

## Dot Point LED Lamps

LTL-709P Bright Red

LTL-709E High Efficiency Red

LTL-709L STD. Green

LTL-709Y Yellow

### Features

- Low power consumption.
- General purpose leads.
- I.C. compatible/low current requirements.
- Reliable and rugged.

### Description

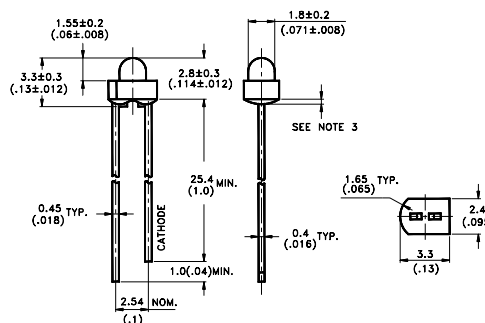
The Bright Red source color devices are made with Gallium Phosphide on Gallium Phosphide Red Light Emitting diode.

The High Efficiency Red source color devices are made with Gallium Arsenide Phosphide on Gallium Phosphide Orange Light Emitting Diode.

The STD. Green source color devices are made with Gallium Phosphide on Gallium Phosphide Green Light Emitting Diode.

The Yellow source color devices are made with Gallium Arsenide Phosphide on Gallium Phosphide Yellow Light Emitting Diode.

### Package Dimensions



#### Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is  $\pm 0.25\text{mm}$  (.010") unless otherwise noted.
3. Protruded resin under flange is 1.0mm (.04") max.
4. Lead spacing is measured where the leads emerge from the package.
5. Specifications are subject to change without notice.

### Devices

| Part No.<br>LTL- | Lens            | Source Color |
|------------------|-----------------|--------------|
| 709P             | Red Diffused    | Bright Red   |
| 709E             | Red Diffused    | Hi. Eff. Red |
| 709L             | Green Diffused  | STD. Green   |
| 709Y             | Yellow Diffused | Yellow       |

### Absolute Maximum Ratings at Ta=25°C

| Parameter  | Bright Red          | STD. Green | Yellow | Hi. Eff. Red | Unit  |
|--|---------------------|------------|--------|--------------|-------|
| Power Dissipation  | 40                  | 100        | 60     | 100          | mW    |
| Peak Forward Current<br>(1/10 Duty Cycle, 0.1ms Pulse Width) | 60                  | 120        | 80     | 120          | mA    |
| Continuous Forward Current                                   | 15                  | 30         | 20     | 30           | mA    |
| Derating Linear From 50°C                                    | 0.2                 | 0.4        | 0.25   | 0.4          | mA/°C |
| Reverse Voltage  | 5                   | 5          | 5      | 5            | V     |
| Operating Temperature Range                                  | -55°C to +100°C     |            |        |              |       |
| Storage Temperature Range                                    | -55°C to +100°C     |            |        |              |       |
| Lead Soldering Temperature<br>[1.6mm (.063 in.) from body]   | 260°C for 5 Seconds |            |        |              |       |

THROUGH HOLE LAMPS

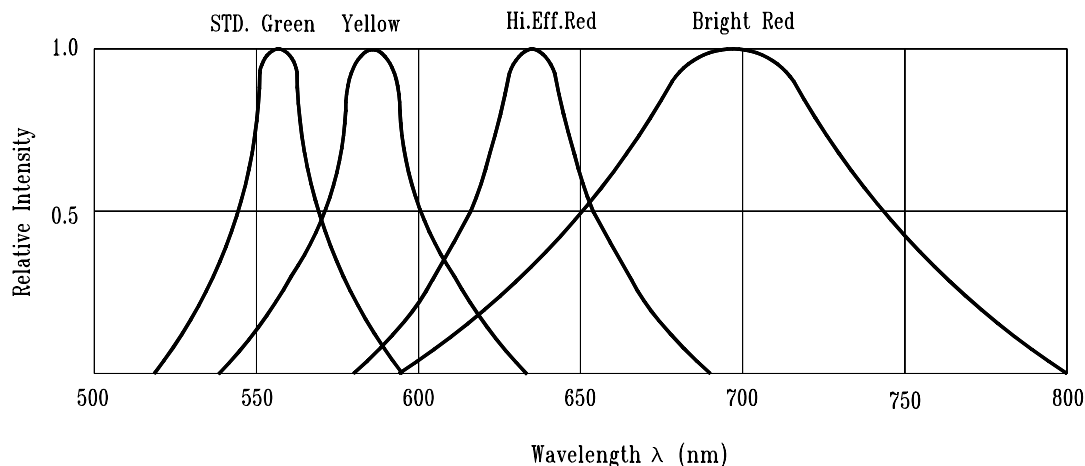
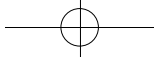
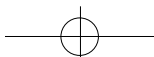


