



Type Document	Product Specification	Revised /Edition	L
Date Issued	2008/03/25	Data Revised	2016/11/21
Subject: JS-1192SXXDXG JS-1192RXDXG JS-1193SXXDXG JS-1193RXDXG JS-1126WXS JS-1126WXR JS-1127WXS JS-1127WXR Pitch: 2.00mm Female Header Series Board to Board Connector			Issued By: Engineering Dept.

*This specification is referred to 2.00mm female header series board to board connector.*

本規格書內容係提供 2.00 mm 排針母座系列產品相關參考，  
其用途為電路板相接於電路板端連接器

## -INDEX-

- 1.0 Product Name/Part Number & Drawing Number. (產品名稱 / 產品型號及圖面型號)
- 2.0 Construction/Dimensions/Material & Surface Finish. (材質以及表面鍍層)
- 3.0 Characteristic. (產品特性)
- 4.0 Specimen. (樣本圖示)
- 5.0 Applicable Standards. (適用規範)
- 6.0 Mechanical Performance. (機械性能)
- 7.0 Electrical Performance. (電氣性能)
- 8.0 Environmental Performance. (環境性能)
- 9.0 Remark (備註).

REV. (版次)	Revision Record (改版變更原因)	Date(日期)	ECN No
D	新增 Square Pin Retention Force( in Base )Pin Header	2012/04/13	EC2012-04-018
E	修改額定電流為2A	2012/06/13	EC2012-06-006
F	頁首增列 JS-1126WS JS-1126WR JS-1127WS JS-1127WR 料號	2012/11/28	EC2012-11-028
G	增列料號選項 JS-1192SXXDXG, JS-1193SXXDXG, JS-1192RXDXG , JS-1193RXDXG	2013/02/19	EC2013-02-019
H	1 增訂Wave Peak Soldering In- Process Temperature Profile 2.修訂Solder Ability 附註Tin Plated : 95% / Gold Plated : 75%	2013/12/03	EC2013/12/003
I	1.修訂8.10.1 項 Temperature Profile / 2增訂8.7 項Cold耐寒試驗	2015/01/29	EC2015-01-029
J	修訂6.2 /6.3 項Retention Force After Wave Solder 修訂為Before Wave Solder	2015/02/26	EC2015-02-026
K	2.0 Pin Header Base 增加 9T 材質選項	2015/10/01	EC2015-10-001
L	Delete 8.10.1.2	2016/11/21	EC2016-11-001



喬訊電子工業股份有限公司  
 CHYAO SHIUNN ELECTRONIC INDUSTRIAL LTD.  
 7FL., NO.17, LANE 3, SEC.1 CHUNG CHENG EAST RD.,  
 TAMSHUI, TAIPEI, TAIWAN, R.O.C.  
 TEL: 886-2-2629-9955 (REP) FAX: 886-2-2626-6677



http://www.chyaoshiunn.com.tw E-mail:cs@chyaoshiunn.com.tw

<b>Type Document</b>	<b>Product Specification</b>	<b>Revised /Edition</b>	<b>L</b>
<b>Date Issued</b>	<b>2008/03/25</b>	<b>Data Revised</b>	<b>2016/11/21</b>
<b>Subject: JS-1192SXDYG JS-1192RXDYG JS-1193SXDYG JS-1193RXDYG JS-1126WXSJS-1126WXR JS-1127WXS JS-1127WXR Pitch: 2.00mm Female Header Series Board to Board Connector</b>			<b>Issued By: Engineering Dept.</b>

**1.0 Product Name/Part Number & Drawing Number(產品名稱 / 產品型號及圖面型號):**

Product Name(產品名稱)		Part Number(零件型號)	Drawing Number(圖面型號)
Female Header	Single Row (單排)	Straight(直立式)	JS-1192SXDYG-XX
		Right Angle(臥式)	JS-1192RXDYG-XX
	Double Row (雙排)	Straight(直立式)	JS-1193SXDYG-XX
		Right Angle(臥式)	JS-1193RXDYG-XX
Pin Header	Single Row (單排)	Straight(直立式)	JS-1126WXS-XXXX / JS-1126WXS-XX(6T) / JS-1126WXS-XX(9T)
		Right Angle(臥式)	JS-1126WXR-XXXX / JS-1126WXR-XX(6T) / JS-1126WXR-XX(9T)
	Double Row (雙排)	Straight(直立式)	JS-1127WXS-XXx2XX / JS-1127WXS-XXx2(6T) / JS-1127WXS-XXx2(9T)
		Right Angle(臥式)	JS-1127WXR-XXx2XX / JS-1127WXR-XXx2(6T) / JS-1127WXR-XXx2(9T)

Note: (xx) The number of the circuits.

