

**3M™ 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: 04-18-2014



	Page
Cover Page	1
Contents.....	2
1. Scope	3
2. 3M Customer Documents	3
3. Performance and Test Descriptions	3
4. Requirements Overview.....	3
5. Electrical.....	4
6. Mechanical.....	4
7. Physical.....	5
8. Environmental.....	5
9. Test Sequence.....	5
10. Figures.....	6
11. Agency Listings.....	7
Important Notice	8

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 45120-02XX-30 mated to Boardmount Headers 45220-XX02-30 using 3M™ Round Conductor Flat Cable 3754/20 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 +105°C

Insulation resistance: >1 x10⁹ 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: Solder tail 200-400u"

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	30° C T rise above ambient, mated pair terminated to cable, all lines driven.	EIA-364-70 Method 2
	1.50		30° C T rise above ambient, mated pair terminated to cable, 6 adjacent lines driven.	
	2.50		30° C 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	1.50 0.15	lbs	Average/pin Average/pin after 260C reflow	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	≤10	ns	Random 3.10g, 15min each x, y, z planes. Mated connectors shall exhibit no discontinuities greater than specified.	EIA-364-28 Condition VII Letter D
Mechanical Shock	≤10	ns	30g half-sine 11ms. Mated connectors shall exhibit no discontinuities greater than specified.	EIA-364-27 Test Condition H
Mating Force / Contact	1.0	Newtons	Connector average/pin. Mated to a .0148" square pin connector. Without friction bumps.	EIA-364-13 Method B
Unmating Force / Contact	0.6	Newtons	Connector average/pin. Mated to a .0148" square pin connector. Without friction bumps.	EIA-364-13 Method B
Durability (Full)	100	Mating cycles	10 milliohm maximum ΔR contact resistance per mated interface throughout testing. 30u"	EIA-364-13
Durability (Preconditioning)	20	Mating cycles	10 milliohm maximum ΔR contact resistance per mated interface throughout testing. 30u"	EIA-364-1000
Reseating	3	Mating cycles	10 milliohm maximum ΔR contact resistance per mated interface throughout testing. 30u"	EIA-364-1000

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 (30)	Micro-meter (Micro-inch)	Minimum of random measurements from any 3 lots shall not be less than specified.	

