



PRODUCT SPECIFICATION

產品規格書

產品名稱 Description	產品料號 Part No.	圖號 Drawing No.
4976-F Series	4976-F2XxxTSA-S	4976-D0000-006
	4976-F2XxxTRA	4976-D0000-007
	4976-F2XxxTHB-2X20CM-Axx	4976-D0000-009

PRODUCT NAME 產品名稱	DOCUMENT No.: 文件編號	Rev. 版本	OUPiIN
4976-F Series	Q4976-PSS-002	A	歐品電子
	Approved 核准	Checked 審核	Prepared 制作



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1. SCOPE 適用範圍

This product specification defines the product performance and the test methods to ascertain the performance of the 4976-F Series, which is designed and manufactured by Oupiin Electronic Co., Ltd. This product specification is applicable but not only for those part numbers which be shown in the cover page.

本產品規格書規定了由歐品電子有限公司設計生產的 4976-F Series 連接器產品的特性及測試方法。本產品規格書適用於但不局限於封面所顯示的產品料號。

2. REFERENCE DOCUMENTS 參考文件

MIL-STD-1344	Test method for electrical connector 電子連接器測試方法
MIL-STD-202	Test method for electrical components 電子零件測試方法
EIA364	Test method for electrical components 電子零件測試方法
JIS C 0051	Test method for electrical components 電子零件測試方法
MIL-G-45204C	Specification for gold plating 鍍金規格
IEC-512-3	IEC standard for current carrying capacity tests IEC電流測試標準
QQ-N-290A	Specification for nickel plating 鍍鎳規格
MIL-P-81728A	Specification for tin/lead plating 鍍錫鉛規格
MIL-T-10727B	Specification for tin plating 鍍錫規格
UL1977	UL standard for safety of attachment plug and receptacle UL安規要求標準

3. FEATURE & DIMENSIONS 特征及尺寸

3.1. PRODUCT DIMENSION 產品尺寸

These connectors shall have the dimensions as shown in drawing.

本產品的相關尺寸參見圖面。

3.2. PCB/PANEL LAYOUT 印刷電路板佈局

The recommended PCB layout is shown in drawing.

本產品適用的 PCB layout 參見圖面。

3.3. BILL OF MATERIAL 材料清單

Harmful material controlling follows the requirements of RoHS. The bill of material is described in drawing.

有害物質控制符合RoHS指令要求。本產品使用的材料參見圖面。

3.4. MECHANICAL & ELECTRICAL CHARACTERISTIC 機械及電氣特性

The connector shall have the mechanical and electrical performance as described in drawing.

本產品的機械及電氣特性參見圖面。



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3.5. PACKAGING 包裝

Products shall be packaged according to requirements specified in purchase order for safe delivery, connector container and the packaging method are shown in package specification.

產品可依客戶指定要求包裝，包裝材料與包裝方式參見產品包裝規範。

3.6. RATING CURRENT, RATING VOLTAGE AND TR 額定電流,額定電壓及溫升

Rating current : See Table.

額定電流：看表

Rating voltage : 600V

額定電壓：600V

Table :

Wire Size	Current Rating (Dual Row)											
	2	4	6	8	10	12	14	16	18	20	22	24
18 AWG	10.30	9.30	8.50	7.70	7.00	6.50	6.10	5.70	5.50	5.40	5.40	5.50
20 AWG	8.50	7.30	6.20	5.30	4.60	4.00	4.00	4.00	3.75	3.75	3.75	3.75
22 AWG	7.50	6.60	5.80	5.10	4.50	4.00	3.60	3.60	3.25	3.25	3.25	3.25
24 AWG	6.50	5.80	5.20	4.60	4.10	3.75	3.40	3.20	3.00	3.00	3.00	3.00
26 AWG	5.50	4.90	4.30	3.80	3.40	3.00	2.70	2.50	2.30	2.25	2.25	2.25
28 AWG	5.00	4.50	4.10	3.70	3.30	3.00	2.70	2.50	2.30	2.20	2.10	2.00
30 AWG	3.75	3.60	3.50	3.40	3.20	3.00	2.70	2.50	2.30	2.20	2.10	2.00

3.7. TEMPERATURE RISE 溫升

1.Chart of Temperature vs current(series connection with all contact of SPEC)

加載電流對應溫度曲線圖(相同規格的所有 PIN 串聯起來)

3.8. STORAGE AND OPERATING TEMPERATURE 存貯與使用溫度

Temperature range: -40°C~+105°C, including terminal temperature rise for rating current.

