PRODUCT SPECIFICATION

TITLE :	
	MINI - USB SERIES CONNECTOR
	Lead-Free

TABLE OF CONTENTS

1.0 SCOPE

2.0 APPLICABLE DOCUMENTS

3.0 MATERIAL SPECIFICATIONS

3.1 DESIGN AND CONSTRUCTION

3.2 MATERIALS

3.3 RATING

3.4 PERFORMANCE AND TEST DESCRIPTION

3.5 TEST REQUIREMENTS AND PROCEDURES

4.0 VIBRATION CONDITION

5.0 HUMIDITY CONDITION

6.0 RE-FLOW CONDITION

7.0 MIGRATION CONDITION

1.0 SCOPE

This specification covers the MINI USB SERIES CONNECTOR product :

2.0 APPLICABLE DOCUMENTS

The following documents from a part of this specification to the extent specified herewith. In the event of conflict between the requirements of the specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of the specification and he referenced documents, this specification shall take precedence.

MIL-STD-202 Test Methods for Electronic and Electrical Component Parts

MIL-STD-1344 Test Methods for Electrical Connectors

3.0 MATERIAL SPECIFICATIONS

3.1 Design and Construction

Connector shall be of the design, construction and physical dimensions specified on the applicable sales drawing

3.2 Materials

a) Contacts : Refer to respective molex sales & engineering drawings
b) Housing : Refer to respective molex sales & engineering drawings
c) Shield : Refer to respective molex sales & engineering drawings
d) Plating : Refer to respective molex sales & engineering drawings

3.3 Ratings

Item	Standard	
Rated Voltage (Max.)	30 V	AC (rms) / DC
Rated Current (Max.)	1.0 A	
Ambient Temperature Range	0 ^{o}C ~ +50 ^{o}C (Including Terminal Temperature rise)	
hipping and Storage Temperature Range	-20 ^{o}C ~ +60 ^{o}C (Including Terminal Temperature rise)	

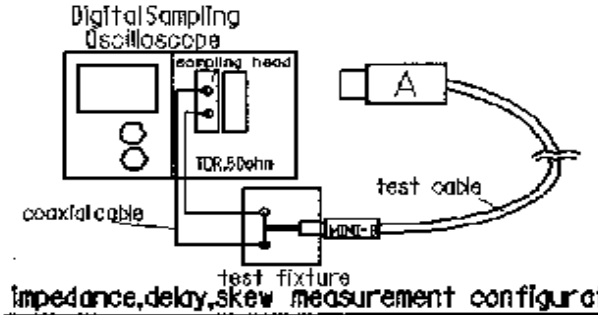
3.4 Performance and Test Description

Connector shall be designed to meet the electrical, mechanical and environmental performance requirements specified in 3.5

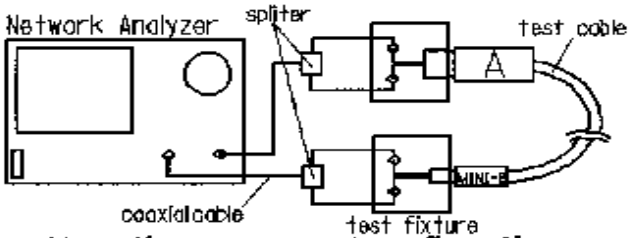
3.5 Test Requirements and Procedures.

ELECTRICAL PERFORMANCES

Item	Requirement	Test Condition
Contact Resistance (initial and after mate/un-mate 5000 cycles)	**50** mΩ Max.	Mate connectors, measure by dry circuit, 20 mV Max. 100mA Max. Except wire conductor resistance. EIA - 364 -23
Insulation Resistance	100 Mega Ω Min	Mate/Un-mate connectors, apply 100V DC for 1 minute between adjacent terminal or ground . EIA - 364 - 21
Dielectric Strength	No Breakdown	Mate/Un-mate connectors, apply 100V AC(rms) for 1 minute between adjacent terminal or ground. EIA - 364 -20
Temperature Rise	30 °C Max.	Mate connector and measure the temperature rise of contact when the maximum AC rated current is passed EIA - 364 - 70
Capacitance	2 *pF* Max.	Measured between adjacent circuits of un-mated connectors at 1kHz . EIA - 364 - 30
Cable Impedance	USB 1.1 Diff. Impedance (rt=4ns)76.5~103.5 ohms	Connect the cable to test fixture, measure by TDR. Measurement configuration are page 4
	USB 2.0 Diff. Impedance (rt=4ns)76.5~103.5 ohms Com. Impedance (rt=0.5ns) 21 ~ 39 ohms	
Attenuation	Reference page 4	Connect the cable to attenuation test fixture, measure by Network Analyzer. Measurement configuration are page 4
Propagation Delay	USB 1.1 26ns / cable Max.	Connect the cable to test fixture, measure by TDR. Measurement configuration are page 4
	USB 2.0 5.2ns / m Max.	
Propagation Delay Skew	USB 1.1 400ps / cable Max.	Connect the cable to test fixture, measure by TDR. Measurement configuration are page 4
	USB 2.0 100ps / cable Max.	