Fig.1 Relative Intensity vs. Wavelength

**Electrical/Optical Characteristics at Ta=25°C**

| Parameter                | Symbol          | Part No.<br>LTL-             | Min.                    | Typ.                       | Max.                     | Unit.          | Test Condition.                |
|--------------------------|-----------------|------------------------------|-------------------------|----------------------------|--------------------------|----------------|--------------------------------|
| Luminous Intensity       | $I_v$           | 709P<br>709E<br>709L<br>709Y | 11<br>3.7<br>2.5<br>3.7 | 3.7<br>12.6<br>8.7<br>12.6 |                          | mcd            | $I_F=10\text{ mA}$<br>Note 1,4 |
| Viewing Angle            | $2\theta_{1/2}$ | 709x                         |                         | 38                         |                          | deg            | Note 2 (Fig.7)                 |
| Peak Emission Wavelength | $\lambda_P$     | 709P<br>709E<br>709L<br>709Y |                         | 697<br>635<br>560<br>585   |                          | nm             | Measurement @Peak (Fig.1)      |
| Dominant Wavelength      | $\lambda_d$     | 709P<br>709E<br>709L<br>709Y |                         | 657<br>623<br>561<br>588   |                          | nm             | Note 3                         |
| Spectral Line Half Width | $\Delta\lambda$ | 709P<br>709E<br>709L<br>709Y |                         | 90<br>40<br>30<br>35       |                          | nm             |                                |
| Forward Voltage          | $V_F$           | 709P<br>709E<br>709L<br>709Y |                         | 2.1<br>2.0<br>2.1<br>2.1   | 2.6<br>2.6<br>2.6<br>2.6 | V              | $I_F=20\text{mA}$              |
| Reverse Current          | $I_R$           | 709x                         |                         |                            | 100                      | $\mu\text{ A}$ | $V_R=5\text{V}$                |
| Capacitance              | C               | 709P<br>709E<br>709L<br>709Y |                         | 55<br>20<br>35<br>15       |                          | pF             | $V_F=0, f=1\text{MHz}$         |

- Notes:1.Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.  
 2.  $\theta_{1/2}$  is the off-axis angle at which the luminous intensity is half the axial luminous intensity.  
 3.The dominant wavelength,  $\lambda_d$  is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.  
 4.  $I_v$  needs  $\pm 15\%$  additional for guaranteed limits.



# Typical Electrical/Optical Characteristic Curves (25°C Ambient Temperature Unless Otherwise Noted)

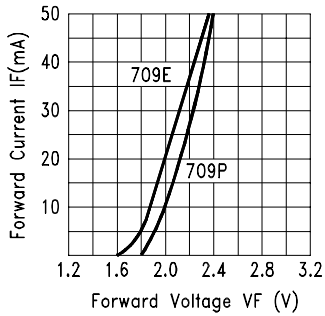


Fig.2 FORWARD CURRENT VS. FORWARD VOLTAGE

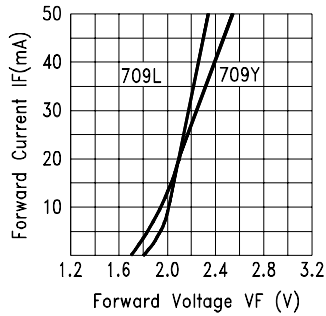


Fig.3 FORWARD CURRENT VS. FORWARD VOLTAGE

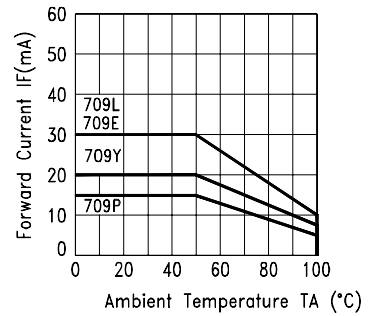


Fig.4 FORWARD CURRENT DERATING CURVE

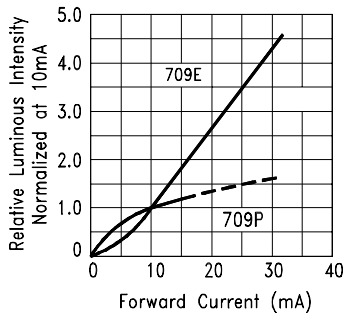


Fig.5 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

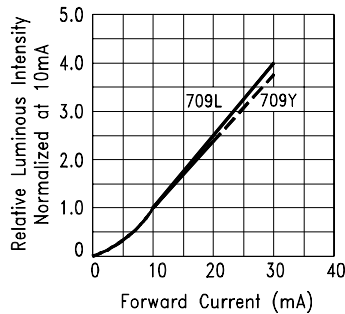


Fig.6 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

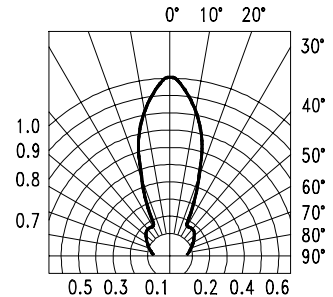


Fig.7 SPATIAL DISTRIBUTION

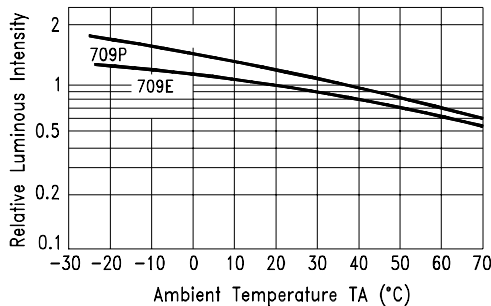


Fig.8 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

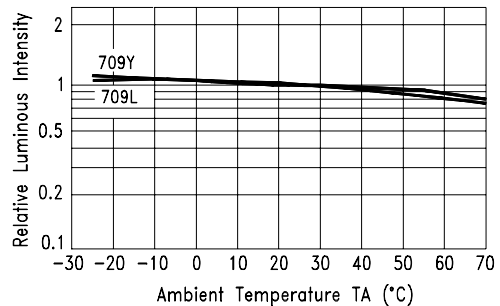


Fig.9 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE