PRODUCT SPECIFICATION PS-7530 Rev. B

ORIGINAL

Title: USB3.1 Connector Product Specification

Part Number: GSB41/GSB42 series

Description: A /B type, Receptacle, Thru hole, PCB mount

ISSUED BY AMPHENOL TAIWAN PDF Format D.C.

Revisions Control

Rev.	ECN Number	Originator	Approval	Issue Date
A	NE-14119	Sondra Sang	Hank Hsu	06/20/2014
B	NE-17206	Sondra Sang	Hank Hsu	08/02/2017

Product Specification Origination

Originator:	Date:	Checked by:	Date:	Approved by:	Date:
Sondra Sang	8/2/2017	Chenny Yeh	8/2/2017	Hank Hsu	8/2/2017

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1. Scope

This document defines the detailed requirements for the Amphenol USB3.1 Series A/B type connector to insure functionality and reliability.

2. Applicable document

2.1	EIA-364 Standard	Test methods for electrical connectors
2.2	UL-STD-94	Tests for flammability of plastic materials for parts in devices and appliances.
2.3	USB3.1 Standard	Universal Serial Bus 3.1 Specification, Revision 1.0

3. Requirement

3.1 Design and construction

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

3.2 Material and finish

3.2.1 Housing

- High temperature thermoplastic, UL94V-0
- Color: Blue

3.2.2 Contact

- Copper Alloy
- Contact area: Selective Gold plating
- Solder area: Gold flash or matte tin plating
- Under-plating: Nickel overall

3.2.3 Shell

- Copper Alloy or Stainless steel
- Solder area: Matte tin plating
- Under-plating: Nickel overall

3.3 Rating

- Voltage rating: 30 VAC
- Operating temperature: -40°C~ 85°C
- Storage temperature: -40°C~ 85°C
- Ambient humidity: 85% R.H. maximum

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4. Performance and testing

4.1 Test requirements and procedures summary

Test	Test procedure	Condition of test specimens	Test criteria
Visual & Dimensional inspection	EIA-364-18 Visual, dimensional and functional inspection.		Must meet the minimum requirements specified by product drawing.
Electrical:			
Low level contact resistance	EIA-364-23b Current: 100 mA maximum Voltage: 20 mV maximum	Mated	Initial: 30 Milliohm maximum for VBUS and GND contacts(Pin 1 & Pin 4) 50 milliohms maximum for all other contacts After test: ΔR=10 milliohms maximum
Insulation resistance	EIA-364-21 Apply a voltage between adjacent terminals. Voltage: 500 VDC	Mated	100 Megohm minimum
Dielectric withstanding voltage	EIA-364-20 Apply a voltage between adjacent terminals. Voltage: 100 VAC Duration: 1 minute	Mated	No breakdown Current leakage < 0.5 mA
Contact capacitance	EIA-364-30 Test between adjacent contact, unmated connector at 1KHz.		2pF maximum per contact. D+/D- contacts only
Contact current rating	EIA-364-70 Measure the temperature rise at the rated current. Ambient temperature: 25℃ 1.8A for VBUS & GND(Pin 1 & Pin 4) 0.25A for all other contacts	Mated	ΔT=30℃ maximum
Super Speed Electrical Requirements:			
Mated connection impedance	It should be measured with a TDR in a differential mold using a 50ps(20-80%)rise time.	Mated	90Ω±10Ω (80Ω~~100Ω)

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Differential-to-common-mode conversion	This is a differential mode to common mode conversion requirement for SS signal pairs	Mated	The differential to common mode conversion (SCD21 or SCD12) does not require embedding the reference host and the reference device with the mated cable assembly. it passes the SCD12 requirement if its SCD12 is less than or equal to -20 dB across the frequency range of 100 MHz to 10 GHz.
Mechanical:			
Insertion force	EIA-364-13 Rate: 12.5 mm/minute		35 N maximum
Extraction force	EIA-364-13 Rate: 12.5 mm/minute		Initial: 10N min After test: 8N min.
Durability (preconditioning)	EIA-364-09 (perform 5 unplug/plug cycles if the application requires up to 25 over the life of the connector or socket; 20 cycles if the application requires 26-200; or, 50 cycles if the application requires 201 or greater)		No evidence of physical damage
Reseating	Manually unplug/plug the connector or socket. Perform 3 such cycles.		No evidence of physical damage
Durability	EIA-364-09 Cycle rate: 200 maximum per hour Number of cycles: 5,000 minimum		No evidence of physical damage - Insertion force (35N max.) - Extraction force (8N min.)
Vibration	EIA-364-28, Test condition VII, Test letter D 15 minutes in each of 3 mutually perpendicular directions. Overall rms: 3.10 g Electrical load: 100 milliamp maximum	Mated	No evidence of physical damage No discontinuities > 1 microsecond

