Qualification Test Report

D1100 Clamp Kit

Tyco Electronics. (Shanghai) Co., Ltd.

1. INTRODUCTION

1.1 Purpose

Testing was performed on D1100 Clamp Kit to determine its conformance to the requirements of Design Objective 108-106051, Rev A1.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of D1100 Clamp Kit.

1.3 Product Description

Description	Part No.	Remarks
D1100 TAB HSG 10P WITH CABLE CLAMP	1971573-1	
D1100 REC HSG 10P WITH CABLE CLAMP	1971574-1	
D1100D CLAMP KIT LOWER CABLE HOOD ASSEMBLY	1971588-1	
LOWER CABLE HOOD	1971585-1	
M2.5 NUT	1971578-1	
UPPER CABLE HOOD	1971584-1	
TAB HOUSING	1971582-1	
REC HOUSING	1971583-1	
M2.5 SCREW	1971579-1	
CABLE CLAMP	1971587-1	
DYNAMIC D1000 SERIES TAB Contact AU	1903112-2	
DYNAMIC D1000 SERIES REC CONTACT	1827570-2	
D1100D 2.0 PITCH HDR ASSY (H-TYPE) 10 POS	1-1827873-5	

Fig. 1

1.4 Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

Temperature: 15℃ to 35℃
Relative Humidity 45% to 75%

1.5 Qualification Test Sequence

Test or Examination	Test Group												
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Test Sequence (a)												
Confirmation of Product	1,5	1,3	1,3	1,3	1,3	1,6	1,7	1,4	1,4	1,4	1,4	1,4	1,3
Termination Resistance (Low Level)						2,5	2,6	2,5	2,6	2,5	2,5	2,5	
Dielectric withstanding Voltage									4,8				4
Insulation Resistance									3,7				5
Temperature Rising				2									
Vibration (High Frequency)						3							
Physical Shock						4							
Connector Mating Force							3						
Connector Unmating Force							4						
Contact Insertion Force			2										
Contact Mating Force	2												
Contact Unmating Force	3												
Durability (Repeated Mating/Unmating)	4						5						
Housing Locking Strength		2											
Humidity-Temperature Cycling									5				
Thermal Shock								3					
Salt Spray										3			
Contact Retention Force					2								
Temperature Life(Heat Asing)											3		
SO2												3	
Cable Pullout													2

(a) Numbers indicate the sequence in which the tests are performed.

Fig.3

2. TEST CONTENT

No.	2.1
Test Items	Examination of Product
Requirements	Meets requirements of product drawing and AMP Specification (114-5377) After test, no corrosion influence performance.
Procedures	Visual inspection No physical damage
Electrical Requirements	
No.	2.2
Test Items	Termination Resistance (Low Level)
Requirements	10 mΩ Max. (Initial) 20 mΩ Max. (Final)

Procedures	Subject mated contacts assembled in housing to 20mV Max. open circuit at 10mA. Take the resistance of the wire only away from measurement Fig. 6. AMP Spec. 109-5311-1
No.	2.3
Test Items	Insulation Resistance
Requirements	1000 MΩ Min. (Initial) 100 MΩ Min. (Final)
Procedures	Impressed voltage 500 V DC. Test between adjacent circuits contact of mated connectors. AMP Spec. 109-5302 MIL-STD-202, Method 302 Condition B
No.	2.4
Test Items	Dielectric withstanding Voltage
Requirements	No creeping discharge nor flashover shall occur. Current leakage: 0.5 mA Max.
Procedures	1000V AC for 1 minute. Test between adjacent circuits contact of mated connectors.
No.	2.5
Test Items	Temperature Rising
Requirements	30 centigrade Max. under loaded specified current.
Procedures	Install Contact in the housing, energize, and measure the rise in heat by energizing. The measurement is measured on the condition of not receiving the influence of the convection of air. The thermo-couple is measured attaching to Crimp of the wire barrel of Contact. (Fig. 6) Wire selection refers AWG 28. AMP Spec. 109-5310
Mechanical Requirements	
No.	2.6
Test Items	Vibration (High Frequency)
Requirements	No electrical discontinuity greater than 1 μsec. shall occur. 20 mΩ Max. (Final)
Procedures	Subject mated connectors to 10-500-10 Hz traversed in 1cycle per 15 minutes at 1.52mm amplitude 3 hours each of 3 mutually perpendicular planes. 100 mA applied. AMP Spec : 109-5202, Condition A MIL-STD-202 : Method 204, Condition A
No.	2.7
Test Items	Physical Shock
Requirements	No electrical discontinuity greater than 1μ sec. shall occur. 20 mΩ Max. (Final)

