Product Specification

Rev.	Description	Written/Date	Checked/Date	Approved/Date
A	New Release per PDR15130	Sean.zhang 01/12/2016		Sam.zhao 01/14/2016
B	change the Insulation Resistance standard	Sean.zhang 06/26/2017		Sam.zhao 06/26/2017
C	Modify the Durability standard	Sean.zhang 04/08/2019		Sam.zhao 04/08/2019
D	Modify the Durability standard	Addy.ma 11/26/2020		Sean.zhang 11/26/2020

1.0 Scope: This specification covers the requirements for product performance and test methods of ECT's Board To Board High current Connectors of the part numbers specified as bellow. Product shall be of the design, construction and physical dimensions specified in the applicable product drawing.

本规格书包含了ECT 板对板 大电流 连接器(料号是818003562/818003563)的性能需求测试方法. 产品的设计, 结构, 形状和尺寸应该在适当的产品图面中进行描述.

2.0 Rating:

2.1 Voltage Rating: 60V AC/DC

额定电压:60 V AC / DC

2.2 Rated current : For signal pin 0.3 AMPS/Pin (Max), For power pin 5AMPS / Pin (Max)

额定电流: 信号 Pin 0.3 AMPS/Pin（Max）,电源 Pin 5AMPS/Pin (Max)

2.3 Temperature Range: -55℃ to +85℃ storage; -55℃ to +85℃ operating

温度范围：-55℃ to +85℃ storage; -55℃ to +85℃ operating

3.0 Test Condition:(测试条件)

All tests shall be performed as bellow conditions unless otherwise specified.

所有测试依据以下规格条件执行，特别说明规格除外。

3.1 Temperature range : +15℃ to +35℃

测试温度范围：+15℃ to +35℃

3.2 Humidity range: 25% to 80%

测试湿度范围：25% to 80%

3.3 Atmospheric Pressure: 86kPa to 106 kPa (860 to 1060 m bar)

测试大气压力：86kPa to 106 kPa (860 to 1060 m bar)

4.0 Test Methods and Requirements(测试方法和要求):

4.1 Examination of product(产品外观检验):

Item 项目	Test Description 测试描述	Test Methods 测试条件	Requirement 要求
4.1.1	Examination of product (Outward Appearance Structure) 产品外观结构检验	**EIA 364-18** Shall be confirmed with eyes in accordance with each drawing. Shall be confirmed by using proper measuring instruments. 依照图面要求对产品目视检查，再用测量工具按图面要求测量尺寸	1). Shall meet visual requirement, show no physical damage. 外观没有任何的物理损坏 2). Structure shall be meet the design and dimensional requirements of drawing.外观结构应满足图纸的设计和尺寸要求

4.2 Electrical Performance(电器性能):

Item 项目	Test Description 测试描述	Test Methods 测试条件	Requirement 要求
4.2.1	Contact Resistance 接触阻抗	**JIS C 5402** Make the BTB plugs and receptacles on board be fully mated ,then apply 20mV, 100mA current to the mated specimens , 将焊板的 BTB 公母端实配后通电测试，电流及电压规格：20mV, 100mA。测试公母端实配后 LLCR	Signal(信号)pin:50mΩ Max / PIN Power(电源)pin:10mΩ Max / PIN
4.2.2	Insulation Resistance 绝缘阻抗	**EIA 364-21** (or MIL-STD-202F, Method 302, Test Condition B) Apply a voltage of 250 VDC between adjacent terminals. of the plugs and receptacles. Electrification Time: 1 min 施加 250VDC 到公端&母端相邻两根端子之间，通电时间：1 min	1).Initial: **1000 MΩ Minimum.** 2).After test: **100 MΩ Minimum.** 初始值: **1000 MΩ Minimum.** 测试后: **100 MΩ Minimum.** .
4.2.3	Dielectric Withstanding Voltage 耐电压	**EIA 364-20** (or MIL-STD-202F, Method 301, Test Condition B) Apply a voltage of 250VAC between adjacent terminals. of the plugs and receptacles. Electrification Time: 1 min. 施加 250VAC 到公端&母端相邻两根端子之间，通电时间：1 min	1). samples no breakdown. 样品无击穿，烧焦等不良. 2). Leakage current: **0.5mA Maximum** 表面漏电：**0.5mA Maximum**
4.2.4	Temperature rise 温升测试	**EIA 364-20, Test Method B** Connect series, Mate connector and measure the temperature rise at the rated current after 3 hours. 串联，匹配连接器，并量测在额定电流下通电 3 小时前后的温度升高的差异.	△T30℃ **Maximum.（PER PIN）**

