Mini USB-B Header, H-Type SMT

1. INTRODUCTION

1.1. Purpose

Testing was performed on the Mini USB-B Header, H-Type SMT to determine if it meets the requirements of Product Specification 108-51114.

1.2. Scope

This report covers the results of electrical, mechanical and environmental performance requirements testing of Mini USB-B Header, H-Type SMT.

The qualification testing was performed from SEP 2016 to NOV 2016.

1.3. Conclusion

Mini USB-B Header, H-Type SMT meets the requirements of Product Specification 108-51114.

1.4. Product Description

This connector has been designed for use of automotive harness to board connector.

1.5. Test Samples

Samples were taken randomly from current production. The following samples where used (Fig. 1)

Part Number	Part Description
X-2294731-X	Mini USB-B Header, H-Type SMT
Molex Incorporated	Mini USB-B Plug Harness

Figure 1

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.

1.6. Reference Test Report No.

- PTR16-128

2. TEST CONTENTS

Test Description	Requirement	Judgement
	GENERAL	
Visual Inspection	No defect that could affect functionality or distort appearance	Visual examination per SAE/USCAR-30, 5.1.8
Connector Cycling	LLCR ≤ 50mΩ	Mate connectors 10 cycles per SAE/USCAR-30, 5.1.7
Circuit Continuity Monitoring	Discontinuity < 1µsec	Monitor circuit continuity of connectors during conditioning per SAE/USCAR-30, 5.1.9
	MECHANICAL	
Connector-Connector Mating / Unmating Force	Mating force ≤ 45N Unmating force with lock engaged ≥ 110N Unmating force with lock dis-engaged ≤ 45N Dis-engaged by depress primary connector latch force > 10N and < 70N	Mate and unmate connector at a uniform rate not to exceed 50mm/min per SAE/USCAR-30, 5.2.1
Vibration / Mechanical Shock	LLCR ≤ 50mΩ	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 > 30N	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 ≤ 50mΩ	Mate connectors and apply 20mV maximum open circuit at 100mA per SAE/USCAR-30, 5.3.1
Isolation Resistance	≥ 100 mΩ	Mate connectors and apply a voltage of 500VAC for 1 min between adjacent terminals per SAE/USCAR-30, 5.3.2

Figure 2 (cont.)

Test Description	Requirement	Judgement
	ENVIRONMENTAL	
Thermal Shock	LLCR ≤ 50mΩ	Mate connectors and subject to 100 cycles of Temp Duration -40°C 30 mins Transfer ≤ 30 secs +85°C 30 mins Transfer ≤ 30 secs per SAE/USCAR-30, 5.5.1
Temperature / Humidity Cycling	LLCR ≤ 50mΩ	Mate connectors and subject to 40 cycles of 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 per SAE/USCAR-30, 5.5.2
High Temperature Exposure	LLCR ≤ 50mΩ	Mate connectors and subject to 85°C for 1008 hours per SAE/USCAR-30, 5.5.3

Figure 2 (end)

3. PRODUCT QUALIFICATION AND REQUALIFICATION TEST ITEM

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 10 specimens and* shall be selected at random from *current production.*

(b) *Numbers indicate sequence in which tests are performed.*

(c) *Run Simultaneously*

Figure 3

4. SUMMARY OF TEST RESULT

GP	Test Items		Requirements	Test Result					Judge
				N	MAX	MIN	AVE	Unit	
C	Visual Inspection		No defect	8	Good			-	OK
	Connector-to-Connector Audible Click	Unconditioned	7 dB above recorded ambient		36.8	14.6	28.4	dB	OK
		Conditioned	5 dB above recorded ambient		35.3	14.8	26.2	dB	OK
	Visual Inspection		No defect		Good			-	OK
D	Visual Inspection		No defect	15	Good			-	OK
	Connector-Connector Mating / Unmating Force	Mating	F ≤ 45N		14.1	12.5	13.1	N	OK
		Unmating lock engaged	F ≥ 110N		132.4	128.3	130.3	N	OK
		Unmating with lock dis-engaged	F ≤ 45N		13.6	12.5	13.1	N	OK
		Dis-engaged by depress primary connector latch	F > 10N F < 70N		43.3	35.8	40.5	N	OK
	Visual Inspection		No defect		Good			-	OK
E	Visual Inspection		No defect	6	Good			-	OK
	Polarization Feature Effectiveness	Code A	F > 30N		Pass			N	OK
		Code C			Pass			N	OK
		Code D			Pass			N	OK
		Code E			Pass			N	OK
		Code F			Pass			N	OK
		Code G			Pass			N	OK
	Visual Inspection		No defect		Good			-	OK
G	Visual Inspection		No defect	9	Good			-	OK
	Connector Cycling	Initial LLCR	≤ 50mΩ		24.84	20.25	22.83	mΩ	OK
		Final LLCR	≤ 50mΩ		25.11	20.35	23.07	mΩ	OK
	Vibration / Mechanical Shock	Initial LLCR	≤ 50mΩ		24.84	20.25	22.83	mΩ	OK
		Final LLCR	≤ 50mΩ		24.61	19.97	22.79	mΩ	OK
	Visual Inspection		No defect		Good			-	OK
H	Visual Inspection		No defect	10	Good			-	OK
	Connector Cycling	Initial LLCR	≤ 50mΩ		26.81	22.10	23.96	mΩ	OK
		Final LLCR	≤ 50mΩ		29.44	22.07	24.20	mΩ	OK
	Thermal Shock	Initial LLCR	≤ 50mΩ		26.81	22.10	23.96	mΩ	OK
		Final LLCR	≤ 50mΩ		26.45	21.81	24.03	mΩ	OK
	Visual Inspection		No defect		Good			-	OK

GP	Test Items		Requirements	Test Result					Judge
				N	MAX	MIN	AVE	Unit	
I	Visual Inspection		No defect	10	Good			-	OK
	Connector Cycling	Initial LLCR	≤ 50mΩ		25.63	20.33	23.31	mΩ	OK
		Final LLCR	≤ 50mΩ		26.85	19.44	23.26	mΩ	OK
	Temperature / Humidity Cycling	Initial LLCR	≤ 50mΩ		25.63	20.33	23.31	mΩ	OK
		Final LLCR	≤ 50mΩ		26.42	19.20	22.96	mΩ	OK
	Visual Inspection		No defect		Good			-	OK
J	Visual Inspection		No defect	10	Good			-	OK
	Connector Cycling	Initial LLCR	≤ 50mΩ		25.12	20.67	23.39	mΩ	OK
		Final LLCR	≤ 50mΩ		26.23	20.83	23.44	mΩ	OK
	High Temperature Exposure	Initial LLCR	≤ 50mΩ		25.12	20.67	23.39	mΩ	OK
		Final LLCR	≤ 50mΩ		27.36	21.42	24.16	mΩ	OK
	Visual Inspection		No defect		Good			-	OK