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**PACKAGE DIMENSIONS**

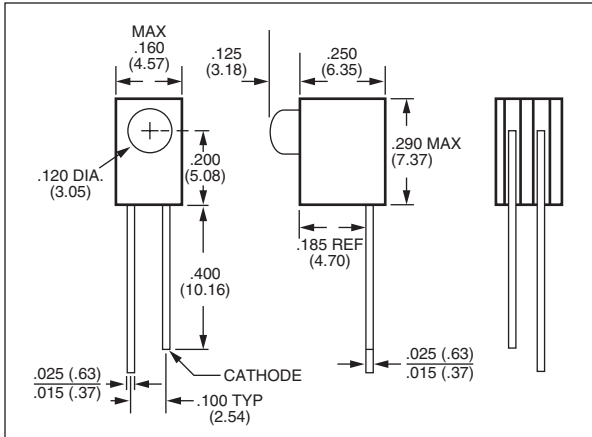


Fig. - 4A

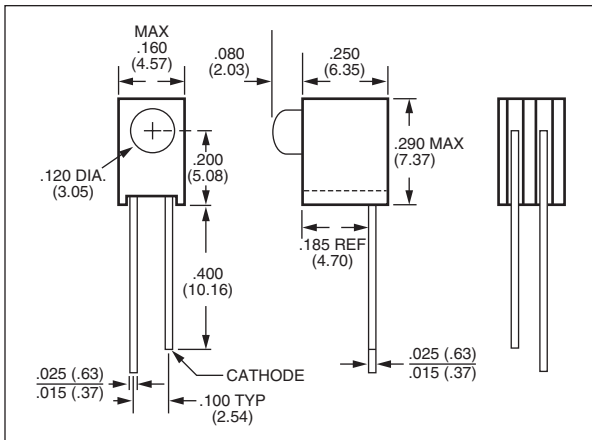


Fig. - 4B

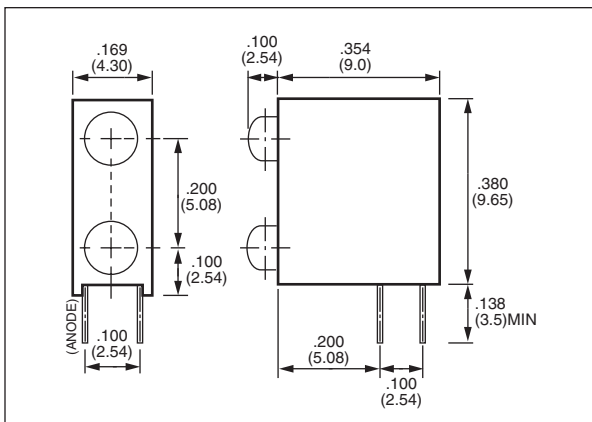


Fig. - 4C

**Description**

For right-angle and vertical viewing, the QT Optoelectronics LED circuit board indicators come in T-3/4, T-1 and T-1 3/4 lamp sizes, and in single, dual and multiple packages. The indicators are available in AlGaAs red, high-efficiency red, bright red, green, yellow, and bi-color at standard drive currents, as well as at 2 mA drive current. To reduce component cost and save space, 5V and 12V types are available with integrated resistors. The LEDs are packaged in a black plastic housing for optical contrast, and the housing meets UL94V-O Flammability specifications.

