

**LITEON****2x5 RECTANGULAR BAR  
FLANGELESS LED LAMPS**

LTL-433R RED  
 LTL-433P BRIGHT RED  
 LTL-433HR HIGH EFFICIENCY RED  
 LTL-433G GREEN

LTL-433Y YELLOW  
 LTL-433A AMBER  
 LTL-433EA ORANGE

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**FEATURES**

- LOW POWER CONSUMPTION.
- MOST SUITABLE FOR USE LIKE LEVEL INDICATOR.
- EXCELLENT UNIFORMITY OF LIGHT EMISSION.
- LONG LIFE-SOLID STATE RELIABILITY.
- I.C. COMPATIBLE.

**DESCRIPTION**

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

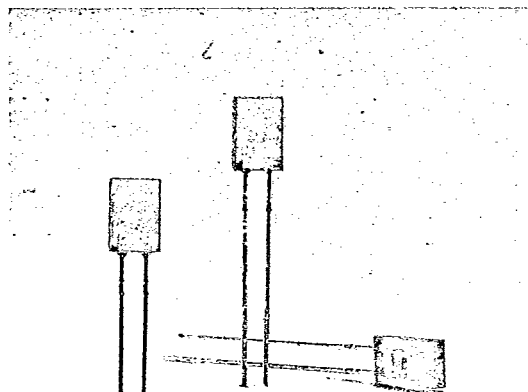
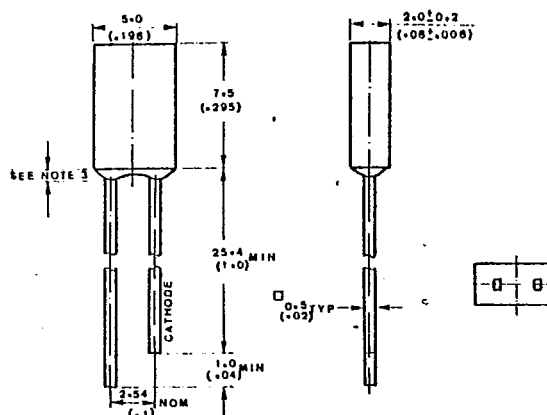
The Bright Red source color devices are made with Gallium Phosphide on Gallium Phosphide Red Light Emitting Diode.

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

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

**DEVICES**

| PART NO.<br>LTL- | LENS   |           | SOURCE COLOR |
|------------------|--------|-----------|--------------|
|                  | COLOR  | DIFFUSION |              |
| 433R             | Red    | Diffused  | Red          |
| 433P             | Red    | Diffused  | Bright Red   |
| 433HR            | Red    | Diffused  | Hi. Eff. Red |
| 433G             | Green  | Diffused  | Green        |
| 433Y             | Yellow | Diffused  | Yellow       |
| 433A             | Amber  | Diffused  | Amber        |
| 433EA            | Orange | Diffused  | 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.

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

| PARAMETER                                                    | RED                                         | BRIGHT RED | GREEN | AMBER YELLOW | HI. EFF. RED ORANGE | UNIT                 |
|--------------------------------------------------------------|---------------------------------------------|------------|-------|--------------|---------------------|----------------------|
| Power Dissipation                                            | 80                                          | 40         | 100   | 60           | 100                 | mW                   |
| Peak Forward Current<br>(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 $25^\circ\text{C}$                      | 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                                  | $-55^\circ\text{C}$ to $+100^\circ\text{C}$ |            |       |              |                     |                      |
| Storage Temperature Range                                    | $-55^\circ\text{C}$ to $+100^\circ\text{C}$ |            |       |              |                     |                      |
| Lead Soldering Temperature<br>[1.6mm (0.063in) From Body]    | $260^\circ\text{C}$ for 5 Seconds           |            |       |              |                     |                      |

