

LITEON**T-1 3/4(5mm) SOLID STATE LAMPS**

LTL-203 RED

LTL-213 BRIGHT RED

LTL-223 HIGH EFFICIENCY RED

LTL-233 GREEN

LTL-253 YELLOW

LTL-293 ORANGE

T-41-21

FEATURES

- LOW POWER CONSUMPTION.
- HIGH EFFICIENCY.
- VERSATILE MOUNTING ON P.C. BOARD OR PANEL.
- I.C. COMPATIBLE/LOW CURRENT REQUIREMENTS.
- POPULAR T-1 3/4 DIAMETER PACKAGE.
- WIDE VIEWING ANGLE.
- GENERAL PURPOSE LEADS.
- RELIABLE AND RUGGED.

DESCRIPTION

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

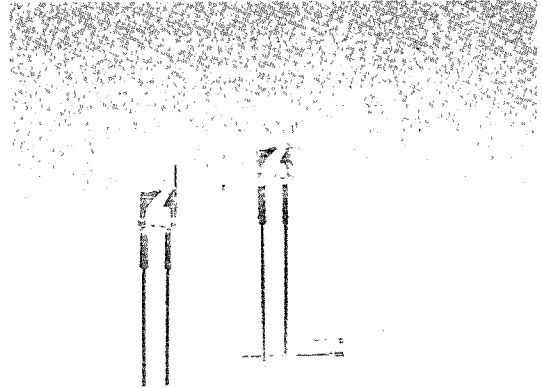
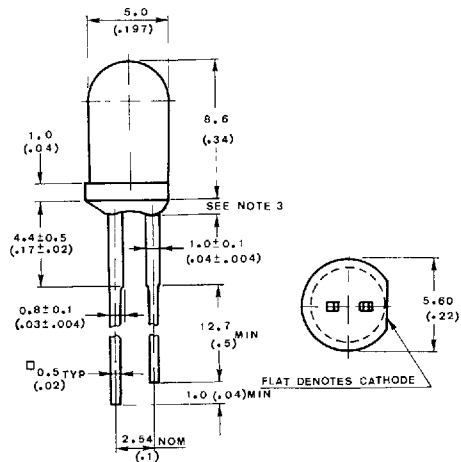
The Bright Red source color devices are made with Gallium Phosphide on Gallium Phosphide Red Light Emitting Diode.

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

DEVICES

| PART NO. LTL- | LENS | | SOURCE COLOR |
|------------------|--------|-------------------------|--------------|
| | COLOR | DIFFUSION | |
| 203 204 | Red | Diffused | Red |
| 213 | Red | Diffused | Bright Red |
| 223 224 | Red | Diffused Transparent | Hi. Eff. Red |
| 233 234 | Green | Diffused Transparent | Green |
| 253 254 | Yellow | Diffused Transparent | Yellow |
| 293 294 | Orange | Diffused Transparent | Orange |

**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 1.5mm (.059") max.
4. Lead spacing is measured where the leads emerge from the package.
5. Specifications are subject to change without notice.

ABSOLUTE MAXIMUM RATINGS AT $T_A = 25^\circ\text{C}$

| PARAMETER | RED | BRIGHT RED | GREEN | YELLOW | HI. EFF. RED ORANGE | UNIT |
|--|--|------------|-------|--------|---------------------|----------------------|
| Power Dissipation | 80 | 40 | 100 | 60 | 100 | mW |
| Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width) | 200 | 60 | 120 | 80 | 120 | mA |
| Continuous Forward Current | 40 | 15 | 30 | 20 | 30 | mA |
| Derating Linear From 25°C | 0.5 | 0.2 | 0.4 | 0.25 | 0.4 | mA/ $^\circ\text{C}$ |
| Reverse Voltage | 5 | 5 | 5 | 5 | 5 | V |
| Operating Temperature Range | - 55°C to $+100^\circ\text{C}$ | | | | | |
| Storage Temperature Range | - 55°C to $+100^\circ\text{C}$ | | | | | |
| Lead Soldering Temperature [1.6mm (0.063in) From Body] | 260 $^\circ\text{C}$ for 5 Seconds | | | | | |