**2.0 Construction/Dimensions/Material & Surface Finish(材質以及表面鍍層):**

Part Name(零件名稱)		Material(材質)	Surface Finish(表面鍍層)
Female Header (排針母座)	Contact (導體)	Phosphor Bronze	Gold -Plated
	Base (膠座)	Nylon 6T	UL 94V-0
Pin Header (排針)	Square Pin (方型導體)	Brass	Gold -Plated
	Base (膠座)	PBT or Nylon 6T or Nylon 9T	UL 94V-0

**3.0 Characteristic(產品特性):**

Item(項目)	Standard(標準規範)
3.1 額定電流 Rated Current	2A AC/DC
3.2 額定電壓 Rated Voltage	125V AC/DC
3.3 Ambient Temperature Range 環境與操作溫度範圍	(操作使用溫度與濕度範圍) Operating Temp.: Insulator Nylon 6T & : -40°C~+105°C ; 85% R.H. Max Insulator PBT :-25°C~+85°C ; 85% R.H. Max Including 30°C Terminal Temperature Rise at rated Current , (包括定額電流內, 端子所產生 30°C以下溫昇)
3.4 Storage of Package 包裝未拆封之保存	Temperature and Humidity Condition 溫濕度條件
	Temperature 溫度 : -10°C~+40°C Percentage Humidity 相對濕度 : 70 % Max
3.5 Floor Life 拆封後使用期限	Term 保存期限 1 Year
	3 Months

Note: 適用電路板厚度 Applicable Printed Circuit Board Thickness: 0.8~1.6 mm



<b>Type Document</b>	<b>Product Specification</b>	<b>Revised /Edition</b>	<b>L</b>
<b>Date Issued</b>	<b>2008/03/25</b>	<b>Data Revised</b>	<b>2016/11/21</b>
<b>Subject: JS-1192SXDXG JS-1192RXDXG JS-1193SXDXG JS-1193RXDXG JS-1126WXS JS-1126WXR          JS-1127WXS JS-1127WXR Pitch: 2.00mm Female Header Series Board to Board Connector</b>			<b>Issued By: Engineering Dept.</b>

4.0 Specimen(樣本圖示) :

Part Name / Part Number/ Picture or Photograph 零件名稱 / 零件型號 / 樣本圖示			
Female Header Double Row Straight JS-1193SXDXG		Pin Header Double Row Straight JS-1127WS	
Female Header Double Row Right Angle JS-1193RXDXG		Pin Header Double Row Right Angle JS-1127WR	
Female Header Single Row Straight JS-1192SXDXG		Pin Header Single Row Straight JS-1126WS	
Female Header Single Row Right Angle JS-1192RXDXG		Pin Header Single Row Right Angle JS-1126WR	

5.0 Applicable Standards(適用規範):

ANSI/EIA 364 ; EIA/ECA 364 Testing method for electrical connectors.

電子連接器，所適用之 ANSI/EIA 364 ; EIA/ECA 364 測試規範



<b>Type Document</b>	<b>Product Specification</b>	<b>Revised /Edition</b>	<b>L</b>
<b>Date Issued</b>	<b>2008/03/25</b>	<b>Data Revised</b>	<b>2016/11/21</b>
Subject: JS-1192SXDYG JS-1192RXDYG JS-1193SXDYG JS-1193RXDYG JS-1126WXSJS-1126WXR JS-1127WXS JS-1127WXR Pitch: 2.00mm Female Header Series Board to Board Connector			<b>Issued By: Engineering Dept.</b>

