PRODUCT SPECIFICATION PS-7513 Rev. B

ORIGINAL

Title: USB3.0 Internal Connector Product Specification

Part Number: G823J / G826J / G802B series

Description: Header & Socket, 2.0mm and 1.27mm Pitch

Revisions Control

Rev.	ECN Number	Originator	Approval	Issue Date
A	Release	Sondra Sang	Hank Hsu	2015. 08. 05
B	NE-18217	Sondra Sang	Hank Hsu	2018. 11. 19

ISSUED BY AMPHENOL TAIWAN PDF Format D.C.

Product Specification Origination

Originator:	Date:	Checked by:	Date:	Approved by:	Date:
Sondra Sang	11/19/2018	Chenny Yeh	11/19/2018	Hank Hsu	11/19/2018

1. Scope

This document defines the detailed requirements for the Amphenol USB3.0 Series Internal connectors 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	USB3.0 Standard	Universal Serial Bus 3.0 Internal Connector 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 or Black

3.2.2 Contact

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

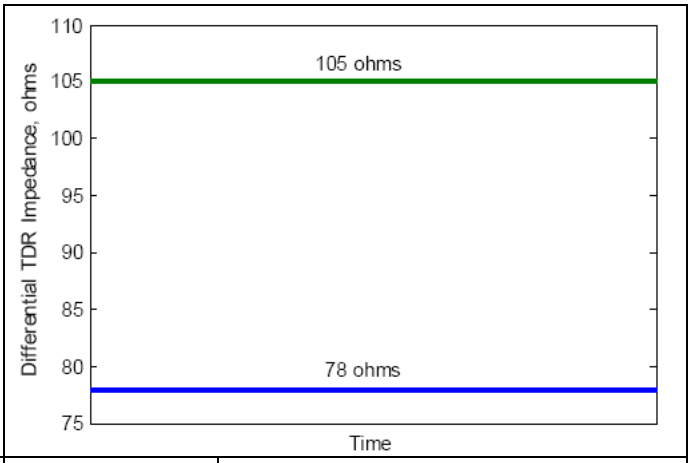
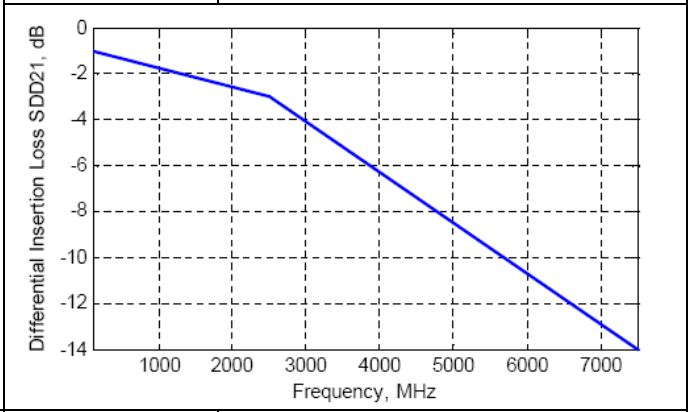
3.3 Rating

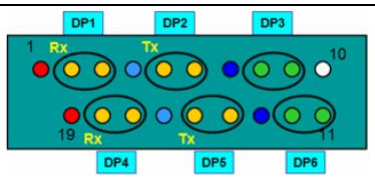
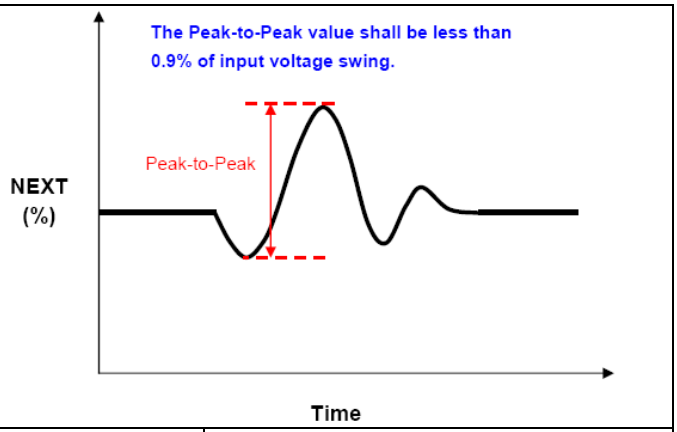
- Voltage rating: 30 VAC
- Operating temperature: -40°C~ +85°C
- Storage temperature: -40°C~ 85°C
- Ambient humidity: 85% R.H. maximum

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 max. After test: 50 Milliohm max.
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 current rating	EIA-364-70, method 2 Measure the temperature rise at the rated current. Ambient temperature: 25℃ 0.5A per pin minimum for Signals; 1.5A per pin minimum for VBUS.	Mated	ΔT=30℃ maximum
Super Speed Electrical Requirements:			
Mated connection impedance	It should be measured with a TDR in a differential mold	Mated	78Ω~~105Ω

