Qualification Test Report

<u>MINI IO BYPASS CONNECTOR</u>

Tyco Electronics. (Shanghai) Co., Ltd.

1. INTRODUCTION

1.1 Purpose

Testing was performed on Mini IO Bypass CONN. to determine its conformance to the requirements of Design Objective 108-106021, Rev. C.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of Mini IO Bypass Connector.

1.3 Product Description

Pos. No.	Name	Remarks
1981080-1	Industrial Mini I/O connector	1.27mm Picth 8p Header ASSY. D-Shape Type1
1971153-1	Industrial Mini I/O Bypass Connector	Package refer to FG-1971153-1 1pc per small bag, 200pcs per big bag
1971153-2	Industrial Mini I/O Bypass Connector	Package refer to FG-1971153-2 20pc per small bag, 200pcs per big bag
2040537-1	Industrial Mini I/O H-HDR ASSY DIP 1	

Fig. 1

1.4 Environmental Conditions

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

Temperature: 15°C to 35°C
Relative Humidity   25% 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	1	1	1	1	1	1	1	1	1	1	1	1
Termination Resistance (Low Level)				2,6			2,5	2,4	2,4	2,4	2,4	2,4	2,4
Insulation Resistance	2,5	2,5											
Dielectric withstanding Voltage	3,6	3,6											
Temperature Rising			2										
Connector Mating Force				3									
Connector Unmating Force				4									
Durability (Repeated Mating/Unmating)				5									
Lock strength					2								
Fixed strength to PCB						2							
Vibration (Low Frequency)			2				3						
Physical Shock							4						
Temperature Life(Heat Aging)								3					
Humidity(Steady State)	4								3				
Thermal Shock										3			
Humidity−Temperature Cycling		4									3		
Salt Spray												3	
Hydrogen sulfide Gas(H2S													3

Remark: "a" indicates the sequence in which the tests are performed.

Fig. 2

2.   TEST CONTENT

No.	2.1
Test Items	Examination of Product
Requirements	Meets requirements of product drawing. After test, no corrosion influence performance.
Procedures	Visual inspection No physical damage
Electrical Requirements	
No.	2.2
Test Items	Termination Resistance (Low Level)
Requirements	80 mΩ Max. (Initial) 100 mΩ Max. (Final)
Procedures	Subject mated contacts assembled in housing to 20mV Max. Open circuit at 100mA. EIA364−23
No.	2.3
Test Items	Dielectric withstanding Voltage
Requirements	No creeping discharge nor flashover shall occur.Current leakage:0.5mA Max
Procedures	250VAC for 1 minute. Test between adjacent circuits and between the surface of housing and contact of mated connectors. EIA364−20

No.	2.4
Test Items	Insulation Resistance
Requirements	500MΩ Min
Procedures	Impressed voltage 100 V DC.1 minute hold. Test between adjacent circuits and between the surface of housing and contact of mated connectors. EIA364-21
No.	2.5
Test Items	Temperature Rising
Requirements	30℃ Max. under loaded specified current.
Procedures	Measure temperature rising by energized current.
Mechanical Requirements	
No.	2.6
Test Items	Connector Mating Force
Requirements	30N Max
Procedures	Cut the protruded locking feature. Operation Speed:10mm/min.Measure the force required to mate samples. EIA364-13.
No.	2.7
Test Items	Connector Mating Force
Requirements	30N Max
Procedures	Cut the protruded locking feature. Operation Speed:10mm/min.Measure the force required to unmate samples. EIA364-13.
No.	2.8
Test Items	Durability (Repeated Mate/Unmating)
Requirements	Termination Resistance(Low Level)
Procedures	Operation Speed:200cycles/hour No. Of cycles:5cycles. EIA364-09
No.	2.9
Test Items	Lock Strength
Requirements	15N Min. For initial mating 12N Min. For 5th mating
Procedures	Mate connector and make lock mechanism effective. Apply axial load to plug connector to unmate the sample.Speed:10mm/min.
No.	2.10
Test Items	Physical Shock
Requirements	No electrical discontinuity greater than 1μ sec. shall occur. Termination Resistance(Low Level)
Procedures	Accelerated Velocity. (30 G) Waveform : Half-sin 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 EIA364-27
	2.11

Test Items	Vibration (Low Frequency)
Requirements	No electrical discontinuity greater than 1 μ sec. shall occur. Termination Resistance(Low Level).
Procedures	Subject mated connectors to 10−55−10 Hz traversed in 1 minute at 1.52mm amplitude 2 hours each of 3 mutually perpendicular planes. EIA364−28
No.	2.12
Test Items	Fixed Strength to PCB
Requirements	No destruction on Receptacle connector with PCB and no harmful damage on other parts.
Procedures	Mate connector. Apply load to edge of plug connector. Load one direction on one sample. 40N. 1minute.
Environmental Requirements	
No.	2.13
Test Items	Temperature Life
Requirements	Termination Resistance(Low Level)
Procedures	Mate connector.85℃,315Hours. EIA364−17.
No.	2.14
Test Items	Humidity(Steady State)
Requirements	Dielectric strength. Insulation resistance. Termination resistance (Low Level)
Procedures	Mated connector,40℃, 90〜95 % R. H. 10 cycles EIA364−31 1cycle=24hours
No.	2.15
Test Items	Thermal Shock
Requirements	Termination Resistance(Low Level)
Procedures	Mated connector −55℃/30 min., 85℃/30 min. Making this a cycle, repeat 10 cycles. EIA364−32
No.	2.16
Test Items	Humidity−Temperature Cycling
Requirements	Dielectric strength. Insulation resistance. Termination resistance (Low Level)
Procedures	Mated connector, 25〜65℃, 80〜98 % R. H. 7 cycles Cold shock −10℃ performed EIA364−31 1cycle=24hours
No.	2.17
Test Items	Salt Spray
Requirements	Termination resistance (Low Level) After it is left for 1 hour under a steady temoerature/humidity, it is measured.

