE DOCUMENTS

The following documents adapted for PCI-e standard CEM connector and thin type CEM connector form a part of this specification to the extent specified herewith.

In the event of conflict between the requirements of the specification and the product drawing, the product drawing shall take precedence.

In the event of conflict between the requirements of the specification and the referenced documents, this specification shall take precedence.

- EIA-364 – Test methods for electrical connectors
- MIL-STD-202F – Test methods for electrical component parts
- UL-STD-94 – Tests for flammability of plastic materials for parts in devices and appliances
- PCI Express Card Electromechanical Specification Revision 6.0

3.0 REQUIREMENTS

3.1 MATERIALS

3.1.1 Insulator

High temperature thermoplastic, UL94V-0 rated

Color: Black

3.1.2 Contacts

Copper Alloy

Contact area: 30 micro inches of gold

Solder area: Matte tin plating

Under plate: Nickel under plating all

3.1.3 Solder pad

Stainless steel

Solder area: Matte tin plating

Under Plating: Nickel under plating overall

3.1.4 Ground pin

Stainless steel

3.2 RATINGS

3.2.1 Voltage: 30 Volts AC/DC for all contacts

3.2.2 Current: 1.1A max per contact

3.2.3 None operating Temperature: -55°C ~ 105°C

3.2.4 Temperature: 65°C

JPC connectivity

PRODUCT SPECIFICATION

TITLE	DOC No.	DSPC-002529
PCIe 6.0 CEM Connector Specification	REVISION：01	PAGE：3/14
	DATE：05/27/2025	AUTHORIZED BY：Ray

4.0 TEST REQUIREMENTS AND PROCEDURES SUMMARY

ITEM 項目	DESCRIPTION 測試項目	TESTCONDITION 測試條件	REQUIREMENT 規格要求
4.1	Examination of Product 檢查產品外觀	**EIA-364-18** Visual, dimensional and functional inspection	Meets requirements of product drawing. No physical damage.

ELECTRICAL REQUIREMENT

4.2	Low Level Contact Resistance 接觸阻抗	**EIA-364-23** Apply a maximum open-circuit voltage of 20 mV and a current of 100 mA to a mated connector.	Initial:30 mΩmax Final:ΔR: 10 mΩ max 初始:30 mΩ max 測試後:ΔR: 10 mΩ max
4.3	Dielectric withstanding Voltage 耐電壓	**EIA-364-20 C-B** Apply 500 VAC for 1 minute between adjacent terminals of an unmated connector. Current leakage:0.5A max.	No breakdown or arcing
4.4	Insulation Resistance 絕緣阻抗	**EIA-364-21** Apply 500 VDC for 1 minute between adjacent terminals and between terminals and ground on unmated and dismounted connectors.	1000MΩ min

4.5	Contact current rating 溫升測試	**EIA 364-70 method 2** The sample size shall be a minimum of three mated connectors. The samples shall be soldered onto a board with the appropriate footprint. Connect the nine power pins (B1, B2, B3, A2, A3, B8, A9, A10, and B10) and the nine nearest ground pins (A4, B4, B7, A12, B13, A15, B16, B18, and A18) 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 versus current test at a minimum of 1.1 A per pin. The temperature rise above ambient shall not exceed 30°C. The ambient condition is still air at 25°C.

JPC
connectivity

PRODUCT SPECIFICATION

TITLE	DOC No.	DSPC-002529
PCIe 6.0 CEM Connector Specification	REVISION：01	PAGE：5/14
	DATE：05/27/2025	AUTHORIZED BY：Ray

MECHANICAL REQUIREMENT

ITEM 項目	DESCRIPTION 測試項目	TEST CONDITION 測試條件	REQUIREMENT 規格
4.6	Insertion Force 插入力	**EIA-364-13** Insert a steel blade of 1.70 mm thickness at a maximum rate of 25.4 mm per minute.	1.15N max per contact pair （1.15N每組,1pair=2pin）
4.7	Withdrawal Force 拔出力	**EIA-364-13** Withdraw a steel blade of 1.44 mm thickness at a maximum rate of 25.4 mm per minute.	0.15N min per contact pair （0.15N每組,1pair=2pin）
4.8	Contact Retention Force 保持力	**EIA-364-37** The end of the post shall be pulled perpendicular to the base housing at a speed of 1.27 mm/min. Minimum retention force: 5 N per terminal.	5N min per terminal

