

# Product Data Sheet

78-5102-0040-1

PD-0040

**3M™ Boardmount Plug and  
Receptacle Connectors 96X  
Series, 2.54 mm (.100 inch)**

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## 1.0 Scope

This data sheet summarizes test methods, test conditions and product performance for the 3M 2.54 mm PC-Boardmount Product family. Both plug and receptacle, plated with 10μ” gold at the mating area. Testing has been conducted in accordance to IEC Std 60603-13 Performance Level 3

## 2.0 Product Tested

Product: 3M 96X Boardmount Plug and Receptacle  
Connectors Series, 2.54 mm (.100 inch)  
Product Number: 961218-6804-AR; 961226-6804-AR; 961220-6804-AR; 961116-6804-AR; 961108-6804-AR; 960116-6202-AR; 960220-6202-AR; 963116-2000-AR; 960108-8100-AR; 960218-8100-AR  
  
Related Specification Sheet: TS-2181; TS-2187; TS-2189; TS-2190  
Qualification also representative for TS-2182; TS-2183, TS-2184, TS-2185, TS-2186, TS-2188, TS-2191, TS-2192, TS-2193  
products related to Spec Sheets:

## 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 (See Section 2).

### 3.2 Standard Test Conditions

The test shall be done under the following conditions:

Temperature: 15°C to 35°C  
Relative Humidity: 45% to 75%  
Atmospheric pressure: 650 to 800 mmHg

#### 4.0 Test Results Summary

	Items	Specification	Test Method	Results
<b>General</b>	Visual	No defects such as deformation, blister, damage, crack, etc.	IEC-512-2-1a	Pass
	Low Level Contact Resistance	Max. R: (Initial) <20 mΩ	IEC-512-2-2a	Pass
<b>Environmental</b>	Durability	Insertions/Withdrawals -50 cycles Max. R: <20 mΩ	IEC-512-7-9a	Pass
	Dry Heat	No physical abnormalities after test 100 °C for 12 Hours Max. R: <20 mΩ	IEC-512-6-11i	Pass
	Cold	No physical abnormalities after test --- --25°C for 16 Hours Max. R: <20 mΩ	IEC-512-6-11j	Pass
	Solderability	Solder Coverage > 95%	IEC-512-1-12a	Pass
<b>Mechanical</b>	Mating Forces	Max force: 3N/ Contact	IEC-512-7-13b	Pass
<b>Electrical</b>	Dielectric Withstanding Voltage	1000 V <sub>dc</sub> 1 min	IEC-512-2-4a	Pass
	Insulation Resistance	> 5 X 10 <sup>8</sup> Ω @ 100 V <sub>dc</sub>	IEC-512-2-3a	Pass
<b>Heat Resistance</b>	Compliance to solder profile	MSL 1	JEDEC-020c	Pass

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## 5.0 Testing

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Test methods are in accordance with IEC -512.

### 5.1 General

#### Visual (Appearance) — IEC-512-2-1a

##### *Purpose*

The purpose of this test is to visually examine and dimensionally inspect the connector in order to determine whether the connector conforms to the applicable specification and detail documents not covered by performance requirements.

##### *Test Method*

The examination shall be made in accordance with IEC-512-2-1a. The visual examination shall include inspection of the following features as a minimum: workmanship, marking, materials, finish, standards, design and construction. The dimensional inspection shall be a check for compliance with the outline drawings of the detail specification.

#### Low Level Contact Resistance — IEC-512-2-2a

##### *Purpose*

The purpose of this test is to evaluate contact resistance characteristics of electrical contacts under conditions where applied voltages and currents do not alter the physical contact interface or modify the conductive oxide films which may be present.

##### *Test Method*

The low-signal level contact resistance shall be tested in accordance with IEC-512-2-2a with circuit current of 100 mA maximum and open circuit voltage of 20 mV maximum.  
All readings are in milli-ohms.

### 5.2 Environmental

#### Durability — IEC-512-7-9a

##### *Purpose*

The purpose of this test is to determine the effects of subjecting electrical connectors to a conditioning action of mating and unmating of connector simulating operations approximating the life of the connector.

