SPEC. NO.: PS-55911-XXXXX-XXX **REVISION:** O

PRODUCT NAME: 0.5mm Pitch USB2.0 Type-C Connector

PRODUCT NO: 55911 / 55919 Series

PREPARED:	CHECKED:	APPROVED:
Bruce	**Mack C**	**Jack Kuo**
DATE: **2016.10.24**	DATE: **2016.10.24**	DATE: **2016.10.24**

1 Revision History

Rev.	ECN #	Revision Description	Prepared	Date
1	ECN-1610178	NEW SPEC	BRUCE	2016.10.24

2 SCOPE

This specification covers performance, tests and quality requirements for 0.5mm Pitch USB2.0 Type-C Connector.

Aces P/N: Plug：55911 Series
Aces P/N: Receptacle：55919 Series

3 APPLICABLE DOCUMENTS

USB Type-C Cable and Connector Specification
EIA-364 : ELECTRONICS INDUSTRIES ASSOCIATION

4 REQUIREMENTS

4.1 Design and Construction

Product shall be of design, construction and physical dimensions specified on applicable product drawing.

4.2 Materials and Finish

4.2.1 Contact: High performance Copper alloy
Finish: (a) Contact Area: Refer to the drawing.
(b) Under plate: Refer to the drawing.
(c) Solder area: Refer to the drawing.
4.2.2 Housing: Thermoplastic, High temp. UL94 V-0
4.2.3 Spacer: Thermoplastic, High temp. UL94 V-0
4.2.4 Shell: Stainless steel
4.2.5 Latch: Stainless steel
4.2.6 Mid-Plate: Stainless steel
4.2.7 Cover: Thermoplastic, High temp. UL94 V-0

4.3 Ratings

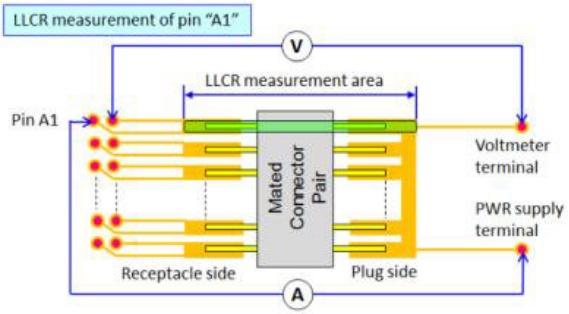
4.3.1 Voltage: 20 Volts AC
4.3.2 Current:
4.3.2.1 55911 11 Pin Type
4.3.2.1.1 3 Amps. for V_{BUS} & GND pins
4.3.2.1.2 0.25 Amps .for the other pins

4.3.2.2 55911 12 Pin Type
4.3.2.2.1 5 Amps. for V_{BUS} & GND pins
4.3.2.2.2 1.25 Amps. for Vconn & GND pins
4.3.2.2.3 0.25 Amps . for the other pins

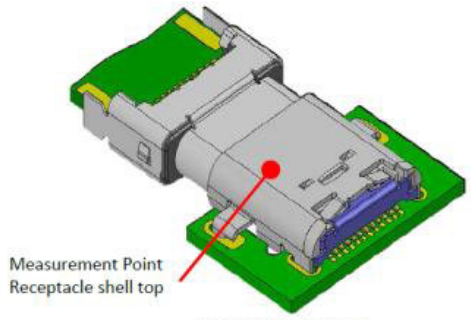
4.3.2 Operating Temperature : -40℃ to +85℃

5 Performance

5.1. Test Requirements and Procedures Summary

Item	Requirement	Standard
Examination of Product	Product shall meet requirements of applicable product drawing and specification.	Visual, dimensional and functional per applicable quality inspection plan.
ELECTRICAL		
Low Level Contact Resistance	40 mΩ (Max) initial for VBUS, GND and all other contacts. 50 m Ω Max. After initial measurement	The low level contact resistance (LLCR) measurement is made across the plug and receptacle mated contacts and does not include any internal paddle cards or substrates of the plug or receptacle. Measure at 20 mV (Max) open circuit at 100 mA. (EIA-364-23) 
Insulation Resistance	100 M Ω Min.	Mated and unmated connectors, apply 100 V DC for 2 minute. Insulation resistance is required between adjacent contacts of unmated and mated connectors. (EIA-364-21)
Dielectric Withstanding Voltage	No discharge, flashover or breakdown. Current leakage: 1 mA max.	100 V AC(RMS). at sea level for 1 minute. (EIA-364-20)