Storage Temperature :0°C~+65°C, Humidity: 80%RH under , Time limit is 6 months the products are stored .

溫度範圍：-40°C~+105°C,包含接觸端子的額定電流溫升.

儲存溫度：0°C~+65°C，濕度：80%RH以下,產品限存時間為6個月.



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4. ENVIRONMENTAL (環境要求)

4.1. SOLDERABILITY (可焊性)

Connectors meet solder ability to EIA-364-52. Finish shall be free of contaminants.
(產品可焊性符合 EIA-364-52 標準規定的相關要求，表面不得有污染物。)

4.2. RESISTANCE TO SOLDER HEAT (耐焊接熱)

4.2.1. INFRARED REFLOW 紅外線回流焊接

Each cycle consists of three consecutive phases, as shown in **Table III**.
每個焊接週期包括三個連續的階段，見附表三。

4.3. WAVE SOLDER 波峰焊接

Each cycle consists of three consecutive phases. as shown in **Table IV**.
每個焊接週期包括三個連續的階段，見附表四。

Note: 說明

Device temperature measurements are referenced from the top-center of the package outer surface.
設備溫度量測時以從頂部中間位置測量為準。

5. PERFORMANCE AND TEST DESCRIPTION 性能及測試

5.1. REQUIREMENT 要求

Product is designed to meet electrical, mechanical, and environmental performance requirements specified in **Table I**.
本產品設計符合附表一所列的機械，電氣及環境要求。

5.2. TEST CONDITION 測試條件

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.
除非特別注明，所有測試在室溫條件下完成。

5.3. SAMPLE SELECTION 樣品選擇

Test samples shall be selected at random from current production. No test samples shall be reused.
Each group shall be containing 5 test samples at least.
測試樣品從現生產的產品中隨機抽取，所有測試過的樣品不得重複使用。每組測試至少有5個樣品。

5.4. TEST SEQUENCE 測試順序

Product qualification test sequence as shown in **Table II**.
產品品質測試順序見附表二。



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Table I: Test Requirements and Methods

附表一：測試要求與方法

Items 項目	Requirements 要求	Test Methods 測試方法
1. Confirmation of Product 產品確認	Product shall be conforming to the requirements of applicable product drawing. 產品必須符合相關產品圖面的要求。	Visually, dimensions and functionally inspected per applicable product drawing. 依相關產品圖面，檢查產品的外觀、尺寸及功能。
2. Contact Resistance 接觸阻抗	10mΩ Max initial. 初始狀態 10mΩ Max	Subject mated contacts assembled in housing to closed circuit of 100 mA max. At open circuit voltage of 20 mV max. 所述固定端子連結到一個封閉回路中測試,電流 100 mA max,電壓 20 mV max。
	Per EIA-364-23 適用：EIA-364-23	
3. Insulation Resistance 絕緣阻抗	1000 MΩ Min. 最小 1000 MΩ.	Measure by applying test potential between the adjacent contacts, and between the contacts and ground in the mated connector. (500 V DC±10%). 測試產品相鄰端子間以及端子與接地間的電阻 (500 V DC±10%)。
	Per EIA-364-21 適用：EIA-364-21	
4. Dielectric Withstanding Voltage 耐電壓	Must withstand test potential of 2200VDC for 1 minute, current leakage must be 5.0mA Max. 必須承受測試電壓 2200 VDC，時間 1 分鐘，漏電流不大于 5.0 mA	Measure by applying test potential between the adjacent contacts, and between the contacts and ground in the mated connector. 對產品相鄰端子間以及端子與接地間加載電壓，並測試其漏電流。
	Per EIA-364-20 適用：EIA-364-20.	
5. Durability 耐久性	10.0mΩ Max initial. After testing Contact Resistance(change from initial) : 20 mΩ max. 初始狀態最大 10 mΩ。 測試後接觸阻抗(從初始值)最大為 20mΩ	Mate connectors up to 25 cycles at a maximum rate of 10 cycles per minute. 常規以每分鐘最大 10 個循環的速率配接连接器至最多 25 個循環
	Per EIA-364-09 適用：EIA-364-09	



