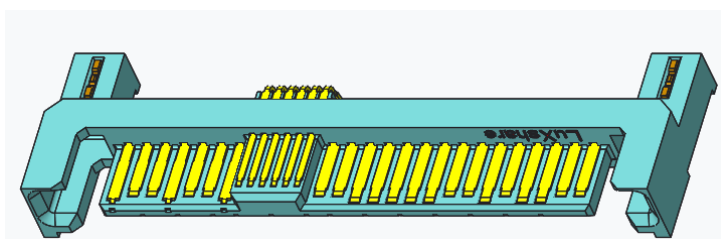


PCIe/SAS (U.2/U.3) Connector Product Specification


Prepared by:
Ray Hung
Check by:
Daniel Lin
Approved by:
Hongji Chen
Date:
05/15/2023
Date:
05/15/2023
Date:
05/16/2023

	TYPE PRODUCT SPECIFICATION	SPEC. NO XX-XX-XX-XXXX	Revision X4
		Date 05/17/2023	Page 2/12
1 SCOPE 範圍: This specification defines the performance, test, quality and reliability requirement of the PCIe/SAS connector product. 本規格書定義了 PCIe/SAS 連接器產品的性能，測試，質量以及可靠性要求。 2 APPLICABLE DOCUMENTS 適用文件: The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, latest edition of the specification applies. In the event of conflict between requirements of this specification and product drawing, product drawing shall take precedence. 以下文件在此處指定的範圍內構成了本說明書的一部分。除非另有說明，否則適用最新版本的規範。如果本規範的要求與產品圖紙衝突，則以產品圖紙為準。 2.1 Industry standards 行業標準： <u>List applicable specifications that are referenced in the specification e.g.:</u> <u>列出規範中引用的適用規範，例如：</u> 2.1.1 Flammability: UL94V-0 or similar applicable specification 易燃性: UL94V-0 或類似的適用規範 2.1.2 EIA 364: Electrical Connector/Socket Test Procedures Including Environmental Classifications. EIA 364: 電連接器/插座測試程序，包括環境類別。 2.1.3 SFF-8639: Multifunction 12 Gb/s 6X Unshielded Connector SFF-8639: 多功能 12 Gb/s 6X 無屏蔽連接器 3 MECHANIC DIMENSIONS 機械尺寸: 3.1 Dimensions 尺寸: Refer to engineering drawing 參考工程圖 4 REQUIREMENTS 要求: 4.1 Qualification 資格: Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein. Unless otherwise specified, all measurements shall be performed within the following lab conditions: 根據本規範提供的連接器應能夠滿足此處指定的資格測試要求。除非另有說明，否則所有測量均應在以下實驗室條件下進行： a. Temperature 溫度: 25°C±10°C b. Relative Humidity 相對濕度: 20% to 80% c. Atmospheric Pressure 大氣壓: 650mm to 800mm of Hg (86 ~106Kpa)			

	TYPE PRODUCT SPECIFICATION	SPEC. NO XX-XX-XX-XXXX	Revision X4
		Date 05/17/2023	Page 3/12
4.2 Materials 材料: Materials used in the construction of this product shall be as specified on the applicable product drawing. 用於製造本產品的材料應符合適用產品圖紙上的規定。 4.3 Finish 電鍍: Plated finished for qualification components shall be meet the connector’s application. 合格組件的電鍍表面處理應符合連接器的應用。 4.4 Workmanship 工藝: Connectors shall be uniform in quality and shall be free from burrs, scratches, cracks, voids, chips, blisters, sharp edges, and other defects that will that may impair performance. 連接器的質量應統一，並且無毛刺，刮痕，裂紋，空隙，碎屑，水泡，鋒利的邊緣以及其他可能影響性能的缺陷。 5 RATING 5.1 Operating Voltage Rating 工作電壓額定值 = 12V 5.2 Operating Temperature Range 工作溫度範圍 = -40~85 (°C) 6 ELECTRICAL CHARACTERISTIC 電器特性: 6.1 Current Rating 額定電流: 6.1.1 1.5A per pin at power section 電源端子每 PIN 1.5A - Peak current 2.5A 1.5S 峰值電流 2.5A 1.5S - Peak current pre-charge 6A 1ms 峰值電流預充電 6A 1ms 6.1.2 500mA per pin at signal section 信號端子每 PIN 500mA			

