Product Data Sheet

PD-0037-B

3M™ Shielded Compact Ribbon (SCR) Connector

3M™ Shielded Compact Ribbon (SCR) Boardmount Right Angle Plug 36110-2220 XX

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1.0 Scope

This data sheet summarizes test methods, test conditions and product performance for the 3M SCR Boardmount Right Angle Plug 36110-2220 XX.

2.0 Product Tested

Product:	SCR B/M R/A Plug
Product Number:	36110-2220 XX
Related Specification Sheet:	TS-2223
Mating Product:	3M SCR Wiremount Receptacle
Mating Product Number:	36210-0100 XX

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 mm Hg

4.0 Test Results Summary

Items		Specification	Test Method	Results
General	Visual	No defects such as deformation, blister, damage, crack, etc.	Sumitomo 3M Design Spec	Pass
	Contact Resistance	Max. R: < 50 mΩ	MIL-STD-202F Method 307	Pass
Environmental	Life at Elevated Ambient Temperature (Thermal Aging)	No Physical abnormalities after test Max. Δ R: < ±25 mΩ 85 °C for 1000 Hours	MIL-STD-202F Method 108A, Condition D	Pass
	Humidity (Steady State)	Max. Δ R: < ±25 mΩ Conditions: 40° ±2°C / 90 – 95 %RH for 96 Hours	MIL-STD-202F Method 103B, Condition B	Pass
	Moisture Resistance	Max. Δ R: < ±25 mΩ 10 Cycles	MIL-STD-202F Method 106F	Pass
	Thermal Shock	No Physical abnormalities after test Max. Δ R: < ±25 mΩ 5 Cycles, –55 °C to +85 °C	MIL-STD-202F Method 107G Condition A	Pass
	Salt Atmosphere (Corrosion)	No Physical abnormalities after test Max. Δ R: < ±25 mΩ	MIL-STD-202F Method 101D Condition B	Pass
	Hydrogen Sulfide Gas	No Physical abnormalities after test Max. Δ R: < ±25 mΩ Conditions: H_2S 3± 1 PPM, 40°C, 70–80 %RH for 96 hours	JEIDA-38-1984	Pass
Mechanical	Mating and Unmating Forces	Mating force: 2.5N/pin Max Unmating force: 0.15N/pin Min	EIA-364-13A	Pass
	Durability	Insertions/Withdrawals Max. Δ R: < ±25 mΩ	Sumitomo 3M Design Spec	Pass
	Vibration	No Physical abnormalities after test Max. Δ R: < ±25 mΩ No electrical discontinuity > 1 μ sec	MIL-STD-202F Method 201A	Pass
	Mechanical Shock	No Physical abnormalities after test Max. Δ R: < ±25 mΩ No electrical discontinuity > 1 μ sec	MIL-STD-202F Method 213B Condition A Half sine, (11 milliseconds) 50 g ± X,Y,Z (9 total shocks)	Pass
	Solderability	Solderability shall be 95% Min.	MIL-STD-202F Method 208E	Pass
	Resistance To Soldering Heat	No Physical abnormalities after test. Conditions: 260 ±5 °C (solder temp), 10 ±1 sec	MIL-STD-202F Method 210A Condition B	Pass
	Latch Strength	Unlatching force: 100N Min	Sumitomo 3M	Pass
Electrical	Dielectric Withstanding Voltage	500 VAC_{RMS} @ Sea Level	MIL-STD-202F Method 301	Pass
	Insulation Resistance	5 X 10^6 @ 500 V_{DC}	MIL-STD-202F Method 302 Condition B	Pass

5.0 Testing

Test methods are based upon Sumitomo 3M test procedures, the United States Department of Defense MIL-STD-202F, 1 April 1980, "Test Method Standard - Electronic And Electrical Component Parts" and the Japan Electronic Industry Development Association JEIDA-38-1984, "Hydrogen Sulphide Test for Electronic Equipment Connectors."

5.1 General

Visual (Appearance)

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 Sumitomo 3M design specifications. 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.

Contact Resistance — MIL-STD-202F Method 307

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 with circuit current of 1mA and open circuit voltage of 20 mV maximum. The termination resistance includes contact to wire interface resistance, bulk resistance of contact, and resistance of solder joints of connectors to circuit boards. See Figure 1.

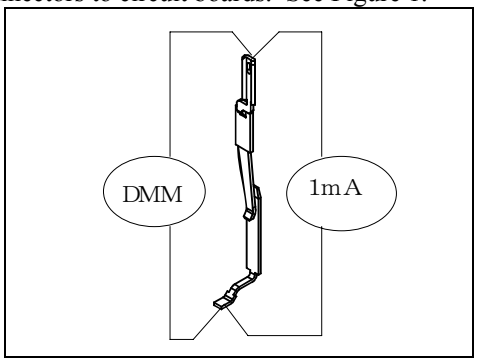


Figure 1. Contact resistance measurement method

Test Results

The initial readings are in milli-ohms. All other readings are the change in resistance from the initial reading in milli-ohms. All initial readings meet the specification requirement of less than 50 milli-ohms.