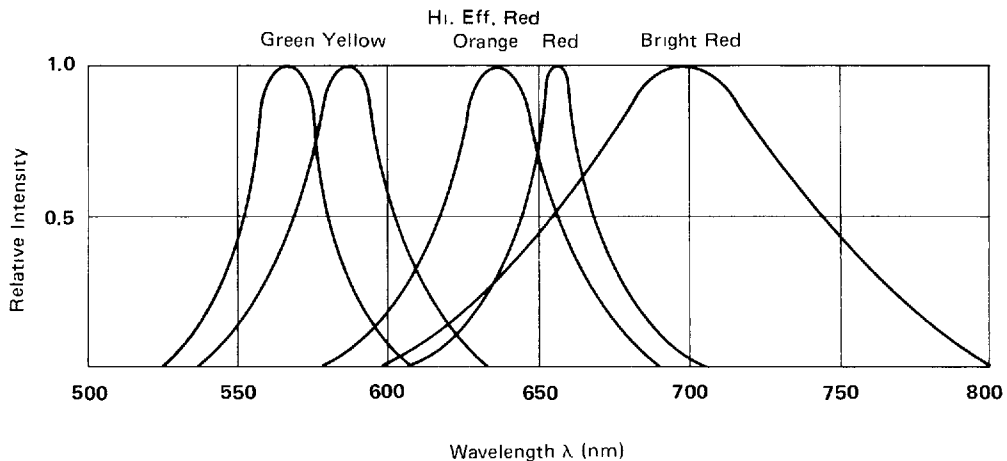


FIG. 1 RELATIVE INTENSITY VS. WAVELENGTH

ELECTRICAL/OPTICAL CHARACTERISTICS AND CURVES AT T_A = 25°C

| PARAMETER | SYMBOL | PART NO. LTL- | MIN. | TYP. | MAX. | UNIT | TEST CONDITION |
|--------------------------|-------------------|---------------|------------|------------|------|------|----------------------------------|
| Luminous Intensity | I _v | 203 204 | 0.2 0.7 | 0.6 2.0 | | mcd | I _F = 10 mA Note 1 |
| Viewing Angle | 2θ _½ | 203 204 | | 54 32 | | deg. | Note 2 (Fig. 6) |
| Peak Emission Wavelength | λ _{PEAK} | | | 655 | | nm | Measurement @ Peak (Fig. 1) |
| Spectral Line Half Width | Δλ | | | 24 | | nm | |
| Forward Voltage | V _F | | | 1.7 | 2.0 | V | I _F = 20 mA |
| Reverse Current | I _R | | | | 100 | μA | V _R = 5V |
| Capacitance | C | | | 30 | | PF | V _F = 0 f = 1 MHz |

NOTES: 1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (Commission Internationale De L'Eclairage) eye-response curve.

2. θ_½ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.