7 Test Requirements and Procedures Summary 測試要求和程序摘要:
ELECTRICAL REQUIREMENTS 電氣要求

ITEM 項目	DESCRIPTION 描敘	REQUIREMENT 要求	TEST CONDITION 測試條件
7.1	Insulation Resistance 絕緣阻抗	1000 MΩ min. 最小 1000MΩ .	Subject a voltage of 500 V DC for 1 minute between adjacent contacts per EIA 364-21. 根據 EIA 364-21 ，在相鄰端子之間施加 500 V DC 電壓 1 分鐘。
7.2	Dielectric Withstanding Voltage 絕緣耐壓	No breakdown or flashover. 無故障或閃燃	Subject a voltage of 500 V AC for 1 minute between adjacent contacts per EIA 364-20 Method B . 根據 EIA 364-20 方法 B ，在相鄰端子之間施加 500 V AC 電壓 1 分鐘。
7.3	Low Level Contact Resistance (LLCR) 低階接觸阻抗	30 mΩ max initial. 初始最大 30mΩ. 15 mΩ max change from initial. 與初始值相比最大變化為 15mΩ	Subject a voltage of 20 mV max open circuit at a current of 100 mA max on mated connector assemblies per EIA 364-23. 施加 20 mV 的電壓 根據 EIA 364-23 的規定，配插連接器組合件上的最大開路電流為 100 mA 。
7.4	Temperature Rise (apply only to 15 positions) 溫升(僅電源部分)	Temperature rise shall not exceed 30 °C after 96 hours (45 minutes ON and 15 minutes OFF per hour). Ambient condition is 25°C at still air. 96 小時後(每小時開啟 45 分鐘和關閉 15 分鐘)，溫升不得超過 30°C 。靜止空氣中的環境條件為 25°C 。	- Wire contact P1, P2, P8 & P9 in parallel for power. 電源端子 P1，P2，P8 和 P9 並聯 - Wire contact P4, P5, P6, P10 & P12 in parallel for return. 接地端子 P4，P5，P6，P10 和 P12 平行返回。 - Apply 6 A total DC current to parallel contacts P1, P2, P8 & P9 and return from parallel contact P4, P5, P6, P10 & P12. 將 6A 的直流電流供電到並聯的電源 PIN，從平行的接地短路返回。

	TYPE PRODUCT SPECIFICATION	SPEC. NO XX-XX-XX-XXXX Date 05/17/2023	Revision X4 Page 5/12
MECHANICAL REQUIREMENTS 機械要求			
ITEM 項目	DESCRIPTION 描敘	REQUIREMENT 要求	TEST CONDITION 測試條件
7.5	Mating Force 插入力	Backplane – 59N Max. 板端 59N 最大	Mate connector assemblies at a rate of 25 mm per minute per EIA 364-13. 連接器插入和拔出的速率為每分鐘 25 毫米/參考 EIA 364-13
7.6	Unmating Force 拔出力	- Backplane: 6N min. 板端 6N 最小 - Initial and after durability 初始及耐久測試後	Unmate connector assemblies at a rate of 25 mm per minute per EIA 364-13. 連接器插入和拔出的速率為每分鐘 25毫米/參考EIA 364-13
7.7	Durability 耐久性	- No Physical damage 無物理損壞 15 mΩ MAX change from initial contact resistance 初始接觸電阻變化最大 15mΩ - Pre-condition 3 cycles 前提條件 3 個週期	Mate and unmate connector assemblies at a rate of 200 cycles/hour max for 500 cycles (backplane) or 25 cycles (cable) per EIA 364-09. 根據EIA 364-09，以最大 200 個循環/小時的速率進行插入和拔出，最多可進行 500 個循環(板端)或 25 個循環(線端)。
7.8	Contact Retention 端子保持力	0.3 kgf MIN. per contact 每根端子最小 0.3 kgf	- Apply axial pull out force on terminal in the housing at a rate of 25.4 mm per minute. 以每分鐘25.4 mm的速度在外殼的端子上施加軸向拉力。 - Pre-condition 3 cycles 預條件3次循環
7.9	Vibration (Random) 震動(隨機)	- Discontinuity <1 microsecond 不連續性<1 微秒 15 milliohm maximum change from initial Contact Resistance 初始接觸電阻的最大變化為 15 毫歐	Subject mated connector to 3.10 g's RMS between 20-500Hz for 15 minutes in each of 3 mutually perpendicular planes. 在 3 個相互垂直的平面中，使連接器的配對連接器在 20-500Hz 之間的 3.10g RMS 下持續 15 分鐘。 (EIA 364-28 Condition VII)
7.10	Physical Shock 物理衝擊	Discontinuity <1 microsecond 不連續性<1 微秒	Subject mated connectors to 50 g's half-sine shock pulses of 11 milliseconds duration in each X,Y and Z