4.3 Mechanical Performance（机械性能）:

Item 项目	Test Description 测试描述	Test Methods 测试条件	Requirement 要求
4.3.1	Vibration 震动测试	**MIL-STD-202, Method-201** half-sine wave, apply 0.1 A DC current。 frequency:10-55-10 Hz; amplitude: 1.52mm sweep time:1 minute the connectors condition is PCB mounting and the plugs mated with receptacles , they must be tested 2 hours in each of the 3 axis(X,Y,Z),total 6 hours. 半正弦波，通以 0.1ADC 电流。 测试频率:10-55-10 Hz; 振幅: 1.52mm 波形完成扫描时间:1 minute；将公母头配合好之后在 X,Y,Z 3 个轴向各测试 2 小时，共 6 小时。	1).Shall meet visual requirement, show no physical damage. 外观没有任何的物理损坏 2). Contact Resistance value Signal pin : 70mΩ Max / PIN Power pin : 20mΩ Max / PIN 测试后电阻值： 信号 pin : 70mΩ Max / PIN 电源 pin : 20mΩ Max / PIN. 3).No discontinuities of 1 μsec or longer duration. 导通瞬断不可超过 1.0 微秒
4.3.2	Physical Shock 机械冲击	**EIA 364-27 Test Condition A** Physical Shock EIA 364-27 Test Condition A (orMIL-STD-202F, Method 213) half-sine wave, apply 0.1ADC current Acceleration:50G(490m/s2) duration：11ms. the connectors condition is PCB mounting and the plugs mated with receptacles , shocking apply to 3 times in each of the 6 direction of 3 axis.18 total shock. 半正弦波，通以 0.1ADC 电流。 测试的重力加速度:50G(490m/s2) 测试时间：11ms. 将焊接 PCB 公母头配合,在 X,Y,Z 三轴 6 个方向各冲击 3 次，总共 18 次	1).Shall meet visual requirement, show no physical damage. 外观没有任何的物理损坏 2). Contact Resistance value Signal pin : 70mΩ Max / PIN Power pin : 20mΩ Max / PIN 测试后电阻值： 信号 pin :70mΩ Max / PIN 电源 pin :20mΩ Max / PIN 3).No discontinuities of 1 μsec or longer duration. 导通瞬断不可超过 1.0 微秒

4.3.3	Durability 寿命测试	**EIA 364-09** Make the specimens that are on board mated, then fix the receptacles to the machine on horizontal or perpendicular direction. Use the machine catch the plugs and separate the specimens, then make the plugs be fully mated with receptacles at a rate of 12.5millimeters/minute on horizontal or perpendicular direction.duration:30 cycles 将焊板的 BTB 公端与母端配合好后将母端水平或垂直固定在测试仪器上，用仪器夹住公端分离，然后将公端以 12.5 millimeters/minute 的速度水平或垂直插入焊板母端直到配合到位，循环 30 次	1).Shall meet visual requirement, show no physical damage. 外观没有任何的物理损坏 2). Contact Resistance value After test: Signal pin : 70mΩ Max / PIN Power pin : 20mΩ Max / PIN 测试后电阻值： 信号 pin :70mΩ Max / PIN 电源 pin : 20mΩ Max / PIN
4.3.4	Connector Mating & Unmating Force 插入/拔出力	**EIA 364-13** Make the specimens that are on board mated, then fix the receptacles to the machine on horizontal or perpendicular direction. Use the machine catch the plugs and separate the specimens, then make the plugs be fully mated with receptacles at a rate of 12.5millimeters/minute on horizontal or perpendicular direction. 将焊板的 BTB 公端与母端配合好后将母端水平或垂直固定在测试仪器上，用仪器夹住公端分离，然后将公端以 12.4 millimeters/minute 的速度水平或垂直插入焊板母端直到配合到位	**Mating force**(插入力)： 第一次（1ST）Max=3.57Kgf 第三十次 (30ST)Max=3.57Kgf **Unmating force**：(拔出力) 第一次（1ST）Min= 0.50Kgf 第三十次 (30ST) Min= 0.30 Kgf
4.3.5	Contact Retention Force 端子保持力	**EIA 364-35** **The pull speed shall 12.5 mm per minute on the terminal assembled in the housing(Only for female group vertical PIN terminal signal and power PIN)** 以 12.5 mm per minute 的速度，将组装在胶芯内的以垂直方向端子拔出（仅针对母座组立式	0.015Kgf /Pin Minimum.

		端子信号 PIN 及电源 PIN）	

4.4 Environmental performance（环境性能）

Item 项目	Test Description 测试描述	Test Methods 测试条件	Requirement 要求
4.4.1	Thermal Shock 热冲击	**EIA 364-32, Test Condition I** (or MIL-202F, Method 107G Condition A.) specimens shall be separated and exposed 5 cycles as the following table conditions. 将测试样本公母端分离暴露条件下，在如下表中的条件，如此测试循环 5 次 Step. 1 2 3 4 Temp.(℃) -55+0,-3 25+10,-5 85+3,-0 25+10,-5 Exposed time(minute) 30 5 30 5	1). Appearance shall not be distinct damage. 不能出现明显的外观损坏 2). The Insulation Resistance value after test：**100 MΩ Min** 测试后绝缘阻抗值：**100 MΩ Min** 3). Contact Resistance value: Signal(信号)pin:70mΩ Max / PIN Power(电源)pin:20mΩ Max / PIN
4.4.2	Humidity 耐湿性	**EIA 364-31, Test Condition A Method III**, (or MIL-202F, Method 103B Test Condition B.) The specimens shall be separated and left in the chamber of 40±2℃ temperature and 90~95% humidity for 120hrs. After test drying in ambient condition for 1 hours 将测试样本公母端分离放在一个恒温恒湿的空间内暴露 120 小时，此空间温度：40±2℃，相对湿度：90~95%。测试完成后将样本擦干放置在周围环境中 1 小时	1). Appearance shall not be distinct damage. 不能出现明显的外观损坏 2). The Insulation Resistance value after test：**100 MΩ Min** 测试后绝缘阻抗值：**100MΩ Min** 3). Contact Resistance value Signal(信号)pin:70mΩ Max / PIN Power(电源)pin:20mΩ Max / PIN
4.4.3	Solder ability 焊接性	**EIA 364-52** Make the specimens' tail tested by the last testing step immersion into molten solder at 245+/-5℃ for 3+/-0.5 seconds. 测试样本焊脚浸润在温度为 245+/-5℃的熔融态锡里面 3+/-0.5s。然后将样本拿出	The surface of the portion to be soldered shall at least 95% covered area must show no voids, pin holes 要求焊脚润锡面积达到浸润面积的 95%以上