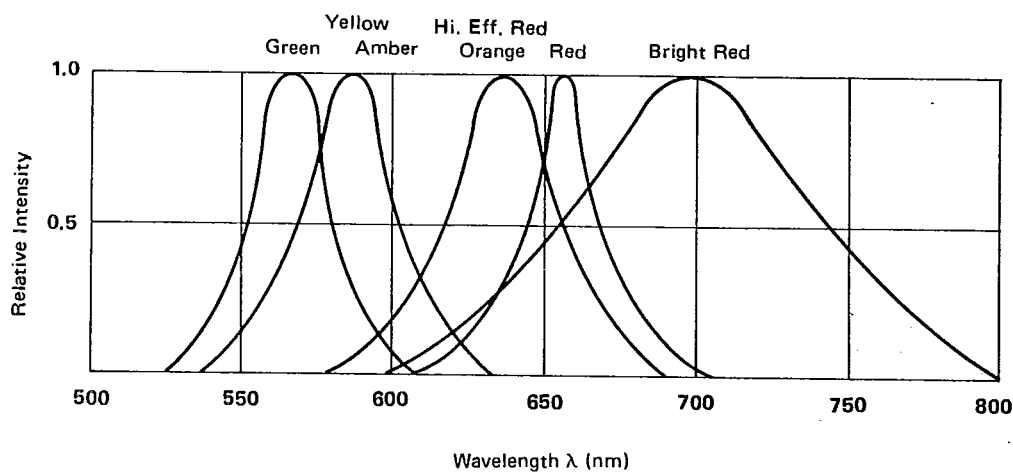


FIG. 1 RELATIVE INTENSITY VS. WAVELENGTH

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

| PARAMETER                | SYMBOL                  | PART NO.<br>LTL-      | MIN.               | TYP.              | MAX.              | UNIT          | TEST<br>CONDITION               |
|--------------------------|-------------------------|-----------------------|--------------------|-------------------|-------------------|---------------|---------------------------------|
| Luminous Intensity       | $I_v$                   | 433R<br>433P<br>433HR | 0.08<br>0.2<br>0.5 | 0.2<br>0.6<br>1.7 |                   | mcd           | $I_F = 10\text{ mA}$<br>Note 1  |
| Viewing Angle            | $2\theta_{1/2}$         | 433R<br>433P<br>433HR |                    | 140               |                   | deg.          | Note 2 (Fig. 6)                 |
| Peak Emission Wavelength | $\lambda_{\text{PEAK}}$ | 433R<br>433P<br>433HR |                    | 655<br>697<br>635 |                   | nm            | Measurement<br>@ Peak (Fig. 1)  |
| Spectral Line Half Width | $\Delta\lambda$         | 433R<br>433P<br>433HR |                    | 24<br>90<br>40    |                   | nm            |                                 |
| Forward Voltage          | $V_F$                   | 433R<br>433P<br>433HR |                    | 1.7<br>2.1<br>2.0 | 2.0<br>2.8<br>2.8 | V             | $I_F = 20\text{ mA}$            |
| Reverse Current          | $I_R$                   | 433R<br>433P<br>433HR |                    |                   | 100               | $\mu\text{A}$ | $V_R = 5\text{ V}$              |
| Capacitance              | C                       | 433R<br>433P<br>433HR |                    | 30<br>55<br>20    |                   | PF            | $V_F = 0$<br>$f = 1\text{ MHz}$ |

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.

