

Amphenol

Amphenol Canada Corp.

5950 14th Avenue
Markham, Ontario
Canada L3R 4M4
Tel: (416) 291-4401
Fax: (416) 292-0647
E-mail: Tech.Support@amphenol-icc.com

Amphenol Canada Corp., China Division

Block A3/A4, The 4th Industrial District of
Industrial Headquarter, Dong Keng Road,
Gong Ming Town, Shenzhen, China
Tel: (86) 755-2717-7945
Fax: (86) 755-2715-9086
E-mail: sales@amphenolcanada.com

PRODUCT SPECIFICATION S6028C

Revision 0.1- Sep28/10

for USB 2.0 A&B Type Plug & Receptacle

1.0 Scope

- 1.1 Description for Amphenol part number UE27-ACX4-X0X: Universal Serial Bus, A type, receptacle, right angle PCB tail, 4 contacts.
- 1.2 This specification covers performance, methods and quality requirements for Universal Serial Bus (USB) plug and receptacle connectors. These connectors are cable mounted plug and printed circuit board mounted receptacle connectors.

2.0 Material

- 2.1 All materials are RoHS compliant per European Union directive 2002/95/EC and amendments.
- 2.2 Shells: Copper alloy, nickel plated.
- 2.3 Housing: Engineering thermoplastic, glass reinforced, UL flammability rating 94V-0, see Amphenol part number system for housing options.
- 2.4 Contacts: Copper alloy with gold over nickel plated, see Amphenol part number system for plating options.

3.0 Ratings

- 3.1 Voltage: 30 VAC (rms)
- 3.2 Current: 1.8A
- 3.3 Operating temperature: -40°C to +85°C
- 3.4 Storage temperature: -40°C to +85°C
- 3.5 Nominal Temperature Rating: +20°C

4.0 Electrical and Mechanical Test

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4.1 Test Requirements and Procedures Summary

	Test Description	Requirement	Procedure
1	Visual and Dimensional inspection.	Visual, dimensional, and functional inspection in accordance with the USB quality inspection plan	Visual and Dimensional inspection. EIA 364-18
2	Contact Current Rating	1.8A at 250V AC minimum when measured at an ambient temperature of 25°C. With power applied to the contacts, the ΔT must not exceed +30°C at any point in the USB connector under test.	EIA 364-70 Method B The object of this test procedure is to detail a standard method to assess the current carrying capacity of mated USB connector contacts.
3	Insulation resistance	1000 M Ω minimum	EIA 364 – 21 Test voltage 500 \pm 50V/DC between adjacent contacts of mated and unmated connector assemblies.
4	Dielectric withstanding Voltage	No flashover & sparkover & excess leakage & breakdown	EIA 364 – 20 Test voltage 750V/AC between adjacent contacts of mated and unmated connector assemblies.
5	Low level contact resistance	Initial: a.) 30m Ω maximum for Lower and Middle stack b.) 50m Ω maximum for Upper stack final: Δ 10m Ω (from the initial test data)	EIA 364-23 Subject mated contacts assembled in housing to 20 mV maximum open circuits at 100 mA maximum. See figure A
6	Contact capacitance	2 pF maximum unmated per contact.	EIA 364 – 30 The object of this test is to detail a standard method to determine the capacitance between conductive elements of a USB connector.

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	Test Description	Requirement	Procedure
7	Mating force	35 Newton maximum	EIA 364 – 13 Measure force necessary to mate connector Assemblies at maximum rate of 12.5 mm/min.
8	Unmating force	10 Newton minimum	EIA 364 – 13 Measure force necessary to unmated connector assemblies at maximum rate of 12.5 mm/min.
9	Durability	1500 cycles After test, no evidence of physical damage.	EIA 364 – 09. Insertion/extraction at a maximum rate of 500cycles per hour.
10	Cable pull-out	Applied a load of 40 Newton for one minute.	EIA364-38 Test condition A
11	Physical shock	No discontinuities of 1 μ s or Longer duration. See Note1.	EIA 364 – 27 Condition H. Subject mated connectors to 30 Gs half-sine shock' pulses of 11 ms duration. Three shocks in each direction applied along three mutually perpendicular planes, 18 total shocks, See Figure C first test setup.
12	Vibration , random	No discontinuities of 1 μ s or Longer duration. See Note1.	EIA 364 – 28A-83 Condition V Test Letter A. Subject mated connectors to 5.35 G's rms. 15 minutes in each of three mutually perpendicular planes ,See Figure B.
13	Thermal shock	<u>See Note1</u>	EIA 364 – 32 Test Condition I. 10 Cycles –55°C and +85°C, The USB connectors under test must be mated.