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6. Conn. Mating /Un-mating Force 連接器插入力/拔出力	Mating force: 7.0 N max. /pin Max. Un-mating force: 1.4N min. /pin Min 插入力最大: 7.0N /pin Max 拔出力最小: 1.4N/pin Min	At a speed of 25.4±6 mm/minute, apply axial insert the mating part into fully or pull out from the subject product. 以25.4±6 mm/分鐘的速度，軸向完全插入對配插件到被測產品中或從被測產品中拔出。
	Per EIA-364-13 適用：EIA-364-13	
7. Terminal Retention Force 端子保持力	13.7N min. retention force.	At a speed of 25.4±6 mm/minute, apply axial insert the mating part into fully or pull out from the subject product. 以 25.4±6 mm/分鐘的速度，軸向完全插入對配插件到被測產品中或從被測產品中拔出。
	Per EIA-364-13 適用：EIA-364-13	
8.Crimp Terminal Retention Force (in housing) 線端端子保持力 (塑膠內)	24.5N min. retention force.	Axial pullout force on the terminal in the housing at a rate of 25.4±6 mm per minute. 以 25.4±6 mm/分鐘的速度，對端子施加軸向力插入對配插件。
	Per EIA-364-29C 適用：EIA-364-29C	
9.Crimp Terminal Insertion Force (into housing) 線端端子插入 (插入塑膠)	14.7N min. retention force.	Apply an axial insertion force on the terminal at a rate of 25.4±6 mm 以 25.4±6 mm/分鐘的速度，對端子施加軸向力。
	Per EIA-364-05 適用：EIA-364-05	
10.Housing Locking Mechanism Strength (塑膠卡扣機械強度)	58N min.	Exert an axial force at a rate of 13mm per minute to separate the housing halves 以每分鐘 13mm 的速度施加軸向力，將塑膠分成兩半。
	Per EIA-364-98 適用：EIA-364-98	
11.Wire Pullout Force (Axial) 線材拔出力(軸向)	16AWG : 89N Min. 18AWG : 89N Min. 20AWG : 57.8N Min. 22AWG : 35.6N Min. 24AWG : 22.2N Min. 26AWG : 13.3N Min. 28AWG : 8.9N Min. 30AWG : 6.6N Min.	Apply an axial pullout force on the wire at a rate of 25 ± 6 mm 以25.4±6 mm/分鐘的速度，對線材施加軸向力。
	Per EIA-364-08 適用：EIA-364-08	



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12. Vibration 機械振動	After testing, no damage. No electrical discontinuity greater than 1μs shall occur. Contact Resistance(change from initial):20 milliohm. 測試後，產品無損壞.不允許出現超過1μs 的瞬間斷開， 接觸阻抗： 測試後接觸阻抗(從初始值)最大為20mΩ。 Per EIA-364-28 適用：EIA-364-28	Mate connectors and vibrate per EIA 364-28, test condition VII, Letter D. Test Duration: 15 minutes each axis. 連接器對配後依照EIA 364-28 中的選項VII，項次D進行測試，每軸測試時間為15分鐘。
13. Mechanical Shock 機械衝擊	After testing, no damage. No electrical discontinuity greater than 1μs shall occur. Contact Resistance(change from initial):20 milliohm. 測試後，產品無損壞.不允許出現超過1μs 的瞬間斷開， 接觸阻抗： 測試後接觸阻抗(從初始值)最大為20mΩ。 Per EIA-364-27. 適用：EIA-364-27。	Subject mated connector and shock at 50g with 1/2 sine wave (11millisecond) shocks in the 3 axes (18 shocks total) 加載50g半正弦波，持續11毫秒，三個方向共18次。
14. Thermal Shock 溫度沖擊	After testing, no damage Contact Resistance :Δ20mΩ max. Dielectric Strength should be OK except 2200VAC test voltage Insulation Resistance should be 1000 MΩ Min. 測試後產品無損壞 接觸阻抗最大變化Δ20.0mΩ； 耐電壓測試OK； 測試電壓為2200VAC 絕緣阻抗最小1000 MΩ Per EIA-364-32. 適用：EIA-364-32。	Temperature range from -4°C to +105°C. Start from -4°C, after 30 minutes, change to +105°C; change time is no more than 5 minutes, total 5 cycles. 溫度變化範圍： -4°C~ +105°C。從 -4°C開始，30分鐘後換到+105°C，轉換時間不超過5分鐘共5個循環。



