3M(TM) Ribbon Cable Socket and Header, 451 and 452 Series .050" x .050" (1.27 mm x 1.27 mm)

Product Specification: 78-5102-0091-4

Revised: 09-10-2014

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1. Scope

This document summarizes test methods, test conditions and product performance requirements for the 3M Ribbon Cable Socket, 451 Series and the 3M Boardmount Header Connectors, 452 Series. Listings of materials, finishes, test conditions, and test standards are included. In the event of conflict between this specification and any documents listed below, the listed documentation supersedes this specification.

2. 3M Customer Documents

78-5100-2396-9	Customer drawing for Connector System Mated Dimensions
78-5100-2436-3	Customer drawing for Ribbon Cable Socket, 451 Series
78-5100-2437-1	Customer drawing for Boardmount Header, 452 Series
78-9101-8937-8	Tooling and Installation Instructions for 451 Series

3. Performance and Test Description

Unless otherwise specified, all tests shall be performed on Ribbon Cable Sockets 45130-02XX-30 and 45130-02XX-00 mated to Boardmount Headers 45230-XX02-30 and 45230-XX02-00 using 3M™ Round Conductor Flat Cable 3754/30 at ambient environmental conditions per EIA-364. Unless otherwise specified, all values and limits are typical of those obtained by qualification testing of the subject product. All specifications are subject to revision and change without notice from 3M.

4. Requirements Overview

4.1 Ratings

Voltage: $125V_{AC}$

Current:

1.00 A, All contacts powered

1.50 A, 6 contacts powered

2.50 A, 1 contacts powered

Rating conditions: EIA-364-070 Method 2, 30°C maximum temperature rise.

Temperature: -65°C to +125°C

Insulation resistance: >1 $x10^9$ Ω at 500 VDC

4.2 Materials

Socket insulation: Glass filled PBT, 94V-0
Cover insulation: Glass filled PBT, 94V-0
Strain relief: Stainless Steel
Socket contact: BeCu
Header insulation: Glass filled LCP, 94V-0
Header pin: Phosphor Bronze
Cable recommendations: 3M Round Conductor Flat Cable 3754, 3447, 3604, 3609, 3749, 3756
Cable accommodation: 30 AWG solid or stranded PVC, FEP, TPE

4.3 Finishes

Plating: (socket and header)

Nickel: 50-150 µ inches , ASTM B689-97, SAE AMS-QQ-N-290
Gold options: 0.76 µm (30 µ inches), ASTM B488-01 Class C
Flash, ASTM B488-01 Class C
Matte Sn: Soldertail 200-400µ"

4.4 Regulatory Compliance

RoHS Compliant. E1 & C1 Apply. See the Regulatory Information Appendix (RIA) in the “RoHS compliance” section of www.3Mconnector.com for compliance information. See customer drawings for regulatory specifics on each connector.

5. Electrical

Description or parameter	Values & limits	Units	Requirement or conditions	Test standard or method
Dielectric withstanding voltage	1250	VAC_{RMS}	Measured between adjacent and opposing contacts. No disruptive discharge during 1 minute duration. Sea level with 70% relative humidity. Excludes cable.	EIA-364-20 Method A Test Condition I
Dielectric Breakdown voltage	500	VAC/sec	Ramp assembled pair at 500V/s until electrical arc. Sea level with 70% relative humidity. Excludes cable.	EIA-364-20 Method A Test Condition I
Insulation resistance	>1 x 10^9	Ohms	Measured between adjacent and opposing contacts. 500 VDC for 1 minute duration.	EIA-364-21
Current rating	1.00	Amperes	30º C T rise above ambient, mated pair terminated to cable, all lines driven.	EIA-364-70 Method 2
	1.50		30º C T rise above ambient, mated pair terminated to cable, 6 adjacent lines driven.	
	2.50		30ºC T rise above ambient, mated pair terminated to cable, 1 line driven.	
Low Level Connection Resistance (LLCR)	<10 Δ	Milliohms	10 milliohm maximum ΔR contact resistance per mated interface throughout testing.	EIA-364-23