impedance,delay,skew measurement configuration



attenuation measurement configuration

Frequency (MHz)	Attenuation Max. (dB/cable)	Remark
0.064	0.08	USB 1.1
0.256	0.11	USB 1.1
0.512	0.13	USB 1.1
0.772	0.15	USB 1.1
1	0.2	USB 1.1
4	0.39	USB 1.1
8	0.57	USB 1.1
12	0.67	USB 1.1
24	0.95	USB 1.1
48	1.35	USB 1.1
96	1.9	USB 1.1
200	3.2	USB 2.0
400	5.8	USB 2.0

Item	**Requirement**		**Test Condition**
Mating / un-mating force (initial)	Mating force	35N (3.57 kgf) Max.	Mate / un-mated at a rate of 12.5 mm / min EIA - 364 - 13
	Un-mating force	7N (0.71 kgf) Min.	
Terminal / housing retention force	4 N (0.41 kgf) Min.		Apply axial pull out force on the terminal assembled in the housing at a rate of 25 +/- 3 mm / min.

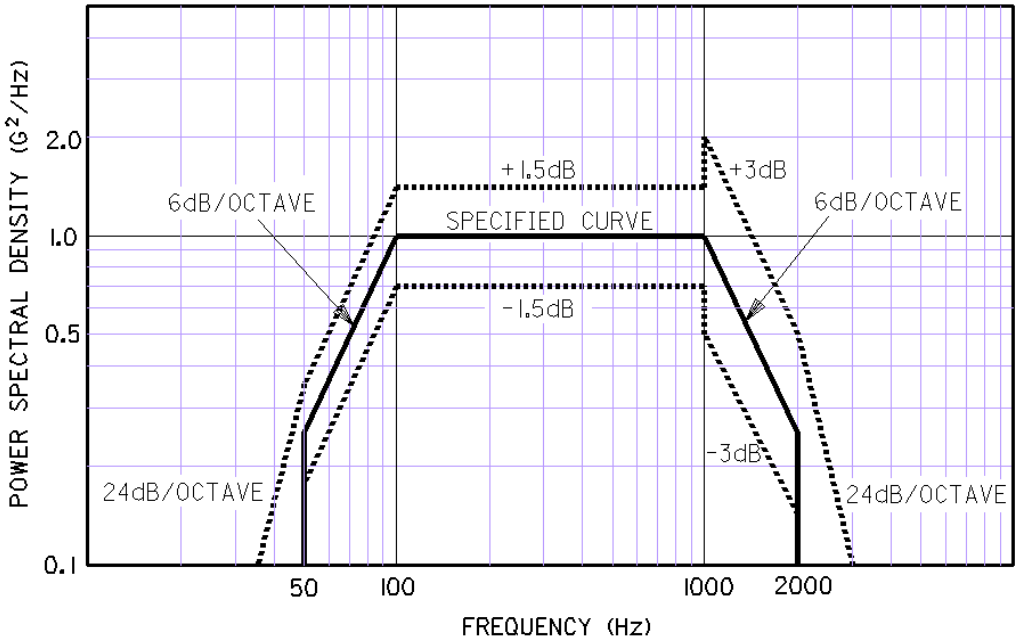
Item	Requirement		Test Condition
Repeated mate / un-mate	Contact Resistance	50 m Ω Max.	When mate / un-mated up to 5000 cycles repeatedly at Max. rate of 200 cycles / hr. EIA - 364 - 09
	Mating force	35 N(3.57 kgf) Max.	
	Un-mating force	3N (0.3 kgf) Min	
	Appearance	No breakdown	
Cable Pull-Out	Appearance	No Damage	Apply axial pull out force on the cable assemble in the connector at a rate of 40N for 1 minute. EIA - 364 - 38
	Contact Resistance	50 m Ω Max.	
Vibration	Appearance	No Damage	Mate connectors and subject to the following vibration conditions(refer to 6 clause), for a period of 15 minutes in each 3 mutually perpendicular axes, passing DC 100mA during the test. EIA - 364 - 28
	Contact Resistance	50 m Ω Max.	
	Dis - continuity	1.0 microsecond Max	
Shock	Appearance	No damage	Mate connectors and subject to the following shock conditions, 3 shocks shall be applied along 3 mutually perpendicular axes, passing DC 100 mA current during the test. (Total of 18 shocks) Test Pulse : Half Sine Peak Value : 294 m/s^2 (30G) Duration : 11 ms EIA - 364 - 27
	Contact Resistance	**50** mΩ Max.	
	Discontinuity	1.0 microsecond Max.	
Heat Resistance	Appearance	No damage	Mate connectors and expose to 105 +/- 2 °C for 250 hours, Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed EIA - 364 - 17
	Contact Resistance	**50** mΩ Max.	
	Insulation Resistance	**100** Mega Ω Min	
	Dielectric Strength	No Breakdown	