**6.0 Mechanical Performance(機械性能):**

Item(項目)	Test Condition(測試條件)	Requirement (規格)
6.1 Insertion & Withdrawal Force 插入力與拔出力	Insert and withdrawal with connectors at the speed rate of 25.4 ±3 mm /minute. (EIA/ECA 364-13D) 排針與排針母座兩端勘合，以每一分鐘 25.4 ±3 mm 的速率，作插入與拔出往返測試	單一接觸點 Per Contact 插入力最大容許值： Insertion Force : <b>0.6kg/f Max</b> 拔出力最小容許值： Withdrawal Force : <b>0.02 kg/f Min</b>
6.2 Contact Pin Retention Force (Female Header) 導體與排母膠座間保持力	Axial pullout force on the contact in the base at the speed rate of 25.4 ±3 mm /minute. 對於已經存在於膠座當中導體，施以每一分鐘 25.4 ±3 mm 速率之軸向拔出力 (EIA/ECA 364-29C)	單一接觸點 Per Contact 最小容許值 <b>0.4kgf/Min.</b>
6.3 Square Pin Retention Force (Pin Header) 方型導體與排針膠座間保持力	Axial pullout force on the square pin in the base at the speed rate of 25.4 ±3 mm per minute. 對於已經存在於膠座當中方型導體，施以每一分鐘 25.4 ±3mm 速率之軸向拔出力 (EIA/ECA 364-29C)	單一接觸點 Per Contact 最小容許值 <b>0.8kgf/Min.</b>

**7.0 Electrical Performance(電氣性能):**

Item(項目)	Test Condition(測試條件)	Requirement(規格)
7.1 (Low –Signal Level) Contact Resistance (低階信號) 接觸阻抗	A maximum voltage of 20mV and a maximum current of 100mA are applied to the mate connector. 對組合狀態下連接器，於其兩端施以最大電壓 20mV 以及最大電流 100mA (EIA/ECA 364-23C)	Contact Resistance: <b>20 milliohms Max.</b> 最大容許值. 20 毫歐姆
7.2 Insulation Resistance 絕緣阻抗	Apply 500V D/C for 1 minute between adjacent contacts to measure the insulation resistance. 對相鄰兩接觸導體，於一分鐘時間內施予 500V D/C 電壓，並量測其間絕緣阻抗值 (EIA 364-21C)	Insulation Resistance: <b>Initial 1000 Megohms Min</b> 最初容許值. 1000 兆歐姆
7.3 Withstanding Voltage 耐電壓	Apply 1000V A/C (rms) for 1 minute and the leakage current shall not exceed 0.5mA to the adjacent terminal and ground of the mate connectors. 對組合狀態下連接器，於其相鄰兩導體末端各施以電壓 1000V A/C(實效值) 時間 1 分鐘，且漏電流必須小於 0.5mA(毫安培) (EIA 364-20C)	No breakdown or Flash over. 無損毀或者產生火花



<b>Type Document</b>	<b>Product Specification</b>	<b>Revised /Edition</b>	<b>L</b>
<b>Date Issued</b>	<b>2008/03/25</b>	<b>Data Revised</b>	<b>2016/11/21</b>
Subject: JS-1192SXDYG JS-1192RXDYG JS-1193SXDYG JS-1193RXDYG JS-1126WXS JS-1126WXR JS-1127WXS JS-1127WXR Pitch: 2.00mm Female Header Series Board to Board Connector			<b>Issued By: Engineering Dept.</b>

