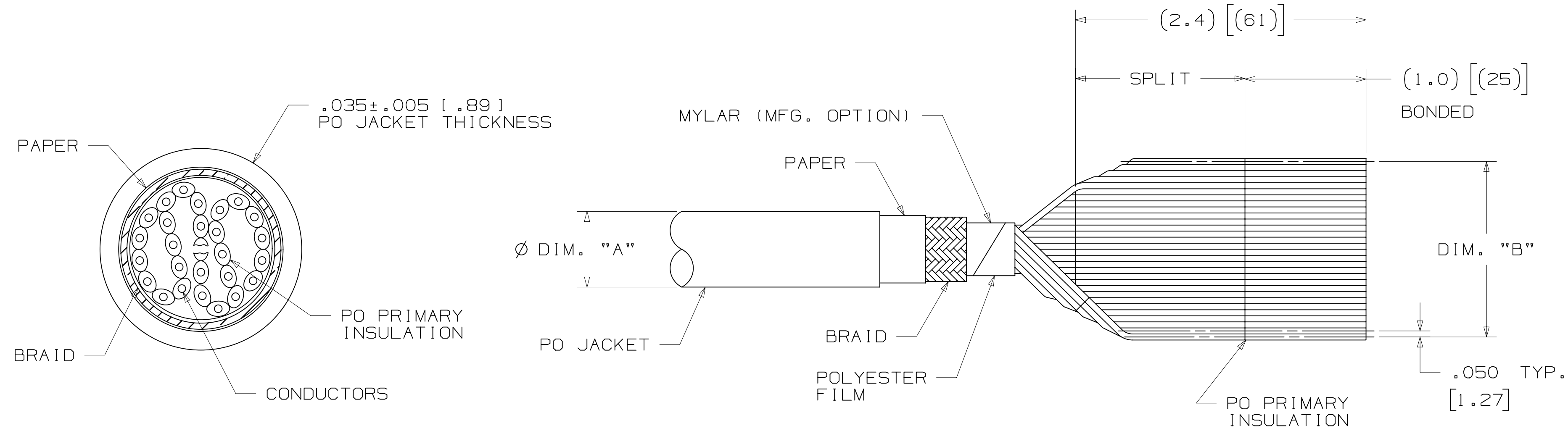


# 3M™ ROUND, SHIELDED/JACKETED, FLAT CABLE, HF659 SERIES

.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.

3M ELECTRONICS MATERIALS SOLUTIONS DIVISION  
 INTERCONNECT SOLUTIONS  
<http://www.3mconnectors.com>

3M IS A TRADEMARK OF 3M COMPANY.  
 FOR TECHNICAL, SALES OR ORDERING INFORMATION CALL 800-225-5373



UL FILE NO: E42769,  
 UL STYLE NO: 22170

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

|                        |                                 |                            |  |                            |              |              |
|------------------------|---------------------------------|----------------------------|--|----------------------------|--------------|--------------|
| DESIGN REFERENCE       | NEXT ASSEMBLY                   | REV                        | ECO  | ISSUE DATE AND DESCRIPTION | DRFT         | CHKD         |
|                        |                                 |                            |  |                            |              |              |
| DIVISION               | DIVISION CODE                   | DATE                       | DATE   | DATE                       | DATE         | DATE         |
|                        | EMSD                            | MAY 29, 2018               | MAY 29, 2018   | MAY 29, 2018               | MAY 29, 2018 | MAY 29, 2018 |
| DO NOT SCALE DRAWING   | SCALE                           | TOLERANCES EXCEPT AS NOTED |  |                            |              |              |
| THIRD ANGLE PROJECTION | INTERPRET PER ASME Y14.5 - 2009 | MAX SURFACE ROUGHNESS      | TITLE: ROUND, SHIELDED / JACKETED, FLAT, CABLE, .050", HF659<br>CAGE NUMBER: D78-5100-2335-7<br>MODEL: HF659 |                            |              |              |
|                        |                                 |                            | REV. 1 OF 2  |                            |              |              |

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

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

Technical Information: The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use: Many factors beyond 3M's control and uniquely within user's control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

Warranty, Limited Remedy, and Disclaimer: Unless an additional warranty is specifically stated on the applicable 3M product packaging or product literature, 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OR TRADE. If the 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.

Limitation of Liability: Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

3M Electronics Materials Solutions Division  
 6801 River Place Blvd.  
 Austin, TX 78726-9000  
 1-800-225-5373  
 www.3M.com/interconnect

|                        |                                 |                            |   |  |              |  |
|------------------------|---------------------------------|----------------------------|---|--|--------------|--|
| DESIGN REFERENCE       | NEXT ASSEMBLY                   | REV                        | ECO   | ISSUE DATE AND DESCRIPTION                               | DRFT         | CHKD   |
|                        |                                 | D                          | 79295   | MAY 29, 2018<br>REVISED AND REDRAWN                      | JNC          | BM   |
|                        |                                 | E                          | 80157   | AUG 01, 2018<br>REVISED ELECTRICAL & ENVIRONMENTAL NOTES | JNC          | BM   |
| NAME                   | DIVISION CODE                   | CHKD                       | DATE  | APPRV  | DATE         |  |
| CASTIGLIONE            | EMSD                            |                            | MAY 29, 2018  | B. MIZE  | MAY 29, 2018 |  |
| DO NOT SCALE DRAWING   | SCALE                           | TOLERANCES EXCEPT AS NOTED |  © 3M COPYRIGHT 2018<br>This document and the information it contains are 3M property and may not be reproduced or further distributed without 3M permission, or used or disclosed other than for 3M authorized purposes. All rights reserved. |  |              |  |
| THIRD ANGLE PROJECTION | INTERPRET PER ASME Y14.5 - 2009 | MILLIMETERS                | TITLE<br>ROUND, SHIELDED / JACKETED, FLAT, CABLE, .050", HF659  |  |              |  |
| MAX SURFACE ROUGHNESS  | MARKED ONLY                     | 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 |

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



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.