DONGGUAN MOLEX INTERCONNECT.,LTD

PRODUCT SPECIFICATION

Title: USB Type C to USB 2.0 Legacy Cable Assy

		TITLE : **USB Type C to USB 2.0 Legacy Cable Assy**			
A	Initial Release	THIS DOCUMENT CONTAINS INFORMATIOON THAT IS PROPRIETARY TO			
REV.	DESCRIPTION	MOLEX AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION			
DOCUMENT NO.		Prepared By : LUCY LI	Date : 15/03/11	Sheet No.	
PS-68798-0003		Checked By : LUCY LI	Date : 15/03/11		
		Approved By : NIE FRED	Date : 15/03/11	1 OF 5	

1 Scope

This specification covers the requirements for USB Type C to USB 2.0 Legacy Cable Assy .

2 Product Description

USB Type C to USB 2.0 Legacy Cable Assy .

See the sales drawing and the other section of this specification for the necessary.In cases where the specification differs from the drawings, the sales drawings take precedence.

3 Ratings

Voltage

Rated Voltage: 30V DC

Current

Vbus and GND refer to sales drawing

Current of 0.25A shall be applied to all the other contacts.

4 Temperature

Operating temperature: -10 °C to +50 °C

Storage temperature: -20 °C to +60 °C

5 Pin assignment

See sales drawing

6. Electrical And Signal Integrity Compliance Requirements

Test Description	Test Condition	Performance Requirement
Low Level Contact Resistance (LLCR)	EIA 364-23 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. The test boards shall be provided with the connectors to be tested. • Measure at 20 mV (max) open circuit at 100 mA.	The following requirements apply to the power and signal contacts: Type C: 40 mΩ (max) initial for VBUS, GND and all other contacts.50 mΩ maximum after initial measurement. Type A and B:30mΩ(max) initial
Dielectric Withstanding Voltage	Test voltage 100 VAC,1Min.	No breakdown
Cable Assembly Voltage Drop	The maximum rated VBUS current of the cable assembly shall be used. The measurement includes representative receptacles at both ends of the cable assembly, mounted on test fixtures.	250 mV max for GND and 500 mV max for VBUS.
D+/D- Pair Differential Impedance	Refer to appendix G.4 of Type C connectors and cable assemblies compliance document Measured with a 400 ps rise time (20%-80%).	75 ohms min and 105 ohms max.
D+/D- Pair Propagation Delay	Refer to appendix G.4 of Type C connectors and cable assemblies compliance document Use a 400 ps rise time (20%-80%) at 50% voltage crossing.	10 ns max for USB Type-C to Micro-B cable assembly; 20 ns max for all other USB Type-C to legacy USB cable assemblies.
D+/D- Pair Intra-pair Skew	Refer to appendix G.4 of Type C connectors and cable assemblies compliance document	100 ps max.
D+/D− Pair Attenuation	Refer to appendix G.4 of Type C connectors and cable assemblies compliance document	⩾ −1.02 dB @ 50 MHz ⩾ −1.43 dB @ 100 MHz ⩾ −2.40 dB @ 200 MHz ⩾ −4.35 dB @ 400 MHz
Rd resistor verification	Measure the resistance between pin A5 and Ground (pin A1, A12, B1, or B12).	Type-C pin A5 resistance to GND for cable assemblies with a USB B plug.
Rp resistor verification	Measure the resistance between pin A5 and VBUS (pin A4, A9, B4, or B9).	Type-C pin A5 to VBUS resistance for cable assemblies with a Standard-A plug.

7. Mechanical Compliance Requirements

7.1 USB 2.0 Legacy cable assembly mechanical performance requirements

Test Description	Test Condition	Performance Requirement
Cable Flexing	EIA 364-41, Condition I with Dimension X = 3.7 times the cable diameter and 100 cycles in each of two planes 120 degree arc.	No physical damage and discontinuity over 1 microsecond during flexing shall occur to the cable assembly

Test Description		Test Procedure		Performance Requirement
Insertion Force		EIA 364-13 The insertion force test shall be done at a maximum rate of 12.5 mm (0.492") per minute.		Type C: Within the range from 5 N to 20 N. Type A and B: 35 Newtons maximum
Extraction Force		EIA 364-13 The extraction force test shall be done at a maximum rate of 12.5 mm (0.492") per minute.		Within the range of 8 N to 20 N, measured after a preconditioning of five insertion/extraction cycles (i.e., the sixth extraction). After an additional twenty-five insertion/extraction cycles, the extraction force shall be measured again (i.e., the thirty-second extraction) and the extraction force shall be within: a) 33 % of the initial reading, and b) within the range of 8 N to 20 N. The extraction force shall be within the range of 6 N to 20 N after 10,000 insertion/extraction cycles. Standard Type A and B:10 Newtons minimum Micro B:8 Newtons minimum after 10000 insertion/extraction cycles
Cable Pull-Out		EIA 364-38 Test Condition A The cable assembly shall is subjected to a 40N axial load for a minimum of 1 minute while clamping one end of the cable plug.		No visible physical damage and no electrical discontinuity over 1 microsecond to the cable assembly.
Durability or Insertion/Extraction Cycles		EIA 364-09		Type C:10,000 cycles minimum. Type A and B: 1,500 cycles minimum. Conductor resistance and dielectric withstanding voltage shall be checked to be within spec after the durability cycles
7.2 USB Type-C end mechanical performance requirements				
4-Axes Continuity		Refer to appendix D of Type C connectors and cable assemblies compliance document. Plug and Receptacle: Subject the mating interface to the moments defined in Appendix D for at least 10 seconds.		No discontinuities greater than 1 microsecond duration in any of the four orientations tested.
Wrenching Strength (Plug-only)		Perpendicular forces are applied to the plug in four directions (i.e., left, right, up, and down). A metal fixture with opening and tongue representative of a receptacle shall be used. Refer to Appendix E of Type C connectors and cable assemblies compliance document		A single plug shall be used for this test. Some mechanical deformation may occur. The plug shall be mated with the continuity test fixture after the test forces have been applied to verify no damage has occurred that causes discontinuity or shorting. The Dielectric Withstanding Voltage test shall be conducted after the continuity test to verify plug compliance. A new plug is required for each of the four test directions. The plug shall disengage from the test fixture or demonstrate mechanical failure (i.e., the force applied during the test procedure peaks and drops off) when a moment of 2.0 Nm is applied to the plug in the up and down directions and a moment 3.5 Nm is applied to the plug in the left and right *directions.*

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8. Environmental Compliance Requirements

Test Description		Test Procedure		Performance Requirement
Temperature Life		EIA 364-17, Method A. 105º C without applied voltage for 120 hours. 105º C without applied voltage for 72 hours when used as preconditioning. The object of this test procedure is to detail a standard method to assess the ability of a USB Type C connector to withstand temperature.		Conductor resistance meets spec before and after the Temperature Life test.
Cyclic Temperature and Humidity		EIA 364-31 The object of this test procedure is to detail a standard test method for the evaluation of the designs and materials used in USB connectors as the effects of high humidity and heat influences them.		Subject samples to between 25℃±3℃ at 80%±3% RH and 65℃±3℃ at 50%±3% RH,Ramp times should be 0.5 hour and dwell times should be 1.0hour.Dwell times start when the temperature and humidity have stabilized within the specified levels.Perform 24 such cycles. Conductor resistance meets spec before and after the Cyclic Temperature and Humidity test.