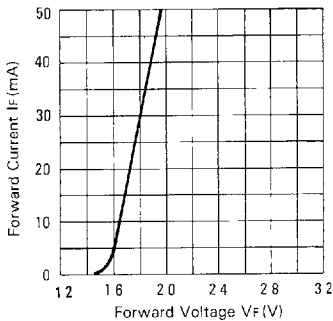


FIG. 2 FORWARD CURRENT VS. FORWARD VOLTAGE

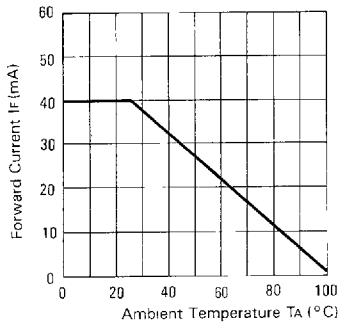


FIG. 3 FORWARD CURRENT DERATING CURVE

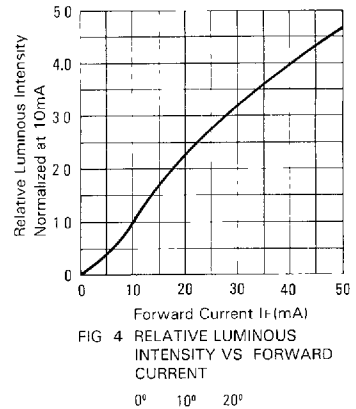


FIG. 4 RELATIVE LUMINOUS INTENSITY VS FORWARD CURRENT

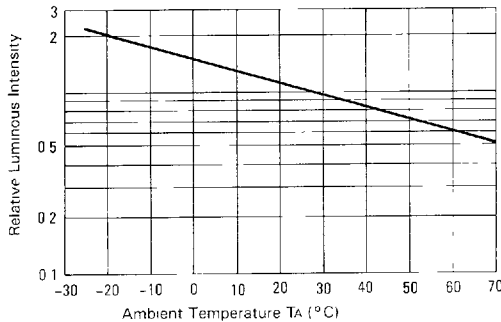


FIG. 5 LUMINOUS INTENSITY VS AMBIENT TEMPERATURE

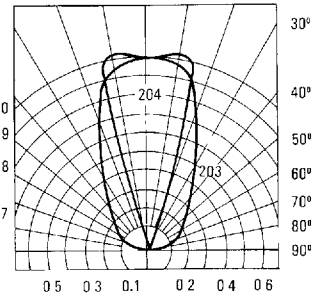


FIG. 6 SPATIAL DISTRIBUTION

ELECTRICAL/OPTICAL CHARACTERISTICS AND CURVES AT $T_A = 25^\circ\text{C}$

| PARAMETER | SYMBOL | PART NO. LTL- | MIN. | TYP. | MAX. | UNIT | TEST CONDITION |
|--------------------------|-------------------------|-------------------|-------------------|-------------------|------|---------------|---------------------------------|
| Luminous Intensity | Iv | 213 223 224 | 0.4 1.0 1.0 | 1.1 3.0 3.5 | | mcd | $I_F = 10\text{ mA}$ Note 1 |
| Viewing Angle | $2\theta_{1/2}$ | 213 223 224 | | 54 54 32 | | deg. | Note 2 (Fig. 11) |
| Peak Emission Wavelength | λ_{PEAK} | 213 223 224 | | 697 635 635 | | nm | Measurement @ Peak (Fig. 1) |
| Spectral Line Half Width | $\Delta\lambda$ | 213 223 224 | | 90 40 40 | | nm | |
| Forward Voltage | V_F | 213 223 224 | | 2.1 2.0 2.0 | 2.8 | V | $I_F = 20\text{ mA}$ |
| Reverse Current | I_R | 213 223 224 | | | 100 | μA | $V_R = 5\text{ V}$ |
| Capacitance | C | 213 223 224 | | 55 20 20 | | 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 (Commission Internationale De L'Eclairage) eye-response curve.
 2. $\theta_{1/2}$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.