Procedures	Mated connector Salt concentration:5%, 35±2℃,48Hours EIA364-26 (MIL-STD-202F Method 101 Condition B)
No.	2.18
Test Items	Hydrogen Sulfide Gas
Requirements	Termination resistance (Low Level)
Procedures	Mated Conn. 3±1 ppm, 40±2℃ 96 hours JEIDA-38

＊ Product must be without rust, corrosion transformation, crack and discoloration.

3.　　TEST RESULT

3-1.Dielectric withstandard Voltadge(Before and After Humidity Temperature Cycling)

	Initial	After Humidity Temperature Cycling
Number of sample	10sets	10sets
Result	No creeping discharge No flashover	No creeping discharge No flashover
Specification	250V AC	250V AC
Judgment	Acceptable	Acceptable

3-2.Insulation Resistance

UNIT: mΩ

	Initial	After Humidity Temperature Cycling
Number of sample	10	10
Result	1.0*10^11 Min.	1.0*10^10 Min.
Specification	1.0*10^6 Min.	5.0*10^5 Min.
Judgment	Acceptable	Acceptable

3-3.Temperature Rising

UNIT:℃

Number of sample	10
Max.	5.08
Min.	3.71
Ave.	4.33
σ	0.467
Specification	30 Max
Judgment	Acceptable

3-4.Connector Mating Force

UNIT: N

	1st	5th
Number of sample	10	10
Max.	12.94	12.5
Min.	3.71	3.2
Ave.	8.63	7.95
Specification	30Nmax	30Nmax
Judgment	OK	OK

Connector Un-mating Force

UNIT: N

	1st	5th
Number of sample	10	10
Max.	11.58	10.65
Min.	2.93	2.62
Ave.	6.81	6.19
Specification	30Nmax	30Nmax
Judgment	OK	OK

3-5.Durability(Repeated Mating/Un-mating)

	Mating Force	Unmating Force	Termination resistance	
	5th (N)	5th (N)	Initial(mΩ)	5th(mΩ)
Number of sample	10	10	10	10
Max.	12.5	10.65	46.995	36.296
Min.	3.2	2.62	25.626	26.963

Ave.	7.95	6.19	29.901	31.627
Specification	30Nmax	30Nmax	80 mΩmax	100 mΩmax
Judgment	Acceptable	Acceptable	Acceptable	Acceptable

3-7.Lock Strength

UNIT: N

	Initial	5th
Number of sample	10	10
Max.	35.32	24.2
Min.	16.56	13.84
Ave.	23.81	18.14
Specification	15N Min	12N Min
Judgment	Acceptable	Acceptable

3-5.Physical Shock/Vibration

UNIT: mΩ

	Initial	Final
Number of sample	10	10
Max.	31.075	35.091
Min.	22.627	23.575
Ave.	27.611	28.906
σ	1.990	2.601
Specification	80 Max	100 Max
Judgment	Acceptable	Acceptable

No electrical discontinuity greater than 1 μ sec shall occur. -----Acceptable

3-9.Fixed Strength to PCB

No destruction on Receptacle connector with PCB and no harmful damage on other parts.------Acceptable

3-18.Heat Aging

UNIT: mΩ

	Initial	Final
Number of sample	10	10
Max.	31.482	35.407
Min.	22.921	22.771
Ave.	27.834	28.899
σ	2.216	2.428
Specification	80 Max	100 Max
Judgment	Acceptable	Acceptable

3-12.Humidity(steady state)

UNIT: mΩ

	Initial	Final
Number of sample	10	10
Max.	30.116	31.375
Min.	21.663	22.198
Ave.	26.618	26.795
σ	2.185	2.635
Specification	80 Max	100 Max
Judgment	Acceptable	Acceptable

3-14.Thermal Shock

UNIT: mΩ

	Initial	Final
Number of sample	10	10
Max.	33.509	35.052
Min.	21.877	21.823
Ave.	27.868	29.010
σ	2.998	3.226
Specification	80 Max	100 Max
Judgment	Acceptable	Acceptable

3-12.Humidity-Temperature Cycling

UNIT: mΩ

	Initial	Final
Number of sample	10	10
Max.	43.601	36.575

	23.885	23.532
Min.	23.885	23.532
Ave.	28.645	29.201
σ	4.091	3.672
Specification	80 Max	100 Max
Judgment	Acceptable	Acceptable

3-15.Salt Spray

UNIT: mΩ

	Initial	Final
Number of sample	10	10
Max.	28.718	32.006
Min.	20.083	21.411
Ave.	25.871	27.194
σ	2.371	2.696
Specification	80 Max	100 Max
Judgment	Acceptable	Acceptable

3-13.H_2S

UNIT: mΩ

	Initial	Final
Number of sample	10	10
Max.	40.614	55.531
Min.	19.312	20.244
Ave.	26.797	29.804
σ	3.748	7.211
Specification	80 Max	100 Max
Judgment	Acceptable	Acceptable

4.   Conclusion

Mini IO Bypass Connector conformed to the electrical, mechanical, and environmental performance requirements of Design Objective 108-106021, Rev C.

5.   VALIDATION

Requested by:

                    Leo Liu   09   01   23
_____ _____/_____/_____

Product Engineer
Shanghai Engineering Center (CIS)

Prepared by:

                    Johnson Wu   09   03   26

_____ _____/_____/_____

Test Engineer
Shanghai Engineering Center (CIS)

Approved by:

                    Julian Zhou   09   03   26

_____   _____/_____/_____

 Manager
Shanghai Engineering Center (CIS)