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	Test Description	Requirement	Procedure
14	Humidity Life	<u>See Note1</u>	EIA 364 – 31 Condition A. method III. 168 Hours minimum (seven complete cycles).the connector under test must be mated.
15	Temperature life	<u>See Note1</u>	EIA 364 – 17A-87 Condition 2 Method A. Subject mated connectors to temperature Life at 85°C for 250 hours
16	Solderability	USB contact solder tails shall pass 95% coverage after one hour steam aging as specified in category 2.	EIA364--52
17	Mixed Flowing Gas	See Note1	EIA364-65-92 Class II, Exposures Sample condition: Unmating Temperature: 30 ± 1°C Humidity: 70 ± 2%R.H Duration:250 hours Gas Concentration: (1) Cl ₂ : 10±3ppb (2) NO ₂ :200±50ppb (3) H ₂ S: 10±5 ppb (4) SO ₂ : 100±2 ppb
18	Flammability	Require its thermoplastic resin vendor to supply a detailed C of C with each resin shipment. The C of C shall clearly show the resin's UL listing number, lot number, date code, etc.	UL 94 V-0
19	<u>Salt Spray</u>	<u>No evidence of physical damage</u> <u>No rust</u>	<u>The connector shall be subjected to a fine mist of salt solution at a temperature of 35 ± 2°C for 8h continuously (salt solution concentration 5 ± 1% by weight)</u>

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	Test Description	Requirement		Procedure
20	Differential impedance	90±15%Ω (76.5~103.5Ω)		Connect the Time Domain Reflectometer (TDR). TDR is setup the differential mode
21	Common mode impedance	30±30%Ω (21~39Ω)		Connect the Time Domain Reflectometer (TDR). TDR is setup the differential mode.
22	Propagation Delay	26ns (maximum for full speed cable)		Connect the Time Domain Reflectometer (TDR). TDR is setup the differential mode.
23	Propagation delay skew	100ps/cable (maximum for full speed cable)		Connect the Time Domain Reflectometer (TDR). TDR is setup the differential mode.
24	Signal pair attenuation (Maximum)	0.512 MHz	0.13 dB/Cable	<ol style="list-style-type: none"> 1. Connect the Network Analyzer output port (port1) to the input connector on the attenuation test fixture (note). 2. Connect the series "A" plug of the cable o be tested to the test fixture, leaving the other end open-circuited. 3. Calibrate the network analyzer and fixture using the appropriate calibration standards over the desired frequency range.
		0.772 MHz	0.15 dB/Cable	
		1.000 MHz	0.20 dB/Cable	
		4.000 MHz	0.39 dB/Cable	
		8.000 MHz	0.57 dB/Cable	
		12.00 MHz	0.76 dB/Cable	
		24.00 MHz	0.95 dB/Cable	
		48.00 MHz	1.35 dB/Cable	
		96.00 MHz	1.90 dB/Cable	
		200.00 MHz	3.2 dB/Cable	
400.00 MHz	5.8 dB/Cable			

Note1: Shall meet visual requirements, show no physical damage .

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4.2 Product qualification test sequence:

Test Examination	Test Group (a)								
	1	2	3	4	5	6	7	8	
	Test Sequence (b)								
Examination	1,10	1,6	1,6	1,9	1,3	1,6	1,3	1,6	
Critical Dimension							2		
Insulation resistance				3,7					
DWV				4,8					
LLCR	3,7	2,5	2,5					2,5	
Capacitance				2					
Mating force	2								
unmating force	8								
Durability	4	3	3					4	
Cable pull-out	9								
Physical shock	6								
Vibration	5								
Thermal shock				5					
Humidity				6					
Temperature life		4							
Mixed Flowing Gas			4						
Solderability					2				
Salt spray								3	
Impedance						2			
Attenuation						3			
Propagation delay						4			
Skew						5			
Number of samples	Plug	8pcs	8pcs	8pcs	8pcs	5pcs	5pcs	<u>3pcs</u>	<u>5pcs</u>
	socket	8pcs	8pcs	8pcs	8pcs	5pcs	5pcs	<u>3pcs</u>	<u>5pcs</u>

Note2:

