Product Data Sheet
PD-0071-A

3M™ Pak 50 Board-to-Board Connectors, P50 Series Socket and Plug
P5X-XXXSX-SX1-XX
P5X-XXXSX-RX1-XX
P5X-XXXPX-SX1-XX
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1.0 Scope

This data sheet summarizes test methods, test conditions and product performance for the 3M P50 Series Board-to-Board Connectors. The connectors are for Board-to-Board connection with two rows of ribbon style contacts at a 0.050" pitch. Connectors are available in straight, right angle, through hole, and SMT configurations.

2.0 Product Tested

Product:	P50 Socket
Product Number:	Group A – G1,G3: P50-100S-S1-EA G3: P50-060S-S1-EA G4: P50-060~080S-S1-EA I, II, IV: Contact Only III, V: P50-100S-RR1-EA
Related Specification Sheet:	TS-2046, TS-2047, TS-2052, TS-2051
Mating Product:	P50L Plug
Mating Product Number:	Group A – G1.G3: P50-100P-S1-EA G3: P50-060P-S1-EA G4: P50-060~080P-S1-EA I, II, IV: Contact Only II, V: P50-100P-RR1-EA

3.0 General Conditions

3.1 Test Specimens

The test specimens shall be strictly in compliance with the design, construction details and physical properties detailed in the relevant Technical Specification Sheet or Engineering Drawing.

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4.0 Test Results Summary

	Items	Specification	Test Method	Results
General	Visual and Construction	Conform to the design drawings	Visual Inspection	Pass
Electrical	Low Level Contact Resistance (LLCR)	Max. R: < 25 mΩ	4 Wire Measurement Current: 100mA DC	Pass
	Dielectric Withstanding Voltage (DWV)	No dielectric break down or Acing	Apply 650 VAC_{RMS} Voltage for 1 minute between 2 adjacent contacts	Pass
	Insulation Resistance (IR)	1000MΩ Min	Apply 500V DC for 1 minute between two adjacent contacts	Pass
	Current Rating: All Contacts in Series	Temperature Rise: 40°C or less Results: 0.5A = 13°C Temp. Rise 0.8A = 23°C Temp Rise 0.9A = 32°C Temp Rise 1.0A = 40°C Temp Rise	Ambient: 22°C	Pass
	Current Rating: 5 Contacts in Series	Temperature Rise: 40°C or less Results: 1.0A = 8°C Temp. Rise 1.5A = 11°C Temp Rise 1.8A = 29°C Temp Rise 2.0A = 38°C Temp Rise	Ambient: 22°C	Pass
	Current Rating: 1 Contacts	Temperature Rise: 40°C or less Results: 1.0A = 4°C Temp. Rise 1.5A = 10°C Temp Rise 2.0A = 15°C Temp Rise	Ambient: 22°C	Pass
Environmental	Humidity (Steady State)	No damage or deformation DWV: No Breakdown or Arcing LLCR: 25 mΩ Max	Humidity: 90~95% RH Temerature: 40°C Duration: 96 hours	Pass
	Life at Elevated Ambient Temperature (Thermal Aging)	LLCR: 40 mΩ Max No damage or deformation	Temperature: +85°C Duration: 240 hours	Pass
	Thermal Shock	No damage or deformation LLCR: 25 mΩ Max (5 Cycles, –55°C to +85°C)	1. -55°C 30 min 2. +25°C 5 min 3. +85°C 30 min 4. +25°C 5 min Repeat 1 - 4 for 5 Cycles	Pass
	Salt Spray	No serious corrosion LLCR: 25 mΩ Max	Temperature: 35°C Concentration: 5% Duration: 48 hrs	Pass
	H_2S Exposure	No serious corrosion LLCR: 25 mΩ Max	Temperature: 40°C Concentration: 3 ppm RH: 80% Duration: 48 hrs	Pass
	SO_2 Exposure	No serious corrosion LLCR: 25 mΩ Max	Concentration: 10ppm Temperature: 40°C RH: 80% Duration: 48 hrs	Pass