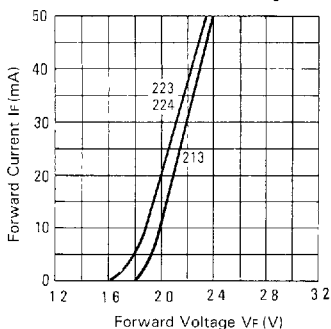


FIG 7 FORWARD CURRENT VS FORWARD VOLTAGE

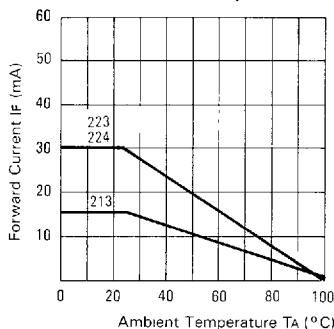


FIG 8 FORWARD CURRENT DERATING CURVE

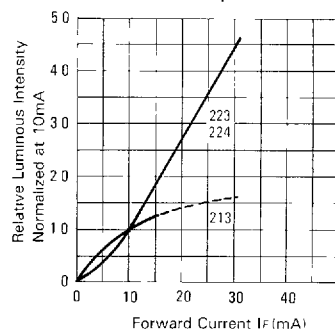


FIG 9 RELATIVE LUMINOUS INTENSITY VS FORWARD CURRENT

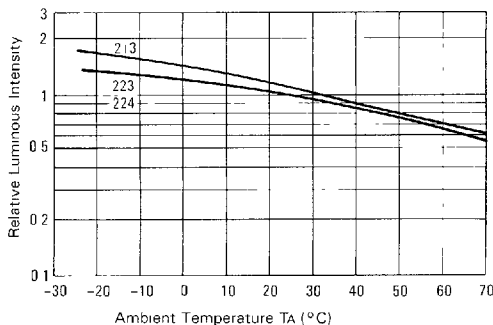


FIG 10 LUMINOUS INTENSITY VS AMBIENT TEMPERATURE

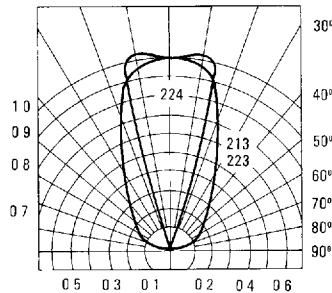


FIG 11 SPATIAL DISTRIBUTION



ELECTRICAL/OPTICAL CHARACTERISTICS AND CURVES AT $T_A = 25^\circ C$

| PARAMETER | SYMBOL | PART NO. LTL- | MIN. | TYP. | MAX. | UNIT | TEST CONDITION |
|--------------------------|------------------|--------------------------|--------------------------|--------------------------|------|---------|-----------------------------|
| Luminous Intensity | Iv | 233 234 253 254 | 0.7 0.7 1.0 1.0 | 2.5 3.5 2.5 3.5 | | mcd | $I_F = 10mA$ Note 1 |
| Viewing Angle | $2\theta_{1/2}$ | 233 234 253 254 | | 54 32 54 32 | | deg. | Note 2 (Fig. 16) |
| Peak Emission Wavelength | λ_{PEAK} | 233 234 253 254 | | 565 565 585 585 | | nm | Measurement @ Peak (Fig. 1) |
| Spectral Line Half Width | $\Delta\lambda$ | 233 234 253 254 | | 30 30 35 35 | | nm | |
| Forward Voltage | V_F | 233 234 253 254 | | 2.1 | 2.8 | V | $I_F = 20mA$ |
| Reverse Current | I_R | 233 234 253 254 | | | 100 | μA | $V_R = 5V$ |
| Capacitance | C | 233 234 253 254 | | 35 35 15 15 | | PF | $V_F = 0$ $f = 1MHZ$ |

NOTES. 1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (Commission Internationale De L'Eclairage) eye-response curve
 2. $\theta_{1/2}$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity