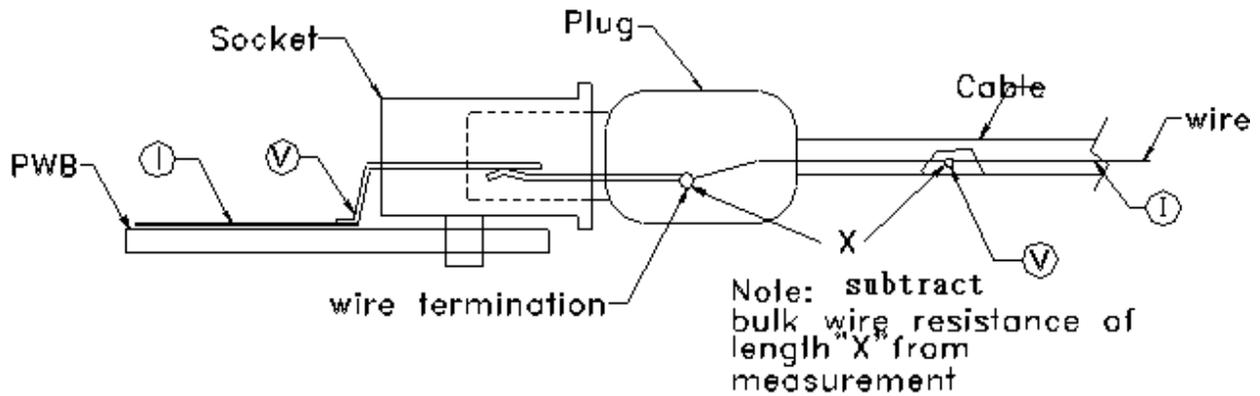
- a.) "Group 6" apply to USB Cable Assembly only.;
- b.) "Group 3 "and "Group 8" test by customer's requirement.

4.3 Sample Selection:

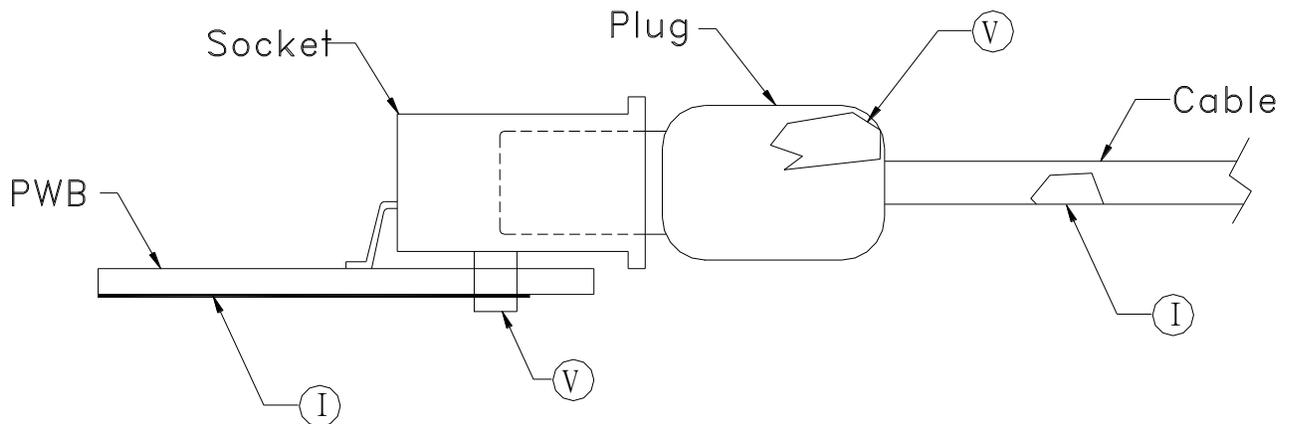
Samples shall be prepared in accordance with applicable manufacturers instructions and shall be selected at random from current production.

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4.4 Figures.