Cold Resistance	Appearance	No damage	Mate connectors and expose to -55 +/- 2 °C for 96 hours, Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed
	Contact resistance	**50** mΩ Max.	
	Insulation Resistance	**100** Mega Ω Min	
	Dielectric Strength	No Breakdown	
Humidity	Appearance	There shall be no remarkable corrosion	Mate connectors and expose to humidity in 7 cycles 7 clause. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. EIA-364-31 method III
	Contact Resistance	**50** mΩ Max.	
	Dielectric Strength	No breakdown	
	Insulation Resistance	**100** MΩ Min.	
Temperature cycling	Appearance	No Damage	Mate connectors and subject to the flowing conditions for 10 cycles, Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. 1 cycle a). -55 +/- 3 °C 30 minutes. b). +85 +/- 2 °C 30 minutes. (Transit time shall be within 10 to 15 minutes)
	Contact resistance	**50** mΩ Max.	
	Dielectric Strength	No breakdown	
	Insulation Resistance	**100** MΩ Min.	
Migration	There shall not be remarkable conduct in a polystyrene migration board.		20 ~ 30 mm to for 2 sheets of polysturene migration board(50x50x3) two data of the length of the role of 60 mm are put in an interval and this putting it to 2 sheets of glass plates 500g of are loaded do a disclosure test(refer to 9 clause) Temperature : 60 °C Duration : 48 hours

