
Mini USB-B Header, H-Type SMT

1. SCOPE

1.1. Content

This specification covers the requirements for product performance, test method and quality assurance provisions for the TE Connectivity (TE) Mini USB-B Header, H-Type SMT.

Applicable product description and part numbers are as follow.

Part Number	Part Description
X-2294731-X	Mini USB-B Header, H-Type SMT

Note: The model number (part number) is configured with a single digit number with a dash in the list parent number. For more information on the dash with a number for each parent numbers refer to the drawing or catalog for the customer. It should be noted that if the prefix is zero, zero and dash are omitted.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 and 2 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

2. APPLICABLE DOCUMENTS

The following documents and forms constitute 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. Unless otherwise indicated, the latest edition of the document applies.

2.1. TE Documents

- 501-166004: Qualification Test Report (Mini USB-B Header, H-Type SMT)

2.2. Industry Document

- SAE/USCAR-30, 2006-11 Issue: Performance Specification For Automotive Universal Serial Bus (USB) Connection System
- SAE/USCAR-2, Rev 6 2013-02 Issue: Performance Specification For Automotive Electrical Connector Systems
- USB 2.0, April 27, 2000 (various updates per www.usb.org): Universal Serial Bus Specification

2.3. Reference Documents

- 109-1: Test Specification (General Requirements for Testing)

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Materials

- A. Contact: Copper Alloy, Gold plated on contact area, Tin plated on solder tails
- B. Solder Nail: Copper Alloy, Tin plated
- C. Housing: Thermoplastic

3.3. Ratings

- Current Rating: 1.0 Ampere
- Voltage Rating: 30VAC RMS Max
- Temperature Rating: -40 to 85°C (Temperature Class 1)

3.4. Performance Requirements and Test Description

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1 and 2. All tests shall be performed in the room temperature, unless otherwise specified.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
GENERAL		
Visual Inspection	No defect that could affect functionality or distort appearance	Visual examination per SAE/USCAR-30, 5.1.8
Connector Cycling	LLCR $\leq 50\text{m}\Omega$	Mate connectors 10 cycles per SAE/USCAR-30, 5.1.7
Circuit Continuity Monitoring	Discontinuity $< 1\mu\text{sec}$	Monitor circuit continuity of connectors during conditioning per SAE/USCAR-30, 5.1.9
MECHANICAL		
Connector-Connector Mating / Unmating Force	Mating force $\leq 45\text{N}$ Unmating force with lock engaged $\geq 110\text{N}$ Unmating force with lock dis-engaged $\leq 45\text{N}$ Dis-engaged by depress primary connector latch force $> 10\text{N}$ and $< 70\text{N}$	Mate and unmate connector at a uniform rate not to exceed 50mm/min per SAE/USCAR-30, 5.2.1
Vibration / Mechanical Shock	LLCR $\leq 50\text{m}\Omega$	Random vibration, not coupled to engine per SAE/USCAR-30, 5.2.3
Connector-to-Connector Audible Click	7 dB above recorded ambient 5 dB above recorded ambient	Mate and unmate connector and measure dB level of sound generated above ambient per SAE/USCAR-30, 5.2.4
Polarization Feature Effectiveness	Force $> 30\text{N}$	Engage the connector halves at a rate not to exceed 50mm/min to attempt mating. Connector must withstand minimum force to prevent mating.
ELECTRICAL		
Low Level Contact Resistance	LLCR $\leq 50\text{m}\Omega$	Mate connectors and apply 20mV maximum open circuit at 100mA per SAE/USCAR-30, 5.3.1
Isolation Resistance	$\geq 100\text{ m}\Omega$	Mate connectors and apply a voltage of 500VAC for 1 min between adjacent terminals per SAE/USCAR-30, 5.3.2

Figure 1 (cont.)