4.4.4	Resistance to soldering heat 耐焊接热	According to the following conditions to test connector. 1. Infrared reflow soldering, the peak temperature of 260 degrees Celsius, reference temperature curve, and the requirements of the SMT2 time; 2. electric soldering iron, requires 300 degrees 5 seconds, 350 degrees below 3 seconds. 按下列条件进行测试： 1.红外线回流焊接，峰值温度260度以下，可参考温度曲线图(5.0)，且要求SMT2次； 2.电烙铁焊接，要求 300 度 5 秒，350 度 3 秒以下。	Appearance: No abnormality. 外观无明显损伤； Coplanarity of the solder tail should be not beyond 0.10mm 焊脚平面度不超 0.10mm
4.4.5	Resistance to high storage temperature 高温存储测试	Make the samples be separated and Leave them in the chamber of temperature +85℃ for 96hr，then it shall be subjected to standard atmospheric condition for 1~2h 将测试样本分离放置在一个+85℃的空间里暴露 96 小时，然后在标准环境下放置 1-2h.	1). Appearance shall not be distinct damage. 不能出现明显的外观损坏 2). Contact Resistance value Signal(信号)pin:70mΩ Max / PIN Power(电源)pin:20mΩ Max / PIN
4.4.6	resistance to low storage temperature 低温存储测试	Make the samples be separated and Leave them in the chamber of temperature -40℃ for 96hr，then it shall be subjected to standard atmospheric condition for 1~2h 将测试样本分离放置在一个-40℃的空间里暴露 96 小时，然后在标准环境下放置 1-2h	1). Appearance shall not be distinct damage. 不能出现明显的外观损坏 2). Contact Resistance value Signal(信号)pin:70mΩ Max / PIN Power(电源)pin:20mΩ Max / PIN
4.4.7	Salt water spray 盐雾测试	**EIA 364-16A (MIL-STD-202 METHOD 101)** Temperature: 35℃±2℃ 温度：35℃±2℃ Density of salt water : 5±1% 盐水浓度：5±1% Duration: 48±2 hours. 持续时间: 48±2 hours.	1). Appearance shall not be distinct damage. 不能出现明显的外观损坏 2). Contact Resistance value Signal(信号)pin:70mΩ Max / PIN Power(电源)pin:20mΩ Max / PIN

5.0 INFRARED REFLOW CONDITION (回流焊曲线条件)

过炉回流曲线要求	
参数	典型值
均温区要求 （150°C 到 200°C）	100~120 s
峰值温升速率(TL~Tp)	Max: 3°C /s
液态线（217°C）以上时间	100~150s
最低回流峰值温度	255°C
250°C 以上时间	Min: 30s
冷却阶段的斜率（Tp~TL）	Max: -6℃/s
25°C 到 Tp 时间	Max: 8min

