

3M™ Ribbon Cable Wiremount Socket Assembly, 451 Series
3M™ Shrouded Boardmount Header Latch and Eject, 452 Series

1.27mm (.050") Pitch

Product Specification: 78-5102-0091-4

Revised: 07-01-2022



1. Scope

This document summarizes test methods, test conditions and product performance requirements for the 3M™ Ribbon Cable Wiremount Socket Assembly, 451 Series and the 3M™ Shrouded Boardmount Header Latch and Eject, 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. Related Documents

78-5100-2436-3	Customer drawing: 3M™ Ribbon Cable Wiremount Socket Assembly, 451 Series
78-5100-2437-1	Customer drawing: 3M™ Shrouded Boardmount Header Latch and Eject, 452 Series
78-5100-2396-9	Customer drawing: 3M™ Wire-to-Board system, 1.27mm (.050"), 450 Series Mated
White Paper	Report: 3M™ Wire-to-Board system, 450 Series Signal Integrity Report
78-9101-8937-8	Instruction Guide: 3M™ Locator Plate 3443-82-XX, Metal Instruction Guide for the assembly of 3M™ Ribbon Cable Sockets, 451 Series
78-9102-1086-9	Instruction Guide: 3M™ Locator Plate 3443-81-XX, 3D Printed Instruction Guide for the assembly of 3M™ Ribbon Cable Sockets, 451 Series

3. Performance and Test Description

Unless otherwise specified, all tests shall be performed on 3M™ Ribbon Cable Wiremount Socket Assembly, 451 Series 45150-01XX-30 and 45150-01XX-00 mated to 3M™ Shrouded Boardmount Header Latch and Eject, 452 Series 45250-XX02-30 and 45250-XX02-00 using 3M™ Round Conductor Flat Cable 3754/50 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: 125Vdc/ac(peak)

Temperature range (EIA): -65°C to +125°C

Insulation resistance: >1 x10⁹ Ω at 500 VDC

Current per EIA-364-70:

Connectors with 4- 30 current carrying poles:

0.75A, All contacts powered

1.50A, 6 contacts powered

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

Connectors with 32 - 50 current carrying poles:

0.75A, All contacts powered

1.50A, 6 contacts powered

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

Agency Listings:

Underwriters Laboratories (UL): File No. E68080

UL Ratings (4-50 current carrying poles)

Temperature: 130 °C

Voltage: 125 Vac/Vdc

Current: 1.0 A

CUL Ratings (4 - 30 current carrying poles)

Temperature: 130 °C

Voltage: 125 Vac/Vdc

Current: 1.0 A

CUL Ratings (32- 50 current carrying poles)

Temperature: 130 °C

Voltage: 125 Vac/Vdc

Current: 0.75 A

3M™ Ribbon Cable Socket and Header, 451 and 452 Series, 1.27mm (0.050") pitch

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

4.3 Finishes

Plating: (socket and header)

Nickel: 50-150 μ inches , ASTM B689-97, SAE AMS-QQ-N-290

Gold options: 0.76 μ m (30 μ inches min), ASTM B488-01 Class C

Flash, ASTM B488-01 Class C

Matte Sn: Solderail 200-400 μ "

4.3 Cable Accommodation

General Accommodation:

30 AWG, 0.025" pitch, stranded or solid conductor, flat cable, PVC, TPE, FEP, PO insulation

3M™ Ribbon Cables:

3M™ Round Conductor Flat Cable, 3754 Series: PVC, round stranded conductor

3M™ Round Conductor Flat Cable, 3447 Series: PVC, round solid conductor

3M™ Round Conductor Flat Cable, 3756 Series: TPE, round stranded conductor

3M™ Round Conductor Flat Cable, 3749 Series: TPE, round solid conductor

3M™ Round Conductor Flat Cable, 3609 Series: FEP, round stranded conductor

3M™ Round Conductor Flat Cable, 3604 Series: FEP, round solid conductor

3M™ Round Conductor Flat Cable, HF447 Series: PO, Halogen Free, round solid conductor

3M™ Round Conductor Flat, Controlled Impedance Cable, 7700 Series: PO, shielded, round solid conductor

4.5

For regulatory information about this product, visit 3M.com/regs or contact your 3M representative.