4.9	Solder Pad Retention Force 焊盤保持力	**EIA-364-37** Measure force to pull out terminals at a speed rate of 1.27mm/ min.	5N min
4.10	Durability 耐久性	**EIA-364-09** Mate and unmated the PCB for 50 cycles at a maximum rate of 25.4 mm per minute.	Contact resistance change: No more than 10 mΩ from the initial value.
4.11	Random Vibration 振動測試	**EIA-364-28, VII-D Test** Subject mated connectors to 3.1G RMS vibration for 15 minutes in each of three mutually perpendicular planes.	Contact resistance change: No more than 10 mΩ from the initial value. Discontinuity: No greater than 1.0 microsecond.

4.12	Mechanical Shock 機械衝擊	**EIA-364-27** Apply an acceleration of 50G with an 11 milliseconds duration sine half-wave waveform, 3 cycles in each of the three axes.	Contact resistance change: No more than 10 mΩ from the initial value. Discontinuity: No greater than 1.0 microsecond.

ENVIRONMENTAL REQUIREMENTS

ITEM	DESCRIPTION 測試項目	TEST CONDITION 測試條件	REQUIREMENT 規格
4.13	Cyclic Temperature and Humidity 恒溫恒濕	**EIA-364-31, Method III** Subject mated specimens to 10 cycles (10 days) between 25°C and 65°C at 90% to 95% relative humidity. After 10 cycles, remove specimens and rest at room temperature for 1 hour.	Appearance: No physical damage
4.14	Temperature Life 高溫壽命測試	**EIA-364-17 method A Mated,** Mated specimens shall be subjected to +105 ± 3°C for 168 hours.	No evidence of physical damage and resistance change (ΔR) shall be a maximum of 10 mΩ.
4.15	Thermal Shock 熱衝擊	**EIA-364-32, Method A,** Condition 1 Mated specimens shall undergo 10 cycles of the following temperature profile: -55° +0/-3°C for 30 minutes, +25° +10/-5°C for 5 minutes, +85° +3/-0°C for 30 minutes (maximum)	No evidence of physical damage and resistance change (ΔR) shall be a maximum of 10 mΩ.

4.16	Solder ability 焊錫測試	**EIA-364-638** Steam age for 1 hour ±5 minutes. Soldering time: 5 ±0.5 seconds at 245 ±5°C, using non-activated flux.	At least 90% of the immersed area shall show smooth, continuous solder coverage with no voids or pinholes.
4.17	Resistance to soldering heat (Infrared reflow) 回流焊	**EIA-364-638** Average ramp rate: 1~4°C per second Temperature (board surface): 260°C +5°C / -5°C Duration: 20~40 seconds	Appearance: No physical damage

JPC connectivity

PRODUCT SPECIFICATION

TITLE	DOC No.	DSPC-002529
PCIe 6.0 CEM Connector Specification	REVISION：01	PAGE：9/14
	DATE：05/27/2025	AUTHORIZED BY：Ray

HIGH SPEED CHARACTERIZATION

ITEM 項目	DESCRIPTION 測試項目	TESTCONDITION 測試條件	REQUIREMENT 規格要求
4.18	Differential Impedance	Rise Time 15ps (20~80%)	85Ω±10%
4.19	Differential Insertion Loss	Refer to Figure 1	EIA-364-101
4.20	Differential Return Loss	Refer to Figure 2	EIA-364-108
4.21	Differential Near End Crosstalk	Refer to Figure 3	EIA-364-90
4.22	Differential Far End Crosstalk	Refer to Figure 4	EIA-364-90