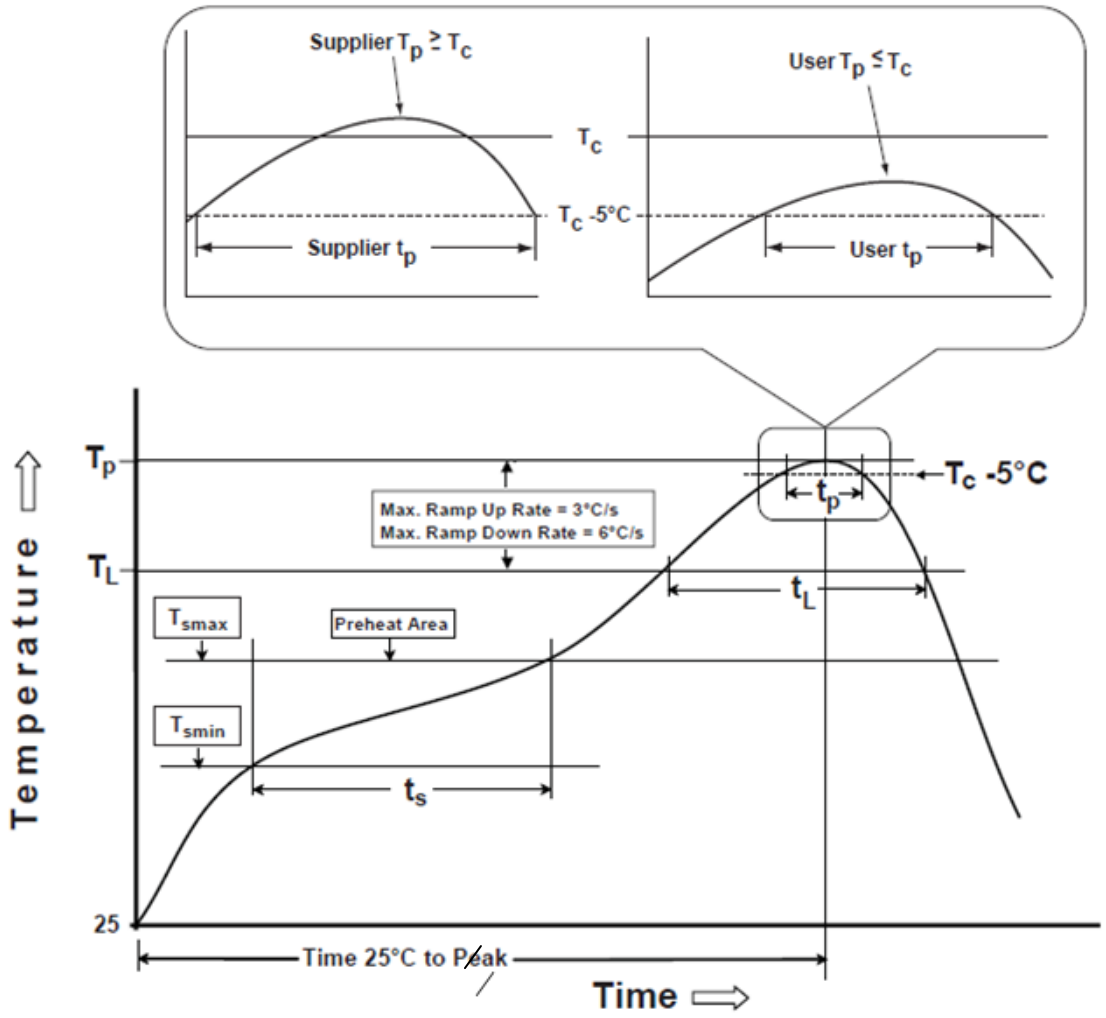


Fig1.Reflow Temperature profile

6.0 INSTRUCTION OF APPLICATION TO USAGE 产品组装的使用说明

This specification is written based on the supposition that the receptacle is mounted on PCB (Hard PCB) and the plug is mounted on FPC. In the case of the receptacle is mounted on FPC and the plug is mounted on PCB (Hard PCB) is also covered. Receptacle contains formable terminal. Please pay attention to un-mating process of connectors if you mount Receptacle on FPC

本说明书根据母座端往PCB基板（硬板）侧实际安装、公座端往FPC（软板）侧，实际安装的设想而作成，同时也适用于公座端往FPC（软板）、公座往PCB基板（硬板）上的实装。母座上的端子容易变形，实装到FPC（软板）上时，特别要注意拔出时的操作。

6.1 MATING (插入操作相关)

6.1.1 HOW TO MATE(INSERTION) 组合方法（插入方法）

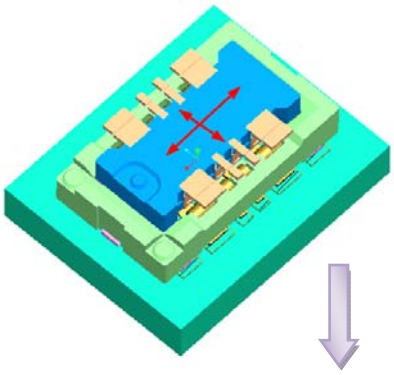
After positioning correctly for mating ,then the distance between PCB and FPC is about 1.10mm, insert the Plug to the receptacle in parallel with each other.

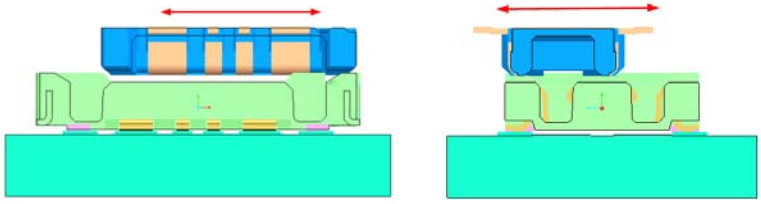
组合时（插入时）请对好位置再进行。位置对好时，PCB基板和FPC软板间的尺寸大概位置在1.10mm之后，请将公座侧与母座侧保持平衡后再插入

Please find correct position at inside wall of receptacle and inside wall of plug