| T-1 (3mm)         |             |                |     |      |      |           |
|-------------------|-------------|----------------|-----|------|------|-----------|
| Part Number       | Color       | View Angle (°) | VF  | mcd  | @ mA | PKG. FIG. |
| MV5064.MP4A       | RED         | 60             | 1.6 | 1.5  | 20   | 4A        |
| MV5364.MP4A       | YELLOW      | 60             | 2.1 | 2.0  | 10   | 4A        |
| MV5464.MP4A       | GREEN       | 60             | 2.2 | 5.0  | 20   | 4A        |
| MV5764.MP4A       | H-E RED     | 60             | 2.0 | 2.0  | 10   | 4A        |
| MV5064.MP4B       | RED         | 60             | 1.6 | 1.5  | 20   | 4B        |
| MV5364.MP4B       | YELLOW      | 60             | 2.1 | 2.0  | 10   | 4B        |
| MV5464.MP4B       | GREEN       | 60             | 2.2 | 5.0  | 20   | 4B        |
| MV5764.MP4B       | H-E RED     | 60             | 2.0 | 2.0  | 10   | 4B        |
| LOW CURRENT (2mA) |             |                |     |      |      |           |
| HLMP-1700.MP4A    | H-E RED     | 50             | 1.8 | 2.0  | 2    | 4A        |
| HLMP-1719.MP4A    | YELLOW      | 50             | 1.9 | 2.0  | 2    | 4A        |
| HLMP-1790.MP4A    | GREEN       | 50             | 1.9 | 2.0  | 2    | 4A        |
| HLMP-1700.MP4B    | H-E RED     | 50             | 1.8 | 2.0  | 2    | 4B        |
| HLMP-1719.MP4B    | YELLOW      | 50             | 1.9 | 2.0  | 2    | 4B        |
| HLMP-1790.MP4B    | GREEN       | 50             | 1.9 | 2.0  | 2    | 4B        |
| AlGaAs RED        |             |                |     |      |      |           |
| HLMP-K101.MP4A    | AlGaAs RED  | 60             | 1.8 | 45.0 | 20   | 4A        |
| HLMP-K105.MP4A    | AlGaAs RED* | 35             | 1.8 | 65.0 | 20   | 4A        |
| HLMP-K150.MP4A    | AlGaAs RED  | 60             | 1.6 | 2.0  | 1    | 4A        |
| HLMP-K155.MP4A    | AlGaAs RED* | 45             | 1.6 | 3.0  | 1    | 4A        |
| HLMP-K101.MP4B    | AlGaAs RED  | 60             | 1.8 | 45.0 | 20   | 4B        |
| HLMP-K105.MP4B    | AlGaAs RED* | 35             | 1.8 | 65.0 | 20   | 4B        |
| HLMP-K150.MP4B    | AlGaAs RED  | 60             | 1.6 | 2.0  | 1    | 4B        |
| HLMP-K155.MP4B    | AlGaAs RED* | 45             | 1.6 | 3.0  | 1    | 4B        |

| T-1 (3mm) bilevel |                 |                |     |     |      |           |
|-------------------|-----------------|----------------|-----|-----|------|-----------|
| Part Number       | Color           | View Angle (°) | VF  | mcd | @ mA | PKG. FIG. |
| QLA694B-2H        | B. RED/B. RED   | 140            | 2.1 | 1.4 | 10   | 4C        |
| QLA694B-2I        | H-E RED/H-E RED | 140            | 2.0 | 6.0 | 10   | 4C        |
| QLA694B-2G        | GRN/GRN         | 140            | 2.1 | 6.0 | 10   | 4C        |
| QLA694B-2Y        | YEL/YEL         | 140            | 2.0 | 6.0 | 10   | 4C        |
| QLA694B-HG        | B. RED/GRN      | 140            | 2.1 | 1.4 | 10   | 4C        |
| QLA694B-GY        | GRN/YEL         | 140            | 2.1 | 6.0 | 10   | 4C        |

First color indicated is on top, and the second color is on the bottom.  
For example: QLA694B-GY has GRN(top)/YEL(bottom).

**General Notes:**

1. All dimensions are in inches (mm).
2. Tolerance is  $\pm 0.15$  ( $\pm .38$ ) unless otherwise specified.
3. All electrical values are typical.
4. All parts have colored *diffused* lens except those with an asterisk (\*), which denotes colored *clear* lens.
5. Custom color combinations are available.