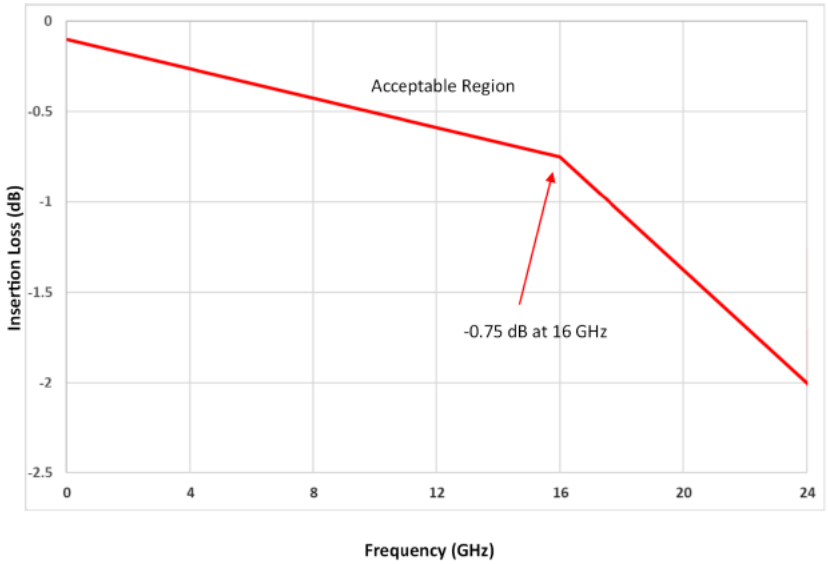


Figure 1. Differential Insertion Loss Limits for 64.0 GT/s Operation

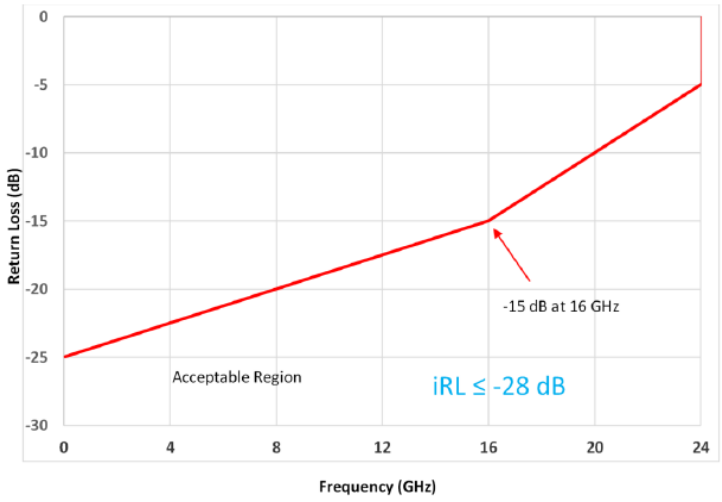


Figure 2. Differential Return Loss Limits for 64.0 GT/s Operation

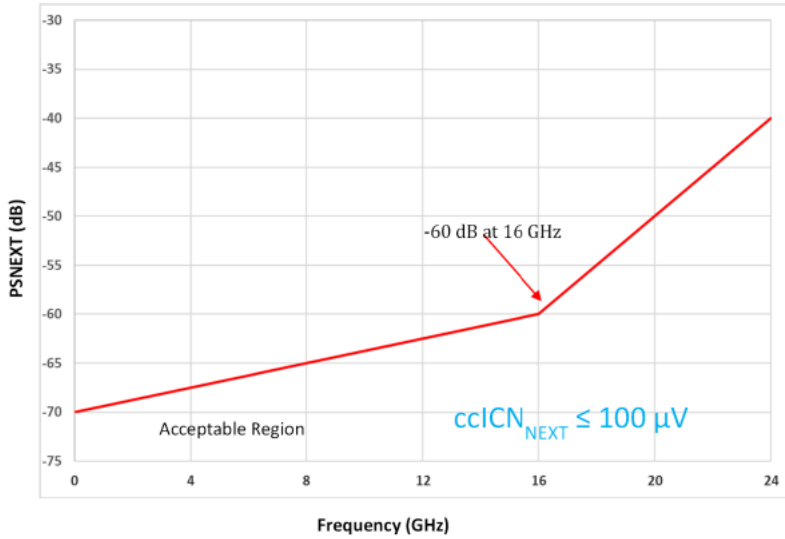


Figure 3. Differential Power Sum Near End Crosstalk Limits for 64.0 GT/s Operation