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Mechanical Shock	EIA-364-28, Test condition H 3 shocks in each direction shall be applied along the 3 mutually perpendicular axes of the test specimen(18 shocks). Shock pulse: Half-sine Peak acceleration: 294m/s^2, 30g's Normal duration: 11ms Electrical load: 100 milliamp maximum	Mated	No evidence of physical damage No discontinuities > 1 microsecond
Environmental:			
Temperature life (preconditioning)	EIA-364-17, Test condition 4, Method A Temperature: 105℃ Duration: 72 hours	Mated	No evidence of physical damage
Temperature life	EIA-364-17, Test condition 4, Method A Temperature: 105℃ Duration: 120 hours	Mated	No evidence of physical damage
Cyclic temp and humidity	EIA-364-31, Test condition A, Method III Number of cycles: 24 cycles Duration: 168 hours	Mated	No evidence of physical damage
Thermal shock	EIA-364-32, test condition I Number of cycles: 10 <1 cycle> Step1: -55 +0/-3 ℃ 30 minutes Step2: +25 +10/-5℃ 5 minutes maximum Step3: +85 +3/-0℃ 30 minutes Step4: +25 +10/-5℃ 5 minutes maximum	Mated	No evidence of physical damage
Thermal cycling	EIA-364-110 Cycle the connector or socket between 15 °C ± 3°C. and 85 °C ± 3 °C, as measured on the part. Ramps should be a minimum of 2 °C per minute, and dwell times should insure that the contacts reach the temperature extremes (a minimum of 5 minutes). Humidity is not controlled. Number of cycles: 500 cycles	Mated	No evidence of physical damage

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Thermal disturbance	EIA-364-32 Cycle the connector or socket between 15 °C ± 3 °C and 85 °C ± 3 °C, as measured on the part. Ramps should be a minimum of 2 °C per minute, and dwell times should insure that the contacts reach the temperature extremes (a minimum of 5 minutes). Humidity is not controlled. Number of cycles: 10 cycles	Mated	No evidence of physical damage
Mixed flowing gas (MFG)	EIA-364-65, class IIA RH: 70±2% Temperature: 30±1℃ Cl_2 : 10±3 ppb NO_2 : 200±50 ppb H_2S : 10±5 ppb SO2 : 100±20 ppb Duration: 7 days		No evidence of physical damage
Solderability	EIA-364-52 The surfaces to be tested shall be immersed in the flux for a minimum of 5 to 10 seconds. Any droplets of flux that may form shall be removed by blotting, taking care not to remove the flux coating from the surfaces to be tested. The test samples being tested shall be allowed to dry in ambient air for 5 to 20 seconds prior to solder immersion. The test sample termination shall be immersed to a depth equal to a length from its tip to a location normally not less than 0.5 mm below the connector seating plane. Temperature: 255±5℃ Duration: 5 seconds	Unmated	95% of immersed area must show no volids or pin holes.
Resistance to soldering heat (Infrared reflow)	EIA-364-29 Average ramp rate: 1~4℃ per second Temperature(board surface): 250 +10℃/-0℃ Duration:30~35 seconds	Unmated	No evidence of physical damage