**PACKAGE DIMENSIONS**

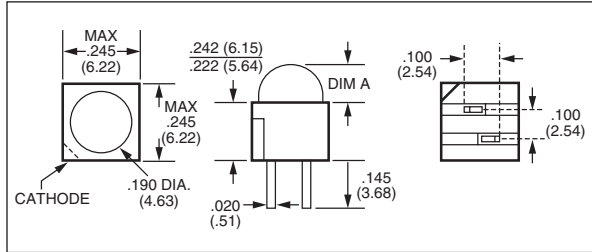


Fig. - 5

| T-1 3/4 (5mm)            |            |                |     |       |      |       |        |           |
|--------------------------|------------|----------------|-----|-------|------|-------|--------|-----------|
| Part Number              | Color      | View Angle (°) | VF  | mcd   | @ mA | DIM A |        | PKG. FIG. |
|                          |            |                |     |       |      | in.   | (mm)   |           |
| MV60538.MP5              | RED        | 65             | 1.7 | 2.0   | 20   | .125  | (3.18) | 5         |
| MV63538.MP5              | YLW        | 65             | 2.1 | 18.0  | 20   | .125  | (3.18) | 5         |
| MV64538.MP5              | GRN        | 65             | 2.2 | 26.0  | 20   | .125  | (3.18) | 5         |
| MV67538.MP5              | H-E RED    | 65             | 2.1 | 14.0  | 20   | .125  | (3.18) | 5         |
| MV60539.MP5              | RED        | 65             | 1.7 | 3.2   | 20   | .180  | (4.57) | 5         |
| MV63539.MP5              | YLW        | 65             | 2.1 | 20.0  | 20   | .180  | (4.57) | 5         |
| MV64539.MP5              | GRN        | 65             | 2.2 | 28.0  | 20   | .180  | (4.57) | 5         |
| MV67539.MP5              | H-E RED    | 65             | 2.1 | 15.0  | 20   | .180  | (4.57) | 5         |
| <b>LOW CURRENT (2mA)</b> |            |                |     |       |      |       |        |           |
| HLMP-47009.MP5           | H-E RED    | 45             | 1.8 | 2.0   | 2    | .180  | (4.57) | 5         |
| HLMP-47199.MP5           | YLW        | 45             | 1.9 | 2.0   | 2    | .180  | (4.57) | 5         |
| HLMP-47409.MP5           | GRN        | 45             | 1.9 | 3.0   | 2    | .180  | (4.57) | 5         |
| <b>AlGaAs RED</b>        |            |                |     |       |      |       |        |           |
| HLMP-D1019.MP5           | AlGaAs RED | 65             | 1.8 | 70.0  | 20   | .180  | (4.57) | 5         |
| HLMP-D1509.MP5           | AlGaAs RED | 24             | 1.6 | 3.0   | 1    | .180  | (4.57) | 5         |
| <b>ULTRA BRIGHT</b>      |            |                |     |       |      |       |        |           |
| MV33509.MP5              | YLW*       | 24             | 2.2 | 150.0 | 20   | .180  | (4.57) | 5         |
| MV34509.MP5              | GRN*       | 24             | 2.2 | 150.0 | 20   | .180  | (4.57) | 5         |
| MV37509.MP5              | H-E RED*   | 24             | 2.2 | 150.0 | 20   | .180  | (4.57) | 5         |
| <b>BICOLOR**</b>         |            |                |     |       |      |       |        |           |
| MV54919.MP5              | RED/GRN    | 100            | 2.3 | 6.0   | 20   | .180  | (4.57) | 5         |

General Notes:

1. All dimensions are in inches (mm).
2. Tolerance is  $\pm 0.15$  ( $\pm .38$ ) unless otherwise specified.
3. All electrical values are typical.
4. All parts have colored *diffused* lens except those with an asterisk (\*), which denotes colored *clear* lens.
5. A double asterisk (\*\*) denotes that the cathode, as indicated, is the red cathode for the RED/GRN bicolor LED.
6. Custom color combinations are available.