6. Mechanical

Description or parameter	Values & limits	Units	Requirement or conditions	Test standard or method
Header pin retention	1.5	lbs	Average/pin	EIA-364-29
Socket/Cable Termination Force	19	Newtons	Average/pin force exerted per IDC contact by application tool to terminate the 451 Series Socket to 3M™ Round Conductor Flat Cable 3754.	Force gauge
Vibration	3.10	g (gravitational force)	Random, 15min each x, y, z planes. No strain relief clip.Mated connectors shall exhibit no discontinuities greater than 10ns during test, and 10 milliohm maximum ΔR contact resistance throughout testing.	EIA-364-28 Condition VII Letter D
	20		Swept-sine, 2.5 hours each x, y, z planes, 10-2000 Hz. Double ended socket harness with strain relief clip both ends. Mated connectors shall exhibit no discontinuities greater than 10ns during test, and 10 milliohm maximum ΔR contact resistance throughout testing.	IEC-60512-6d-2e-6c
Mechanical Shock	30	g (gravitational force)	Half-sine, 11ms, 3 pulses each x, y, z.. No strain relief clip. Mated connectors shall exhibit no discontinuities greater than 10ns during test, and 10 milliohm maximum ΔR contact resistance throughout testing.	EIA-364-27 Test Condition H
	50		Half-sine, 11ms, 3 pulses each x, y, z. Double ended socket harness with strain relief clip both ends. Mated connectors shall exhibit no discontinuities greater than 10ns during test, and 10 milliohm maximum ΔR contact resistance throughout testing.	EIA-364-27 Test Condition A

6.0 Mechanical continue

Mating Force / Contact	1.0	Newtons (MAX)	Connector average/pin. Mated to a .0148" square pin connector. Without friction bumps.	EIA-364-13 Method B
Unmating Force / Contact	0.6	Newtons (MIN)	Connector average/pin. Mated to a .0148" square pin connector. Without friction bumps.	EIA-364-13 Method B
Durability (Full)	100(30µ" Au) 20(Flash Au)	Mating cycles	10 milliohm maximum ΔR contact resistance per mated interface throughout testing.	EIA-364-13
Durability (Preconditioning)	50	Mating cycles	10 milliohm maximum ΔR contact resistance per mated interface throughout testing. (30µ"Au only)	EIA-364-13

7. Physical

Description or parameter	Values & limits	Units	Requirement or conditions	Test standard or method
Visual			No defects such as deformation, blister, damage, crack, etc.	EIA-364-18
Plating Thickness Tin	5.08-10.2 (200-400)	Micro-meter (Micro-inch)	Random measurements from any 3 lots shall not be outside of specification.	EIA-364-48 Method C
Plating Thickness Nickel	1.27-3.81 (50-150)	Micro-meter (Micro-inch)	Random measurements from any 3 lots shall not be outside of specification.	
Plating Thickness Gold	0.76 min (30)	Micro-meter (Micro-inch)	Minimum of random measurements from any 3 lots shall not be less than specified.	

8. Environmental

Description or parameter	Values & limits	Units	Requirement or conditions	Test standard or method
Temperature Life (Full)	1008 125	hours °C	No physical abnormalities. 10 milliohm maximum ΔR contact resistance throughout testing.*	EIA-364-17 Method A Condition 5D
Thermal Shock	-65 to +125	°C	No physical abnormalities. 10 milliohm maximum ΔR contact resistance per mated interface throughout testing.*	EIA-364-32, Table 2, Condition II
Humidity Temperature Cycling	10 +25 to +65 80 to 100 -10	Days °C % RH °C cold shock	No physical abnormalities. 10 milliohm maximum ΔR contact resistance per mated interface throughout testing.	EIA-364-31, Method III, Fig 1,
Solderability (Header)	As-received 8	hours	95 percent coverage of solderable area	EIA-364-52
Moisture Sensitivity Level (Header)	260	°C	Level 1 (85°C / 85% RH, 168 hours), No defects such as deformation, blister, damage, crack, etc., must maintain dimensional stability.	J-STD-020 Level 1 (MSL1)
Mixed Flowing Gas	336	hours	Durability preconditioning: 50 cycles Mated with wear: 224 hours Unmated with wear: 112 hours 0.76 µm (30 µ inches) contact plating	EIA-364-65B Class IIA