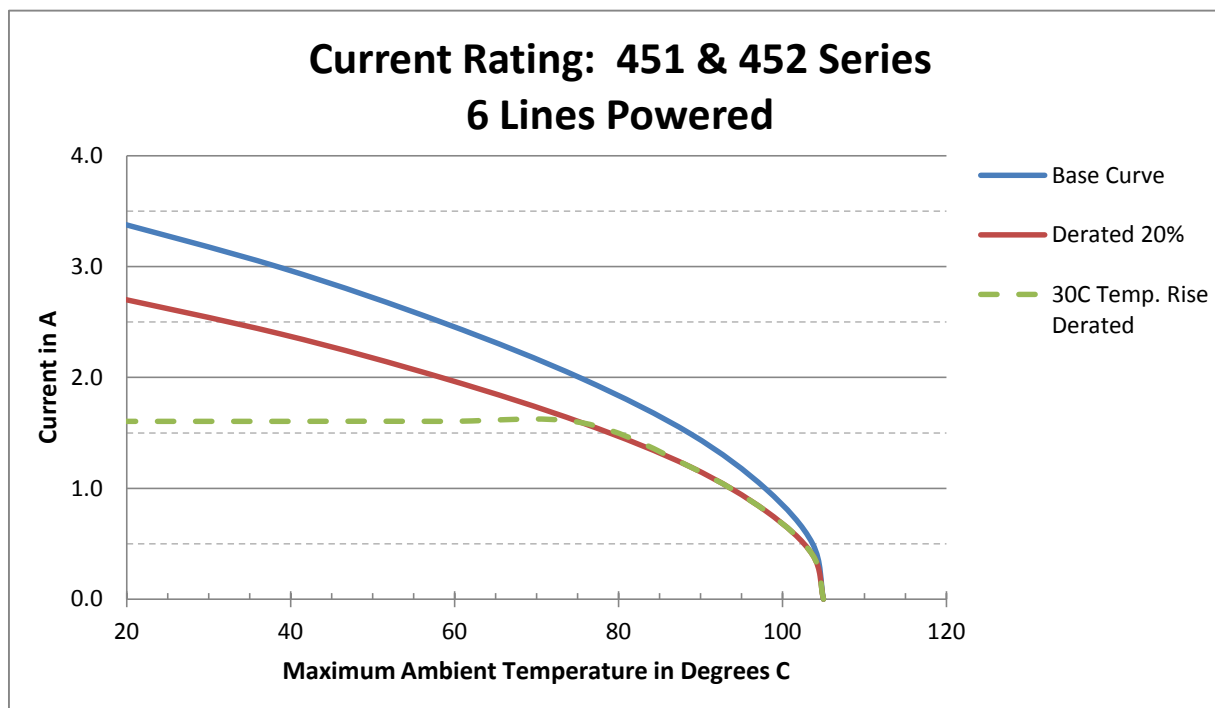
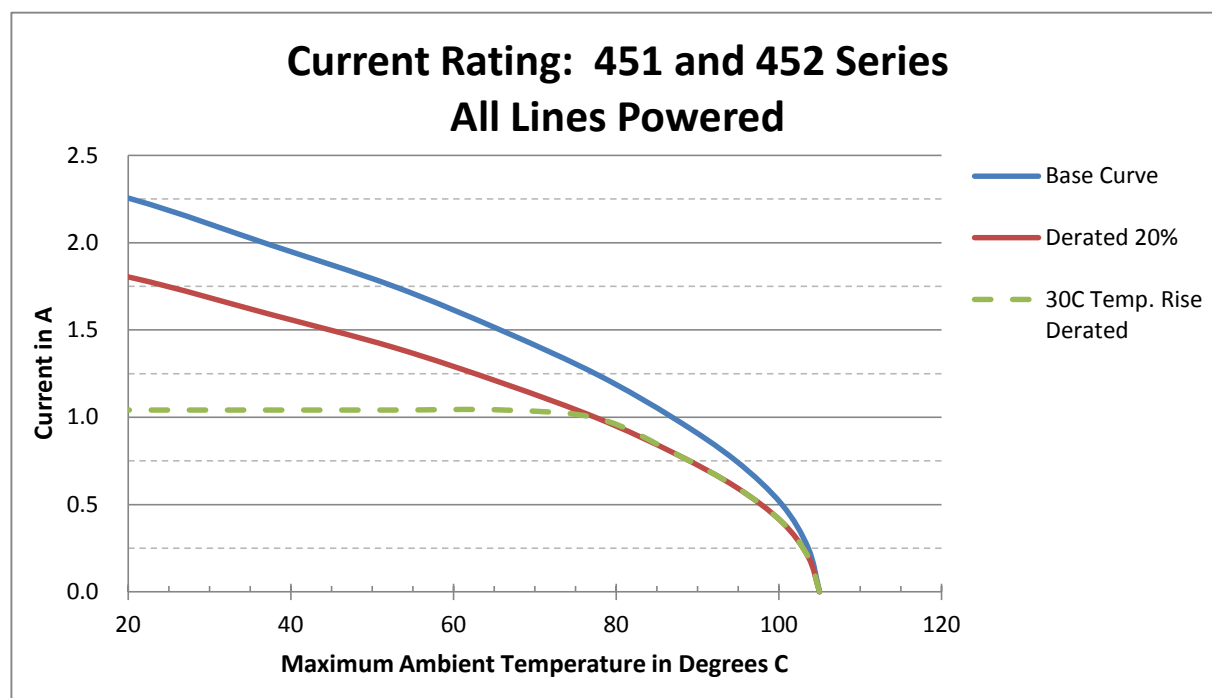
8. Environmental