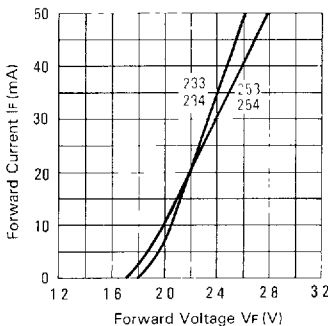


FIG 12 FORWARD CURRENT VS FORWARD VOLTAGE

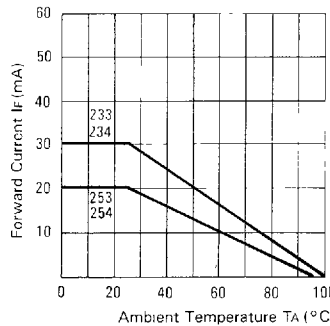


FIG 13 FORWARD CURRENT DERATING CURVE

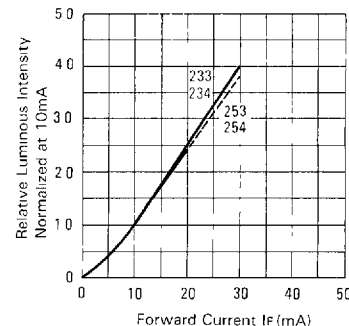


FIG 14 RELATIVE LUMINOUS INTENSITY VS FORWARD CURRENT

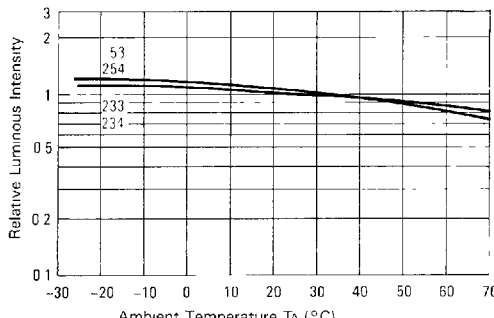


FIG 15 LUMINOUS INTENSITY VS AMBIENT TEMPERATURE

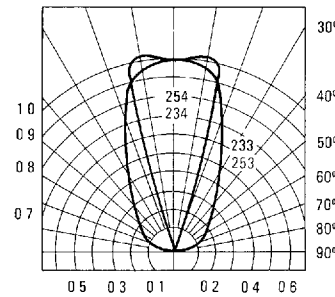


FIG 16 SPATIAL DISTRIBUTION

ELECTRICAL/OPTICAL CHARACTERISTICS AND CURVES AT TA = 25°C

| PARAMETER | SYMBOL | PART NO. LTL- | MIN. | TYP. | MAX. | UNIT | TEST CONDITION |
|--------------------------|--------|---------------|------------|------------|------|------|-----------------------------|
| Luminous Intensity | Iv | 293 294 | 1.0 1.0 | 3.0 3.5 | | mcd | IF = 10 mA Note 1 |
| Viewing Angle | 2θ½ | 293 294 | | 54 32 | | deg. | Note 2 (Fig. 21) |
| Peak Emission Wavelength | λPEAK | | | 630 | | nm | Measurement @ Peak (Fig. 1) |
| Spectral Line Half Width | Δλ | | | 40 | | nm | |
| Forward Voltage | VF | | | 2.0 | 2.8 | V | IF = 20 mA |
| Reverse Current | IR | | | | 100 | μA | VR = 5V |
| Capacitance | C | | | 20 | | PF | VF = 0 f = 1 MHZ |

- NOTES: 1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (Commission Internationale De L'Eclairage) eye-response curve.
 2. θ½ is the off-axis angle at which the liminous intensity is half the axial luminous intensity.

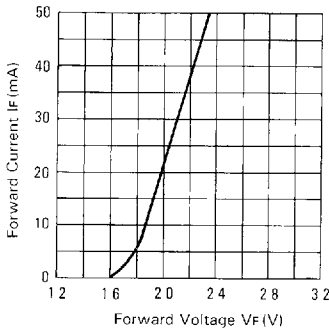


FIG 17 FORWARD CURRENT VS FORWARD VOLTAGE

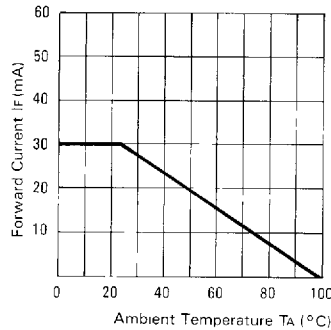


FIG 18 FORWARD CURRENT DERATING CURVE

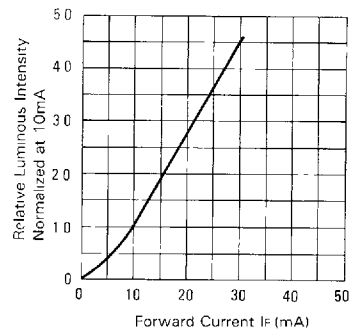


FIG 19 RELATIVE LUMINOUS INTENSITY VS FORWARD CURRENT

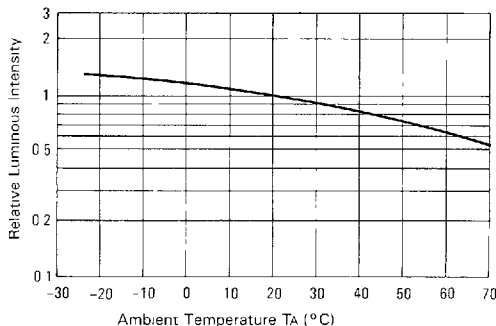


FIG 20 LUMINOUS INTENSITY VS AMBIENT TEMPERATURE

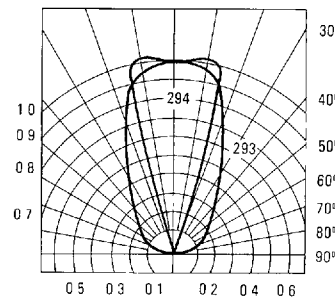


FIG 21 SPATIAL DISTRIBUTION