ENVIRONMENTAL PERFORMANCE

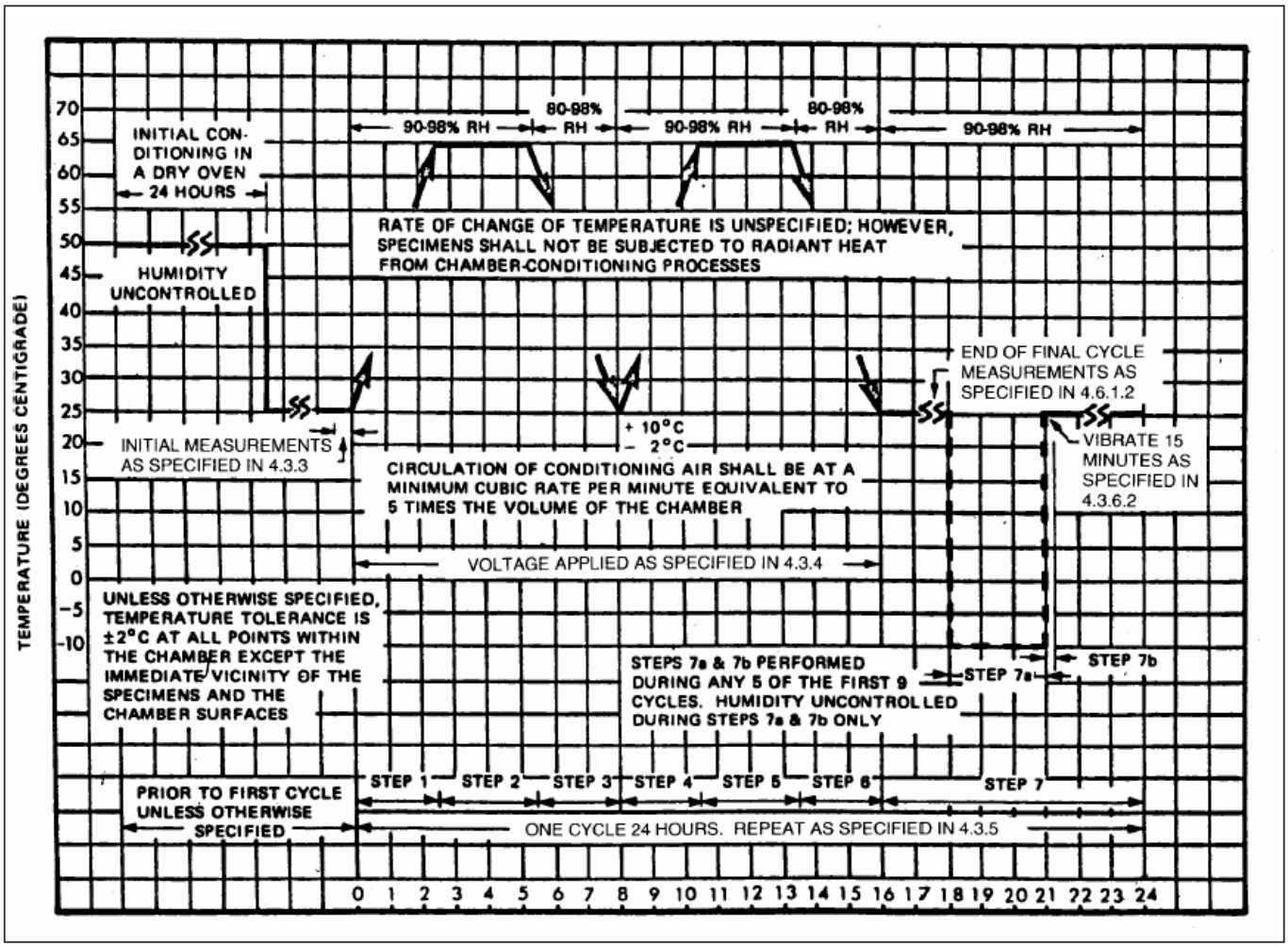
Item	Requirement		Test Condition
Salt spray	Appearance	by visual inspection without noticeable rust.	Mate connectors and expose to the following salt mist conditions. Upon completion of the exposure period, salt deposits shall be removed by a gentle wash or dip in running water, after which the specified measurements shall be performed. NaC1 solution Concentration : 5 +/- 1 % Spray time : 48 +/- 4 h Ambient Temperature : 35 +/- 2 °C (EIA - 364 -26)
	Contact Resistance	**100** mΩ Max.	
SO_2 Gas	Appearance	No Damage	Mate connectors and expose to 50 +/- 5 ppm SO_2 gas, ambient temperature 40 +/- 2 °C for 24 hours.,
	Contact Resistance	**100** mΩ Max	
Solder -ability	Solder Wetting	95% of immersed area must show no voids , pin holes	Dip solder-tails in flux then immerse in solder bath at 245+/- 5 °C up to 0.5 mm from the bottom of the housing for 4 ~ 5 seconds (EIA - 364 -52 Category 2)
Resistance to soldering heat	Without deformation of case or excessive looseness of the terminals(pin.). Electrical characteristics shall be satisified.		For procedures other than specified below, refer to IEC PUB. 68-2-20. Test Tb Method 1A or 2 Solder bath method Solder temperature : 260 +/- 5 °C Immersion time : 10 +/- 1 second Thickness of P.C.B : 0.8 mm Solder iron method Solder temperature : 350 +/- 10 °C Immersion time : 3 +/- 1 second However, excessive pressure shall not be applied to the terminal
	No Damage after reflow		Reference reflow condition at 8 clause.

4.0 VIBRATION CONDITION

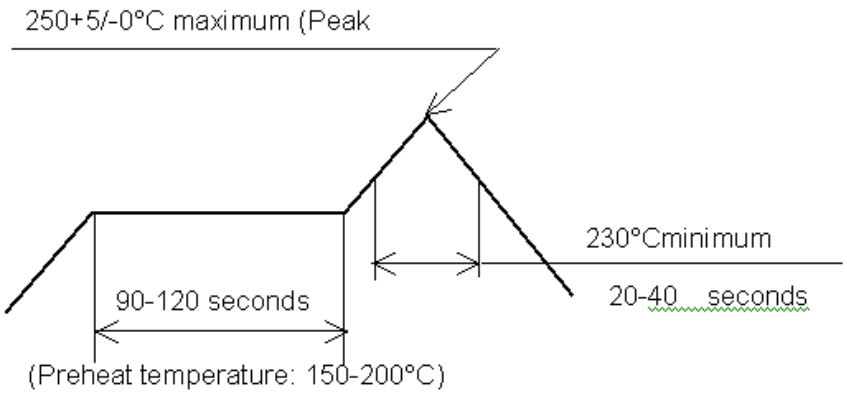


Power spectral density, G^2/Hz	Overall rms miniimum
0.02	5.35

5.0 HUMIDITY CONDITION



6.0 REFLOW CONDITION



TEMPERATURE CONDITION GRAPH

(TEMPERATURE ON TRANSITION AREA)

7.0 MIGRATION CONDITION