Mechanical	Total Insertion Force	Insertion Force: <93.1N (100pins) < 0.931 N per contact	Measure with mating connectors	Pass
	Withdrawl Forces (Contact Retention Force)	Withdrawl Force: >19.6N(100pins) >19.6N per contact	Measure with mating connectors	Pass
	Durability (100 times)	No damage or deformation LLCR: Max. R: < 25mΩ	100 insertion/withdrawl cycles at 400-600 cycles/hour	Pass
	Durability (500 times)	No damage or deformation LLCR: Max. R: < 25 mΩ	500 insertion/withdrawl cycles at 1000 cycles/hour	Pass
	Vibration	No damage or deformation No electrical discontinuity > 1 μ sec	Frequency: 10~55Hz Amplitude: 1.52 mm Sweep time: 1 min 2 hours each in X, Y, and Z directions with 100mA DC applied to all contacts in series	Pass
	Mechanical Shock	No damage or deformation No electrical discontinuity > 1 μ sec	Acceleration: 490m/s^2 Shock Mode: half sin wave Duration: 11ms 3 Times each in X, Y, and Z and opposite directions with 100mA DC applied to all contacts in series	Pass
	Solderability (Wetting Time)	Zero cross time, 3s Max	1) Precondition: 85°C, 65%RH, 168h 2) Dip into solder bath, 2 mm depth, 20 mm/min. Eutectic: 235°C, Lead Free 245°C	Pass
	Solderability (Wetted Area)	95% minimum solder coverage	1) Precondition: 85°C, 65%RH, 168h 2) Dip into solder bath, 2 mm depth, 20 mm/min. Eutectic: 235°C, Lead Free 245°C	Pass
	Solder Heat Resistance	No physical abnormalities after test. LLCR: Max. R: < 25 mΩ	J-STD-020C, 260°C	Pass
	Solder Joint Reliability	Change in pull strength 50% maximum	1) Precondition: 85°C, 65%RH, 168h 2) Reflow solder 3 sec: Eutectic: 235°C, Lead Free 245°C 3) Temperature Cycle -40°C to +125°C, 30 min each extreme, 1000 cycles 4) Apply load at 5 mm/min on initial and after cycling	Pass
	Whisker Test	No whiskers on Sn surface using 100x magnification	1) 60°C, 93% RH, 1000h 2) Ambient, 60 days	Pass

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Testing

Test methods are based upon common electronics industry test methods.

5.1   Test Sequence

Tests conducted according to the sequence outlined in the chart below.

Tests	Sequence Group							
	A	B	C	D	E	F	G	Others*
Visual and Construction	1	1	1	1	1	1		
Insulation Resistance	2	2						
Dielectric Withstanding Voltage	3	3,7						
Low Level Contact Resistance	4	4,8	3,6	3,5	3,5	3,5		
Total Insertion Force	5							
Total Withdrawl Force	6							
Thermal Shock	7							
Vibration	8							
Shock	9		4					
Humidity		5	5					
Durability (100 times)		6	2	2	2	2		
Salt Spray		7						
SO2 Exposure				4				
H2S Exposure					4			
Life at Elevated Ambient Temperature						4		
Contact Retention Force							1	
Durability (500 Times)							2	
Current Rating							3	
Total Insertion and Withdrawl Force							4	
Solderability (Wetting time)								I
Solderability (Wetting area)								II
Soldering Heat Resistance								III
Solder Joint Reliability								IV
Whisker Test								V

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* Tests run individully

Important Notice

The information we are furnishing you is being provided free of charge and is based on tests performed at 3M laboratory facilities or affiliates. While we believe that these test results are reliable, their accuracy or completeness is not guaranteed. Your results may vary due to differences in test types and conditions. This information is intended for use by persons with the knowledge and technical skills to analyze, handle and use such information. You must evaluate and determine whether the product is suitable for your intended application. The foregoing information is provided "AS-IS". In providing this information 3M makes no warranties regarding product use or performance, including any implied warranty of merchantability or fitness for a particular use.