

# 3M™ ROUND, SHIELDED/JACKETED, FLAT CABLE, HF659 SERIES

.050" 28 AWG STRANDED, MASS TERMINATABLE, HALOGEN FREE PO/PO



NOTE:  
 1) BLUE MARKING ON ONE EDGE OF PRIMARY CABLE DESIGNATES WIRE #1.  
 2) DIMENSION "B" PERTAINS TO BONDED AREA ONLY.

## ORDERING INFORMATION

HF659/XX XX XX

NUMBER OF CONDUCTORS  
(SEE TABLE 1)

BLANK = STANDARD  
 SF = SPLICE FREE

BLANK = STANDARD  
 SO = CONTINUOUSLY BONDED WIRE (NO SPLIT)

NOTE:  
 AVAILABLE IN STANDARD 275FT ROLLS. CONTACT 3M FOR AVAILABILITY OF ADDITIONAL CONDUCTOR COUNTS AND/OR CUSTOM ROLL LENGTHS.

TABLE 1

| NO. OF CONDUCTORS | 3M PART NUMBER | DIM. "A"   | DIM. "B"    |
|-------------------|----------------|------------|-------------|
| 09                | HF659/09       | .25 [6.4]  | .40 [10.2]  |
| 10                | HF659/10       | .25 [6.4]  | .45 [11.4]  |
| 14                | HF659/14       | .30 [7.6]  | .65 [16.5]  |
| 15                | HF659/15       | .30 [7.6]  | .70 [17.8]  |
| 16                | HF659/16       | .30 [7.6]  | .75 [19.1]  |
| 20                | HF659/20       | .33 [8.4]  | .95 [24.1]  |
| 24                | HF659/24       | .34 [8.6]  | 1.15 [29.2] |
| 25                | HF659/25       | .34 [8.6]  | 1.20 [30.5] |
| 26                | HF659/26       | .34 [8.6]  | 1.25 [31.8] |
| 30                | HF659/30       | .37 [9.4]  | 1.45 [36.8] |
| 34                | HF659/34       | .37 [9.4]  | 1.65 [41.9] |
| 36                | HF659/36       | .41 [10.4] | 1.75 [44.5] |
| 37                | HF659/37       | .41 [10.4] | 1.80 [45.7] |
| 40                | HF659/40       | .41 [10.4] | 1.95 [49.5] |
| 50                | HF659/50       | .45 [11.4] | 2.45 [62.2] |
| 60                | HF659/60       | .48 [12.2] | 2.95 [74.9] |
| 64                | HF659/64       | .48 [12.2] | 3.15 [80.0] |

## 2 PHYSICAL :

JACKET MATERIAL: HALOGEN FREE POLYOLEFIN (PO)  
 COLOR: DARK GRAY  
 PRIMARY MATERIAL: HALOGEN FREE POLYOLEFIN (PO)  
 COLOR: DARK GRAY

MARKING: STANDARD: NONE  
 CONDUCTORS: 28 AWG, 7 X 36 AWG [7 X Ø .127] TINNED STRANDED COPPER  
 SHIELDING: .001 [.03] THICK ALUMINUM/POLYESTER FILM FOIL AND 90% COVERAGE TINNED COPPER BRAID.

## 2 ELECTRICAL :

VOLTAGE RATING: USA 150V CANADIAN 150V EU: <50V  
 INSULATION RESISTANCE: (PRIMARY CABLE) >1 X 10<sup>10</sup>Ω/10ft. [3m]

|                           |                        |                        |
|---------------------------|------------------------|------------------------|
| CHARACTERISTIC IMPEDANCE: | UNBALANCED 54Ω         | BALANCED 107Ω          |
| CAPACITANCE:              | 28.7 pF/ft [84.2 pF/m] | 14.4 pF/ft [47.2 pF/m] |
| INDUCTANCE:               | .08μH/ft [.27μH/m]     | .16μH/ft [.52μH/m]     |
| PROPAGATION DELAY:        | 1.55 ns/ft [4.95 ns/m] | 1.54 ns/ft [4.95 ns/m] |
| VELOCITY OF PROPAGATION:  | 66%                    | 66%                    |

NOTE: UNBALANCED IS MEASURED BETWEEN GROUND-SIGNAL-GROUND CONDUCTORS.  
 BALANCED IS MEASURED BETWEEN CONDUCTORS WITHIN A PAIR.  
 "MEASURED VALUES ARE TYPICAL"

## 2 ENVIRONMENTAL :

TEMPERATURE RATING: -40°C TO +105°C (EIA-364-32G, METHOD A, TEST CONDITION 2)  
 -15°C TO +75°C (UL TEMPERATURE RATING)

FLAMMABILITY RATING: INTERNAL: HORIZONTAL FLAME PER UL758  
 EXTERNAL: CABLE FLAME (VERTICAL) PER UL758

HALOGEN FREE IS DEFINED AS BOTH 1) NO HALOGEN COMPOUNDS THAT ARE INTENTIONALLY ADDED TO THE PRODUCT OR USED IN THE MANUFACTURING PROCESS FOR THE PRODUCT AND 2) ANY IMPURITIES PRESENT ARE LESS THAN 900ppm BROMINE, LESS THAN 900ppm CHLORINE AND/OR LESS THAN 1500ppm TOTAL BROMINE AND CHLORINE. THE LATTER ARE THE LEVELS SET FORTH IN CERTAIN INDUSTRY STANDARDS FOR PRINTED CIRCUIT BOARDS, SUCH AS THE INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC) 61249-2-21 STANDARDS. THIS INFORMATION REPRESENTS 3M'S KNOWLEDGE AND BELIEF WHICH MAY BE BASED IN WHOLE OR IN PART ON INFORMATION PROVIDED BY 3RD PARTY SUPPLIERS TO 3M.