**PACKAGE DIMENSIONS**

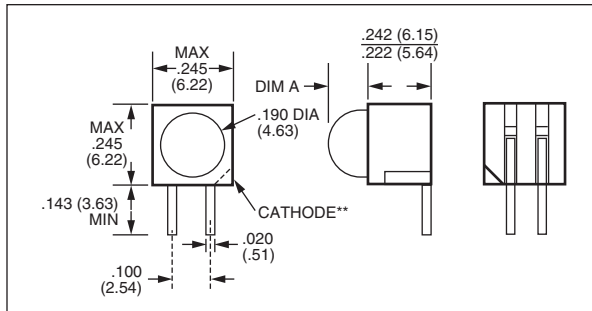


Fig. - 6

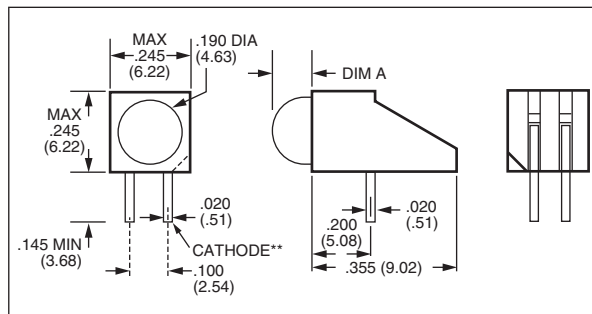


Fig. - 7

| T-1 3/4 (5mm)            |            |                |     |       |      |       |        |           |
|--------------------------|------------|----------------|-----|-------|------|-------|--------|-----------|
| Part Number              | Color      | View Angle (°) | VF  | mcd   | @ mA | DIM A |        | PKG. FIG. |
|                          |            |                |     |       |      | in.   | (mm)   |           |
| MV60538.MP6              | RED        | 65             | 1.7 | 2.0   | 20   | .125  | (3.18) | 6         |
| MV63538.MP6              | YLW        | 65             | 2.1 | 18.0  | 20   | .125  | (3.18) | 6         |
| MV64538.MP6              | GRN        | 65             | 2.2 | 26.0  | 20   | .125  | (3.18) | 6         |
| MV67538.MP6              | H-E RED    | 65             | 2.1 | 14.0  | 20   | .125  | (3.18) | 6         |
| MV60539.MP6              | RED        | 65             | 1.7 | 3.2   | 20   | .180  | (4.57) | 6         |
| MV63539.MP6              | YLW        | 65             | 2.1 | 20.0  | 20   | .180  | (4.57) | 6         |
| MV64539.MP6              | GRN        | 65             | 2.2 | 28.0  | 20   | .180  | (4.57) | 6         |
| MV67539.MP6              | H-E RED    | 65             | 2.1 | 15.0  | 20   | .180  | (4.57) | 6         |
| <b>LOW CURRENT (2mA)</b> |            |                |     |       |      |       |        |           |
| HLMP-47009.MP6           | H-E RED    | 45             | 1.8 | 2.0   | 2    | .180  | (4.57) | 6         |
| HLMP-47199.MP6           | YLW        | 45             | 1.9 | 2.0   | 2    | .180  | (4.57) | 6         |
| HLMP-47409.MP6           | GRN        | 45             | 1.9 | 3.0   | 2    | .180  | (4.57) | 6         |
| <b>AlGaAs RED</b>        |            |                |     |       |      |       |        |           |
| HLMP-D1019.MP6           | AlGaAs RED | 65             | 1.8 | 70.0  | 20   | .180  | (4.57) | 6         |
| HLMP-D1509.MP6           | AlGaAs RED | 24             | 1.6 | 3.0   | 1    | .180  | (4.57) | 6         |
| <b>ULTRA BRIGHT</b>      |            |                |     |       |      |       |        |           |
| MV33509.MP6              | YLW*       | 24             | 2.2 | 150.0 | 20   | .180  | (4.57) | 6         |
| MV34509.MP6              | GRN*       | 24             | 2.2 | 150.0 | 20   | .180  | (4.57) | 6         |
| MV37509.MP6              | H-E RED*   | 24             | 2.2 | 150.0 | 20   | .180  | (4.57) | 6         |
| <b>BICOLOR**</b>         |            |                |     |       |      |       |        |           |
| MV54919.MP6              | RED/GRN    | 100            | 2.3 | 6.0   | 20   | .180  | (4.57) | 6         |

| T-1 3/4 (5mm)            |            |                |     |       |      |       |        |           |
|--------------------------|------------|----------------|-----|-------|------|-------|--------|-----------|
| Part Number              | Color      | View Angle (°) | VF  | mcd   | @ mA | DIM A |        | PKG. FIG. |
|                          |            |                |     |       |      | in.   | (mm)   |           |
| MV60538.MP7              | RED        | 65             | 1.7 | 2.0   | 20   | .125  | (3.18) | 7         |
| MV63538.MP7              | YLW        | 65             | 2.1 | 18.0  | 20   | .125  | (3.18) | 7         |
| MV64538.MP7              | GRN        | 65             | 2.2 | 26.0  | 20   | .125  | (3.18) | 7         |
| MV67538.MP7              | H-E RED    | 65             | 2.1 | 14.0  | 20   | .125  | (3.18) | 7         |
| MV60539.MP7              | RED        | 65             | 1.7 | 3.2   | 20   | .183  | (4.65) | 7         |
| MV63539.MP7              | YLW        | 65             | 2.1 | 20.0  | 20   | .183  | (4.65) | 7         |
| MV64539.MP7              | GRN        | 65             | 2.2 | 28.0  | 20   | .183  | (4.65) | 7         |
| MV67539.MP7              | H-E RED    | 65             | 2.1 | 15.0  | 20   | .183  | (4.65) | 7         |
| <b>LOW CURRENT (2mA)</b> |            |                |     |       |      |       |        |           |
| HLMP-47009.MP7           | H-E RED    | 45             | 1.8 | 2.0   | 2    | .183  | (4.65) | 7         |
| HLMP-47199.MP7           | YLW        | 45             | 1.9 | 2.0   | 2    | .183  | (4.65) | 7         |
| HLMP-47409.MP7           | GRN        | 45             | 1.9 | 3.0   | 2    | .183  | (4.65) | 7         |
| <b>AlGaAs RED</b>        |            |                |     |       |      |       |        |           |
| HLMP-D1019.MP7           | AlGaAs RED | 65             | 1.8 | 70.0  | 20   | .183  | (4.65) | 7         |
| HLMP-D1509.MP7           | AlGaAs RED | 24             | 1.6 | 3.0   | 1    | .183  | (4.65) | 7         |
| <b>ULTRA BRIGHT</b>      |            |                |     |       |      |       |        |           |
| MV33509.MP7              | YLW*       | 24             | 2.2 | 150.0 | 20   | .183  | (4.65) | 7         |
| MV34509.MP7              | GRN*       | 24             | 2.2 | 150.0 | 20   | .183  | (4.65) | 7         |
| MV37509.MP7              | H-E RED*   | 24             | 2.2 | 150.0 | 20   | .183  | (4.65) | 7         |
| <b>BICOLOR**</b>         |            |                |     |       |      |       |        |           |
| MV54919.MP7              | RED/GRN    | 100            | 2.3 | 6.0   | 20   | .183  | (4.65) | 7         |

