

PRODUCT SPECIFICATION

PS-7545

Rev. **A**

ORIGINAL

Title: OCuLink Connector Product Specification

Part Number: G14A series

Description: Receptacle, PCB mount

Revisions Control

Rev.	ECN Number	Originator	Approval	Issue Date
A	NE-16159	Sondra Sang	Hank Hsu	06 29, 2016



Product Specification Origination

Originator:	Date:	Checked by:	Date:	Approved by:	Date:
Sondra Sang	6/29/2016	Chenny Yeh	6/26/2016	Hank Hsu	6/26/2016

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1. Scope

This document defines the detailed requirements for the Amphenol [OCuLink](#) 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 | PCIe OCuLink Standard | PCI Express OCuLink 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: Black

3.2.2 Contact

- Copper Alloy
- Contact area: Selective Gold plating
- Solder area: Matte Tin plating
- Under-plating: Nickel overall

3.2.3 Shell

- Stainless steel
- Solder area: Nickel under-plated overall

3.3 Rating

- Voltage rating: 30 VDC
- Operating temperature: -40°C~ 85°C
- Storage temperature: -40°C~ 85°C
- Ambient humidity: 80% 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: Baseline After test: $\Delta R=30$ milliohms maximum
Insulation resistance	EIA-364-21 Apply a voltage between adjacent terminals. Voltage: 100 VDC	Unmated	100 Megohm minimum
Dielectric withstanding voltage	EIA-364-20 Apply a voltage between adjacent terminals. Voltage: 250 VAC for 100ms Duration: 1 minute	Mated	No breakdown Current leakage < 0.5 mA
Contact current rating	EIA-364-70 Measure the temperature rise at the rated current. Ambient temperature: 25°C 1.0A for Pin A21 & Pin B1) 0.5A for all other contacts	Mated	$\Delta T=30^{\circ}\text{C}$ maximum
High Speed Electrical Requirements:			
Mated connector Impedance (Differential Characteristic)	EIA-364-108 It should be measured with a TDR in a differential mold using a 25ps(20~80%) rise time	Mated	$85\Omega\pm 10\%$ (93.5 Ω ~76.5 Ω)
Differential insertion loss of high speed pairs	EIA-364-101 The measured differential insertion loss SDD21, -1 dB minimum	Mated	The range for this frequency domain measurement is 100 MHz to 12GHz
Differential Return loss of high speed pairs	The measured differential return loss SDD11, -12 dB maximum	Mated	The range for this frequency domain measurement is 100 MHz to 12GHz

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Common-Mode Return Loss of high speed pairs	The common-mode return loss SCC11, -3dB maximum	Mated	The range for this frequency domain measurement is 100 MHz to 12GHz
Differential Near-end Crosstalk (NEXT) for each receive signal pair	EIA-364-90 The differential near-end crosstalk , -35dB maximum	Mated	The range for this frequency domain measurement is 100 MHz to 12GHz
Differential Far-end Crosstalk (FEXT) for each receive signal pair	EIA-364-90 The differential far-end crosstalk , -35dB maximum	Mated	The range for this frequency domain measurement is 100 MHz to 12GHz
Mechanical:			
Insertion force (W/o Latch)	EIA-364-13 Rate: 19~31 mm/sec		2N~20N
Insertion force (W/ Passive Latch)	EIA-364-13 Rate: 19~31 mm/sec		10N~40N
Insertion force (W/ Active Latch)	EIA-364-13 Rate: 19~31 mm/sec		8N~40N
Extraction force (W/o Latch)	EIA-364-13 Rate: 19~31 mm/sec		1N~16N
Extraction force (W/ Passive Latch)	EIA-364-13 Rate: 19~31 mm/sec		8N~25N
Extraction force (W/ Active Latch)	EIA-364-13 Rate: 19~31 mm/sec		8N~25N
Durability- External	EIA-364-09 Cycle rate: 500 maximum per hour Number of cycles: 10,000 minimum		No evidence of physical damage
Durability- Internal	EIA-364-09 Cycle rate: 500 maximum per hour Number of cycles: 50 minimum		No evidence of physical damage

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Wrenching strength (W/ mated Cable-Passive Latch)	Bend cable 90° at minimum bend radius. Pull in 4 axis directions for round cable. Pull in 2 axis directions for flat cable. No damage to plug/ cable assembly.	Mated	25 N maximum
Wrenching strength (W/ mated Cable-Active Latch)	Bend cable 90° at minimum bend radius. Pull in 4 axis directions for round cable. Pull in 2 axis directions for flat cable. No damage to plug/ cable assembly.	Mated	40 N maximum
Active Latch Retention Strength	No damage to plug/ cable assembly below minimum value.		30 N minimum
Mechanical Shock	EIA-364-27, Test condition A 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: 490m/s ² , 50g's Normal duration: 11ms	Mated	No evidence of physical damage No discontinuities > 1 microsecond After test: ΔR=30 milliohms maximum
Vibration	EIA-364-28, Test condition III, 15 minutes in each of 3 mutually perpendicular directions. Frequency range: 10~2000Hz Peak level: 15gn (147.1m/s ²)	Mated	No evidence of physical damage No discontinuities > 1 microsecond After test: ΔR=30 milliohms maximum
Environmental:			
Temperature life	EIA-364-17, Test condition 4, Method A Temperature: 105°C 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: 96 hours	Mated	No evidence of physical damage