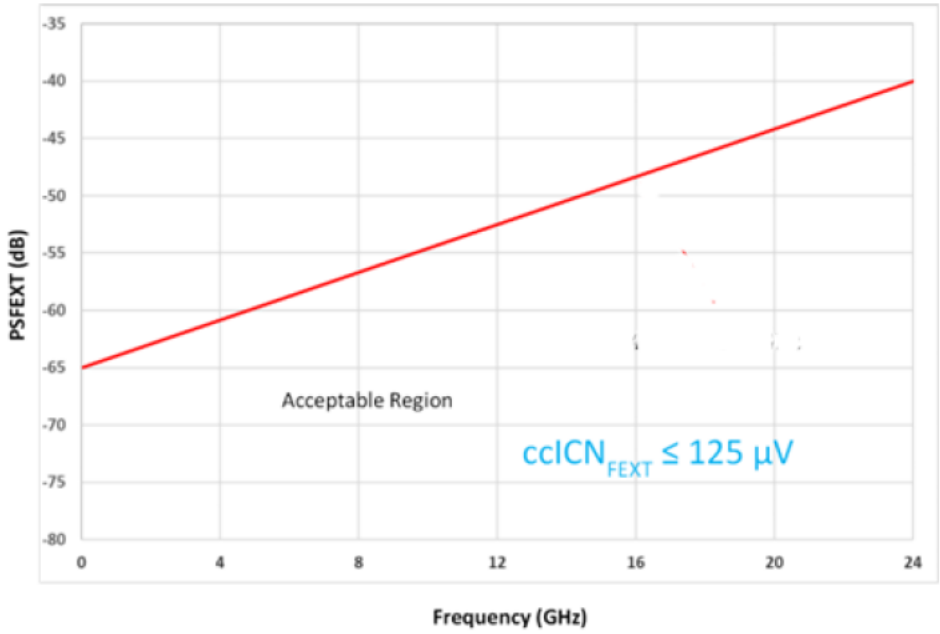


Figure 4. Differential Power Sum Far End Crosstalk Limits for 64.0 GT/s Operation

Note: The SI specification Listed above is introduced from PCI Express Card Electromechanical Specification Revision 6.0

JPC connectivity

PRODUCT SPECIFICATION

TITLE	DOC No.	DSPC-002529
PCIe 6.0 CEM Connector Specification	REVISION : 01	PAGE : 12/14
	DATE : 05/27/2025	AUTHORIZED BY : Ray

5.0 PRODUCT QUALIFICATION AND REQUALIFICATION TEST SEQUENCE:

Test or Examination	Test Group										
	A	B	C	D	E	F	G	H	I	J	K
Examination of Product	1 6	1 5	1 4	1 5	1 5	1 5	1 5	1 8	1 5	1 5	1 3
Low Level Contact Resistance	2 5	2 4		2 4	2 4	2 4	2 4		2 4	2 4	
Dielectric withstanding Voltage								3 7			
Insulation Resistance								2 6			
Temperature Rise				3							
Insertion Force	3										
Withdrawal Force	4										
Contact Retention Force			2								
Solder Pad Retention Force			3								
Durability (Preconditioning)											
Durability		3									
Vibration									3		
Mechanical Shock										3	
Cyclic Temperature and Humidity						3		5			
Resistance to Solder Heats											
Temperature Life					3						
Thermal Shock							3	4			
Mixed Flowing Gas											
Thermal Disturbance											
Solderability											2
Sample size	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**

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

(b) Discontinuities shall not take place in this test group, during tests.