正确的位置调合如右图，请沿母座内壁和公座内壁来进行操作

STEP 1

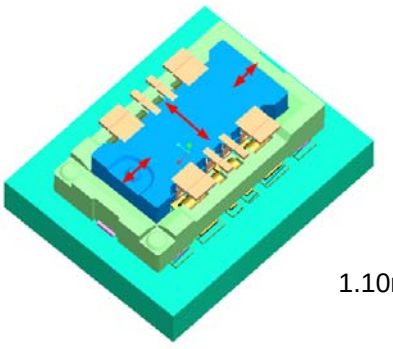


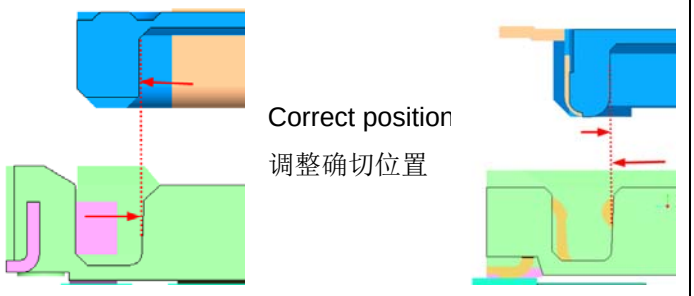


Positioning the plug correctly in parallel with the receptacle

请在公座侧与母座侧保持平衡的状态下再校对位置

STEP2





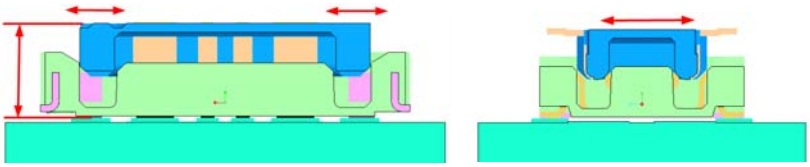
Correct position

调整确切位置

Correct position for mating

正确的嵌合调整位置

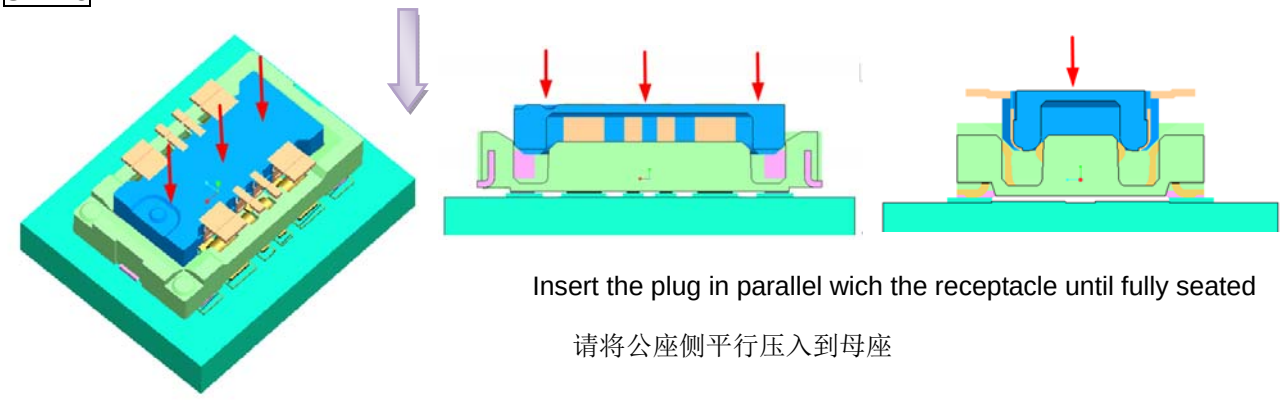
1.10mm



Position the plug correct by adjusting back or forth

轻轻移动公座侧来确认位置调合是否正确

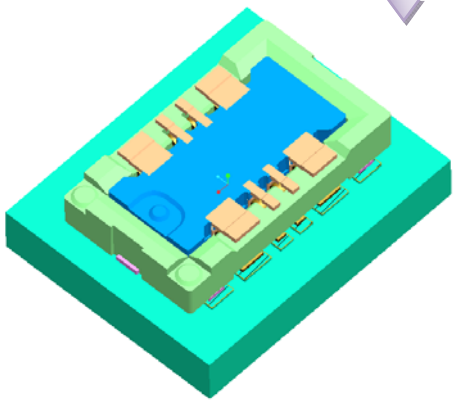
STEP3



Insert the plug in parallel wich the receptacle until fully seated

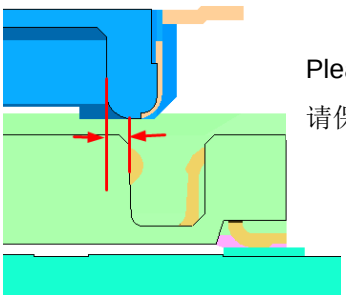
请将公座侧平行压入到母座

STEP4



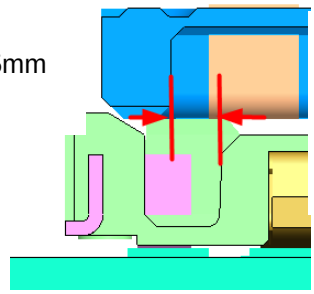
6.2 MATING POSITIONING WITH SLIGHTLY INCLINED 组合时调合位置的方法（位置平行调整困难时）

6.2.1 When operated in “a” Direction(lengthways) 长方向有自由度时



Please keep it within 0.15mm

请保持在 0.15mm 以内

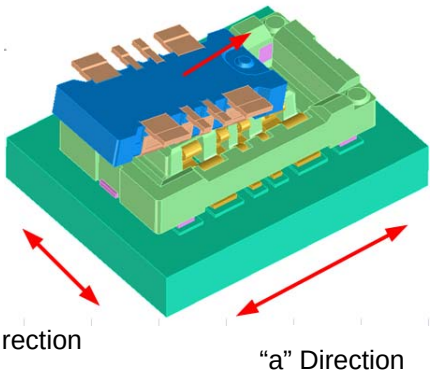


Please find right Position regarding to procedure below(请按以下流程来调整位置)

“ b” Direction 短方向

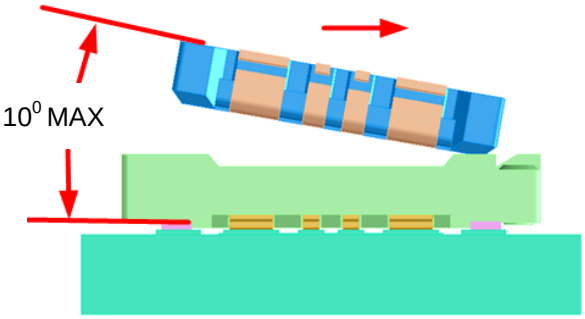
“ a” Direction（lengthways） 长方向

STEP1



“b” Direction

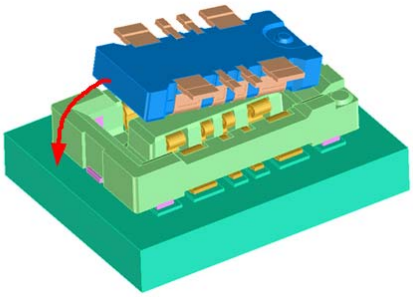
“a” Direction



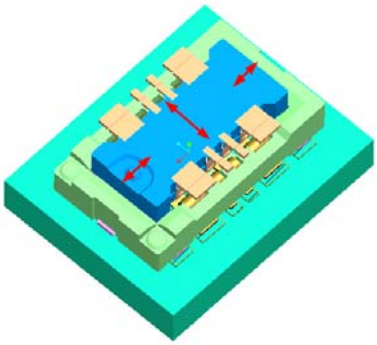
Position for mating by inclining the plug to the receptacle approximately less than 10^0