Contact Current Rating	When current is applied to the contacts, the temperature rise shall not exceed 30°C at the outside surface of the shell. This requirement applies to the USB Type-C connector mated pair only.	Mate connector: measure the temperature rise at rated current after: 5A applied to All VBUS pins (pins A4,A9,B4 and B9) 1.25A applied to Vconn pin (B5) and GND pins. (pins A1,A12,B1, and B12) 0.25A applied to all the other contacts. The ambient condition is still air at 25° C (EIA-364-70 METHOD 2)

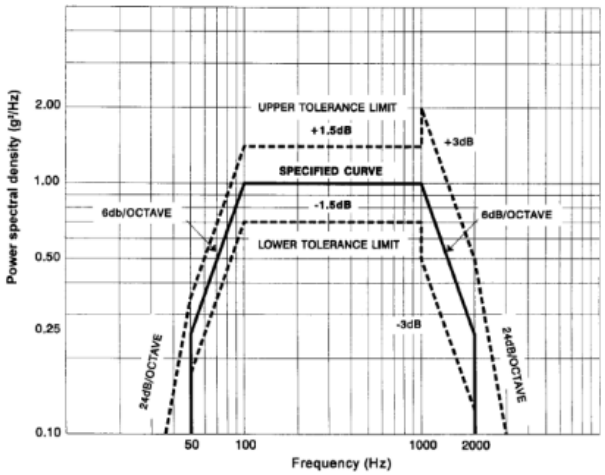
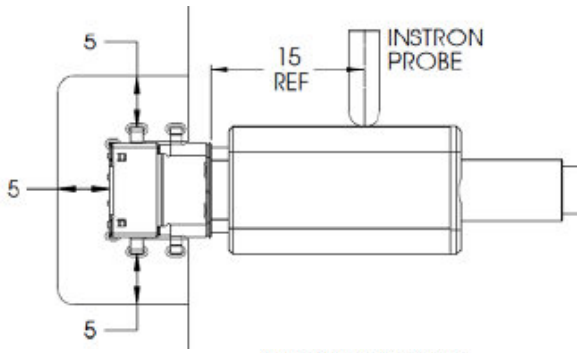


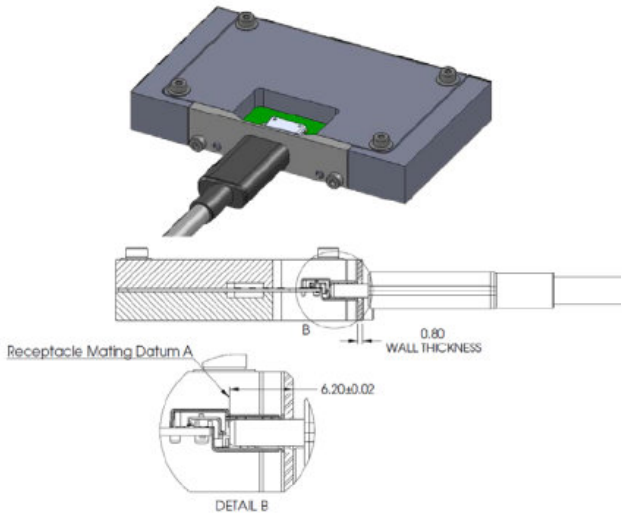
Current Rating Test PCB

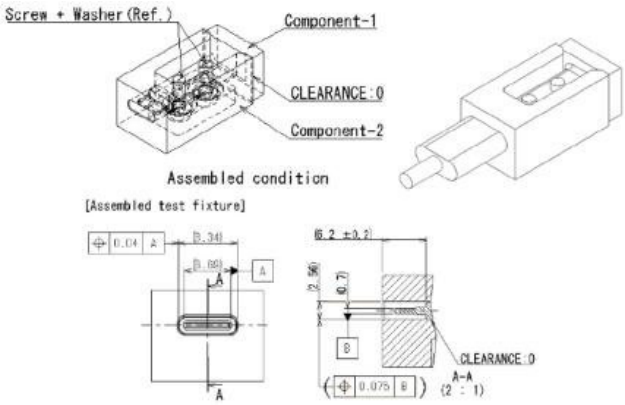
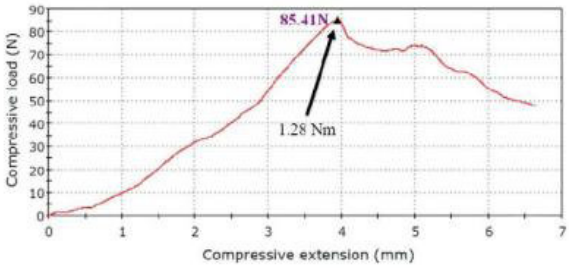
Item	Trace width (mm)	Trace length (mm) on each PCB	Thickness
Signal trace	0.25 max.	13 max.	35 µm (1 oz. copper)
Ground trace	1.57 max.	38 max.	35 µm (1 oz. copper)
V_{BUS} and V_{CONN}	1.25 max.	30 max.	35 µm (1 oz. copper)
PCB	N/A	N/A	0.80 - 1.20 mm