8.0 Environmental Performance(環境性能) :

Item(項目)	Test Condition(測試條件)	Requirement(規格)
8.1 Durability 耐久性	Mate Connectors up <b>50</b> Cycles at a Maximun rate of <b>10</b> cycles Per minute prior to environmental test 以組合狀態下連接器且未經環境測試，依每分鐘內進行 <b>10</b> 次嵌入與拔出之最大速率，連續 <b>50</b> 次嵌入與拔出往返測試 (EIA/ECA 364-09C )	(After the test) Contact resistance <b>30 mΩ Max</b> 經耐久性試驗後接觸阻抗 最大容許值. <b>30</b> 毫歐姆
8.2 Temperature Rise (Via Current Cycling) 溫昇 (經由電流循環操作)	Mate connector . measure the temperature rise of contact when the maximum rated current is passed 以組合狀態下連接器，通過最大容許電流 量測其導體溫度上昇值(EIA 364-70B Conditions 1 . Method 1)	Mate connectors <b>Temperature Rise: +30°C/Max.</b> 組合狀態下之連接器溫度上昇最大容許值+30°C
8.3 Vibration 耐振動	A mated connector shall be mounted on a printed Circuit board and subjected to a vibration test of the following conditions. During the test, test current continuity shall be checked. After the test, contact resistance shall be measured. 以組合狀態下連接器焊接於電路板作為試驗樣品,依照隨附如下規格要求,進行耐振動試驗，試驗過程中確認是否產生不連續電流(斷電)現象，並於試驗過後量測其接觸阻抗。 (EIA/ECA 364-28E-Condition 1 ) Frequency(頻率) : 10~55~10 Hz/minute. Amplitude (振幅) : 1.5 mm P-P Direction (方向) :1. Axis of up and down.上下軸向(Y 軸) 2. Axis of right the left. 左右軸向(X 軸) 3. Axis of front and back.前後軸向(Z 軸) Period(週期) : 2 hours for each direction. (每一個軸向持續 2 小時)	Initial Contact Resistance : <b>20 milliohms Max.</b> 接觸阻抗最初容許值 <b>20</b> 毫歐姆 (After the test) Contact Resistance: <b>30 milliohms Max.</b> 經耐振動試驗後接觸阻抗 最大容許值 <b>30</b> 毫歐姆  No discontinuity current is longer than 1 microsecond. 電流中斷現象， 時間不可多於 1 微秒



喬訊電子工業股份有限公司  
 CHYAO SHIUNN ELECTRONIC INDUSTRIAL LTD.  
 7FL., NO.17, LANE 3, SEC.1 CHUNG CHENG EAST RD.,  
 TAMSHUI, TAIPEI, TAIWAN, R.O.C.  
 TEL: 886-2-2629-9955 (REP) FAX: 886-2-2626-6677



http://www.chyaoshiunn.com.tw E-mail:cs@chyaoshiunn.com.tw

<b>Type Document</b>	<b>Product Specification</b>	<b>Revised /Edition</b>	<b>L</b>
<b>Date Issued</b>	<b>2008/03/25</b>	<b>Data Revised</b>	<b>2016/11/21</b>
<b>Subject: JS-1192SXDYG JS-1192RXDYG JS-1193SXDYG JS-1193RXDYG JS-1126WXSJS-1126WXR JS-1127WXS JS-1127WXR Pitch: 2.00mm Female Header Series Board to Board Connector</b>			<b>Issued By: Engineering Dept.</b>

Item(項目)		Test Condition(測試條件)	Requirement(規格)
8.4	Humidity 恆溫恆濕	<p>A mated connector shall be placed in a humidity chamber of the following conditions. After the test, leave the specimen at room temperature for 1~2 hours before the contact resistance, the insulation resistance and the dielectric withstanding voltage shall be measured.</p> <p>(EIA 364-31B Conditions II. Method A)</p> <p>以組合狀態下連接器放置於恆定溫度與濕度的空間，依照隨附如下規格要求，進行恆溫恆濕試驗，經試驗過後將樣品置於室溫 1~2 小時，再量測其接觸阻抗、絕緣阻抗、以及耐電壓測試。</p> <p>Temperature(溫度) : 40±2°C.          Relative Humidity(相對濕度) : 90%~95% (RH).          Period(週期) : 96 hours continuously. (持續 96 小時)</p>	<p>(After the test)</p> <p>Contact Resistance:  <b>30 milliohms Max.</b>          經恆溫恆濕試驗後接觸阻抗          最大容許值. 30 毫歐姆</p> <p>(After the test)</p> <p>Insulation Resistance :  <b>500 Megohms Min.</b>          經恆溫恆濕試驗後絕緣阻抗          最小容許值 500 兆歐姆</p> <p>經恆溫恆濕試驗後耐電壓 :</p> <p>(After the test)</p> <p>Withstanding Voltage:  <b>1000V A/C for 1 minute</b></p>
8.5	Thermal Shock 冷熱衝擊	<p>A mated connector shall be subjected to a thermal shock test of the following conditions. After the test, leave the specimen at room temperature for 1~2 hours before the contact resistance, the insulation resistance and the dielectric withstanding voltage shall be measured.</p> <p>以組合狀態下連接器作為試驗樣品，依照隨附如下規格要求，進行冷熱衝擊試驗，經試驗過後將樣品置於室溫 1~2 小時，再量測其接觸阻抗、絕緣阻抗、以及耐電壓測試。</p> <p>(EIA/ECA 364-32D Conditions I. Method A)</p> <p>One Cycle Consists Of:  <b>-55°C+0/-3°C for 30 minutes. → Room Temp. 5 minutes</b>  <b>85°C+3/-0°C for 30 minutes. → Room Temp. 5 minutes</b></p> <p>Total Cycles: 5 Cycles.          以-55°C+0/-3°C溫度持續 30 分鐘，經室溫 5 分鐘，而後再以 85°C+3/-0°C溫度持續 30 分鐘，再經室溫 5 分鐘，構成一次冷熱循環，總計循環次數 5 次。</p>	<p>Same as paragraph 8.4          同 8.4 章節</p>