请在公座侧稍微倾斜（10 度以下）的状态下进行组合位置调整操作

STEP2

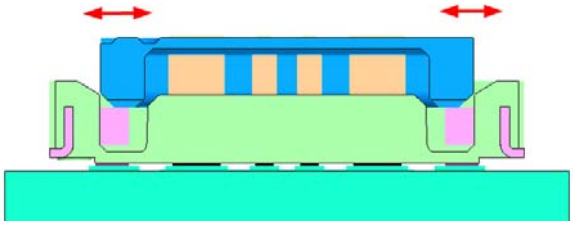


STEP3



Once the plug is positioned over the receptacle Move it to the parallel position

位置调合后，请将公座侧和母座侧保持平行



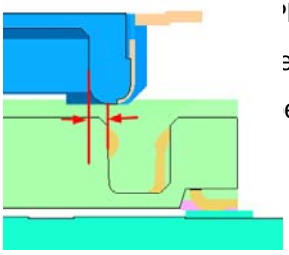
Position the plug correct by adjusting back or forth

轻轻移动公座侧来确认位置调合是否对位

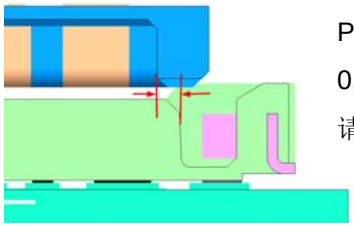
Please go to the STEP3 in 6.1.1

请参照 6.1.1 步骤 3 进行下一步操作

6.2.2 When operated in “b” Direction 短方向有自由度时



lease find right Position
egarding to procedure
elow(请按以下流程来调整)

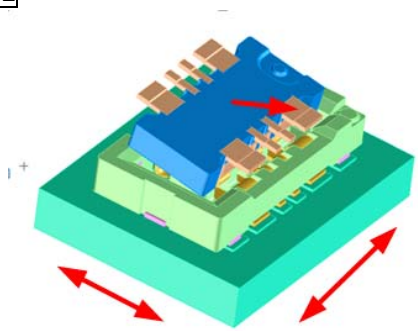


Please keep it within 0.25mm
请保持在 0.25mm 以内

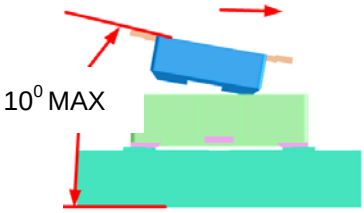
“ b” Direction 短方向

“ a” Direction（lengthways） 长方向

STEP1

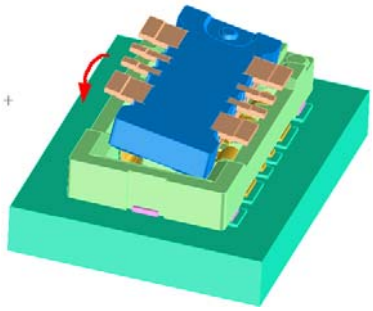


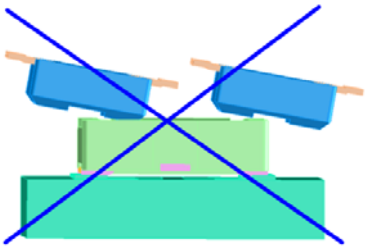
“b” Direction “a” Direction



Position for mating by inclining the plug to the receptacle approximately less than 10^0
请在公座侧稍微倾斜（10 度以下）的状态下进行组合位置调整操作

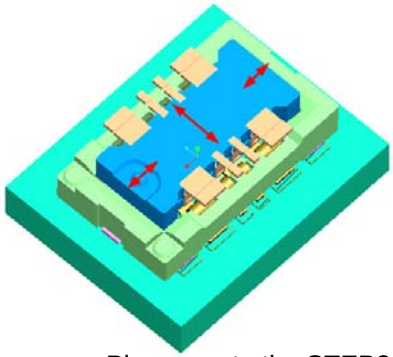
STEP2





Notes)Pay attention NOT to have the wrong position in “b” Direction 注：请注意位置调合偏差不能太大

STEP3



Please go to the STEP3 in 6.1.1
请参照 6.1.1 步骤 3 进行下一步操作



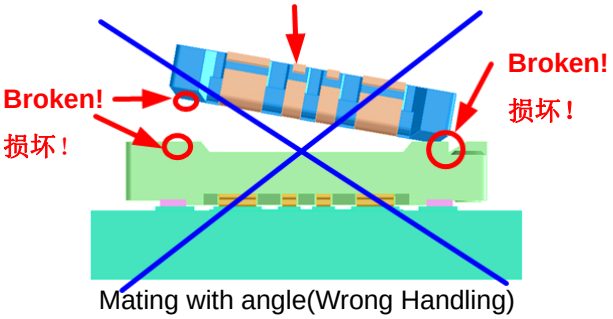
Once the plug is positioned over the receptacle
Move it to the parallel position
位置调合后，请将公座侧和母座侧保持平行
Position the plug correct by adjusting back or forth
轻轻移动公座侧来确认位置调合是否对位