Procedures	Mated connectors Accelerated Velocity : 490m/s2 Waveform: Sign Curve Duration : 11 m sec. Number of Drops : 3 drops each to normal and reversed directions of X, Y and Z axes, totally 18 drops. AMP Spec. 109-5208 MIL-STD-202, Method 213 Condition A
No.	2.8
Test Items	Connector Mating/Unmating Force
Requirements	Mating Force (2.94×Pos.)N Max. (300×Pos.)g Max.
	Unmating Force (0.12×Pos.)N Min. (1^{st}) (12×Pos.)g Min. (1^{st}) (0.08×Pos.)N Min. (50^{th}) (8×Pos.)g Min. (50^{th})
Procedures	Operation Speed : 25 mm/min. Measure the force required to mate/unmate connectors. However, It is measure without HSG Lock
No.	2.9
Test Items	Contact Insertion Force
Requirements	7.84N (0.8 kgf) Max. per contact
Procedures	Measure the force required to insert contact into housing. AMP Spec. 109-5211
No.	2.10
Test Items	Contact Retention Force
Requirements	14.7N(1.5kgf) Min.
Procedures	Apply an axial pull-off load to crimped wire. Operation Speed : 100 mm / min. AMP Spec. 109-5210
No.	2.11
Test Items	Contact Mate/Unmating Force
Requirements	Mate 2.94N(300g)Max.(1^{st}～50^{th})
	Unmating 0.12N(12g)Min. (1^{st}) 0.08N (8g)Min. (50^{th})

Procedures	Operation speed 100 mm/min AMP Spec. 109-5206
No.	2.12
Test Items	Durability (Repeated Mate/Unmating)
Requirements	20 mΩ Max.
Procedures	No. of Cycles : 50 cycles
No.	2.13
Test Items	Housing Locking Strength
Requirements	24.5 N (2.5 kgf) Min.
Procedures	Measure connector locking strength. Operation Speed : 100 mm/min. AMP Spec. 109-5210
No.	2.14
Test Items	Thermal Shock
Requirements	20 mΩ Max. (Final)
Procedures	Mated connector -55 centigrade/30 min., 85 centigrade/30 min. Making this a cycle, repeat 25 cycles. AMP Spec. 109-5103 Condition A MIL-STD-202 Method 107-1 Condition A-1 The measurement is held after being left indoor for 3 hours.
No.	2.15
Test Items	Humidity-Temperature Cycling
Requirements	Dielectric withstanding voltage 1 minute.(Final) 2.0mm pitch：1000V AC 2.5 & 3.5mm pitch：1500V AC Current leakage : 0.5 mA Max. Insulation resistance: 100 MΩ Min. (Final) Termination resistance: 20 mΩ Max. (Final)
Procedures	Mated connector, 25～65 centigrade 80～98 % R. H. 10 cycles Cold shock －10 centigrade(not) performed AMP Spec. 109-5106 MIL-STD-202, Method 106 The measurement is held after being left indoor for 3 hours. 1cycle=24hours
Environmental Requirements	
No.	2.16
Test Items	Salt Spray
Requirements	20 mΩ Max. (Final) No corrosion influence performance

Procedures	Subject mated connectors to 5±1% salt concentration for 48 hours. MIL-STD-202, Method 101 Condition B The measurement is held after remove the salt and dry up at indoor.
No.	2.17
Test Items	Temperature Life (Heat Aging)
Requirements	20 mΩ Max. (Final)
Procedures	Mated Conn. 105±2 centigrade Duration :96 hours AMP Spec. 109-5104-3 Condition A The Measurement is held after being left indoor for 3 hours.
No.	2.18
Test Items	SO2 Gas
Requirements	20 mΩ Max. (Final) No corrosion influence performance
Procedures	Mated conn. SO2 Gas : 10ppm. 95%RH 25 centigrade, 96hours. AMP Spec. 109-5107 Condition C
No.	2.19
Test Items	Cable Pullout
Requirements	CCA&A shall have no physical damage or electrical discontinuities greater than 1.0 microsecond. See Fig 8
Procedures	Apply 8 kgf ; AMP spec 109-46.

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Note: Shall meet visual requirements, show no physical damage, and meet requirements of additional test as specified in the Product Qualification and Requalification Test Sequence.