##### *Test Method*

Connector durability shall be tested in accordance with IEC-512-7-9a

Condition: 50 Cycles  
Max speed: 10 mm/s  
Max. R: < 20 mΩ

#### Dry Heat — IEC-512-6-11i

##### *Purpose*

The purpose of this test is to determine the effects on the electrical and mechanical characteristics of the connector resulting from exposure of the connector under specified condition of dry heat.

##### *Test Method*

Mated connectors shall be tested in accordance with IEC-512-6-11i.

Temperature: 100°C  
Duration: 12 hours  
Max. R: < 20 mΩ

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## **Cold — IEC-512-11j**

### *Purpose*

The purpose of this test is to determine the effects on the electrical and mechanical characteristics of the connector resulting from exposure under specified condition of cold.

### *Test Method*

Mated connectors shall be tested in accordance with IEC-512-6-11j.

Temperature: -25°C  
Duration: 16 hours  
Max. R: < 20 mΩ

## **Solderability — IEC-512-1-12a**

### *Purpose*

This test is conducted to determine the suitability of connectors solder tails being adequate covered by solder after dipping process.

### *Test Method*

Mated connectors shall be tested in accordance with IEC-512-1-12a.

Solder: 96.5Sn/3.0Ag/0.5Cu  
Solder bath temperature: 260°C  
Flux: R type  
Solder Coverage: > 95 %

## **5.3 Mechanical**

### **Mating Forces — IEC-512-7-13b**

#### *Purpose*

The purpose of this test is to determine the mechanical forces required to mate the electrical connectors.

#### *Test Method*

The mechanical forces required to mate these electrical connectors shall be determined in accordance with IEC-512-7-13b.

Max speed: 100 mm / min  
Maximum force per contact: 3 N

## **5.4 Electrical**

### **Dielectric Withstanding Voltage — IEC-512-2-4a**

#### *Purpose*

The purpose of this test is to prove that a given electrical connector can operate safely at its rated voltage and withstand momentary overpotentials due to switching, surges, and other similar phenomena.

#### *Test Method*

Withstanding voltage shall be tested in accordance with IEC-512-2-4a.

Applied Voltage: 1000 V<sub>dc</sub>  
Duration: 1 minute  
Measurement: Check for evidence of a breakdown

## Insulation Resistance — IEC-512-2-3a

### *Purpose*

The purpose of this test is to establish the methods and procedures to be followed in determining the resistance offered by the insulation materials and the various seals of a connector to a direct current potential tending to produce a leakage of current through or on the surface of these members.

### *Test Method*

Insulation resistance shall be tested in accordance with IEC-512-2-3a.

Applied Voltage: 100 V<sub>dc</sub>  
Duration: 1 minutes  
Measurement: Insulation Resistance  
>5 X 10<sup>8</sup> Ω @ 100 V<sub>dc</sub>

## 6.0 Heat Resistance

### Heat Resistance Compliance — JEDEC-020C

#### *Purpose*

Purpose of this test is to assure that the part does not deform, crack, craze, blister or split under the heat environment needed for Pb-Free Assemblies and soldering with non leaded solder.

#### *Test Method*

Avg Ramp –Up Rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C / sec max (200° - 260°C)
<b>Preheat</b> T <sub>smin</sub> T <sub>smax</sub> Time (t <sub>smin</sub> to t <sub>smax</sub> )	150°C 200°C 60 - 180 sec
Time t <sub>L</sub> maintained above Temp T <sub>L</sub> T <sub>L</sub> t <sub>L</sub>	217°C 60 - 150 sec
Peak T <sub>p</sub> / Classification	260°C +3°C / MSL1
Time t <sub>p</sub> within 5°C of T <sub>p</sub>	20 – 40 sec
Ramp – Down Rate Time 25°C to T <sub>p</sub>	6°C / sec max 8 minutes max.

#### *Results*

The 2.54 mm PC-Boardmount family of parts is JEDEC-20C compliant.

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