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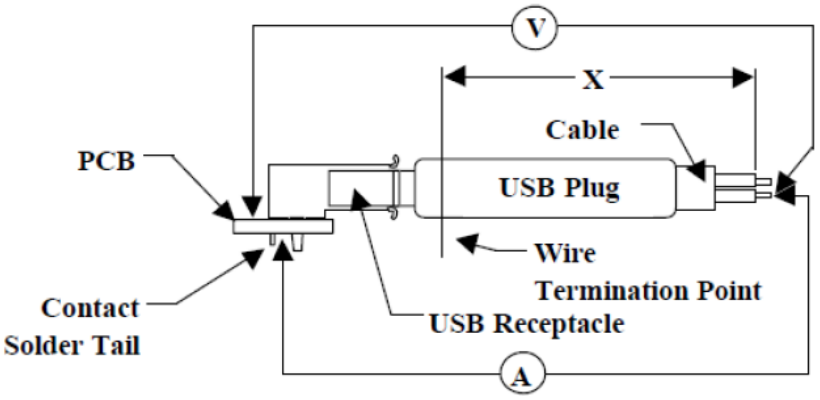
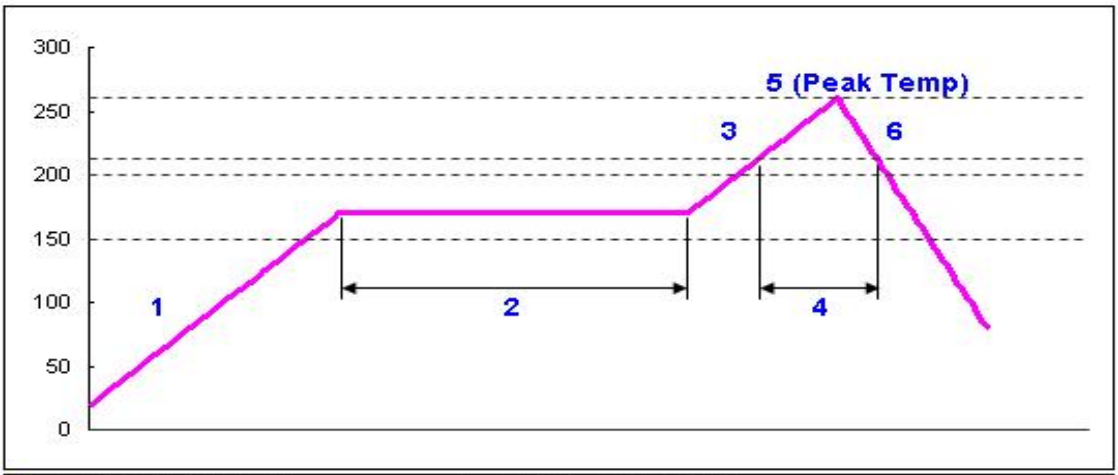
4.2 Typical contact resistance measurement



4.3 Recommended IR reflow profile(Lead-free)



1	Average ramp rate	3°C per second max.
2	Pre-heat temp.(minimum)	150°C
	Pre-heat temp.(maximum)	200°C
	Pre-heat time	60 to 120 seconds
3	Ramp to peak	3°C per second max.
4	Time over liquidus(217°C)	60 to 150 seconds
5	Peak temp.	260 +0/-10°C
	Time within 5°C of peak	10 seconds max.
6	Ramp- cool down	6°C per second max.
	Time 25°C to peak	8 minutes max.

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5.0 Test sequence

Test or examination	Test groups									
	A-1	A-2	A-3	A-4	A-5	A-7	B-2	B-3	B-4	B-5
Low level contact resistance	1,4,6	1,4,6,8	1,4,7	1,4,6,8 ,10	1,4,6,8	2,8				
Insulation resistance							2			
Dielectric withstanding voltage						1,9				
Contact current rating										
Contact Capacitance							1			
Mated connection impedance									1	
Differential-to-common-mode conversion									2	
Insertion force						3,6				
Extraction force						4,7				
Durability (preconditioning)	2	2	2	2	2					
Reseating	5	7		9	7					
Durability						5				
Vibration			5							
Mechanical Shock			6							
Temperature life (preconditioning)			3	3	3					
Temperature life	3									
Cyclic temp and humidity		5								
Thermal shock		3								
Thermal cycling					5					
Thermal disturbance				7						
Mixed flowing gas (MFG)				5						
Solderability								1		
Resistance to soldering heat (Infrared reflow)										
General examination	7	9	8	11	9	10	3	2		
Critical dimensions										1
Plating thickness										2

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Note:

1. Test specimen:
   Test group **A1~A7:** 10 pcs/group
   All other groups: **B-2:** 3 pcs; **B-3:** 5 pcs; **B-4:** 3 pcs; **B-5:** 3 pcs;
2. Test group **A-4:** For Customer require
3. Test specimen shall be sure to meet the drawing before the testing.

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