		15 milliohm maximum change from initial Contact Resistance 初始接觸電阻的最大變化為 15 毫歐	axis (18 shocks total) 使匹配的連接器在X，Y和Z軸上承受持續時間為11毫秒的50g與½正弦波 (11milliseconds)的衝擊(總共18次沖擊) (EIA 364-27 Condition H)
7.11	Soldering Heat Resistivity 高溫焊接	There shall be no evidence of physical or mechanical damage 沒有任何物理或機械損壞的跡象	- Pre-heating 預熱: 150°C ~ 200°C, 60~180 sec - Soldering 焊接: 230°C min. 60 sec max. - Peak Temperature 峰值溫度: 260°C±5°C, 10±1 sec - Number of times 次數: 3 times - Reference參考: Peak Reflow – 260 °C - EIA 364-56

	TYPE PRODUCT SPECIFICATION	SPEC. NO XX-XX-XX-XXXX Date 05/17/2023	Revision X4 Page 7/12
Environmental Requirements 環境要求			
ITEM 項目	DESCRIPTION 描敘	REQUIREMENT 要求	TEST CONDITION 測試條件
7.12	Humidity 溫濕循環	- No Physical damage 無物理損壞 15 milliohm maximum change from initial Contact Resistance 初始接觸電阻的最大變化為 15 毫歐	Subject mated connector assemblies to 240 hours at 25°C~65 °C with 90~95% relative humidity, 10 Cycles per EIA 364-31, Method IV 連接器配插測試240小時，溫度在 25°C~65 °C，相對濕度90-95%，循環 10次。參考EIA 364-31, 方法IV
7.13	Temperature Life 溫度壽命	- No Physical damage 無物理損壞 15 milliohm maximum change from initial Contact Resistance 初始接觸電阻的最大變化為 15 毫歐	Subject mated connector assemblies to 105°C for 500 hours per EIA 364-17, Method A, Condition III. 根據EIA 364-17，方法A，條件III，使連接器互配組件在105°C的溫度下放置500小時。
7.14	Thermal Shock 溫度衝擊	- No Physical damage 無物理損壞 15 milliohm maximum change from initial Contact Resistance 初始接觸電阻的最大變化為 15 毫歐	Subject mated connector assemblies to 10 cycles between -55°C and 85°C per EIA 364-32, Condition I. 根據EIA 364-32條件I，使連接器公母互配在-55°C至85°C之間進行10個循環。
7.15	Mixed Flowing Gas 混合氣體	No Physical damage 無物理損壞	Temperature: 30°C, Relative Humidity: 70%, Chlorine: 10 ppb , Nitrogen Oxide: 200 ppb , Hydrogen Sulfide: 10 ppb , Sulfur Dioxide: 100 ppb, Exposure Time: 20 days, (Unmated: day 1~10) (Mated: day 11~20) 溫度：30°C 相對濕度：70%， 氯：10 ppb，氮氧化物：200 ppb， 硫化氫：10 ppb，二氧化硫：100 ppb， 曝光時間：20天， (未配插：第1~10天)

	TYPE PRODUCT SPECIFICATION	SPEC. NO XX-XX-XX-XXXX	Revision X4
		Date 05/17/2023	Page 8/12

			(配插：第11～20天) (EIA-364-65, Class IIA)
7.16	Solderability 可焊性	Solderable area shall have a solder coverage of 95% min. 可焊區域的焊料覆蓋率應至少為 95%。	Pre-heating :150°C±10°C, 60~120 sec Soldering: 230°C±5°C, 10±1 sec 預熱: 150°C±10°C，60~120秒 焊接: 230°C±5°C，10±1秒
7.17	Salt Spray 鹽霧測試	All pins' contact surfaces without obvious corrosion 所有引腳的接觸面均無明顯腐蝕	Meet 48 Hours(5% Salt Concentration) and mating area 滿足48小時（5%鹽濃度）在配插區域 (EIA-364-26)

8 QUALITY ASSURANCE PROVISIONS 質量保證條款:

8.1 Equipment Calibration 設備校準:

All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with MIL-C-45662 and ISO 9000.

進行任何測試所用的所有測試設備和檢驗設施均應按照 MIL-C-45662 和 ISO 9000 維護在校準系統中。

8.2 Inspection Condition 檢驗條件:

Unless otherwise specified herein, all inspections shall be performed under the following ambient conditions:

除非本文另有規定，否則所有檢查應在以下環境條件下進行:

a) Temperature 溫度: 25°C±10 °Cf

b) Relative Humidity 相對溼度: 20% to 80%

c) Atmospheric Pressure 氣壓: 650mm to 800mm of Hg (86 ~106Kpa)

8.3 Sample Quantity and Description 樣品數量和說明:

The sample size to be tested in each group shown in Qualification Testing Sequences should follow Table 1; All samples must be free of defects that would impair normal connector operation. All samples must meet dimensional requirements of connector.