General Notes:

1. All dimensions are in inches (mm).
2. Tolerance is  $\pm 0.15$  ( $\pm .38$ ) unless otherwise specified.
3. All electrical values are typical.
4. All parts have colored *diffused* lens except those with an asterisk (\*), which denotes colored *clear* lens.
5. A double asterisk (\*\*) denotes that the cathode, as indicated, is the red cathode for the RED/GRN bicolor LED.
6. Custom color combinations are available.

## PACKAGE DIMENSIONS

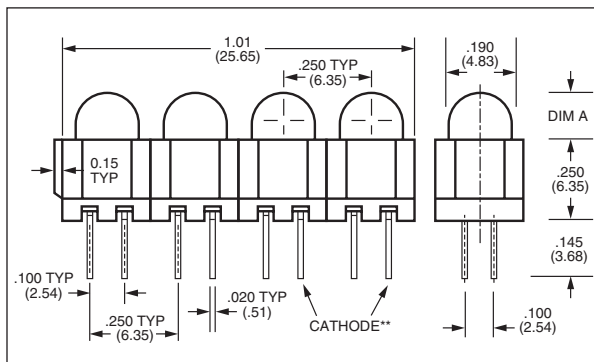


Fig. - 8

**Specific Notes:**

For T-1 3/4 (5mm) multiple, multiples of four is the standard configuration.  
Options — To obtain units in multiples of two add a "-2" suffix to the part number (i.e. MV64539.MP8-2). To obtain units in multiples of three add a "-3" suffix.

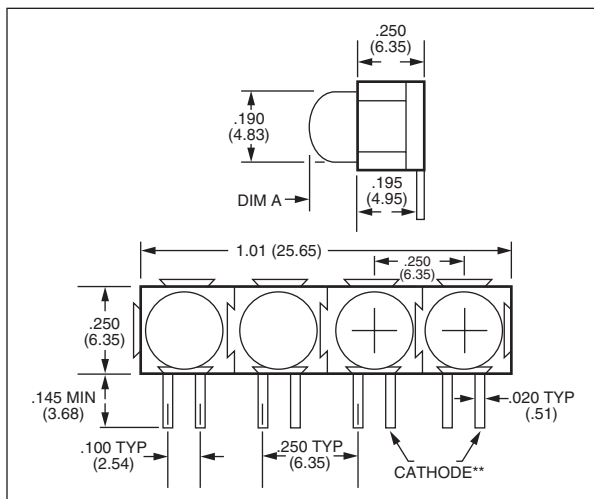


Fig. - 8A

| T-1 3/4 (5mm) multiple |          |                |     |       |      |       |        |           |
|------------------------|----------|----------------|-----|-------|------|-------|--------|-----------|
| Part Number            | Color    | View Angle (°) | VF  | mcd   | @ mA | DIM A |        | PKG. FIG. |
|                        |          |                |     |       |      | in.   | (mm)   |           |
| MV60538.MP8            | RED      | 65             | 1.7 | 2.0   | 20   | .140  | (3.56) | 8         |
| MV63538.MP8            | YLW      | 65             | 2.1 | 18.0  | 20   | .140  | (3.56) | 8         |
| MV64538.MP8            | GRN      | 65             | 2.2 | 26.0  | 20   | .140  | (3.56) | 8         |
| MV67538.MP8            | H-E RED  | 65             | 2.1 | 14.0  | 20   | .140  | (3.56) | 8         |
| MV60539.MP8            | RED      | 65             | 1.7 | 3.2   | 20   | .195  | (4.95) | 8         |
| MV63539.MP8            | YLW      | 65             | 2.1 | 20.0  | 20   | .195  | (4.95) | 8         |
| MV64539.MP8            | GRN      | 65             | 2.2 | 28.0  | 20   | .195  | (4.95) | 8         |
| MV67539.MP8            | H-E RED  | 65             | 2.1 | 15.0  | 20   | .195  | (4.95) | 8         |
| LOW CURRENT (2mA)      |          |                |     |       |      |       |        |           |
| HLMP-47009.MP8         | H-E RED  | 45             | 1.8 | 2.0   | 2    | .195  | (4.95) | 8         |
| HLMP-47199.MP8         | YLW      | 45             | 1.9 | 2.0   | 2    | .195  | (4.95) | 8         |
| HLMP-47409.MP8         | GRN      | 45             | 1.9 | 3.0   | 2    | .195  | (4.95) | 8         |
| ULTRA BRIGHT           |          |                |     |       |      |       |        |           |
| MV33509.MP8            | YLW*     | 24             | 2.2 | 150.0 | 20   | .195  | (4.95) | 8         |
| MV34509.MP8            | GRN*     | 24             | 2.2 | 150.0 | 20   | .195  | (4.95) | 8         |
| MV37509.MP8            | H-E RED* | 24             | 2.2 | 150.0 | 20   | .195  | (4.95) | 8         |
| BICOLOR**              |          |                |     |       |      |       |        |           |
| MV54919.MP8            | RED/GRN  | 100            | 2.3 | 6.0   | 20   | .195  | (4.95) | 8         |