5.2 Environmental

Life (at Elevated Ambient Temperature) — MIL-STD-202F Method 108A

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 to an elevated ambient temperature for a specified length of time.

Test Method

Mated connectors shall be tested in accordance with MIL-STD-202F Method 108A, Test Condition D.

Temperature:	85 °C
Duration:	1000 hours

Test Results

	Initial R mΩ	Final Δ R mΩ
Maximum:	28.58	3.94
Average:	22.04	0.46
Minimum:	15.24	-2.57
Standard Deviation:	3.24	0.97

Humidity (Steady State) — MIL-STD-202F Method 103B

Purpose

The purpose of this test is to permit evaluation of the properties of materials used in connectors as they are influenced or deteriorated by the effects of high humidity and heat condition.

Test Method

Mated connectors shall be tested in accordance with MIL-STD-202F Method 103B, Test Condition B.

Temperature Range:	40 ± 2 °C
Relative Humidity:	90 – 95 %RH
Duration:	96 Hours

Test Results

	Initial R mΩ	Final Δ R mΩ
Maximum:	26.44	2.82
Average:	21.15	0.16
Minimum:	15.27	-1.08
Standard Deviation:	3.12	0.67

Moisture Resistance — MIL-STD-202F Method 106F

Purpose

The purpose of this test is to evaluate, in an accelerated manner, the resistance of component parts and constituent materials to the deteriorative effects of the high-humidity and heat conditions typical of tropical environments. This test differs from the steady-state humidity test (Method 103B) and derives its added effectiveness in its employment of temperature cycling, which provides alternate periods of condensation and drying essential to the development of the corrosion processes and, in addition, produces a "breathing" action of moisture into partially sealed containers. Increased effectiveness is also obtained by use of a higher temperature, which intensifies the effects of humidity.

Test Method

Mated connectors shall be tested in accordance with MIL-STD-202F Method 106F.

Temperature Cycle:	25 °C to 65 °C
Relative Humidity:	90 – 100 %RH
Duration:	10 Cycles (10 Days)

Test Results

	Initial R mΩ	Final Δ R mΩ
Maximum:	26.94	4.10
Average:	21.70	0.36
Minimum:	15.15	-1.73
Standard Deviation:	3.12	1.03

Thermal Shock — MIL-STD-202F Method 107G

Purpose

The purpose of this test is to determine the resistance of a given electrical connector to exposure at extremes of high and low temperatures and to the shock of alternate exposures to these extremes, simulating the worst probable conditions of storage, transportation and application.

Test Method

Mated connectors shall be tested in accordance with MIL-STD-202F Method 107G, Test Condition A.

Temperature:	-55 °C & +85 °C
Cycle Time:	15 minutes each Temperature
Transition Time:	5 minute maximum
Cycles:	5

Test Results

	Initial R mΩ	Final Δ R mΩ
Maximum:	26.44	5.35
Average:	21.15	-0.01
Minimum:	15.27	-1.04
Standard Deviation:	3.12	0.72

Salt Atmosphere (Corrosion) — MIL-STD-202F Method 101D

Purpose

The purpose of this test is to determine the effects of a controlled salt laden atmosphere on the electrical connector.

Test Method

Mated connectors shall be tested in accordance with MIL-STD-202F Method 101D, Test Condition B.

Salt Solution:	5 ±1%
Temperature:	95°F ±5°F (35°C±3°C).
Duration:	48 Hours

Test Results

	Initial R mΩ	Final Δ R mΩ
Maximum:	26.94	11.51
Average:	21.70	1.17
Minimum:	15.15	-1.59
Standard Deviation:	3.12	2.12

Hydrogen Sulfide Test for Electronic Equipment Connectors — JEIDA-38-1984

Purpose

The purpose of this test is to determine the effects of a controlled environmentally related corrosive atmosphere on the electrical connector.

Test Method

Mated connectors shall be tested in accordance with JEIDA-38-1984.

Relative Humidity:	70 – 80 %
Temperature:	40 ± 2 °C
Duration:	96 Hours
H_2S:	3 ± 1 ppm

Test Results

	Initial R mΩ	Final Δ R mΩ
Maximum:	26.49	6.05
Average:	21.44	0.55
Minimum:	15.17	-1.45
Standard Deviation:	3.23	1.14

5.3 Mechanical

Mating and Unmating Forces — EIA-364-13A

Purpose

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

Test Method

The latch is removed. Using the tensile tester, the SCR receptacle is inserted in the plug at 5mm/minute. The maximum load is measured. In the removal test, the receptacle is removed from the plug at 5 mm/minute and the maximum load is measured.

Test Results

Force:	Newtons
Mating:	1.13 Max.
Unmating:	0.76 Min.

Durability

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

The plug and receptacle were mated and un-mated manually 500 times at the approximate rate of one cycle per second. Contact resistance was measured at completion.