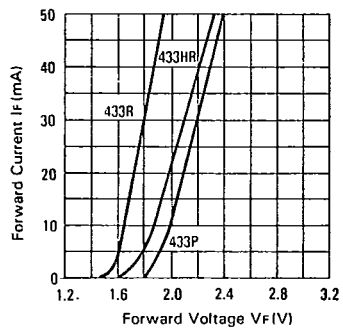


FIG. 2 FORWARD CURRENT VS. FORWARD VOLTAGE

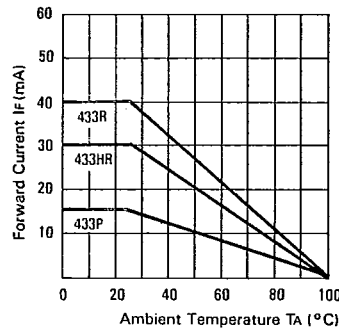


FIG. 3 FORWARD CURRENT DERATING CURVE

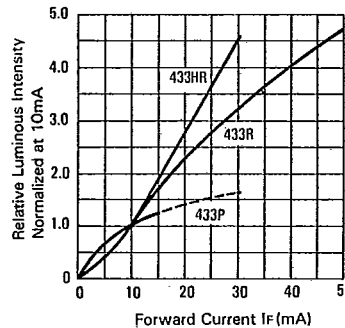


FIG. 4 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

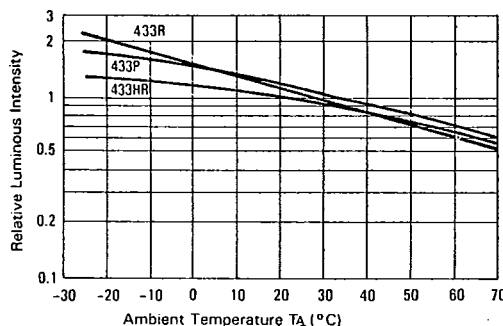


FIG. 5 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

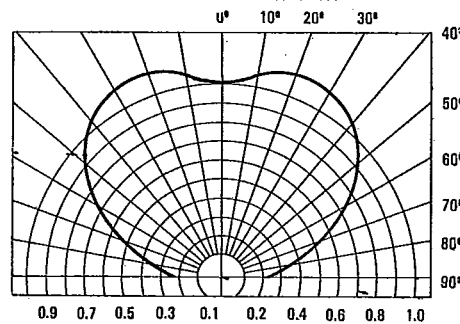


FIG. 6 SPATIAL DISTRIBUTION

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

| PARAMETER                | SYMBOL                  | PART NO.<br>LTL- | MIN.       | TYP.       | MAX. | UNIT          | TEST<br>CONDITION               |
|--------------------------|-------------------------|------------------|------------|------------|------|---------------|---------------------------------|
| Luminous Intensity       | $I_v$                   | 433G<br>433Y     | 0.6<br>0.6 | 1.7<br>1.7 |      | mcd           | $I_F = 10\text{ mA}$<br>Note 1  |
| Viewing Angle            | $2\theta_{1/2}$         | 433G<br>433Y     |            | 140        |      | deg.          | Note 2 (Fig. 11)                |
| Peak Emission Wavelength | $\lambda_{\text{PEAK}}$ | 433G<br>433Y     |            | 565<br>585 |      | nm            | Measurement<br>@ Peak (Fig. 1)  |
| Spectral Line Half Width | $\Delta\lambda$         | 433G<br>433Y     |            | 30<br>35   |      | nm            |                                 |
| Forward Voltage          | $V_F$                   | 433G<br>433Y     |            | 2.1        | 2.8  | V             | $I_F = 20\text{ mA}$            |
| Reverse Current          | $I_R$                   | 433G<br>433Y     |            |            | 100  | $\mu\text{A}$ | $V_R = 5\text{ V}$              |
| Capacitance              | C                       | 433G<br>433Y     |            | 35<br>15   |      | PF            | $V_F = 0$<br>$f = 1\text{ MHz}$ |

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.