MECHANICAL

Durability	10000 cycles.	Perform 2500 plug/unplug cycles. Rotate the receptacle or plug 180° and perform 2,500 plug/unplug cycles. Cycle rate of 200 - 550 cycles per hour (total of 10,000 plug/unplug cycles, flipping every 2,500 cycles). (EIA-364-09)
Durability (preconditioning)	No evidence of physical damage	Perform 50 unplug/plug cycles (EIA-364-09)
Insertion Force	5 N to 20 N (Total: 5~10000 cycles) Value: 5、10001 cycles	At a maximum rate of 12.5 mm (0.492") per minute. (EIA 364-13)
Extraction Force	8 N to 20 N (Total: 6~1000 cycles) Value: 6、32 cycles 6N to 20N (Total: 1001~10000 cycles) Value: 10001 cycles	At a maximum rate of 12.5 mm (0.492") per minute. (EIA 364-13)

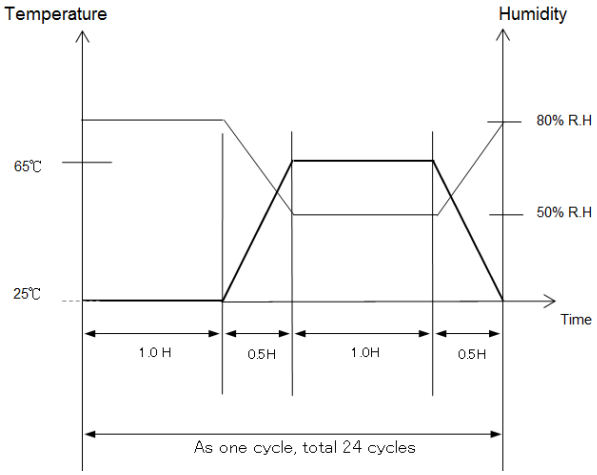
Reseating	No evidence of physical damage	Manually unplug/plug the connector or socket. Perform 3 such cycles.
Vibration	No evidence of physical damage. No discontinuities of 1 μS or longer duration when mated connector during test.	15 minutes in each of 3 mutually perpendicular directions. Both mating halves should be rigidly fixed so as not to contribute to the relative motion of one contact against another. The method of fixturing should be detailed in the test report. (EIA-364-28 Condition V, test condition letter A) - For USB 2.0 Type 
4-Axis Continuity	No discontinuities greater than 1 microsecond duration in any of the four orientations tested.	-Only for Cable or adaptor Assembly. -The PCB shall be clamped on three sides of the receptacle no further than 5 mm away from the receptacle outline. - 5 mm ball tipped probe applied the force - Duration : 10 seconds  Force and Moment Requirements Receptacle configuration with respect to mounting surface / Force at 15 mm from receptacle shell mating edge (N) / Moment with respect to receptacle shell mating edge (Nm) Right angle: 20 / 0.30 Vertical: 8 / 0.12

Wrenching Strength A (Plug only)	No plug damage. No discontinuity or short after the test force applied.	- Direction: four directions (i.e., left, right, up, and down). - Duration: 10 seconds - A moment of 0.75 Nm(e.g.,50N at 15mm from the edge Of the receptacle) **Wrenching Strength Test Fixture** 