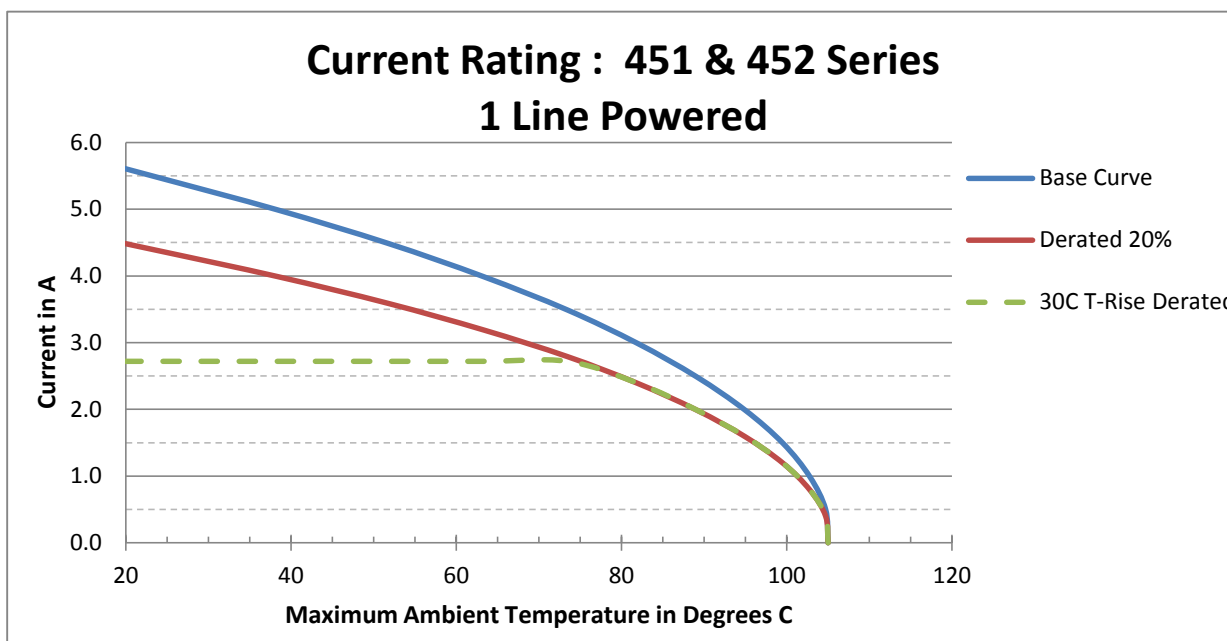
Description or parameter	Values & limits	Units	Requirement or conditions	Test standard or method
Temperature Life (Full)	1008 105	hours °C	1008 hours at 105°C. No physical abnormalities. 10 milliohm maximum ΔR contact resistance throughout testing.	EIA-364-17 Method A Condition 3D
Temperature Life (Pre-conditioning)	538 105	hours °C	538 hours at 105°C. No physical abnormalities. 10 milliohm maximum ΔR contact resistance throughout testing.	EIA-364-1000
Thermal Shock	-65 to 105	°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	°C	10 days, 10 cycles. No physical abnormalities. 10 milliohm maximum ΔR contact resistance per mated interface throughout testing.	EIA-364-31, Method III, Fig 1, 10C cold shock
Solderability (Header)	>95	Percent	As received, 8hr steam age, dip and look. Coverage of solderable area	EIA-364-52
Moisture Sensitivity Level (Header)	Level 1 (MSL1)	N/A	No defects such as deformation, blister, damage, crack, etc., must maintain dimensional stability.	J-STD-020

9. Test Sequence

TEST	EIA 364 TP NO.	TEST GROUP					
		1	2	3	5A	5B	6
Visual	18	0,8	0,10	0,10	0,4	0,6	0,3
Durability (Pre-conditioning)	13	2	2	2			
Durability (Full)	13				2	3	
Temperature Life (Full)	17	4					
Temperature Live (Pre-conditioning)	17			4			
Dielectric Withstanding Voltage	20					1,4	2
Dielectric Breakdown Voltage	20					7	
Insulation Resistance	21					2,5	
LLCR	23	1,3,5,7	1,3,5,7,9	1,3,5,7,9	1,3		
Mechanical Shock	27			8			
Vibration	28			6			
Thermal Shock	32		4				
Humidity Temperature Cycling	31		6				
Thermal Disturbance	1000						
Temperature Rise vs. Current	70						1
Reseating	1000	6	8				

10. Figures





11. Agency Listings

11.1 Underwriters Laboratories (UL)

Agency	File No.
UL	E68080
CUL	E68080

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Unless otherwise noted, references to industry specifications are intended to indicate substantial compliance to the material elements of the specification. Such references should not be construed as a guarantee of compliance to all requirements in a given specification.

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