5. Electrical Testing

Description or parameter	Values & limits	Units	Requirement or conditions	Test standard or method
Dielectric withstanding voltage	1250	V _{DC}	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	1250	V _{DC}	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
EIA Current rating 4 - 30 poles	0.75	Amperes	30° C T rise above ambient, mated pair terminated to cable, all poles powered.	EIA-364-70 Method 2
	1.50		30° C T rise above ambient, mated pair terminated to cable, 6 adjacent poles powered.	
EIA Current rating 32 - 50 poles	0.75	Amperes	30° C T rise above ambient, mated pair terminated to cable, all poles powered.	EIA-364-70 Method 2
	1.50		30° C T rise above ambient, mated pair terminated to cable, 6 adjacent poles powered.	
Low Level Connection Resistance (LLCR)	<10 Δ or <30 Δ	Milliohms	Maximum ΔR contact resistance per mated interface throughout testing. <30mOhm for Temperature Life. <10mOhm for all other tests.	EIA-364-23

6. Mechanical Testing

Description or parameter	Values & limits	Units	Requirement or conditions	Test standard or method
Header pin retention	4.5	Newtons (MIN)	Average/pin	EIA-364-29
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

3M™ Ribbon Cable Socket and Header, 451 and 452 Series, 1.27mm (0.050") pitch

Mating Force / Contact	1.25	Newtons (MAX)	Connector average/pin. Mated to a .0148" square pin connector. Without friction bumps.	EIA-364-13 Method B
Unmating Force / Contact	0.4	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, 4-30p)	Mating cycles	10 milliohm maximum ΔR contact resistance per mated interface throughout testing.	EIA-364-13
	25(30μ" Au, 32-50p)			
	20(Flash Au)			
Durability (Preconditioning)	50 (4-30p) 25 (32-50p)	Mating cycles	10 milliohm maximum ΔR contact resistance per mated interface throughout testing. (30μ"Au only)	EIA-364-13

7. Physical Testing

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.	
Solderability (Header)	As-received	hours	95 percent coverage of solderable area. No steam age.	EIA-364-52

8. Environmental Testing

Description or parameter	Values & limits	Units	Requirement or conditions	Test standard or method
Temperature Life (Full)	1008 125	hours °C	No physical abnormalities. 30 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,
Mixed Flowing Gas	336	hours	Durability preconditioning: 50 cycles Mated with wear: 336 hours Tested on 30pin, 0.76 μm (30 μ") contact plating	EIA-364-65B Class IIA
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-020E
				Level 1 (MSL1)