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15. Temperature Life 溫度壽命	After testing, no damage, Contact Resistance: 20 milliohm max (change from initial). Discontinuity < 1 microsecond. 測試後產品無損壞， 接觸阻抗(從初始值)最大為20.0mΩ； 瞬斷< 1微秒。 Per EIA-364-17 適用：EIA-364-17	Connectors mate and expose tin plated terminals to 240 hours at 105 ± 2 °C. 連接器對配後，鍍錫端子暴露在105 ± 2 °C的環境中240小時；
16. Humidity/ Temperature Cycles 溫濕度循環	After testing, no damage, Contact Resistance(change from initial): 20mΩ max. Dielectric Strength should be OK , except 500VAC test voltage Insulation Resistance should be 1000 MΩ Min. 測試後產品無損壞， 接觸阻抗(重初始值)最大為20.0mΩ； 耐電壓測試OK；測試電壓為500VAC 絕緣阻抗最小1000 MΩ Per EIA-364-31 適用：EIA-364-31	Cycle mated connectors between 25 °C ± 3 °C at 80% ±3% RH and 65 °C ± 3 °C at 50% ± 3 RH. Ramp time: 0.5 hr; dwell time: 1 hr. Perform 24 cycles. Remove surface moisture and air dry for 1 hour prior to measurements 配對連接器後在溫度 25°C±3°C 相對溼度 80% ±3% 和溫度 65°C±3°C 相對濕度 50%±3 之間循環。溫升時間：0.5 小時；停留時間：1 小時。執行 24 個循環。測量前除去表面水分並風乾 1 小時
17. Salt Spray 鹽霧	After testing, no damage, Contact resistance 20mΩ max (change from initial), Dielectric. Strength should be OK, 測試後產品無損壞，接觸阻抗(重初始值)最大為20mΩ Per EIA-364-26 適用：EIA-364-26	5±1% salt concentration 48 hours 35±2°C 鹽水濃度 5±1%，時間 48 小時，溫度 35±2°C。



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18. Solder-ability 可焊性	Appearance of the specimen shall be inspected after the test with the assistance of a magnifier capable of giving a magnification of 10 X for any damage such as pinholes, void or rough surface. 5% maximum dewetting. 產品在測試完成後，在放大倍數為 10 倍的顯微鏡下，檢查外觀損壞如：小孔，空焊，外觀粗糙度。未沾錫區不大於5% Per EIA-364-52 適用：EIA-364-52	Solder-bath temperature $245 \pm 5^{\circ}\text{C}$, duration 5 sec. 錫爐溫度為 245 ± 5 度，沾錫時間 5 秒
19. Low Temperature 低溫測試	After testing, no damage, Contact Resistance(change from initial): $20\text{m}\Omega$ max. 測試後產品無損壞，接觸阻抗(重初始值)最大為 $20\text{m}\Omega$。 Per EIA-364-59 適用：EIA-364-59	Mate connectors: Duration; 96 hours; Temperature: $-40 \pm 3^{\circ}\text{C}$ 配接連接器：持續時間；96小时；溫度：$-40 \pm 3^{\circ}\text{C}$
20. Temperature rise (rating current) 溫升測試	Temperature rise: 30°C Max. 溫升：最大 30°C。 Per EIA-364-70 & EIA-364-55 適用：EIA-364-70 & EIA-364-55	Mate connectors, measure the temperature rise at rated current until temperature stable. Ambient conditions - Still air 25°C Per EIA-364-70 配對連接器，測量額定電流下的溫升，直至溫度穩定，周圍環境溫度 25°C



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Table II: Product Qualification Test Sequence

