

# 3M™ Round, Shielded/Jacketed, Flat Cable

.050" 28 AWG Stranded, Mass-Term, Halogen Free PO/PO

HF659 Series



- 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
- Broad operating temperature range from -40°C to 105°C
- Round construction permits easier routing
- 28 AWG wire on .050 inch centers permits mass termination to broad line of IDC connectors
- Continuous split/bond repeat allows for mass termination of IDC connectors
- Dual shielding provides 35 db average shielding
- Primary cable is zippable for branching or discrete terminations
- See the Regulatory Information Appendix (RIA) in the "RoHS compliance" section of [www.3Mconnector.com](http://www.3Mconnector.com) for compliance information (RIA E1 & C1 apply)

Date Modified: December 3, 2010

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## 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 × 36 AWG [ 7 × Ø 0.127 ] Tinned Stranded Copper

Shielding: 0.001 [0.03] Thick Aluminum/Polyester Film Foil and 90% Coverage Tinned Copper Braid

## Electrical

**Voltage Rating:** USA: 150V      Canada: 150V      EU: <50V

**Insulation Resistance:** (Primary Cable) > 1 × 10<sup>10</sup> Ω/10 ft. [ 3 m ]

| <b>Characteristic Impedance:</b> | <b>Unbalanced</b> | <b>Balanced</b> |
|----------------------------------|-------------------|-----------------|
|                                  | 54 Ω              | 107 Ω           |

|                     |                          |                          |
|---------------------|--------------------------|--------------------------|
| <b>Capacitance:</b> | 28.7 pF/ft [ 84.2 pF/m ] | 14.4 pF/ft [ 47.2 pF/m ] |
|---------------------|--------------------------|--------------------------|

|                    |                          |                          |
|--------------------|--------------------------|--------------------------|
| <b>Inductance:</b> | 0.08 μH/ft [ 0.27 μH/m ] | 0.16 μH/ft [ 0.52 μH/m ] |
|--------------------|--------------------------|--------------------------|

|                           |                          |                          |
|---------------------------|--------------------------|--------------------------|
| <b>Propagation Delay:</b> | 1.55 ns/ft [ 4.95 ns/m ] | 1.54 ns/ft [ 4.95 ns/m ] |
|---------------------------|--------------------------|--------------------------|

|                                 |     |     |
|---------------------------------|-----|-----|
| <b>Velocity of Propagation:</b> | 66% | 66% |
|---------------------------------|-----|-----|

Note: Unbalanced is measured between ground-signal-ground conductors. Balanced is measured between signal conductors within a pair.

## Environmental

**Temperature Rating:** -40°C to +105°C

**Flammability Rating:** USA: VW-1

Canada: FT-1

UL File No.: E42769, Style No.: 21683

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 900 ppm bromine, less than 900 ppm 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 standard. 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.

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HF659 Series

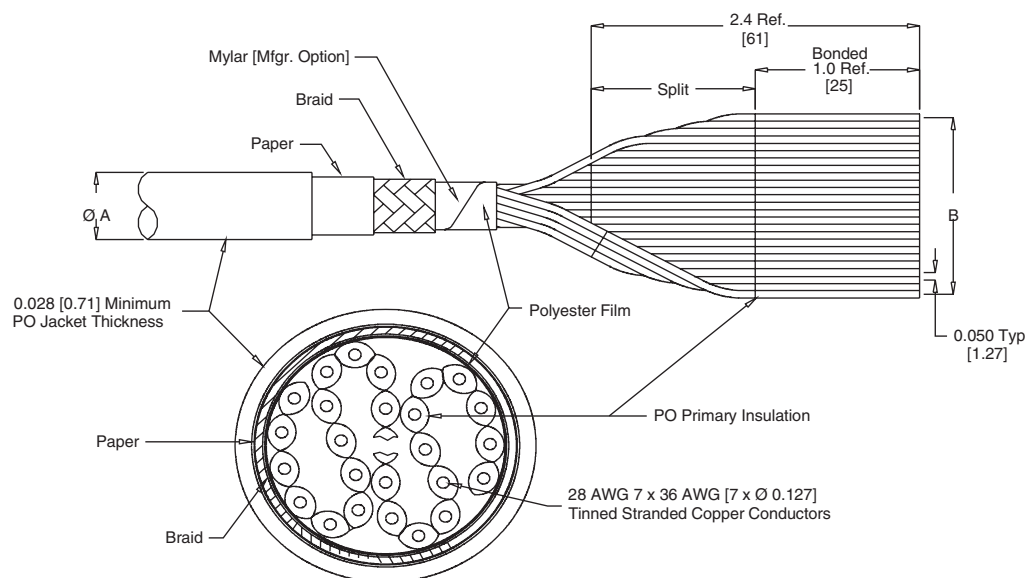


Inch  
[mm]

| Tolerance Unless Noted |     |      |       |
|------------------------|-----|------|-------|
|                        | .0  | .00  | .000  |
| Inch                   | ±.1 | ±.05 | ±.010 |

[ ] Dimensions for Reference Only

| Number of Conductors | 3M Part Number | Dimension A<br>± .03" | Dimension B<br>(See Note 2) |
|----------------------|----------------|-----------------------|-----------------------------|
| 09                   | HF659/09       | 0.27 [ 6.9 ]          | 0.40 [ 10.2 ]               |
| 10                   | HF659/10       | 0.27 [ 6.9 ]          | 0.45 [ 11.4 ]               |
| 14                   | HF659/14       | 0.31 [ 7.9 ]          | 0.65 [ 16.5 ]               |
| 15                   | HF659/15       | 0.31 [ 7.9 ]          | 0.70 [ 17.8 ]               |
| 16                   | HF659/16       | 0.31 [ 7.9 ]          | 0.75 [ 19.1 ]               |
| 20                   | HF659/20       | 0.34 [ 8.6 ]          | 0.95 [ 24.1 ]               |
| 24                   | HF659/24       | 0.37 [ 9.4 ]          | 1.15 [ 29.2 ]               |
| 25                   | HF659/25       | 0.37 [ 9.4 ]          | 1.20 [ 30.5 ]               |
| 26                   | HF659/26       | 0.37 [ 9.4 ]          | 1.25 [ 31.8 ]               |
| 34                   | HF659/34       | 0.41 [ 10.4 ]         | 1.65 [ 41.9 ]               |
| 36                   | HF659/36       | 0.43 [ 10.9 ]         | 1.75 [ 44.5 ]               |
| 37                   | HF659/37       | 0.43 [ 10.9 ]         | 1.80 [ 45.7 ]               |
| 40                   | HF659/40       | 0.43 [ 10.9 ]         | 1.95 [ 49.5 ]               |
| 50                   | HF659/50       | 0.48 [ 12.2 ]         | 2.45 [ 62.2 ]               |
| 60                   | HF659/60       | 0.51 [ 13.0 ]         | 2.95 [ 74.9 ]               |
| 64                   | HF659/64       | 0.54 [ 13.7 ]         | 3.15 [ 80.0 ]               |



#### Notes:

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** (RIA E1 & C1 apply)

Number of Conductors  
(See Table)

Blank = Standard  
S0 = Continuously Bonded Wire  
(No Split)

Blank = Standard  
SF = Splice Free

Note: Available in standard 275 ft. rolls. Contact 3M for availability of additional conductor counts and/or custom roll lengths.

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RIA-2217B-E

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