喬訊電子工業股份有限公司  
 CHYAO SHIUNN ELECTRONIC INDUSTRIAL LTD.  
 7FL., NO.17, LANE 3, SEC.1 CHUNG CHENG EAST RD.,  
 TAMSHUI, TAIPEI, TAIWAN, R.O.C.  
 TEL: 886-2-2629-9955 (REP) FAX: 886-2-2626-6677



<http://www.chyaoshiunn.com.tw> E-mail: [cs@chyaoshiunn.com.tw](mailto:cs@chyaoshiunn.com.tw)

<b>Type Document</b>	<b>Product Specification</b>	<b>Revised /Edition</b>	<b>L</b>
<b>Date Issued</b>	<b>2008/03/25</b>	<b>Data Revised</b>	<b>2016/11/21</b>
Subject: JS-1192SXDYG JS-1192RXDYG JS-1193SXDYG JS-1193RXDYG JS-1126WXS JS-1126WXR JS-1127WXS JS-1127WXR Pitch: 2.00mm Female Header Series Board to Board Connector			<b>Issued By: Engineering Dept.</b>

Item(項目)	Test Condition(測試條件)	Requirement(規格)
8.6 Thermal Aging 高溫老化試驗	A mated connector shall be placed in a heat oven of the following conditions. After the test, leave the specimen at room temperature for 1~2 hours before the contact resistance shall be measured. 以組合狀態下連接器放置於加熱烤箱當中，依照隨附如下規格要求，進行高溫老化試驗，經試驗過後將樣品置於室溫 1~2 小時，再量測其接觸阻抗。 (EIA 364-17B Conditions 3or4 . Method A) Temperature(溫度): Nylon 6T & : <b>+105°C</b> ; PBT: <b>+85°C</b> Period(週期): 96 hours continuously . (持續 96 小時)	Initial Contact Resistance : 20 milliohms Max. 接觸阻抗最初容許值 20 毫歐姆 (After the test) Contact Resistance : <b>30 milliohms Max. .</b> 經高溫老化試驗後接觸阻抗 最大容許值. 30毫歐姆
8.7 Cold 耐寒試驗 (Low Temperature)	A mated connector shall be placed in a cold chamber of the following conditions. After the test, leave the specimen at room temperature for 1~2 hours before the contact resistance shall be measured. 以組合狀態下連接器放置於低溫空間內，依照隨附如下規格要求，進行耐寒試驗，經試驗過後將樣品置於室溫 1~2 小時，再量測其接觸阻抗。 (EIA 364-59A Condition D ; Condition 3or4 ) Temperature(溫度): Nylon 6T & : <b>-40°C</b> ; PBT: <b>-25°C</b> Period(週期): 96 hours continuously . (持續 96 小時)	Initial Contact Resistance : 20 milliohms Max. 接觸阻抗最初容許值 20 毫歐姆 (After the test) Contact Resistance : <b>30 milliohms Max. .</b> 經耐寒試驗後接觸阻抗 最大容許值. 30 毫歐姆
8.8 Salt Spray 鹽水噴霧	A mated connector shall be subjected to a Salt Spray test of the following conditions. After the test , the specimen shall be washed with running water and dried naturally before the measurement of contact resistance. 以組合狀態下連接器作為試驗樣品，依照隨附如下規格要求，進行鹽水噴霧試驗，試驗過後將樣品用清水沖洗並經過自然風乾，而後量測其接觸阻抗。 Density(鹽水密度): 5 % in weight. Temperature(溫度): 35±2°C. Period(週期): 48 hours (EIA 364-26B Conditions B)	Initial Contact Resistance : 20 milliohms Max. 接觸阻抗最初容許值 20 毫歐姆 (After the test) Contact Resistance: <b>30 milliohms Max.</b> 經鹽水噴霧試驗後接觸阻抗 最大容許值. 30 毫歐姆