*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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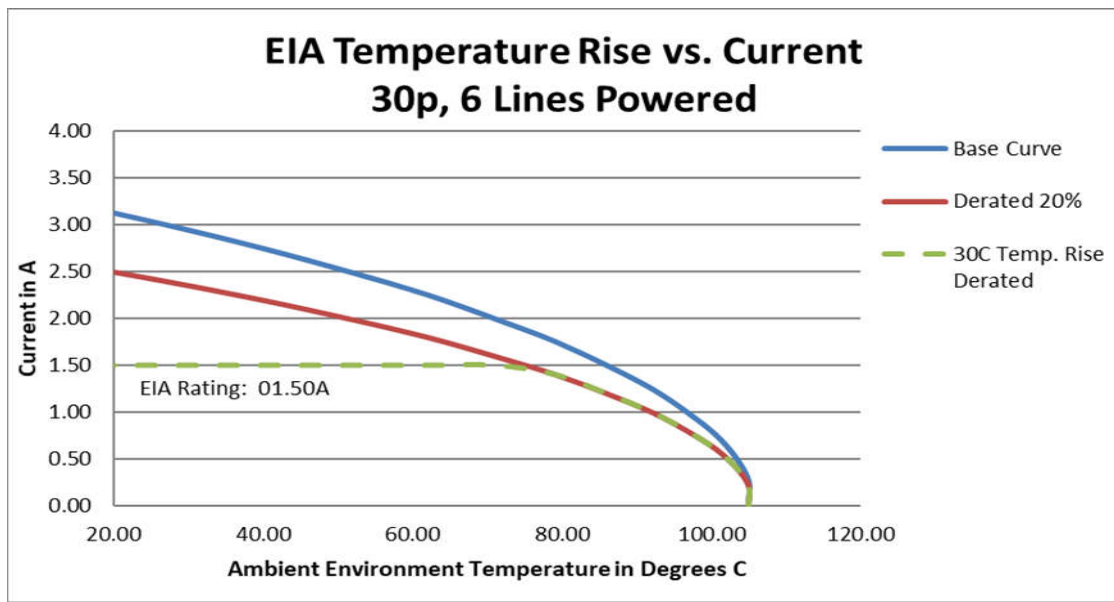
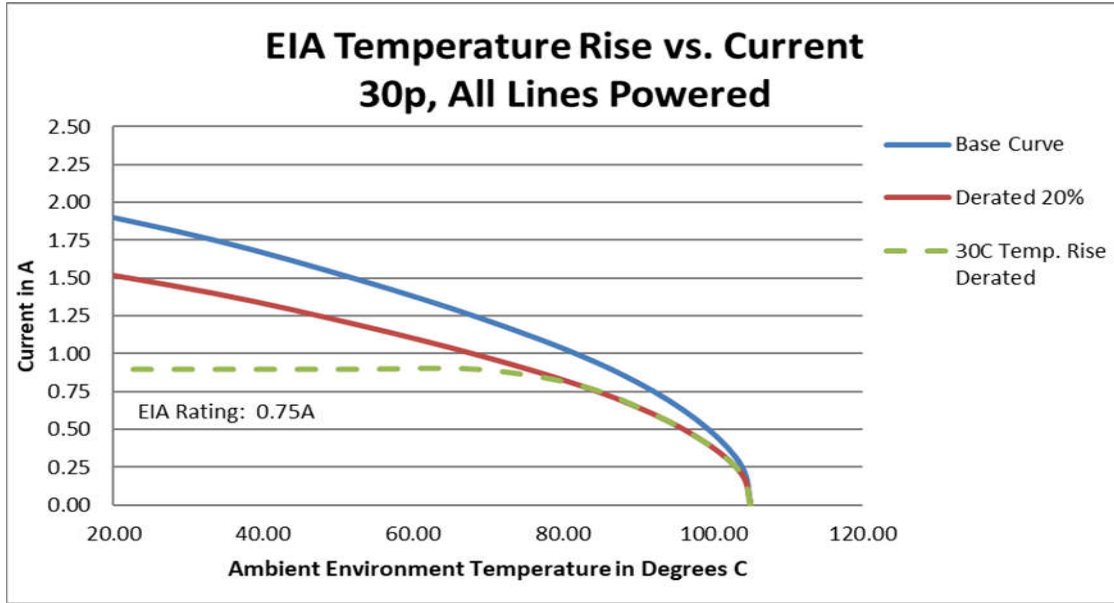
9. Test Sequence**9.1 Sequenced Tests**