**Specific Notes:**

For T-1 3/4 (5mm) multiple, multiples of four is the standard configuration.  
Options — To obtain units in multiples of two add a "-2" suffix to the part number (i.e. MV64539.MP8-2). To obtain units in multiples of three add a "-3" suffix.

| T-1 3/4 (5mm) multiple |          |                |     |       |      |       |        |           |
|------------------------|----------|----------------|-----|-------|------|-------|--------|-----------|
| Part Number            | Color    | View Angle (°) | VF  | mcd   | @ mA | DIM A |        | PKG. FIG. |
|                        |          |                |     |       |      | in.   | (mm)   |           |
| MV60538.MP8A           | RED      | 65             | 1.7 | 2.0   | 20   | .140  | (3.56) | 8A        |
| MV63538.MP8A           | YLW      | 65             | 2.1 | 18.0  | 20   | .140  | (3.56) | 8A        |
| MV64538.MP8A           | GRN      | 65             | 2.2 | 26.0  | 20   | .140  | (3.56) | 8A        |
| MV67538.MP8A           | H-E RED  | 65             | 2.1 | 14.0  | 20   | .140  | (3.56) | 8A        |
| MV60539.MP8A           | RED      | 65             | 1.7 | 3.2   | 20   | .195  | (4.95) | 8A        |
| MV63539.MP8A           | YLW      | 65             | 2.1 | 20.0  | 20   | .195  | (4.95) | 8A        |
| MV64539.MP8A           | GRN      | 65             | 2.2 | 28.0  | 20   | .195  | (4.95) | 8A        |
| MV67539.MP8A           | H-E RED  | 65             | 2.1 | 15.0  | 20   | .195  | (4.95) | 8A        |
| LOW CURRENT (2mA)      |          |                |     |       |      |       |        |           |
| HLMP-47009.MP8A        | H-E RED  | 45             | 1.8 | 2.0   | 2    | .195  | (4.95) | 8A        |
| HLMP-47199.MP8A        | YLW      | 45             | 1.9 | 2.0   | 2    | .195  | (4.95) | 8A        |
| HLMP-47409.MP8A        | GRN      | 45             | 1.9 | 3.0   | 2    | .195  | (4.95) | 8A        |
| ULTRA BRIGHT           |          |                |     |       |      |       |        |           |
| MV33509.MP8A           | YLW*     | 24             | 2.2 | 150.0 | 20   | .195  | (4.95) | 8A        |
| MV34509.MP8A           | GRN*     | 24             | 2.2 | 150.0 | 20   | .195  | (4.95) | 8A        |
| MV37509.MP8A           | H-E RED* | 24             | 2.2 | 150.0 | 20   | .195  | (4.95) | 8A        |
| BICOLOR**              |          |                |     |       |      |       |        |           |
| MV54919.MP8A           | RED/GRN  | 100            | 2.3 | 6.0   | 20   | .195  | (4.95) | 8A        |

**General Notes:**

- All dimensions are in inches (mm).
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- All electrical values are typical.
- All parts have colored *diffused* lens except those with an asterisk (\*), which denotes colored *clear* lens.
- A double asterisk (\*\*) denotes that the cathode, as indicated, is the red cathode for the RED/GRN bicolor LED.
- Custom color combinations are available.

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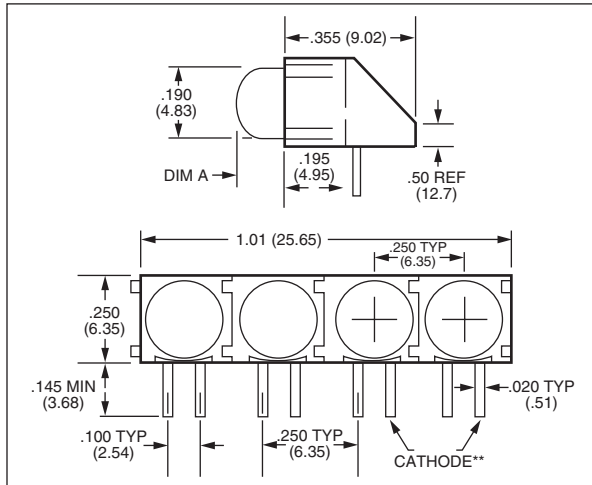


Fig. - 8B  
Specific Notes:  
For T-1 3/4 (5mm) multiple, multiples of four is the standard configuration.  
Options — To obtain units in multiples of two add a "-2" suffix to the part number (i.e. MV64539.MP8-2). To obtain units in multiples of three add a "-3" suffix.