附表二：產品測試順序

Test Description 測試描述	Test Group 1 測試分組 1												
	A	B	C	D	E	F	G	H	I	J	K	L	M
1. Confirmation of Product 產品確認	1,	1	1	1	1	1	1	1	1	1	1	1	1
2. Contact Resistance 接觸阻抗	4,6	4,5, 7		4,6,8 , 10						3,5	3,5	3,5	
3. Insulation Resistance 絕緣阻抗	2	2		2	3,5								
4. Dielectric Withstanding Voltage 耐電壓			2,5,7		2,6								
5. Durability 耐久性	3	3	3	3	4					2	2	2	
6. Conn. Mating /Un-mating Force 連接器插入力/拔出力						2							
7. Terminal Retention Force 端子保持力						3							
8. Crimp Terminal Retention Force (in housing) 線端端子保持力(塑膠內)							2						
9. Crimp Terminal Retention Force (into housing) 線端端子保持力(插入塑膠)								2					
10. Housing Locking Mechanism Strength 塑膠卡扣機械強度							3						
11. Wire Pullout Force (Axial) 線材拔出力(軸向)									2				
12. Vibration 機械振動				7									
13. Mechanical Shock 機械衝擊				9									
14. Thermal Shock 溫度沖擊		4	4										
15. Temperature Life 溫度壽命	5			5									
16. Humidity/Temperature Cycles 溫濕度循環		6	6										



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17. Salt Spray 鹽霧										4			
18. Solder-ability 可焊性													2
19. Low Temperature 低溫測試											4		
20. Temperature rise (rating current) 溫升測試												4	
樣品數	5	5	5	5	5	5	5	5	5	5	5	5	5



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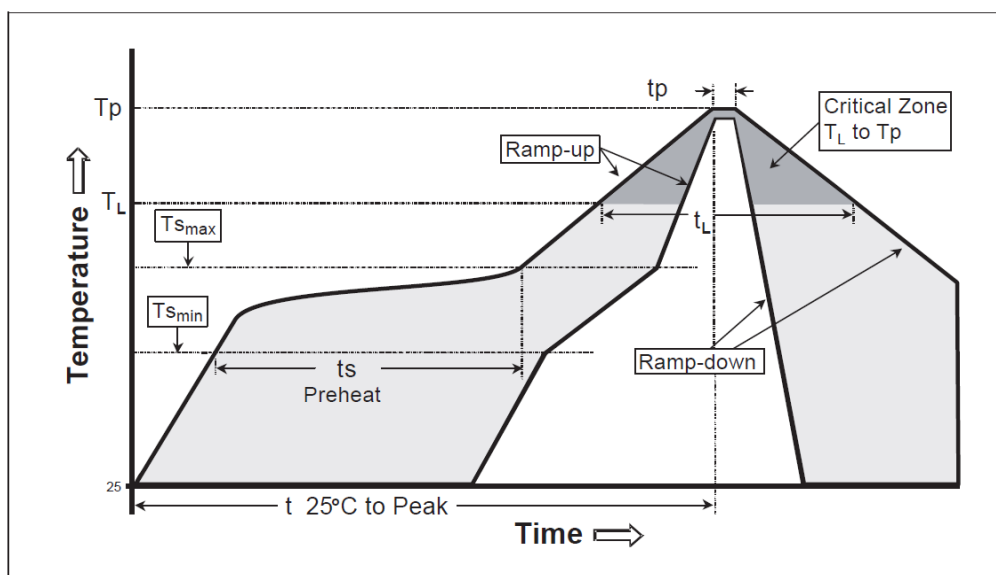
Table III: Reflow Soldering Profile

附表三：回流焊接曲線圖

Lead-free reflow profile requirements:

無鉛回流焊接曲線

Parameter 参数	Reference 参考	Specification 规格
升溫區 Ramp-up	25°C ~150°C	3°C /S Max
預熱區(Pre-heating) Temperature Min(T_{smin}) Temperature Max(T_{smax}) Time(T_{smin} to t_{smax})	150°C ~200°C	60~180sec
Time maintained above(保持时间) Temperature(T_L) Time(t_L)	217°C	60~150sec
Time within 5°C of actual peak Temperature(t_p)	260-/+5°C	20~40sec
冷卻區 Cooling	Ramp-Down Rate	6°C /S(Max)
Time 25°C to Peak Temperature	25°C ~ Peak Temp.	8 minutes maximum



This profile is the minimum requirement for evaluating soldering heat resistance of components. Heat transfer method used for reflow soldering is hot air convection. The actual air temperatures used to achieve the specified profile largely dependent on the reflow equipment.

這個曲線圖是評估元件器件焊接抗熱的基本要求。應用在對焊接中的熱傳遞方式是熱氣對流。達到特定曲線圖地實際溫度主要依賴與回流焊接設備。

Table IV : Weld the curve graph in crest

附表四：波峰焊曲線圖