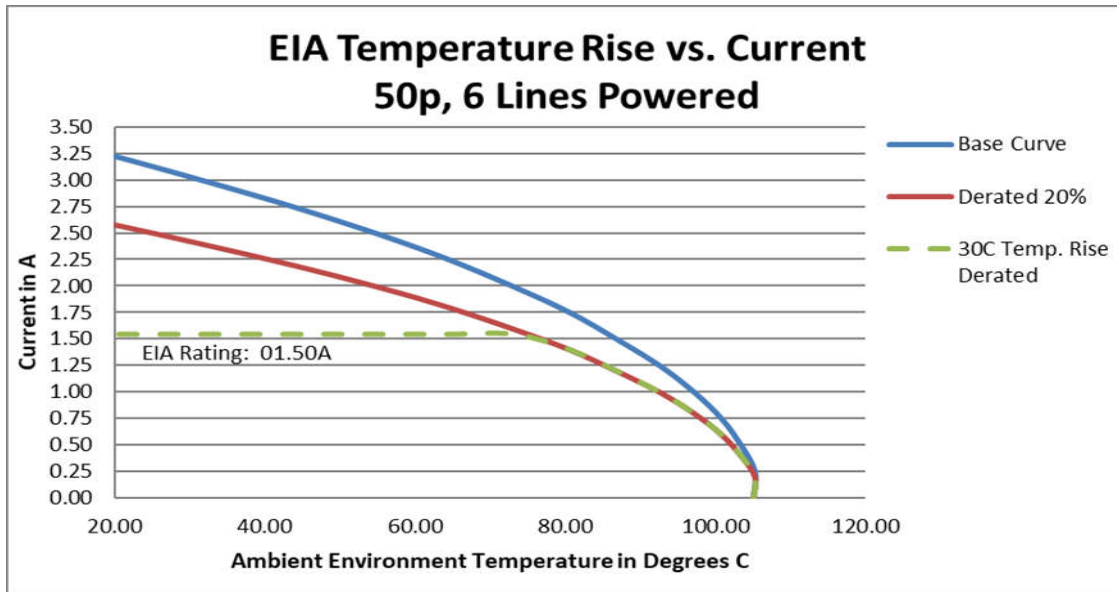
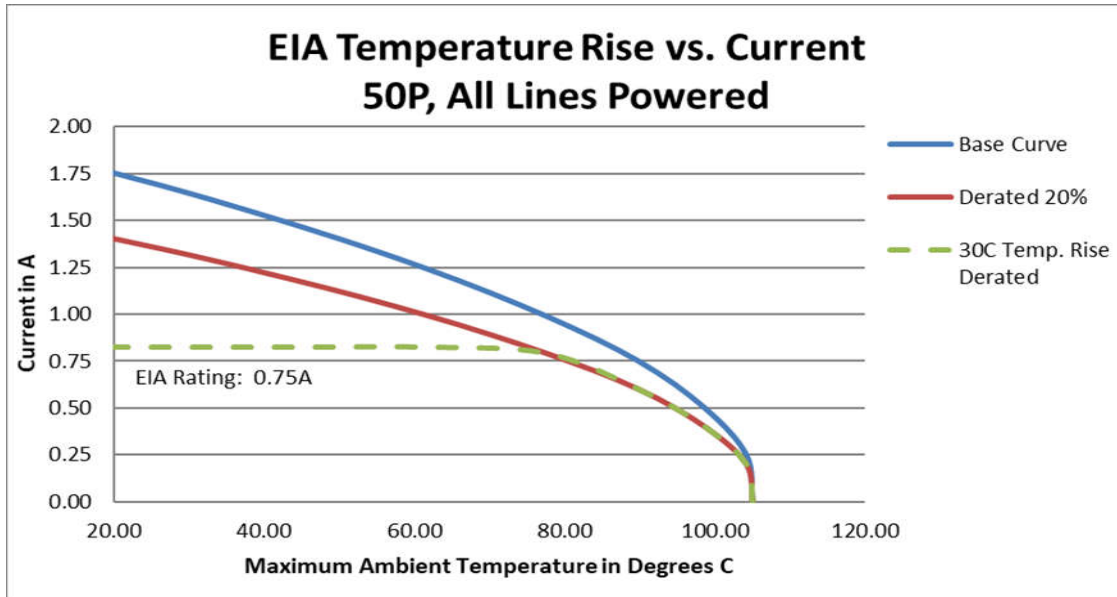
TEST	EIA 364 TP NO.	TEST GROUP					
		1	2	3	4	5	6
Visual	18	0,6	0,8	0,6	0,5	0,4	0,3
Durability (Pre-conditioning)	13				2		
Durability (Full)	13		2	3			
Temperature Life (Full)	17					2	
Dielectric Withstanding Voltage	20			1,4			2
Dielectric Breakdown Voltage	20			7			
Insulation Resistance	21			2,5			
LLCR	23	1,3,5	1,3,5,7		1,4	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

9.2 Independent Tests

1. Plating Thicknesses
2. Header Solderability
3. Header Moisture Sensitivity Level
4. Header Pin Retention
5. Mating Force / Contact
6. Unmating Force / Contact

10. Figures





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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