在資格測試順序中顯示的每組中要測試的樣本數量應遵循表 1；所有樣品必須沒有缺陷，且不會損害正常連接器操作。所有樣品必須符合連接器的尺寸要求。

	TYPE PRODUCT SPECIFICATION	SPEC. NO XX-XX-XX-XXXX	Revision X4
		Date 05/17/2023	Page 9/12

8.4 Acceptance 驗收:

8.4.1 Electrical and mechanical requirements placed on test samples shall be established from test data using appropriate statistical techniques or shall otherwise be customer specified, and all samples tested in accordance with this product specification shall meet the stated requirements.

在測試樣品上放置的電氣和機械要求，應使用適當的統計技術從測試數據中建立，否則應由客戶指定，所有按照本產品規格測試的樣品均應符合規定的要求。

8.4.2 Failures attributed to equipment, test set up, or operator error shall not disqualify the product. If product failure occurs, corrective actions shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

因設備，測試裝置或操作員錯誤引起的故障不會使產品喪失資格。如果發生產品故障，則糾正措施不應使該產品不合格。如果發生產品故障，應採取糾正措施並重新提交樣品進行鑑定。

8.5 Qualification Testing 資格測試:

Qualification testing shall be performed on sample units produced with equipment and procedures, normally used in production. The test sequence shall be as shown in Qualification Testing Sequences Visual Examination: EIA 364-18.

對生產中通常使用的設備和程序所生產的樣品單位，應進行資格測試。測試程序應如“資格測試程序外觀檢查：EIA 364-18 中所示。

8.6 Re-qualification Testing 重新資格測試:

If any of the following conditions occur, the responsible product engineer shall initiate re-qualification testing consisting of all applicable parts of the qualification test matrix Table 1.

如果發生以下任何一種情況，則負責的產品工程師應啟動重新資格測試，該測試包括資格測試矩陣表 1 中的所有適用部分。

8.6.1 A significant design change is made to the existing product which impacts the product form, fit or function. Examples of significant changes shall include, but not be limited to, changes in the plating material composition or thickness, contact force, contact surface geometry, insulator design, contact base material, or contact lubrication requirements.

對現有產品進行了重大的設計更改，從而影響了產品的形狀，配合或功能。重大變化的示例應包括但不限於電鍍材料成分或厚度，接觸力，接觸表面幾何形狀，絕緣體設計，接觸基材或接觸潤滑要求的變化。

8.6.2 A significant change is made to the manufacturing process, which impacts the product form, fit or function.

對製造過程進行了重大更改，這會影響產品的形狀，配合或功能。

8.6.3 A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

在生產或最終使用期間發生重大事件，需要針對產品設計或製造過程採取糾正措施。

	TYPE PRODUCT SPECIFICATION	SPEC. NO XX-XX-XX-XXXX	Revision X4
		Date 05/17/2023	Page 11/12

9 Product Qualification Test Sequence 產品驗證測試程序:

Test Group→		A	B	C	D	E	F	G	H	J
Section	Test Item↓									
	Examination of Product 產品檢驗	1,5	1,9	1,5,9	1,11	1,6	1,3	1,3	1	1,5
7.1	Insulation Resistance 絕緣阻抗				3,9					2
7.2	Dielectric Withstanding Voltage 絕緣耐壓				4,10					3
7.3	Low Level Contact Resistance (LLCR) 低階接觸阻抗	2,4	3,8	2,4,7	2,6,8	2,5				
7.4	Temperature Rise (apply only to 15 positions) 溫升(僅電源部分)			8						
7.5 7.6	Mating / Unmating Force 插入力/拔出力		2,5							
7.7	Durability(include pre-cond.) 耐久性	3	4							
7.8	Contact Retention 端子保持力								2	
7.9	Vibration (Random) 震動(隨機)		6							
7.10	Physical Shock 物理衝擊		7							
7.11	Soldering Heat Resistivity 高溫焊接							2		
7.12	Humidity 溫濕循環				5					
7.13	Temperature Life 溫度壽命			3						
7.14	Thermal Shock 溫度衝擊				7					
7.15	Mixed Flowing Gas 混合氣體					3				
7.16	Solderability 可焊性						2			
7.17	Salt Spray 鹽霧測試									4
	Reseating(manually unmating/mating three times) 重新拔插(手動對插 3 次)			6		4				
Sample Quantity 樣品數量		5	5	5	5	5	5	5	5	5

Table 1



TYPE

PRODUCT SPECIFICATION

SPEC. NO

XX-XX-XX-XXXX

Revision

X4

Date

05/17/2023

Page

12/12

10 Revision recoed 改版紀錄:

REV.	Page	Description	EC#	Date
X1	All	Initial revision	NA	11/06/2020
X2	11	Update Group C	NA	12/10/2020
X3	11	Update Group D,J	NA	01/06/2021
X4	11	Update figure	NA	05/15/2023