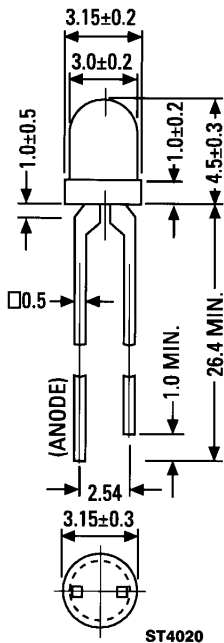


**INTEGRATED T-1 RESISTOR LAMPS**  
**5 VOLT and 12 VOLT SERIES**

**RED MR5060 TINTED/MR5660 UNTINTED**  
**HIGH EFFICIENCY RED MR5760/MR5761 TINTED**  
**YELLOW MR5360/MR5361 TINTED**  
**HIGH EFFICIENCY GREEN MR5460/MR5461 TINTED**

**PACKAGE DIMENSIONS**



NOTES:  
1. ALL DIMENSIONS ARE IN MM.  
2. LEAD SPACING IS MEASURED WHERE THE LEADS EMERGE FROM THE PACKAGE.  
3. PROTRUDED RESIN UNDER THE FLANGE IS 1.5 mm (0.059\") MAX.

**DESCRIPTION**

This group of T-1 size LED lamps contain integral resistors. Operation at 5 volts (MR5X60 Part Nos.) or 12 volts (MR5X61 Part Nos.) is possible without the use of external current limiting resistors. Color tinted, diffused epoxy packages are used for all the lamps in this group; with the exception of the MR5660, which is no tint - but diffused.

**FEATURES**

- Integral Current Limiting Resistor (No external resistor required)
- TTL Compatible
- Operate with 5 Volt & 12 Volt Supplies
- All Colors - Red, HER, Yellow, Green
- Wide Viewing Angle
- Solid-State Reliability

**PHYSICAL CHARACTERISTICS**

| TYPE   | SOURCE COLOR          | LENS COLOR      |
|--------|-----------------------|-----------------|
| MR5060 | Red                   | Red Diffused    |
| MR5660 | Red                   | Clear Diffused  |
| MR5760 | High Efficiency Red   | Red Diffused    |
| MR5761 | High Efficiency Red   | Red Diffused    |
| MR5360 | Yellow                | Yellow Diffused |
| MR5361 | Yellow                | Yellow Diffused |
| MR5460 | High Efficiency Green | Green Diffused  |
| MR5461 | High Efficiency Green | Green Diffused  |

**INTEGRATED T-1 RESISTOR LAMPS**  
**5 VOLT and 12 VOLT SERIES**

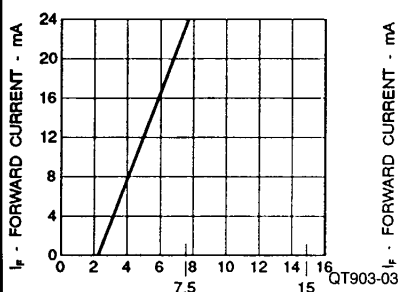
| ELECTRO-OPTICAL CHARACTERISTICS (TA = 25°C Unless Otherwise Specified) |                    |        |      |      |        |                     |      |        |      |       |        |                |      |                        |
|------------------------------------------------------------------------|--------------------|--------|------|------|--------|---------------------|------|--------|------|-------|--------|----------------|------|------------------------|
| RED                                                                    |                    |        |      |      |        | HIGH EFFICIENCY RED |      |        |      | UNITS |        | TEST CONDITION |      |                        |
| PARAMETER                                                              | SYMBOL             | MR5060 |      |      | MR5660 |                     |      | MR5760 |      |       | MR5761 |                |      |                        |
|                                                                        |                    | MIN.   | TYP. | MAX. | MIN.   | TYP.                | MAX. | MIN.   | TYP. | MAX.  | MIN.   | TYP.           | MAX. |                        |
| Luminous Intensity                                                     | I <sub>v</sub>     |        |      |      |        |                     |      |        |      |       | 1.5    | 4.0            | mcd  | V <sub>F</sub> = 12 V  |
| Luminous Intensity                                                     | I <sub>v</sub>     | 0.8    | 1.5  |      | 0.8    | 1.5                 |      | 1.5    | 4.0  |       |        |                | mcd  | V <sub>F</sub> = 5 V   |
| Total Viewing Angle                                                    | 2θ <sub>1/2</sub>  | 60     |      |      | 60     |                     |      | 60     |      |       | 60     |                | Deg  |                        |
| Peak Wavelength                                                        | λ <sub>p</sub>     | 655    |      |      | 655    |                     |      | 635    |      |       | 635    |                | nm   |                        |
| Spectral Line Halfwidth                                                | Δ λ <sub>1/2</sub> | 24     |      |      | 24     |                     |      | 40     |      |       | 40     |                | nm   |                        |
| Forward Current 12V Devices                                            | I <sub>F</sub>     |        |      |      |        |                     |      |        |      |       | 13     | 20             | mA   | V <sub>F</sub> = 12 V  |
| Forward Current 5V Devices                                             | I <sub>F</sub>     |        | 13   | 20   |        | 13                  | 20   |        | 10   | 15    |        |                | mA   | V <sub>F</sub> = 5 V   |
| Reverse Breakdown Voltage                                              | V <sub>R</sub>     | 5.0    |      |      | 5.0    |                     |      | 5.0    |      |       | 5.0    |                |      | I <sub>R</sub> = 100μA |