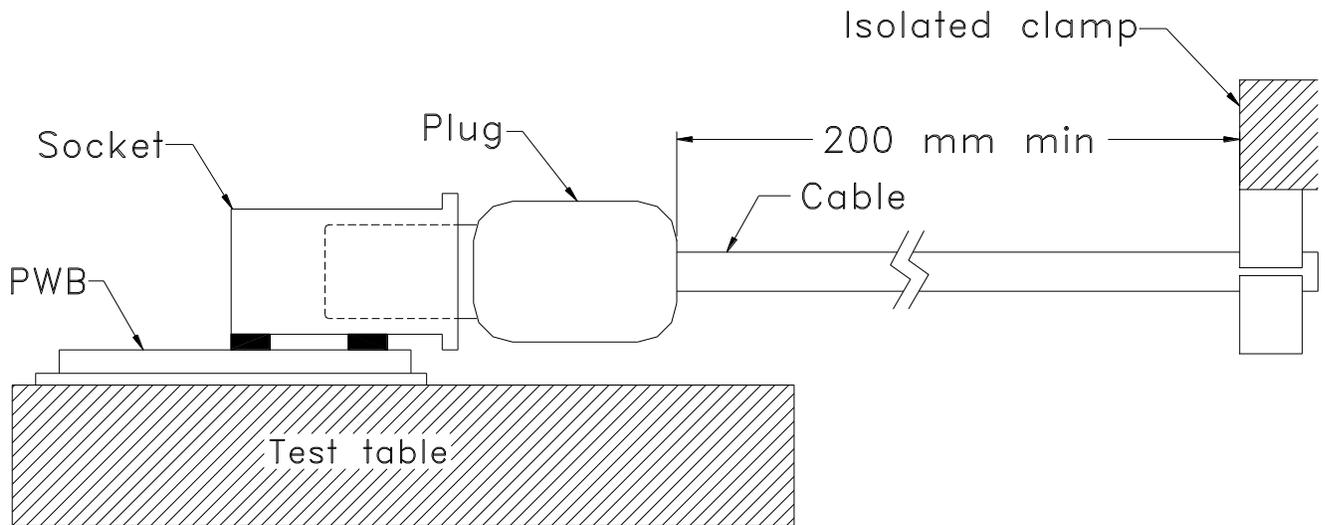


a) contact resistance

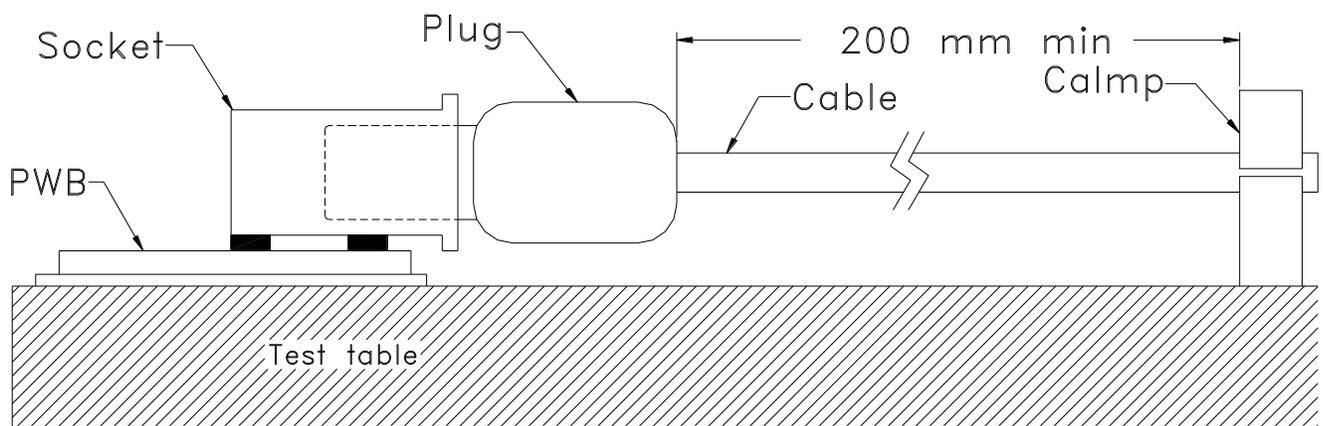


b) shield resistance

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a) vibration test



b) shock test

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5.0 USB connector termination data

5.1 Provide the standardized contact terminating assignments by number and electrical value for series "A" and series "B" connectors.

5.2 USB connector termination assignment:

Contact number	Signal name	Typical wiring Assignment
1	Vbus	Red
2	D-	White
3	D+	Green
4	GND	Black
shell	Shield	Drain Wire

6.0 Packaging

6.1 Quantity: 120 pcs per tray, 3000 pcs per carton

6.2 Packaging method: Carton box for shipment must have the enough strength in order to protect physical damage during transportation

6.3 Labelling: part number, quantity, date/lot code, CSA and UL logos as a minimum on each internal box and carton.