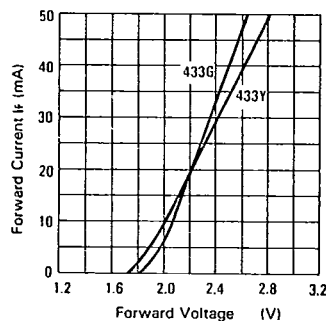


FIG. 7 FORWARD CURRENT VS. FORWARD VOLTAGE

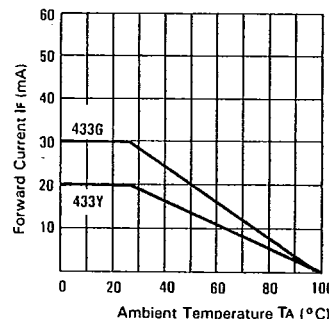


FIG. 8 FORWARD CURRENT DERATING CURVE

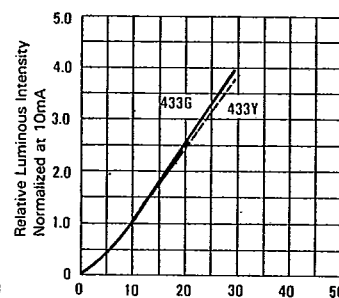


FIG. 9 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

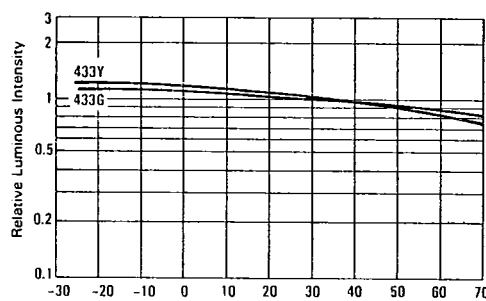


FIG. 10 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

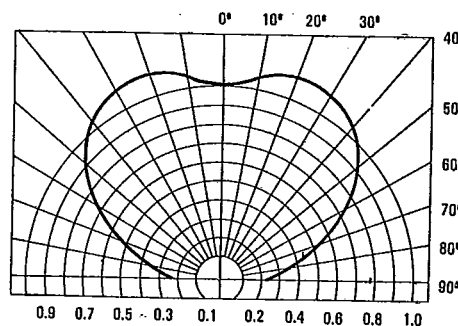


FIG. 11 SPATIAL DISTRIBUTION



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

| PARAMETER                | SYMBOL                  | PART NO.<br>LTL— | MIN.       | TYP.       | MAX. | UNIT          | TEST<br>CONDITION              |
|--------------------------|-------------------------|------------------|------------|------------|------|---------------|--------------------------------|
| Luminous Intensity       | $I_v$                   | 433A<br>433EA    | 0.6<br>0.5 | 2.5<br>1.7 |      | mcd           | $I_F = 10\text{ mA}$<br>Note 1 |
| Viewing Angle            | $2\theta_{1/2}$         | 433A<br>433EA    |            | 140        |      | deg.          | Note 2 (Fig. 16)               |
| Peak Emission Wavelength | $\lambda_{\text{PEAK}}$ | 433A<br>433EA    |            | 600<br>630 |      | nm            | Measurement<br>@ Peak (Fig. 1) |
| Spectral Line Half Width | $\Delta\lambda$         | 433A<br>433EA    |            | 35<br>40   |      | nm            |                                |
| Forward Voltage          | $V_F$                   | 433A<br>433EA    |            | 2.1<br>2.0 | 2.8  | V             | $I_F = 20\text{ mA}$           |
| Reverse Current          | $I_R$                   | 433A<br>433EA    |            |            | 100  | $\mu\text{A}$ | $V_R = 5\text{V}$              |
| Capacitance              | C                       | 433A<br>433EA    |            | 15<br>20   |      | PF            | $V_F = 0$<br>$f = 1\text{MHz}$ |

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.

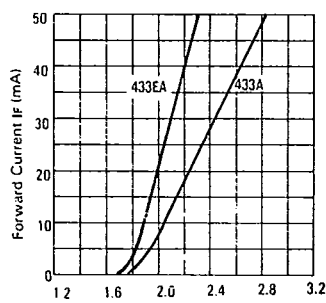


FIG. 12 FORWARD CURRENT VS. FORWARD VOLTAGE

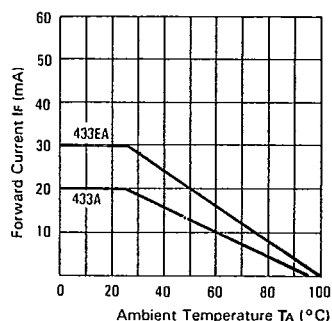


FIG. 13 FORWARD CURRENT DERATING CURVE

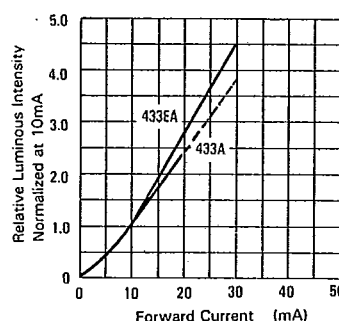


FIG. 14 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

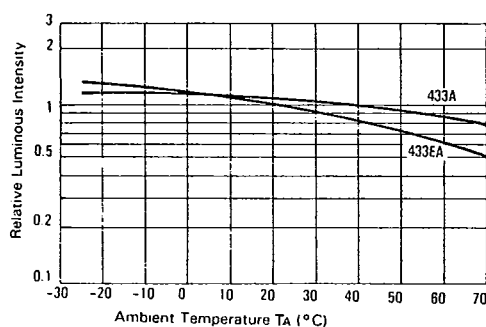


FIG. 15 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

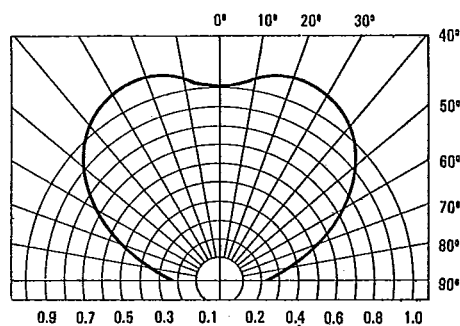


FIG. 16 SPATIAL DISTRIBUTION