*Temperature is primarily limited by cable specifications. Testing completed at 125°C with high temperature 3M FEP cables (3604, 3609). Temperature is limited to 105°C when mated to 3M PVC or TPE cables (3754, 3447, 3749, 3756).

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9. Test Sequence

TEST	EIA 364 TP NO.	TEST GROUP						
		1	2	3A	3B	4	5	6
Visual	18	0,6	0,8	0,4	0,6	0,5	0,4	0,3
Durability (Pre-conditioning)	13					2		
Durability (Full)	13		2	2	3			
Temperature Life (Full)	17						2	
Dielectric Withstanding Voltage	20				1,4			2
Dielectric Breakdown Voltage	20				7			
Insulation Resistance	21				2,5			
LLCR	23	1,3,5	1,3,5,7	1,3		1,4	1,3	
Mechanical Shock	27	2						
Vibration	28	4						
Thermal Shock	32		4					
Humidity Temperature Cycling	31		6					
Mixed Flowing Gas	65					3		
Temperature Rise vs. Current	70							1

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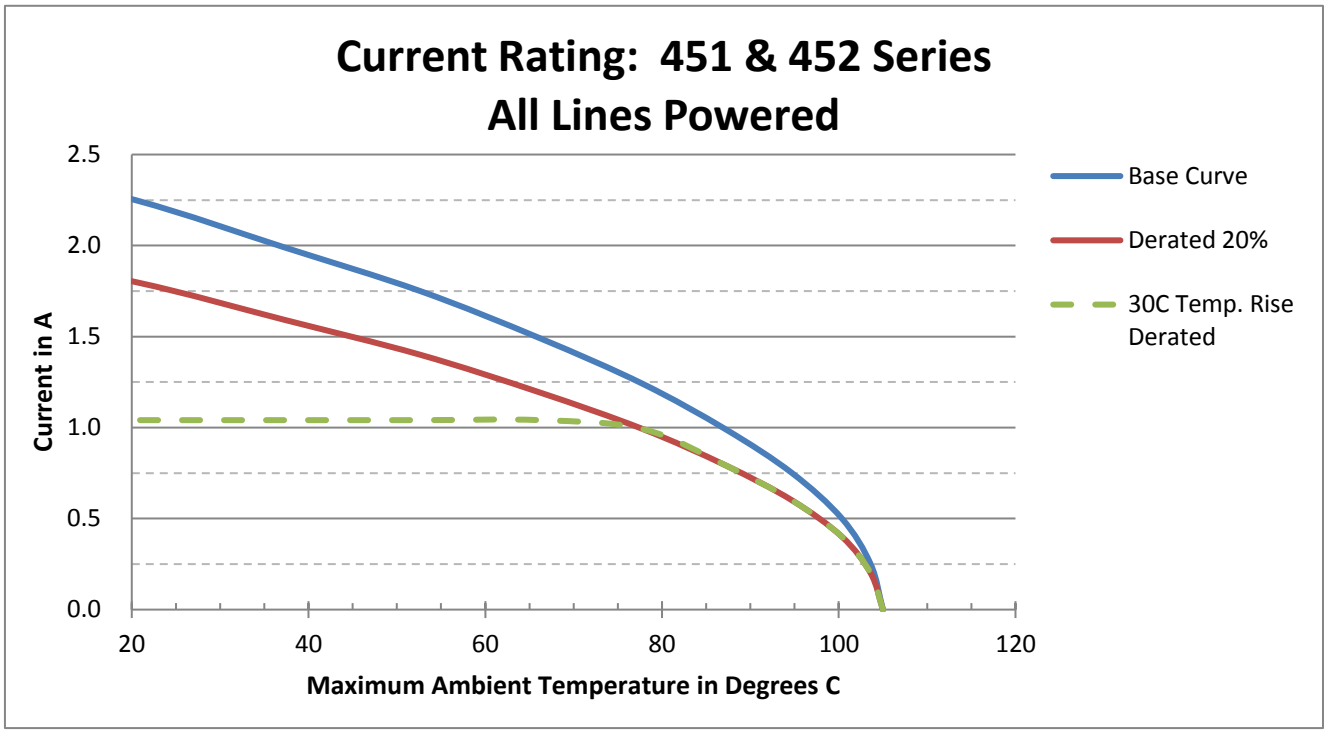
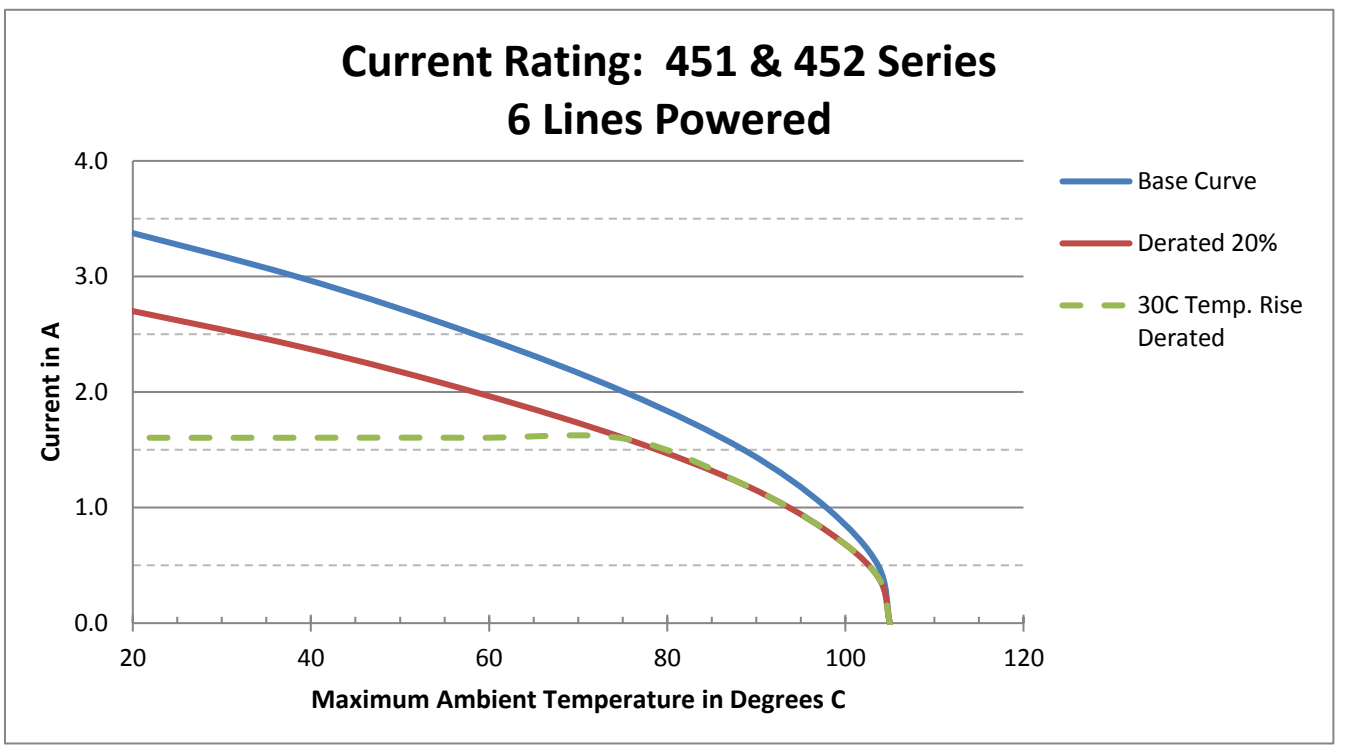
10. Figures