- \* LOW SMOKE ZERO HALOGEN (LSZH) INSULATION. ADVANTAGES OF LSZH INSULATION ARE THE LOW SMOKE (IEC 61034-2-2005) AND LOW TOXICITY OF COMBUSTION GASES (NF X 70-100-2-2006), REDUCING THE RISK TO FIREFIGHTERS AND REDUCING THE SOOT AND CORROSION DAMAGE TO NEARBY EQUIPMENT.
- \* ROUND CONSTRUCTION PERMITS MORE EASY ROUTING.
- \* 28 AWG WIRE ON .050 INCH CENTERS PERMITS MASS TERMINATION TO BROAD LINE OF IDC CONNECTORS.
- \* CONTINUOUS SPLIT/BOND REPEAT ALLOWS FOR MASS TERMINATIONS OF IDC CONNECTORS.
- \* DUAL SHIELDING PROVIDES 35 db AVERAGE SHIELDING.
- \* PRIMARY CABLE IS ZIPPABLE FOR BRANCHING OR DISCRETE TERMINATION.

- NOTES
1. REGULATORY INFORMATION: VISIT 3M.com/regs OR CONTACT YOUR 3M REPRESENTATIVE TO FIND THE RoHS COMPLIANCE STATUS OF THE 3M PART YOU ARE INTERESTED IN.
  2. IN THE EVENT OF CONFLICT BETWEEN THIS DATA AND THAT CONTAINED IN THE PRODUCT SPECIFICATION, THE PRODUCT SPECIFICATION TAKES PRECEDENT.

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 INTERCONNECT SOLUTIONS  
<http://www.3mconnectors.com>

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UL FILE NO: E42769,  
 UL STYLE NO: 22170

| INCH [MM]                     |         |           |
|-------------------------------|---------|-----------|
| TOLERANCE - UNLESS NOTED      |         |           |
| [ INCH ]                      | [ .X ]  | [ .XXX ]  |
| [ INCH ]                      | [ ±.1 ] | [ ±.05 ]  |
| [ INCH ]                      | [ ]     | [ ±.010 ] |
| [ ] = DIM. FOR REFERENCE ONLY |         |           |

|                        |               |   |      |  |      |            |
|------------------------|---------------|---|------|--|------|------------|
| DESIGN REFERENCE       | NEXT ASSEMBLY | REV   | ECO  | ISSUE DATE AND DESCRIPTION   | DRFT | CHKD       |
|                        |               |   |      |  |      |            |
| APPROVED               | DATE          | DATE  | DATE | DATE   | DATE | DATE       |
|                        |               |   |      |  |      |            |
| DIVISION               |               | DIVISION CODE   |      | EMSD   |      |            |
| DO NOT SCALE DRAWING   |               | SCALE   |      | TOLERANCES EXCEPT AS NOTED   |      |            |
| THIRD ANGLE PROJECTION |               | INCHES  |      | MILLIMETERS  |      |            |
| MAX SURFACE ROUGHNESS  |               | SURFACES  |      | MARKED ONLY  |      |            |
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| TITLE                  |               | ROUND, SHIELDED / JACKETED, FLAT, CABLE, .050", HF659 |      |  |      |            |
| CAGE NUMBER            | SIZE          | DRAWING NO.   | REV. |  |      |            |
| D                      |               | 78-5100-2335-7  | E    |  |      |            |
| MODEL                  | HF659         | DET   | ISTS | YES  | NO   | SHT 1 OF 2 |

78-5100-2335-7  
 178-5100-2335-7  
 Time 8/1/2018 11:51:00 AM UTC Offset (hrs) 6

8 7 6 5 4 3 2 1

3M™ ROUND, SHIELDED/JACKETED, FLAT CABLE, HF659 SERIES  
 .050" 28 AWG STRANDED, MASS TERMINATABLE, HALOGEN FREE PO/PO

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3M Electronics Materials Solutions Division  
 6801 River Place Blvd.  
 Austin, TX 78726-9000  
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|                        |                                 |                            |   |                            |             |  |
|------------------------|---------------------------------|----------------------------|---|----------------------------|-------------|--|
| DESIGN REFERENCE       | NEXT ASSEMBLY                   | REV                        | ECO   | ISSUE DATE AND DESCRIPTION | DRFT        | CHKD   |
|                        |                                 |                            |   |                            |             |  |
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| THIRD ANGLE PROJECTION | INTERPRET PER ASME Y14.5 - 2009 | MILLIMETERS                | TITLE<br>ROUND, SHIELDED / JACKETED, FLAT, CABLE, .050", HF659  |                            |             |  |
| MAX SURFACE ROUGHNESS  | MARKED SURFACES                 | INCHES                     | CAGE NUMBER   | SIZE                       | DRAWING NO. | REV.   |
|                        |                                 |                            | D   | 78-5100-2335-7             | E           |  |
|                        |                                 |                            | MODEL   | HF659                      | DET         | LISTS <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO SHT 2 OF 2 |

E REVISION  
 78-5100-2335-7 DRAWING NUMBER  
 B  
 A  
 Time 8/1/2018 11:53:10 AM UTC Offset (hrs) 6



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### Наши контакты:

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331