6.3 CONNECTOR HANDLING WHEN MATING(组合时操作注意事项)

Please DO NOT apply force while mating the receptacle or plug at an angle in the “a” direction(lengthways)

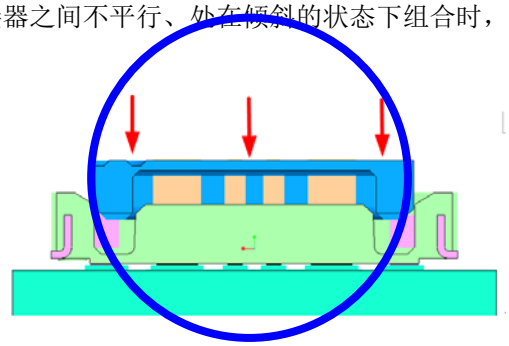
It may cause damage to the connector

请在连接器之间平行的状态下进行组合操作。如果在连接器之间不平行、处在倾斜的状态下组合时，连接器本体之间可能会有干涉，就会有损坏连接器的可能。



Mating with angle(Wrong Handling)

连接器倾斜组合

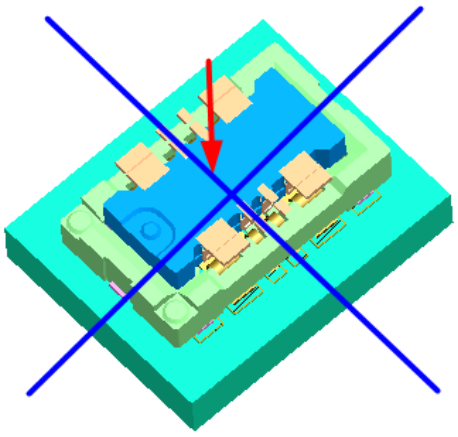


Mating with Parallel(Correct Handling)

连接器平行组合

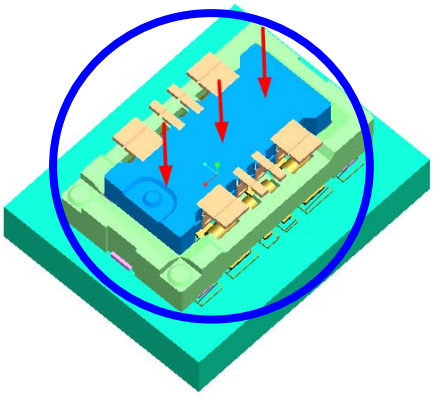
This product is downsized comparing with the current products and needs to be handled more carefully. When mating(inserting), do NOT push the only center of connector but the whole connector in parallel with The receptacle . When pushed only the center of connector , it may cause damage to the connector

本产品比现有产品还要小，连接器的强度较低。组合（插入）时，不能单单只按押连接器中间部，要平行按押整体。FPC 加强板的强度不充足时，如果只按押连接器中间的话，连接器就会有折断的可能。



Pushing only Center(Wrong Handling)

只按压连接器中间部



Pushing Whole Paralleled(Correct Handling)

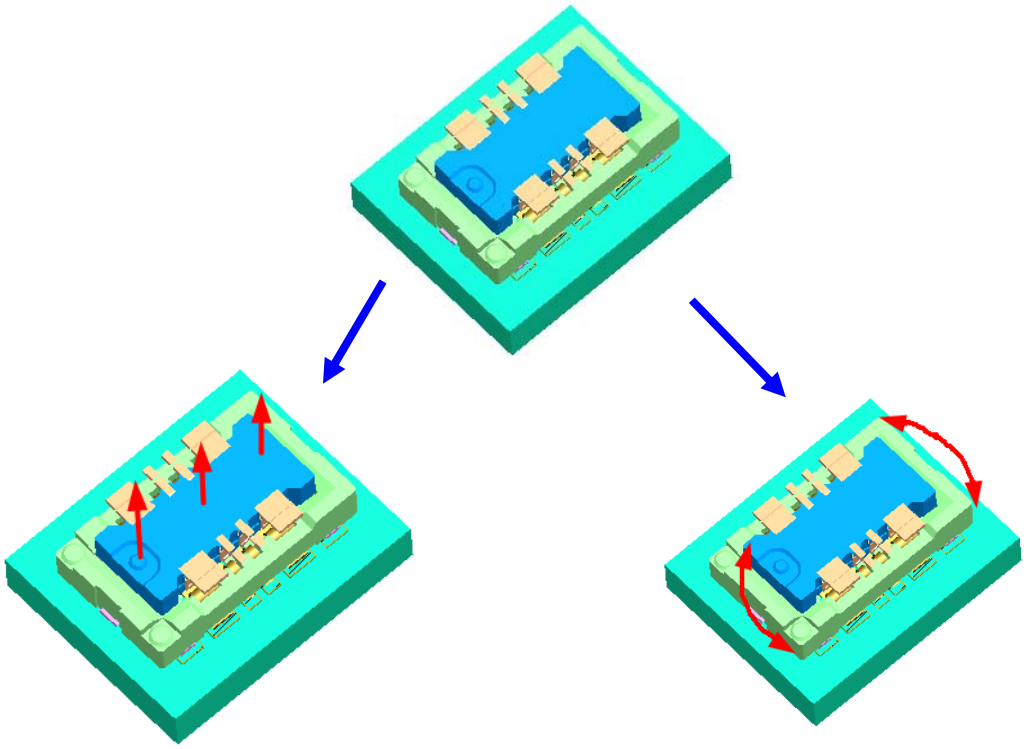
平行按压连接器整体

6.4 UN-MATING

6.4.1 HOW TO WITHDRAW 拔出方法

The plug shall be released from the receptacle paralleled to the mated axis or by moving the plug slowly