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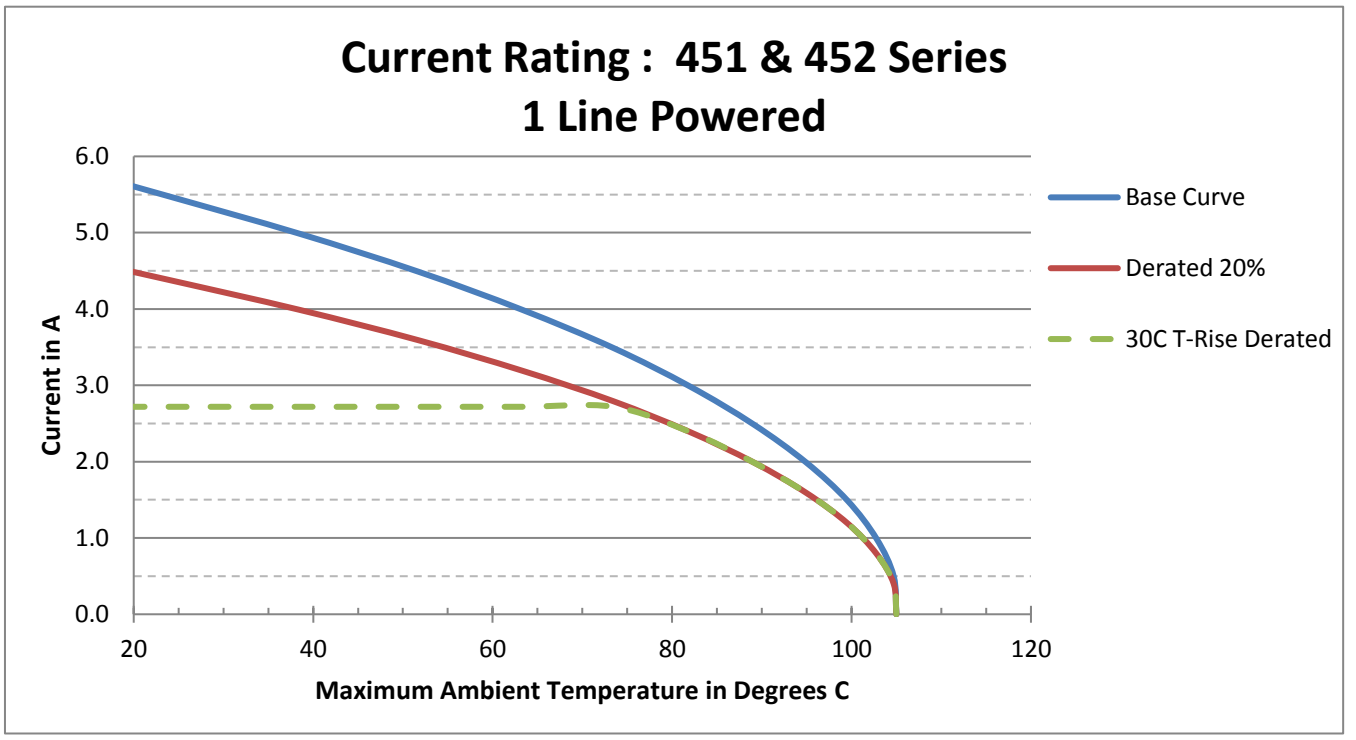
10.0 Figures



11. Agency Listings

11.1 Underwriters Laboratories (UL): File No. E68080

UL Ratings
Temperature: 125 °C
Voltage: 125 V
Current: 1.0 A

CUL Ratings
Temperature: 125 °C
Voltage: 125 V
Current: 1.0 A

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