3. TEST RESULT

3-1. Test Group1

3-1-1. Contact Mating Force/ Contact Unmating Force

Unit: N

	1st mating	1st unmating	50th mating	50th unmating
Number of sample	10	10	10	10
Max.	0.587	0.593	0.699	0.759
Min.	0.283	0.313	0.324	0.425
Ave.	0.397	0.412	0.454	0.506
Specification	2.94N Max	0.12N Min	2.94N Max	0.08N Min
Judgment	Acceptable	Acceptable	Acceptable	Acceptable

3-2. Test Group2

3-2-1. Housing Locking Strength

Unit: N

Number of sample	10
Max.	96.853
Min.	87.387
Ave.	92.676
Specification	24.5N Min
Judgment	Acceptable

3-3. Test Group3

3-3-1. Contact Insertion Force

Unit: N

	Pin	Receptacle
Number of sample	10	
Max.	1.355	1.677
Min.	1.046	1.032
Ave.	1.202	1.347
Specification	7.84N Max	7.84N Max
Judgment	Acceptable	Acceptable

3-4. Test Group4

3-4-1. Temperature Rising (1A)

Unit: ℃

Number of sample	10
Max.	5.57
Min.	0.02
Ave.	1.45
Specification	30℃ Max
Judgment	Acceptable

3-5. Test Group5

3-5-1. Contact Retention Force

Unit: N

	Pin	Receptacle
Number of sample	10	
Max.	25.127	26.263
Min.	21.084	17.186
Ave.	22.883	23.449
Specification	14.7N Min	14.7N Min
Judgment	Acceptable	Acceptable

3-6. Test Group 6

3-6-1. Termination Resistance (Low Level)

Unit: mΩ

	Initial	Final
Number of sample	10	10
Max.	9.144	9.098
Min.	3.606	2.506
Ave.	4.820	4.239
Specification	10mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

3-6-2. Vibration (Low Frequency) & Physical Shock

No electrical discontinuity greater than 1 μsec shall occur.

3-7. Test Group 7

3-7-1. Termination Resistance (Low Level)

Unit: mΩ

	Initial	Final
Number of sample	10	10
Max.	8.374	9.750
Min.	3.441	2.348
Ave.	4.672	4.558
Specification	10mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

3-7-2. Connector Mating Force/Unmating Force

Unit: N

	Mating	Unmating
Number of sample	10	10
Max.	5.001	2.868
Min.	3.194	2.458
Ave.	3.734	2.647
Specification	2.94N Max	1.2N Min
Judgment	Acceptable	Acceptable

3-8. Test Group 8

3-8-1. Termination Resistance (Low Level)

Unit: mΩ

	Initial	After Thermal shock
Number of sample	10	10
Max.	7.039	6.597
Min.	3.400	2.916
Ave.	4.756	4.493

Specification	10mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

3-9. Test Group 9

3-9-1. Termination Resistance (Low Level)

Unit: mΩ

	Initial	After Humidity
Number of sample	10	10
Max.	7.002	14.681
Min.	3.416	3.181
Ave.	4.547	5.766
Specification	10mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

3-9-2. Insulation Resistance

Unit: Ω

	Initial	Final
Number of sample	10 sets	10 sets
Result	1.0*10^12 Min.	1.0*10^11 Min.
Specification	1.0*10^9 Min.	1.0*10^8 Min.
Judgment	Acceptable	Acceptable

3-9-3. Withstanding Voltage

No breakdown or flashover

3-10. Test Group 10

3-10-1. Termination Resistance (Low Level)

Unit: mΩ

	Initial	After Salt Spray
Number of sample	10	10
Max.	8.341	10.484
Min.	3.120	3.004
Ave.	4.385	4.945
Specification	10mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

3-11. Test Group 11

3-11-1. Termination Resistance (Low Level)

Unit: mΩ

	Initial	After Heat Aging
Number of sample	10	10
Max.	6.495	10.380
Min.	3.086	3.614
Ave.	4.575	6.198

Specification	10mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

3-12. Test Group 12

3-12-1. Termination Resistance (Low Level)

Unit: mΩ

	Initial	After S02
Number of sample	10	10
Max.	6.970	12.809
Min.	3.192	2.859
Ave.	4.610	5.779
Specification	10mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

3-13. Test Group 13

3-13-1. Cable Pull Out

No physical damage and electrical discontinuities greater than 1.0 microsecond.

3-13-2. Insulation Resistance

Unit: Ω

	Initial
Number of sample	10 sets
Result	1.0*10^11 Min.
Specification	1.0*10^9 Min.
Judgment	Acceptable

3-13-3. Withstanding Voltage
No breakdown or flashover

4. CONCLUSION

D1100 Clamp Kit conformed to the electrical, mechanical, and environmental performance requirements of Design Objective 108-106051, Rev A1.

5. VALIDATION

Requested by:

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