Test Description	Requirement	Procedure															
ENVIRONMENTAL																	
Thermal Shock	LLCR \leq 50m Ω	Mate connectors and subject to 100 cycles of <table border="1" data-bbox="1027 394 1266 579"> <thead> <tr> <th>Temp</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>-40°C</td> <td>30 mins</td> </tr> <tr> <td>Transfer</td> <td>\leq 30 secs</td> </tr> <tr> <td>+85°C</td> <td>30 mins</td> </tr> <tr> <td>Transfer</td> <td>\leq 30 secs</td> </tr> </tbody> </table> per SAE/USCAR-30, 5.5.1	Temp	Duration	-40°C	30 mins	Transfer	\leq 30 secs	+85°C	30 mins	Transfer	\leq 30 secs					
Temp	Duration																
-40°C	30 mins																
Transfer	\leq 30 secs																
+85°C	30 mins																
Transfer	\leq 30 secs																
Temperature / Humidity Cycling	LLCR \leq 50m Ω	Mate connectors and subject to 40 cycles of <table border="1" data-bbox="1027 646 1453 898"> <thead> <tr> <th>Time</th> <th>Temp</th> <th>RH</th> </tr> </thead> <tbody> <tr> <td>0.5 hrs</td> <td>-40°C</td> <td>uncontrolled</td> </tr> <tr> <td>0.5 hrs</td> <td>-40°C ramp to +85°C</td> <td>uncontrolled</td> </tr> <tr> <td>6.0 hrs</td> <td>+85°C</td> <td>80-100%</td> </tr> <tr> <td>1.0 hrs</td> <td>+85°C ramp to -40°C</td> <td>uncontrolled</td> </tr> </tbody> </table> per SAE/USCAR-30, 5.5.2	Time	Temp	RH	0.5 hrs	-40°C	uncontrolled	0.5 hrs	-40°C ramp to +85°C	uncontrolled	6.0 hrs	+85°C	80-100%	1.0 hrs	+85°C ramp to -40°C	uncontrolled
Time	Temp	RH															
0.5 hrs	-40°C	uncontrolled															
0.5 hrs	-40°C ramp to +85°C	uncontrolled															
6.0 hrs	+85°C	80-100%															
1.0 hrs	+85°C ramp to -40°C	uncontrolled															
High Temperature Exposure	LLCR \leq 50m Ω	Mate connectors and subject to 85°C for 1008 hours per SAE/USCAR-30, 5.5.3															

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)						
	C	D	E	G	H	I	J
	Test Sequence (b)						
Visual Inspection	1,3	1,3	1,3	1,7	1,7	1,8	1,7
Connector Cycling				3	3	3	3
Circuit Continuity Monitoring				5 (c)	5 (c)		
Connector-Connector Mating / Unmating Force		2					
Vibration / Mechanical Shock				5 (c)			
Connector-to-Connector Audible Click	2						
Polarization Feature Effectiveness			2				
Low Level Contact Resistance				2,4,6	2,4,6	2,4,6	2,4,6
Isolation Resistance						7	
Thermal Shock					5 (c)		
Temperature / Humidity Cycling						5	
High Temperature Exposure							5



NOTE

- (a) Each test group shall consist of a minimum of 5 specimens and shall be selected at random from current production.
- (b) Numbers indicate sequence in which tests are performed.
- (c) Run Simultaneously

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

Samples shall be selected at random from current production. The number of test points will correspond to the number of positions on the connector.

4.2. Re-Qualification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product quality assurance shall co-ordinate re-qualification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineers.

4.3. Acceptance

Acceptance is based upon verification that product meets requirements of Figure 1. Failures attributed to equipment, test set-up or operator deficiencies shall not disqualify product. When product failure occurs, corrective actions shall be taken and samples re-submitted for qualification. Testing to confirm corrective action is required before re-submittal.

4.4. Quality Conformance Inspection

Applicable TE quality inspection plan will specify sampling acceptable quality level to be used. Dimensional and functional requirements shall be accordance with applicable product drawing and specification.