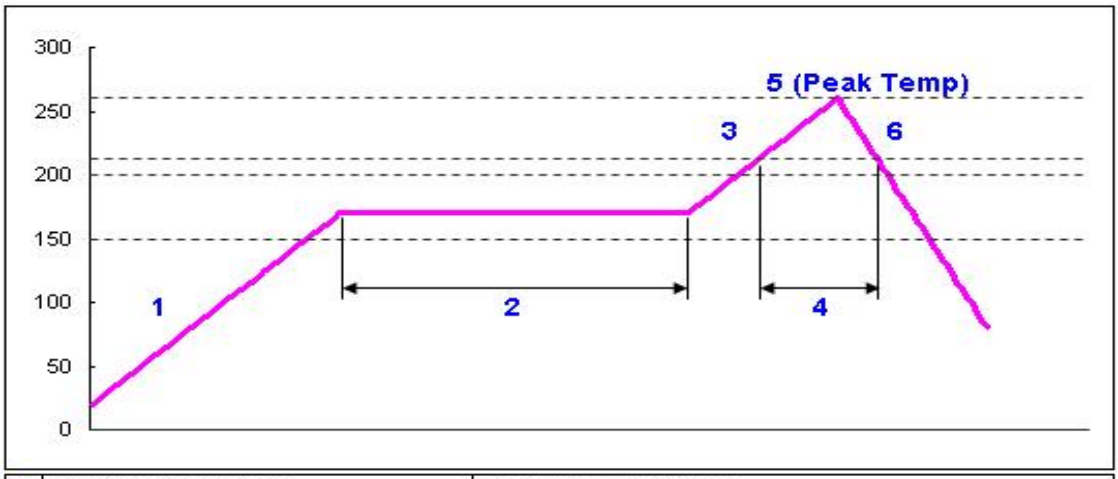
	using a 50ps(20-80%)rise time.		
Differential insertion loss	EIA-364-101 The measured differential insertion loss of a mated cable assembly must not exceed the differential insertion loss limit.	Mated	The differential insertion loss, SDD21, measures the differential signal energy transmitted through the mated cable assembly, the differential insertion loss limit. defined by the following vertices: (100MHz,-1dB), (2.5GHz, -3.0dB),and (7.5GHz,-14dB).
			
Differential near-end crosstalk between Super Speed Pairs	EIA-364-90 The differential near-end crosstalk is required for the TX-RX pairs DP1-DP2, DP4-DP5 and DP2-DP4.	Mated	The differential near-end crosstalk shall be measured in the time-domain with TDT in differential mode and the risetime shall be verified to be 50 ps (20~80%) at the connector under test. The measured crosstalk shall be no greater than 0.9%, peak to peak.

			
Differential Far-end crosstalk between SuperSpeed Pairs	EIA-364-90 The differential far-end crosstalk is required for all the TX- to -TX and RX-to-RX SuperSpeed pairs.	Mated	The differential far-end crosstalk shall be measured in the time-domain with TDT in differential mode and the risetime shall be verified to be 50 ps (20~80%) entering the connector under test. The measured crosstalk shall be no greater than 1.85%, peak to peak.
Intra-Pair Skew	The intra-paiir-skew of the mated cable assembly shall be controlled to be less than 15 ps.	Mated	The measurement shall be done with a TDT in differential mode for each of the SuperSpeed pairs with a 50 ps (20~80%) risetime. The propagation delay of each line in a differential pair at the 50% crossing shall be measured and the delay difference reported as the intra-pair skew.
Mechanical:			
Insertion force	EIA-364-13 Rate: 12.5 mm/minute		35 N maximum
Extraction force	EIA-364-13 Rate: 12.5 mm/minute		15 N min
Durability	EIA-364-09 Cycle rate: 200 maximum per hour Number of cycles: 25 minimum		No evidence of physical damage - Insertion force (35 N max.) - Extraction force (15 N min.) - contact resistance (50 Milliohm max.)
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).	Mated	No evidence of physical damage No discontinuities > 1 microsecond

	Shock pulse: Half-sine Peak acceleration: 294m/s^2, 30g's Normal duration: 11ms Electrical load: 100 milliamp maximum		
Environmental:			
Temperature life	EIA-364-17, Test condition 4, Method A Temperature: 105℃ Duration: 120 hours	Mated	No evidence of physical damage
Vibration	EIA-364-28, Test condition VII, Test letter D 10 minutes in each of 3 mutually perpendicular directions. Overall rms: 5.35 g Electrical load: 100 milliamp maximum	Mated	No evidence of physical damage No discontinuities > 1 microsecond
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

Mixed flowing gas (Just for 30 μ" gold)	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

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.

5.0 Test sequence

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Test or examination	Test groups							
	A-1	A-2	A-3	A-4	A-5	A-7	B-1	B-2
Low level contact resistance	1,3	1,3,5	1,4	1,3	1,3	3,9		
Insulation resistance						2		
Dielectric withstanding voltage						1,10		
Contact current rating								
Mated connection impedance								1
Differential insertion loss								2
Differential near-end crosstalk between Super Speed Pairs								3
Differential Far-end crosstalk between SuperSpeed Pairs								4
Intra-Pair Skew								5
Insertion force						4,8		
Extraction force						5,7		
Durability						6		
Vibration			2					
Mechanical Shock			3					
Temperature life	2							
Cyclic temp and humidity		4						
Thermal shock		2						
Thermal cycling					2			
Mixed flowing gas (MFG)				2				
Solderability							1	
Resistance to soldering heat (Infrared reflow)								
General examination	4	6	5	4	4	11	2	

Note:

1. Test specimen:
   Test group **A1~A7:** 10 pcs / group
   All other groups: **B1~B2:** 3 pcs / group;
2. Test specimen shall be sure to meet the drawing before the testing.