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**USB CONNECTOR SERIES.**

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**1. SCOPE**

This specification covers performance, tests and quality requirements for **USB CONNECTOR SERIES**.

**2. APPLICABLE DOCUMENT**

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

**2.1. TYCO SPECIFICATIONS**

- A. 109-1: General Requirements for Test Specifications
- B. 109-197 : Tyco Specification vs EIA and IEC Test Methods
- C. 501-57635 : Test Report

**3. REQUIREMENTS****3.1. DESIGN AND CONSTRUCTION**

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

**3.2. MATERIALS**

- A. Contact: Copper Alloy, Gold plating on contact area, Tin-lead or Tin-Cu plated on soldertails, Nickel underplated all over
- B. Housing: Thermoplastic High Temperature, UL94V-0.
- C. Front Shell: Copper Alloy, Nickel plated over Cu underplated all over.
- D. Rear Shell: Steel, Nickel plated over Cu underplated all over.

**3.3. RATINGS**

- A. Current Rating: 1.0 Ampere.
- B. Voltage Rating: 30 VAC RMS Max.
- C. Operating temperature: -40°C to +80°C.

### 3.4. TEST CONDITION

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1.

### 3.5. TEST REQUIREMENTS AND PROCEDURES SUMMARY

TEST ITEM	REQUIREMENTS	PROCEDURE
Examination of product	Meets requirements of product drawing and AMP Specification.	Visual inspection No physical damage.
<b>ELECTRICAL TEST</b>		
Termination Resistance (Low Level)	Initial: 30 mΩ Max. Final: 40 mΩ Max.	Subject mated contacts assembled in housing to 20 mV Max. open circuit at 100 mA Max. See figure 3. EIA 364-23
Insulation Resistance	1000 MΩ Min.	Test between adjacent contacts of mated and unmated connector assemblies. EIA 364-21.
Dielectric Withstanding Voltage	No creeping discharge nor flash over.	Test between adjacent contacts of mated and unmated connector assemblies. 750 Vac for 1 minute. EIA 364-20
Capacitance	2 pF Max.	Test between adjacent circuits of unmated connectors at 1 KHz. EIA 364-30
<b>MECHANICAL TEST</b>		
Connector Mating Force	Initial: 35 N Max.	Measure force necessary to mate connector assemblies at Max. rate of 12.5 mm/min. EIA 364-13
Connector Unmating Force	Initial: 10 N Min.	Measure force necessary to mate connector assemblies at Max. rate of 12.5 mm/min. EIA 364-13
Durability	See note (a).	Mate and unmate connector assemblies for 1500 cycles at Max. rate of 200 cycles per hour. EIA 364-09
Vibration	No electrical discontinuity of 1 microsecond or longer duration. See note (a).	Subject mated connectors to 5.35 G's rms. 15 minutes in each of three mutually perpendicular planes. See figure 4. EIA 364-28 condition V , Test letter A.
Physical Shock	No electrical discontinuity of 1 microsecond or longer duration. See note (a).	Subject mated connectors to 30 G's half-sine shock pulses of 11 ms duration. Three shocks in each direction applied along three mutually perpendicular planes, 18 total shocks. See figure 4 for the test setup. EIA 364-27 condition H.
Contact Retention	8 N Min. per pin.	Apply axial load to contact.

ENVIRONMENTAL TEST		
Thermal Shock	Ins. resistance: 500 M $\Omega$ Min. Dielectric Withstanding Voltage: 750 V ac 1min. See note (a).	Mated connector. -55 $^{\circ}$ C/30min., 85 $^{\circ}$ C /30min. 5 cycles. EIA 364-32 test condition I.
Humidity Test	See note (a).	Mated connectors. 40 $^{\circ}$ C with 90~95% R.H. for 96 hours. EIA 364-31 method II test condition A.
Temperature Life	See note (a).	Mated connectors. 85 $\pm$ 5 $^{\circ}$ C 250 hours. EIA 364-17 test condition 3 method A.
Solderability	The inspected area of each lead must have 95% solder coverage minimum.	Steam Aging Preconditioning: Intended for nontin and nontin-alloy Leadfinishes for 93+3/-5 $^{\circ}$ C $\cdot$ 1hrs. Intended for tin and tin-alloy Leadfinishes for 93+3/-5 $^{\circ}$ C $\cdot$ 8hrs. <JESD22-B102D, Condition C> Solder pot temperature: 245 $\pm$ 5 $^{\circ}$ C, 5sec.
Resistance to Wave Soldering Heat	No physical damage shall occur.	Solder Temp. : 240 $\pm$ 5 $^{\circ}$ C, 10 $\pm$ 0.5sec. Tyco spec. 109-202, Condition A
Resistance to Wave Soldering Heat	No physical damage shall occur.	Solder Temp. : 265 $\pm$ 5 $^{\circ}$ C, 10 $\pm$ 0.5sec. Tyco spec. 109-202, Condition B
Resistance to Reflow Soldering Heat	No physical damage shall occur.	Pre-soak condition, 85 $^{\circ}$ C/85% RH for 168 hours. Pre Heat : 150~200 $^{\circ}$ C, 60~180sec. Heat : 217 $^{\circ}$ C Min., 60~150sec. Peak Temp. : 245+0/-5 $^{\circ}$ C, 10~30sec. Duration : 3 cycles Tyco spec. 109-201, Condition A
Resistance to Wave Soldering Heat	No physical damage shall occur.	Pre-Heat: 100~150 $^{\circ}$ C, 60 sec Max. Heat: 210 $^{\circ}$ C Min., 30 sec Max. Peak Temp.: 240 $^{\circ}$ C Max., 10 $\pm$ 0.5sec.
Resistance to Reflow Soldering Heat	No physical damage shall occur.	Pre-soak condition, 85 $^{\circ}$ C/85% RH for 168 hours. Pre Heat : 150~200 $^{\circ}$ C, 60~180sec. Heat : 217 $^{\circ}$ C Min., 60~150sec. Peak Temp. : 260+0/-5 $^{\circ}$ C, 20~40sec. Duration : 3 cycles Tyco spec. 109-201, Condition B

Figure1.

Note: (a) Shall meet visual requirements, show no physical damage, and shall meet requirements of additional tests as specified in the test sequence listed in figure 2.

### 3.6. PRODUCT QUALIFICATION AND REQUALIFICATION TEST SEQUENCE

Test or Examination	Test Group (a)				
	A	B	C	D	E
	Test Sequence (b)				
Examination of Product	1,9	1,5	1,9	1,3	1,3
Termination Resistance (Low Level)	3,7	2,4			
Insulation Resistance			3,7		
Dielectric Withstanding Voltage			4,8		
Connector Mating Force	2				
Connector Unmating Force	8				
Durability	4				
Capacitance			2		
Vibration	5				
Physical Shock	6				
Thermal Shock			5		
Humidity Test			6		
Temperature Life		3 (c)			
Solderability				2	
Resistance to Soldering Heat					2

Figure 2

- Notes: (a) See Para 3.7  
 (b) Numbers indicate sequence in which tests are performed.  
 (c) Precondition samples with 10 cycles durability.

### 3.7. SAMPLE SELECTION

Samples shall be prepared in accordance with applicable manufacturers' instructions and shall be selected at random from current production. Test groups 1,2, 3 and 4 shall consist of a minimum of eight connectors. A minimum of 30 contacts shall be selected and identified. Unless otherwise specified, these contacts shall be used for all measurement