| ELECTRO-OPTICAL CHARACTERISTICS (TA = 25°C Unless Otherwise Specified) |                    |        |      |      |        |                       |      |        |      |       |        |                   |      |                        |
|------------------------------------------------------------------------|--------------------|--------|------|------|--------|-----------------------|------|--------|------|-------|--------|-------------------|------|------------------------|
| YELLOW                                                                 |                    |        |      |      |        | HIGH EFFICIENCY GREEN |      |        |      | UNITS |        | TEST<br>CONDITION |      |                        |
| PARAMETER                                                              | SYMBOL             | MR5360 |      |      | MR5361 |                       |      | MR5460 |      |       | MR5461 |                   |      |                        |
|                                                                        |                    | MIN.   | TYP. | MAX. | MIN.   | TYP.                  | MAX. | MIN.   | TYP. | MAX.  | MIN.   | TYP.              | MAX. |                        |
| Luminous Intensity                                                     | I <sub>v</sub>     |        |      |      | 1.5    | 4.0                   |      |        |      |       | 1.5    | 4.0               | mcd  | V <sub>F</sub> = 12 V  |
| Luminous Intensity                                                     | I <sub>v</sub>     | 1.5    | 4.0  |      |        |                       |      | 1.5    | 4.0  |       |        |                   | mcd  | V <sub>F</sub> = 5 V   |
| Total Viewing Angle                                                    | 2θ <sub>1/2</sub>  | 60     |      |      | 60     |                       |      | 60     |      |       | 60     |                   | Deg  |                        |
| Peak Wavelength                                                        | λ <sub>p</sub>     | 583    |      |      | 583    |                       |      | 565    |      |       | 565    |                   | nm   |                        |
| Spectral Line Halfwidth                                                | Δ λ <sub>1/2</sub> | 36     |      |      | 36     |                       |      | 28     |      |       | 28     |                   | nm   |                        |
| Forward Current 12V Devices                                            | I <sub>F</sub>     |        |      |      | 13     | 20                    |      |        |      |       | 13     | 20                | mA   | V <sub>F</sub> = 12 V  |
| Forward Current 5V Devices                                             | I <sub>F</sub>     |        | 10   | 15   |        |                       |      | 12     | 15   |       |        |                   | mA   | V <sub>F</sub> = 5 V   |
| Reverse Breakdown Voltage                                              | V <sub>R</sub>     | 5.0    |      |      | 5.0    |                       |      | 5.0    |      |       | 5.0    |                   |      | I <sub>R</sub> = 100μA |

| <b>ABSOLUTE MAXIMUM RATINGS</b> (TA = 25°C Unless Otherwise Specified) |                                |                                 |                       |                        |
|------------------------------------------------------------------------|--------------------------------|---------------------------------|-----------------------|------------------------|
|                                                                        | RED/HER/YELLOW<br>5 VOLT LAMPS | RED/HER/YELLOW<br>12 VOLT LAMPS | GREEN<br>5 VOLT LAMPS | GREEN<br>12 VOLT LAMPS |
| DC Forward Voltage (T <sub>A</sub> = 25°C)                             | 7.5 Volts                      | 15 Volts                        | 7.5 Volts             | 15 Volts               |
| Reverse Voltage (I <sub>R</sub> = 100 μA)                              | 5 Volts                        | 5 Volts                         | 5 Volts               | 5 Volts                |
| Operating Temperature Range                                            | -40°C to +85°C                 | -40°C to +85°C                  | -20°C to +85°C        | -20°C to +85°C         |
| Storage Temperature Range                                              | -55°C to +100°C                | -55°C to +100°C                 | -55°C to +100°C       | -55°C to +100°C        |
| Lead Soldering Temperature                                             | 260°C for 5 seconds            |                                 |                       |                        |