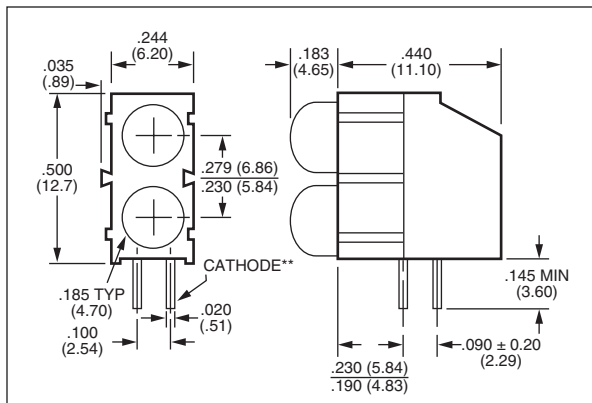


Fig. - 9  
Parts are stackable

| T-1 3/4 (5mm) multiple |          |                |     |       |      |       |        |           |
|------------------------|----------|----------------|-----|-------|------|-------|--------|-----------|
| Part Number            | Color    | View Angle (°) | VF  | mcd   | @ mA | DIM A |        | PKG. FIG. |
|                        |          |                |     |       |      | in.   | (mm)   |           |
| MV60538.MP8B           | RED      | 65             | 1.7 | 2.0   | 20   | .140  | (3.56) | 8B        |
| MV63538.MP8B           | YLW      | 65             | 2.1 | 18.0  | 20   | .140  | (3.56) | 8B        |
| MV64538.MP8B           | GRN      | 65             | 2.2 | 26.0  | 20   | .140  | (3.56) | 8B        |
| MV67538.MP8B           | H-E RED  | 65             | 2.1 | 14.0  | 20   | .140  | (3.56) | 8B        |
| MV60539.MP8B           | RED      | 65             | 1.7 | 3.2   | 20   | .195  | (4.95) | 8B        |
| MV63539.MP8B           | YLW      | 65             | 2.1 | 20.0  | 20   | .195  | (4.95) | 8B        |
| MV64539.MP8B           | GRN      | 65             | 2.2 | 28.0  | 20   | .195  | (4.95) | 8B        |
| MV67539.MP8B           | H-E RED  | 65             | 2.1 | 15.0  | 20   | .195  | (4.95) | 8B        |
| LOW CURRENT (2mA)      |          |                |     |       |      |       |        |           |
| HLMP-47009.MP8B        | H-E RED  | 45             | 1.8 | 2.0   | 2    | .195  | (4.95) | 8B        |
| HLMP-47199.MP8B        | YLW      | 45             | 1.9 | 2.0   | 2    | .195  | (4.95) | 8B        |
| HLMP-47409.MP8B        | GRN      | 45             | 1.9 | 3.0   | 2    | .195  | (4.95) | 8B        |
| ULTRA BRIGHT           |          |                |     |       |      |       |        |           |
| MV33509.MP8B           | YLW*     | 24             | 2.2 | 150.0 | 20   | .195  | (4.95) | 8B        |
| MV34509.MP8B           | GRN*     | 24             | 2.2 | 150.0 | 20   | .195  | (4.95) | 8B        |
| MV37509.MP8B           | H-E RED* | 24             | 2.2 | 150.0 | 20   | .195  | (4.95) | 8B        |
| BICOLOR**              |          |                |     |       |      |       |        |           |
| MV54919.MP8B           | RED/GRN  | 100            | 2.3 | 6.0   | 20   | .195  | (4.95) | 8B        |

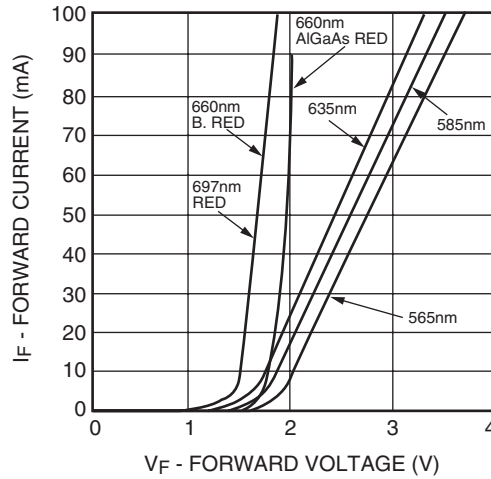
Specific Notes:  
For T-1 3/4 (5mm) multiple, multiples of four is the standard configuration.  
Options — To obtain units in multiples of two add a "-2" suffix to the part number (i.e. MV64539.MP8-2). To obtain units in multiples of three add a "-3" suffix.