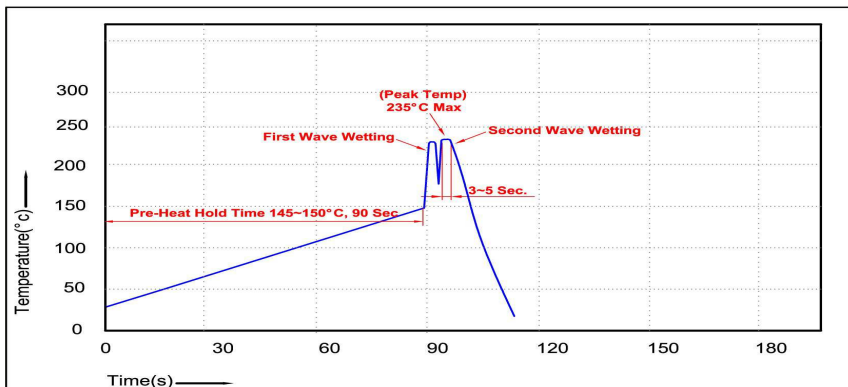
<b>Type Document</b>	<b>Product Specification</b>	<b>Revised /Edition</b>	<b>L</b>
<b>Date Issued</b>	<b>2008/03/25</b>	<b>Data Revised</b>	<b>2016/11/21</b>
<b>Subject: JS-1192SXDYG JS-1192RXDYG JS-1193SXDYG JS-1193RXDYG JS-1126WXSJS-1126WXR JS-1127WXS JS-1127WXR Pitch: 2.00mm Female Header Series Board to Board Connector</b>			<b>Issued By: Engineering Dept.</b>

Item(項目)	Test Condition(測試條件)	Requirement(規格)
8.9 Solder Ability 焊錫性	Fluxed soldering section of header shall be dipped in solder of the following conditions. 將連接器 pin 針基板嵌入端，接觸熱溶狀錫料，依照隨附如下規格要求，進行焊錫性試驗 Solder Temperature (焊錫溫度) : $245 \pm 5^{\circ}\text{C}$ . (EIA 364-52B) Immersion Period (沉浸週期) : $3 \pm 0.5$ Seconds (操作方式) : 零件焊錫位置，距離導體末端 1.5mm Method : 1.5mm from contact pin or square pin tip	Solder entirely (Tin Plated : 95% / Gold Plated : 75%) of immersed area must show no voids or pinholes. 焊料覆蓋面積必須達到 (鍍錫 95% / 鍍金 75%)，而且不能產生氣孔或空隙
8.10 Resistance to Soldering Heat 焊錫耐熱性	Resistance to Wave soldering heat when using PBT : 使用 PBT 塑料，能夠承受波焊耐熱範圍 : Refer to Temperature Profile 請參考 8.10.1.1 溫度曲線圖 Resistance to Wave soldering heat when using Nylon 6T/9T : 使用 Nylon 6T 塑料，能夠承受波焊耐熱範圍 : Refer to Temperature Profile 請參考 8.10.1.2 溫度曲線圖 by soldering iron 手工烙鐵焊錫適用溫度範圍 : $350 \pm 5^{\circ}\text{C}$ $5 \pm 0.5$ Seconds. (操作方式) : 零件焊錫位置，距離導體末端 1.5mm Method : 1.5mm from contact pin or square pin tip (EIA/ECA 364-56C Procedure 3. Conditions A)	No deformation or damage. 不可有變形或損壞