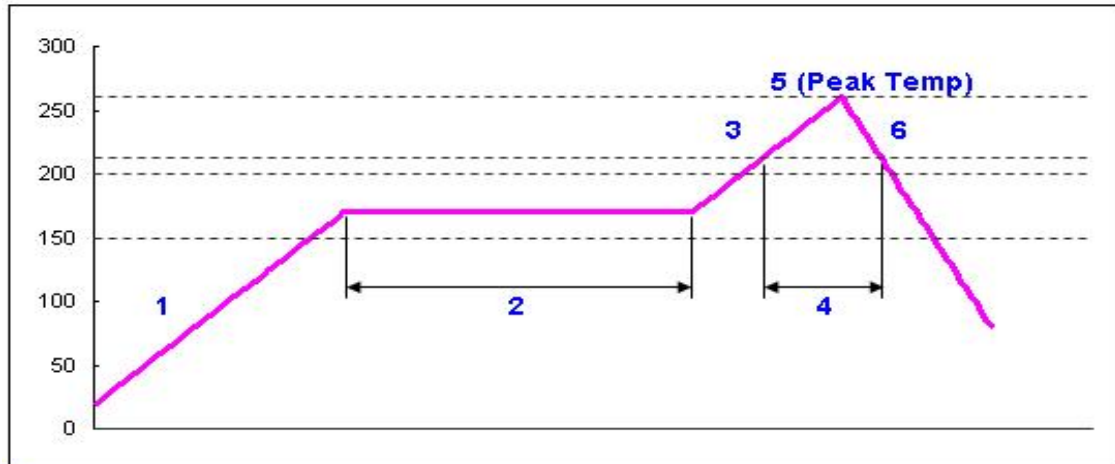
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Thermal shock	EIA-364-32, test condition I Number of cycles: 10 <1 cycle> Step1: -55 +0/-3 °C 30 minutes Step2: +25 +10/-5°C 5 minutes maximum Step3: +85 +3/-0°C 30 minutes Step4: +25 +10/-5°C 5 minutes maximum	Mated	No evidence of physical damage
Mixed flowing gas (MFG)	EIA-364-65, class IIA RH: 70±2% Temperature: 30±1°C Cl ₂ : 10±3 ppb NO ₂ : 200±50 ppb H ₂ S : 10±5 ppb SO ₂ : 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°C Duration: 5 seconds	Unmated	95% of immersed area must show no voids or pin holes.
Resistance to soldering heat (Infrared reflow)	EIA-364-29 Average ramp rate: 1~4°C per second Temperature(board surface): 250 +10°C/-0°C Duration:30~35 seconds	Unmated	No evidence of physical damage

4.2 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	B	C	D	E	F	G	H	J	K	L	M
Low level contact resistance	1,4,6	1,5,7,9	1,5	1,4,6	1,9	1,9						
Insulation resistance					2	2		2				
Dielectric withstanding voltage					3	3						
Contact current rating								1				
Mated connector Impedance (Differential Characteristic)							1					
Differential insertion loss of high speed pairs							2					
Differential Return loss of high speed pairs							3					
Common-Mode Return Loss of high speed pairs							4					
Differential Near-end Crosstalk (NEXT) for each receive signal pair							5					
Differential Far-end Crosstalk (FEXT) for each receive signal pair							6					
Insertion force (W/o Latch)											2	
Insertion force (W/ Passive Latch)					4,7							
Insertion force (W/ Active Latch)						4,7						
Extraction force (W/o Latch)											3	
Extraction force (W/ Passive Latch)					5,8							
Extraction force (W/ Active Latch)						5,8						
Durability- External					6	6						
Durability- Internal	2(a)	2(a)	2(a)	2(a)								
Reseating (Manually mated/ un-mated 3 times)	5	8		5								
Wrenching strength (W/ mated Cable- Passive Latch)									1			

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Wrenching strength (W/ mated Cable- Active Latch)										1		
Active Latch Retention Strength											1	
Mechanical Shock			4									
Vibration			3									
Temperature life	3											
Cyclic temp and humidity		6										
Thermal shock		4										
Mixed flowing gas (MFG)				3								
Solderability												1
Resistance to soldering heat (Infrared reflow)												2
General examination	7	10	6	7	10	10		3				
Sample size	5	5	5	5	5	5	1	2	5	5	5	5

Notes: (a) Preconditioning, 50 cycles requirement. The insertion and removal cycle is at a maximum rate of 200 cycles per hour.