Condition:	500 Cycles

Test Results

	Initial R mΩ	Final Δ R mΩ
Maximum:	27.60	4.93
Average:	21.83	0.32
Minimum:	15.39	-1.58
Standard Deviation:	3.11	1.36

Vibration — MIL-STD-202F Method 201A

Purpose

The purpose of this test is to determine the effects of vibration within the predominant or random vibration frequency ranges and magnitudes that may be encountered during the life of the connector.

Test Method
Mated connectors shall be tested in accordance with MIL-STD-202F Method 201A.

Amplitude:	0.03 inch (0.06 inch max. total excursion)
Frequency:	10 to 55 Hz
Duration:	2 hours in each of 3 mutually perpendicular directions (total of 6 hours)

Test Results

	Initial R mΩ	Final Δ R mΩ
Maximum:	26.44	2.26
Average:	21.15	-0.61
Minimum:	15.27	-2.01
Standard Deviation:	3.12	0.74

Mechanical Shock — MIL-STD-202F Method 213B
Purpose
This test is conducted to determine the suitability of connectors when subjected to shocks such as those expected from rough handling, transportation and operation.

Test Method
Mated connectors shall be tested in accordance with MIL-STD-202F Method 213B, Test Condition A.

Normal Duration:	11 milliseconds
Peak Acceleration:	50 g
Wave form:	Half Sine
Cycles:	3 times each in +/- X, Y & Z directions

Test Results

	Initial R mΩ	Final Δ R mΩ
Maximum:	26.72	1.42
Average:	21.84	-0.19
Minimum:	15.39	-1.65
Standard Deviation:	3.04	0.53

Solderability — MIL-STD-202F Method 208E

Purpose

The purpose of this test method is to determine the solderability of all terminations which are normally joined by a soldering operation. This determination is made on the basis of the ability of these terminations to be wetted by solder and the predictability of a suitable fillet resulting from solder application. These procedures will verify that the pre-assembly lead finish provides a solderable surface of sufficient quality to enable satisfactory soldering.

Test Method

The solderability test shall be performed in accordance with ANSI/J-STD-002 “Solderability Tests for Component Leads, Terminations, Lugs, Terminals and Wires” and MIL-STD-202F Method 208E.

Solder Temperature:	245 °C
Immersion Duration:	5 sec

Test Results

	Solder Wetting
B/M plug terminal	100%
B/M plug shroud section	100%

Resistance to Soldering Heat — MIL-STD-202F Method 210A

Purpose

This test is performed to determine whether wire and other component parts can withstand the effects of the heat to which they will be subjected during the soldering process.

Test Method

The Resistance to Soldering Heat test shall be tested in accordance with MIL-STD-202F Method 210A, Test Condition B.

Solder Temperature:	260 °C
Immersion Duration:	10 sec

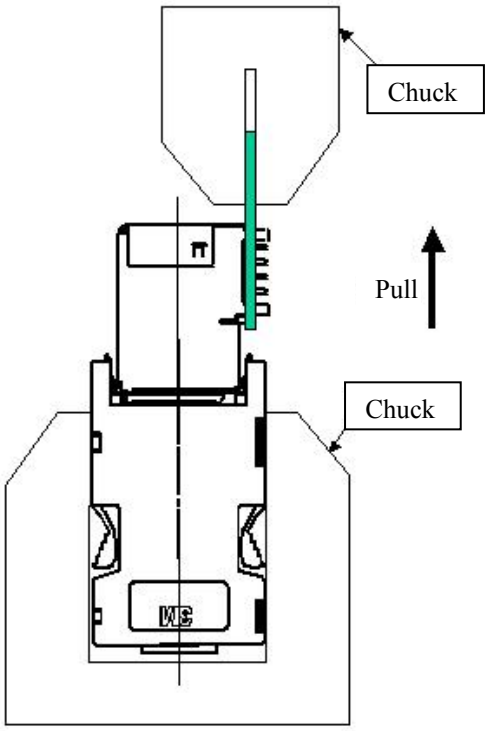
Test Results

Connector Area (after soldering)	Solder Heat Resistance
Board-mount tails	No deformation
Mating area	No deformation

Latch Strength Test

Purpose

The purpose of this test is to determine the mechanical forces required to overcome the latching mechanism.



Test Method

The mechanical forces required to unmate these electrical connectors shall be determined by pulling the connectors apart with a tensile testing machine at a rate of 10 mm/min. as shown in Fig. 2.

Test Results

Force:	Newtons
Unlatching:	121.5 Min.

5.4 Electrical

Dielectric Withstanding Voltage — MIL-STD-202F Method 301

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 MIL-STD-202F Method 301.

Applied Voltage:	500 VAC_{RMS} @ Sea Level
Duration:	1 minute
Observation:	No evidence of a breakdown

Test Results

All samples passed

Insulation Resistance — MIL-STD-202F Method 302
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 MIL-STD-202F Method 302, Test Condition B.

Applied Voltage:	500 V_{DC}
Duration:	1 minute

Test Results

	Resistance in MΩ
Between pins:	5.16E+06 Minimum