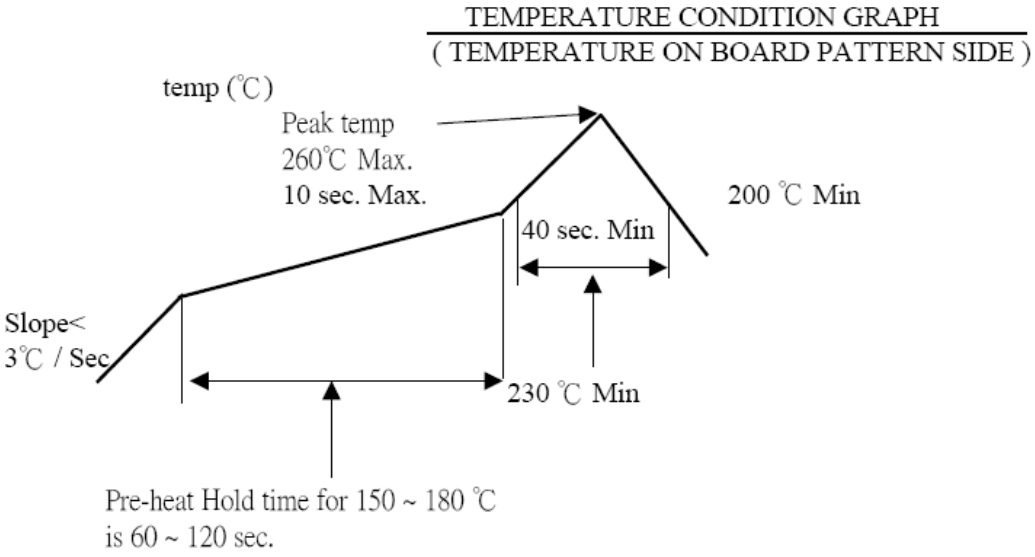
Wrenching Strength B	The plug shall disengage from the test fixture or mechanically failure.	- 2.0 Nm moment is applied in the up and down directions - 3.5 Nm moment is applied in the left and right directions.   **Example of Wrenching Strength Test Mechanical failure point**

ENVIRONMENTAL

Item	Requirement	Standard
Resistance to Hand Soldering Heat	Excessive pressure shall not be applied to the terminals. See Product Qualification and Test Sequence.	Soldering iron：350±10℃ Duration：3~4 sec.
Thermal Shock	No physical damage . See Product Qualification and Test Sequence.	Mate Connector condition for 10 cycles. Place a thermocouple in the center of the largest mass component of the connector that is in the center of the test chamber to insure that the contacts reach the temperature extremes before ramping to the other temperature. (EIA-364-32, test condition I) Thermal shock test conditions： Step / Test condition I (Temperature, °C / Time, minutes) 1: +0 -55 -3 / 30 2: +10 25 -5 / 5 max 3: +3 85 -0 / 30 4: +10 25 -5 / 5 max
Salt Spray (Only For Gold Plating)	No physical damage. See Product Qualification and Test Sequence	Mated Connector. Subject mated/unmated connectors to 5% salt-solution concentration, 35℃±2℃,Gold flash for 8 hours (EIA-364-26)
Temperature Life	No physical damage. See Product Qualification and Test Sequence.	Mated Connector. 105º C without applied voltage for 120 hours. (EIA-364-17, method A)
Temperature Life (preconditioning)	No physical damage . See Product Qualification and Test Sequence.	Mated Connector. 105º C without applied voltage for 72 hours when used as preconditioning. (EIA-364-17, method A)

Cyclic temperature & Humidity	No physical damage . See Product Qualification and Test Sequence.	Mated Connector Cycle the connector between 25℃±3℃ at 80%±3% RH and 65℃±3℃ at 50%±3% RH. Ramp times should be 0.5hour and dwell times should be 1hour. Dwell times start when the temperature and humidity have stabilized within the specified levels. Perform 24 such cycles. (EIA-364-31) 
Solder ability	Tin plating: Solder able area shall have minimum of 95% solder coverage. Gold plating: Solder able area shall have minimum of 75% solder coverage	And then into solder bath, Temperature at 245 ±5℃, for 4-5 sec. (EIA-364-52)

6 INFRARED REFLOW CONDITION



7 PRODUCT QUALIFICATION AND TEST SEQUENCE

Test or Examination	Test Group												
	1	2	3	4	5	6	7	8	9	10			
	Test Sequence												
Examination of Product			1	1	1		1、3	1、4	1、3	1、3			
Low-signal Level Contact Resistance		2、10	2、5 7	2、5 7、9	2、5 7	2		2、5					
Insulation Resistance		12											
Dielectric Withstanding Voltage		1、11				3							
Contact Current Rating	1												
Durability		5、7											
Durability(preconditioning)			3	3	3								
Reseating				8	6								
Insertion Force		3、8											
Extraction Force		4、6 9											
Vibration			6										
Thermal Shock				4									
Cyclic temperature & Humidity				6									
Temperature Life					4								
Temperature Life (preconditioning)			4										
Wrenching Strength A						1							
Wrenching Strength B						4							
4-Axis Continuity Test							2						
Salt Spray (Only For Gold Plating)								3					
Resistance to Hand Soldering Heat									2				
Solder ability										2			
Sample Size	4	4	4	4	4	4	4	4	4	4			