Notes : Flowing Mixed Gas (EIA 364-65A) shall be conduct by Customer request 混合流動氣體測試依照客戶需求

8.10.1 Temperature Profile(溫度曲線圖) :

8.10.1.1 Wave Peak Soldering In- General Process 波焊一般制程







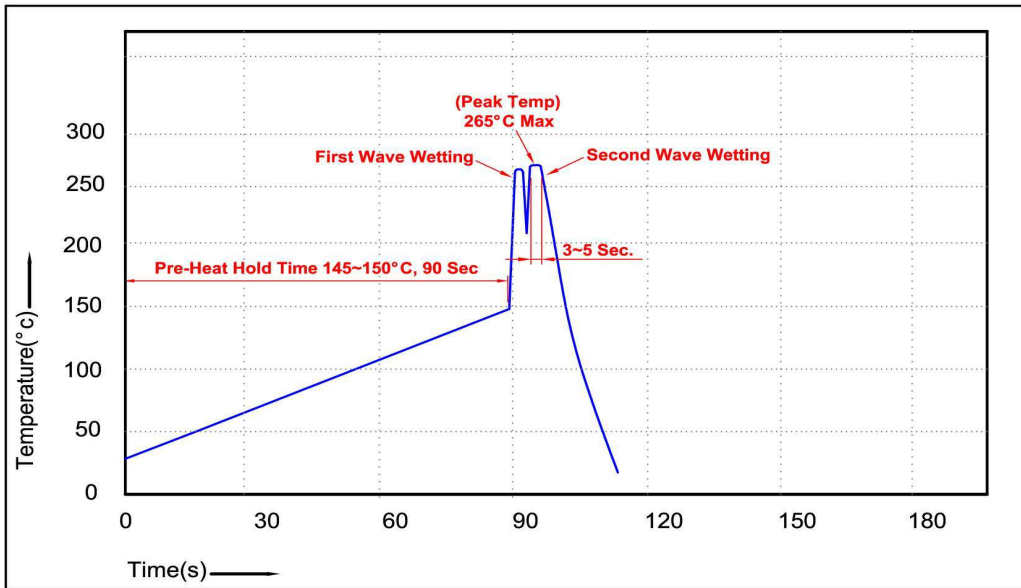
喬訊電子工業股份有限公司  
 CHYAO SHIUNN ELECTRONIC INDUSTRIAL LTD.  
 7FL., NO.17, LANE 3, SEC.1 CHUNG CHENG EAST RD.,  
 TAMSHUI, TAIPEI, TAIWAN, R.O.C.  
 TEL: 886-2-2629-9955 (REP) FAX: 886-2-2626-6677



http://www.chyaoshiunn.com.tw E-mail:cs@chyaoshiunn.com.tw

<b>Type Document</b>	<b>Product Specification</b>	<b>Revised /Edition</b>	<b>L</b>
<b>Date Issued</b>	<b>2008/03/25</b>	<b>Data Revised</b>	<b>2016/11/21</b>
<b>Subject: JS-1192SXDYG JS-1192RXDYG JS-1193SXDYG JS-1193RXDYG JS-1126WXS JS-1126WXR JS-1127WXS JS-1127WXR Pitch: 2.00mm Female Header Series Board to Board Connector</b>			<b>Issued By: Engineering Dept.</b>

8.10.1.2 Wave Peak Soldering In- General Process 波焊一般制程



9.0 Remark(備註) : Any change or revision for the product specification will not be announced in advance.

Please contact our sales representative for the latest information.

有關規格書內容經變更或改版，如未能夠及時發佈與通知，煩請連絡我司業務人員以提供產品最新資訊

**Reviewed:** Tom Shih **Approved:** Tom Shih **Verified:** Erin Chou