| T-1 3/4 (5mm) bilevel |                  |                |     |       |      |           |
|-----------------------|------------------|----------------|-----|-------|------|-----------|
| Part Number           | Color            | View Angle (°) | VF  | mcd   | @ mA | PKG. FIG. |
| MV60539.MP90          | RED/RED          | 65             | 1.7 | 3.2   | 20   | 9         |
| MV63539.MP93          | YLW/YLW          | 65             | 2.1 | 20.0  | 20   | 9         |
| MV64539.MP94          | GRN/GRN          | 65             | 2.2 | 28.0  | 20   | 9         |
| MV67539.MP97          | H-E RED/H-E RED  | 65             | 2.1 | 15.0  | 20   | 9         |
| LOW CURRENT (2mA)     |                  |                |     |       |      |           |
| HLMP-47009.MP97       | H-E RED/H-E RED  | 45             | 1.8 | 2.0   | 2    | 9         |
| HLMP-47199.MP93       | YLW/YLW          | 45             | 1.9 | 2.0   | 2    | 9         |
| HLMP-47409.MP94       | GRN/GRN          | 45             | 1.9 | 3.0   | 2    | 9         |
| ULTRA BRIGHT          |                  |                |     |       |      |           |
| MV33509.MP93          | YLW/YLW *        | 24             | 2.2 | 150.0 | 20   | 9         |
| MV34509.MP94          | GRN/GRN *        | 24             | 2.2 | 150.0 | 20   | 9         |
| MV37509.MP97          | H-E RED/H-E RED* | 24             | 2.2 | 150.0 | 20   | 9         |
| BICOLOR**             |                  |                |     |       |      |           |
| MV54919.MP91          | R/G/ R/G         | 100            | 2.3 | 6.0   | 20   | 9         |

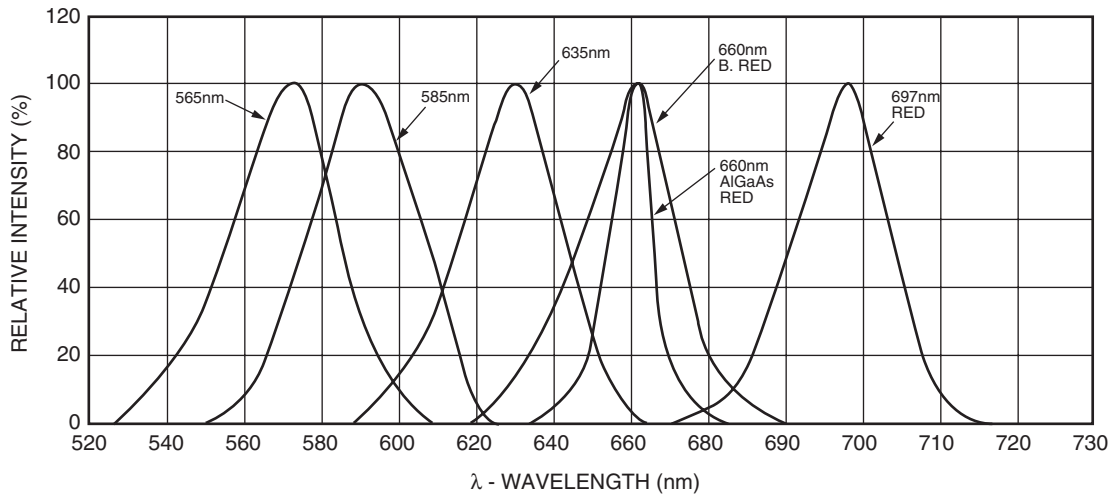
General Notes:  
1. All dimensions are in inches (mm).  
2. Tolerance is  $\pm 0.15$  ( $\pm .38$ ) unless otherwise specified.  
3. All electrical values are typical.  
4. All parts have colored *diffused* lens except those with an asterisk (\*), which denotes colored *clear* lens.  
5. A double asterisk (\*\*) denotes that the cathode, as indicated, is the red cathode for the RED/GRN bicolor LED.  
6. Custom color combinations are available.

**Typical Performance Characteristics ( $T_A = 25^\circ\text{C}$ )**

**Forward Current vs. Forward Voltage**



**Relative Intensity vs. Peak Wavelength**



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