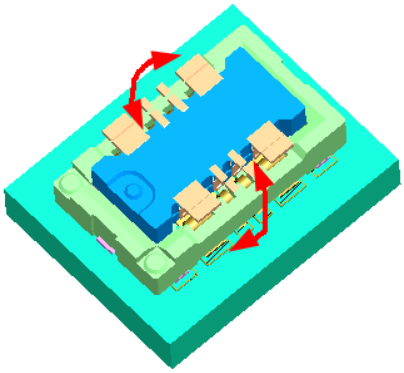
极力沿着组合轴平行拔去，或是向左右一点点边晃动边拔出。



Releasing the plug paralleled to the mated axis

沿着组合轴向平行拔去

Releasing the plug by moving slowly in “a” direction (lengthways) 向左右一点点边晃动边拔去（长方向）



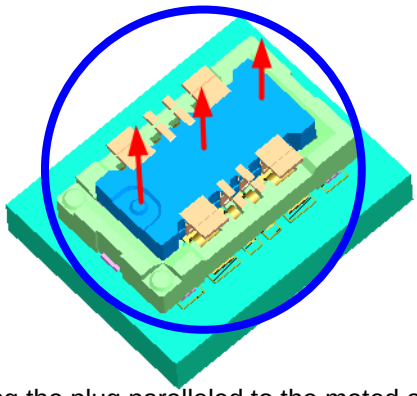
Releasing the plug by moving slowly in “b” direction

向左右一点点边晃动边拔去(短方向)

6.4.2 CONNECTOR HANDLING WHEN WITHDRAWING（拔出时操作注意事项）

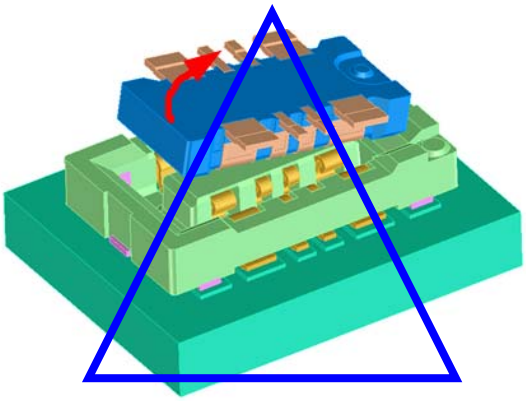
This product is downsized comparing with the current products and needs to be handled more carefully When un-mating(withdrawing), do NOT twist the plug to release . It may cause damage to connector.

本产品比现有产品还要小，连接器的单体强度较低（单体强度）。如果在过度倾斜状态下拔去的话，连接器就会有破损的可能



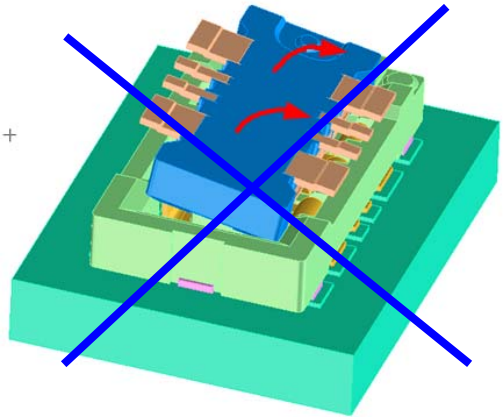
Releasing the plug paralleled to the mated axis

沿着组合轴向平行拔去



Slant releasing in “a” Direction (lengthways)

长方向的倾斜拔出



Slant releasing in “b” Direction

短方向的倾斜拔出

Merit and demerit for slant releasing are below

长方向的倾斜拔去方式与短方向的倾斜拔去方式存在以下优点及缺点

	Slant releasing in “a” Direction (lengthways) 长方向的倾斜拔出	Slant releasing in “b” Direction 短方向的倾斜拔出
Merit 优点	1.Not easily cause the damage to the terminals 不容易引起端子变形 2.Hard to be withdrawn 拔出的力度小	None 无特别优点
Demerit 缺点	1. Multiple connector can be damaged plug 多个连接器时拔出时可能会损坏公座	The continuity defect can be caused by damage to the terminals 端子变形风险，同时会存在不导通的可能

7.0 Test Group		Sample Groups																	
Test Item	Test Description	A	B	C	D	E	F	G	H	I	J								
4.1.1	Examination of product	1,7	1,9	1,6	1,3	1,4	1,4	1,4	1,3	1,3	1,3								
4.2.1	Low Level Contact Resistance	2,6	2, 10	2,5		3	3	3											
4.2.2	Insulation Resistance		3,7																
4.2.3	Dielectric Withstanding Voltage		4,8																
4.2.4	Temperature rise								2										
4.3.1	Vibration			3															
4.3.2	Physical shock			4															
4.3.3	Durability	4																	
4.3.4	Mating & Unmating force	3,5																	
4.3.5	Contact Retention Force									2									
4.4.1	Thermal Shock		5																
4.4.2	Humidity		6																
4.4.3	Solderability				2														
4.4.4	Resistance to soldering heat										2								
4.4.5	Heat resistance					2													
4.4.6	Cold resistance						2												
4.4.7	Salt water spray							2											
Number of Test Samples (Minimum)	5	5	5	5	5	5	5	5	5	5	5								