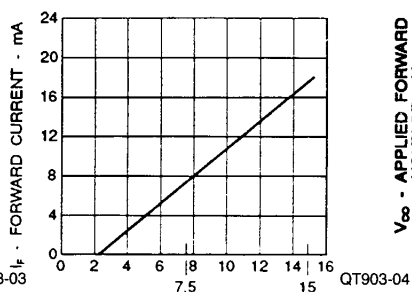
**TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES**

(TA = 25°C Unless Otherwise Specified)



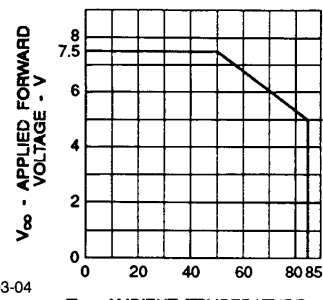
V<sub>cc</sub> - APPLIED FORWARD VOLTAGE - V

Fig. 1. Forward Current vs. Applied Forward Voltage 5 Volt Devices



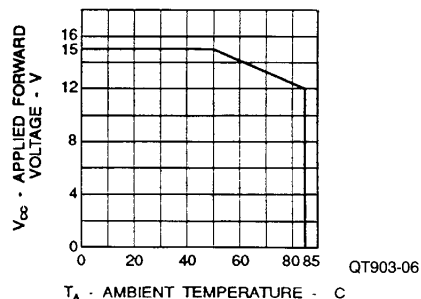
V<sub>cc</sub> - APPLIED FORWARD VOLTAGE - V

Fig. 2. Forward Current vs. Applied Forward Voltage 12 Volt Devices



T<sub>A</sub> - AMBIENT TEMPERATURE - °C

Fig. 3. Maximum Allowed Applied Forward Voltage vs. Ambient Temperature  
R<sub>θJA</sub> = 175°C/W 5 Volt Devices



T<sub>A</sub> - AMBIENT TEMPERATURE - °C

Fig. 4. Maximum Allowed Applied Forward Voltage vs. Ambient Temperature  
R<sub>θJA</sub> = 175°C/W 12 Volt Devices

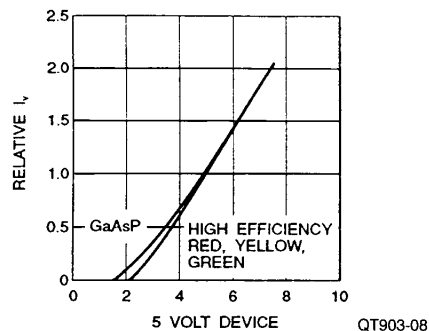
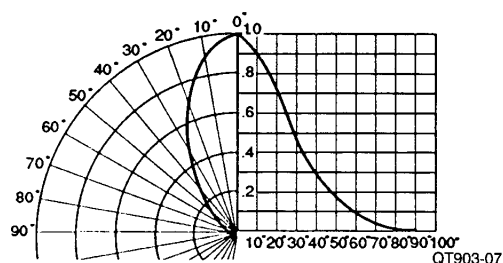


Fig. 6. Relative Luminous Intensity vs. Applied Forward Voltage 5 Volt Devices

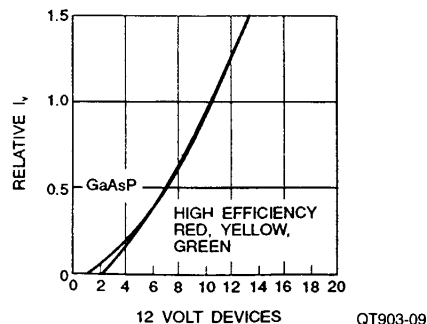


Fig. 7. Relative Luminous Intensity vs. Applied Forward Voltage 12 Volt Devices



## INTEGRATED T-1 REISTOR LAMPS 5 VOLT and 12 VOLT SERIES

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