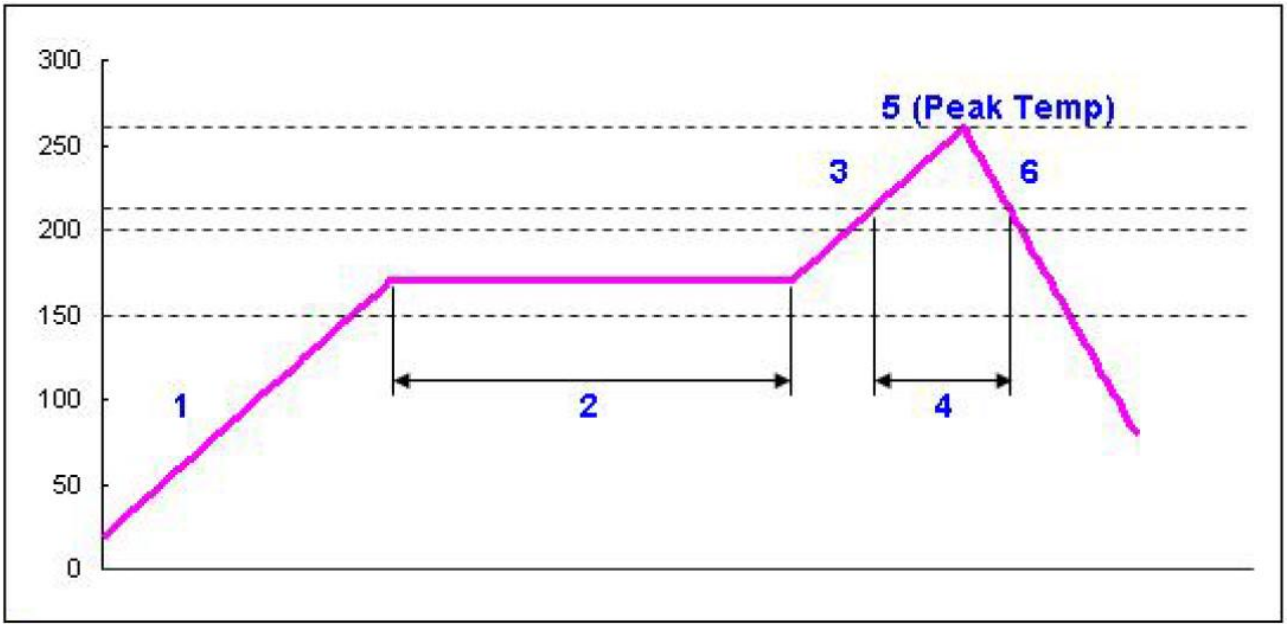
6.0 PACKAGING

Parts shall be packed in trays and protected against damage during handling, transportation and storage

7.0 RECOMMENDED IR REFLOW PROFILE (LEAD-FREE)

測試的峰值溫度:250+10/-0℃

預熱溫度:150-200℃



1	Average ramp rate	3℃ per second Max
2	Pre-heat temp.(Min)	150℃
	Pre-heat temp.(Max)	200℃
	Pre-heat time	60 to 120 seconds
3	Ramp to peak	3℃ per second Max
4	Time over liquidus(230℃)	60 to 150 seconds
5	Peak temp.	250+10/-0℃
	Time within 5℃ of peak	10seconds Max
6	Ramp-cool down	6℃ per second Max
	Time 25℃ to peak	8 minutes Max

Requirement: No physical damage after ran through re-flow oven by 3 time

JPC
connectivity

PRODUCT SPECIFICATION

TITLE	DOC No.	DSPC-002529
PCIe 6.0 CEM Connector Specification	REVISION : 01	PAGE : 14/14
	DATE : 05/27/2025	AUTHORIZED BY : Ray

8.0 REVISION RECORD

Rev.	Comments	Originator	Approval	Date
01	Initial Draft	Sam	Ray	05/29/2025