

# Infrared LED

... designed for applications requiring high power output, low drive power and very fast response time. This device is used in industrial processing and control, light modulators, shaft or position encoders, punched card readers, optical switching, and logic circuits. It is spectrally matched for use with silicon detectors.

- High-Power Output — 4 mW (Typ) @  $I_F = 100$  mA, Pulsed
- Infrared-Emission — 940 nm (Typ)
- Low Drive Current — 10 mA for 450  $\mu$ W (Typ)
- Popular TO-18 Type Package for Easy Handling and Mounting
- Hermetic Metal Package for Stability and Reliability

**MLED930**

**INFRARED  
LED  
940 nm**

CONVEX  
LENS



**CASE 209-01  
METAL**

## MAXIMUM RATINGS

| Rating                                                                                          | Symbol    | Value       | Unit                       |
|-------------------------------------------------------------------------------------------------|-----------|-------------|----------------------------|
| Reverse Voltage                                                                                 | $V_R$     | 6           | Volts                      |
| Forward Current — Continuous                                                                    | $I_F$     | 60          | mA                         |
| Forward Current — Peak Pulse (PW = 100 $\mu$ s, d.c. = 2%)                                      | $I_F$     | 1           | A                          |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ (Note 1) | $P_D$     | 250<br>2.27 | mW<br>mW/ $^\circ\text{C}$ |
| Operating Temperature Range                                                                     | $T_A$     | -55 to +125 | $^\circ\text{C}$           |
| Storage Temperature Range                                                                       | $T_{stg}$ | -65 to +150 | $^\circ\text{C}$           |

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic                                   | Fig. No. | Symbol      | Min | Typ  | Max | Unit  |
|--------------------------------------------------|----------|-------------|-----|------|-----|-------|
| Reverse Leakage Current ( $V_R = 3$ V)           | —        | $I_R$       | —   | 2    | —   | nA    |
| Reverse Breakdown Voltage ( $I_R = 100$ $\mu$ A) | —        | $V_{(BR)R}$ | 6   | 20   | —   | Volts |
| Forward Voltage ( $I_F = 50$ mA)                 | 2        | $V_F$       | —   | 1.32 | 1.5 | Volts |
| Total Capacitance ( $V_R = 0$ V, $f = 1$ MHz)    | —        | $C_T$       | —   | 18   | —   | pF    |

## OPTICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

|                                                                                                          |      |                 |        |          |   |                  |
|----------------------------------------------------------------------------------------------------------|------|-----------------|--------|----------|---|------------------|
| Total Power Output (Note 2) ( $I_F = 60$ mA, dc)<br>( $I_F = 100$ mA, PW = 100 $\mu$ s, duty cycle = 2%) | 3, 4 | $P_O$           | —<br>1 | 2.5<br>4 | — | mW               |
| Radiant Intensity (Note 3)<br>( $I_F = 100$ mA, PW = 100 $\mu$ s, duty cycle = 2%)                       | —    | $I_O$           | —      | 1.5      | — | mW/<br>steradian |
| Peak Emission Wavelength                                                                                 | 1    | $\lambda_P$     | —      | 940      | — | nm               |
| Spectral Line Half Width                                                                                 | 1    | $\Delta\lambda$ | —      | 40       | — | nm               |

Notes: 1. Printed Circuit Board Mounting

2. Power Output,  $P_O$ , is the total power radiated by the device into a solid angle of  $2\pi$  steradians. It is measured by directing all radiation leaving the device, within this solid angle, onto a calibrated silicon solar cell.

3. Irradiance from a Light Emitting Diode (LED) can be calculated by:

$$H = \frac{I_e}{d^2}$$

where  $H$  is irradiance in mW/cm<sup>2</sup>;  $I_e$  is radiant intensity in mW/steradian;  
 $d^2$  is distance from LED to the detector in cm.

# MLED930

## TYPICAL CHARACTERISTICS

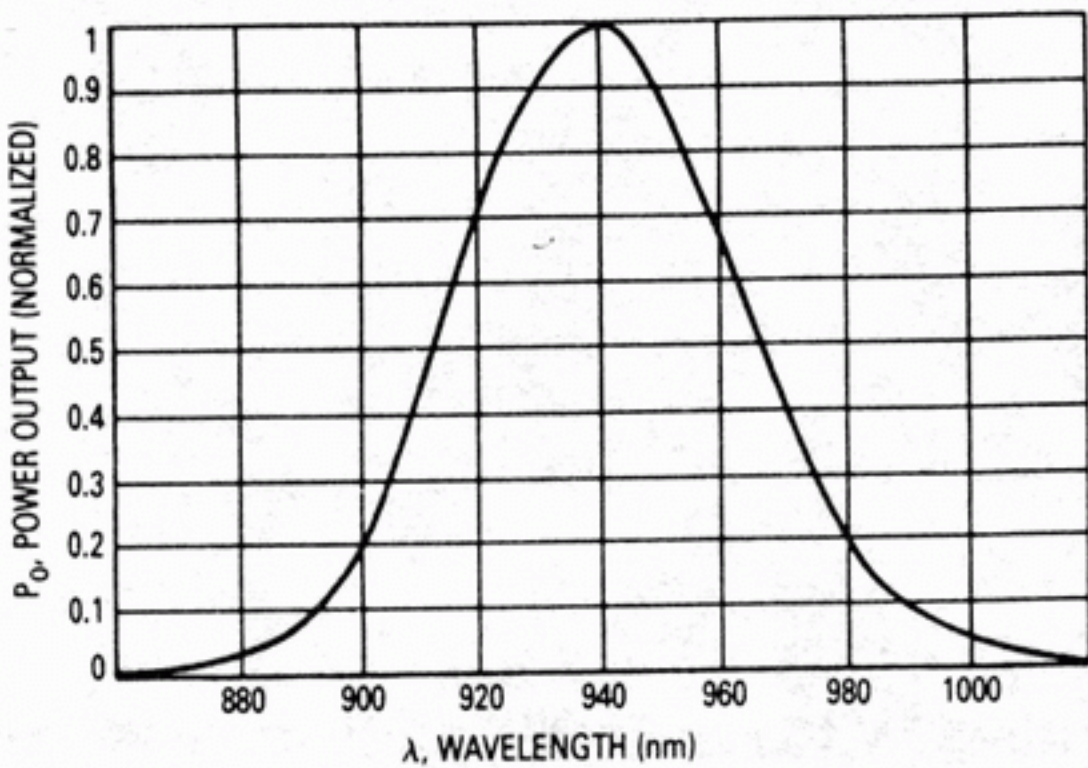


Figure 1. Relative Spectral Output

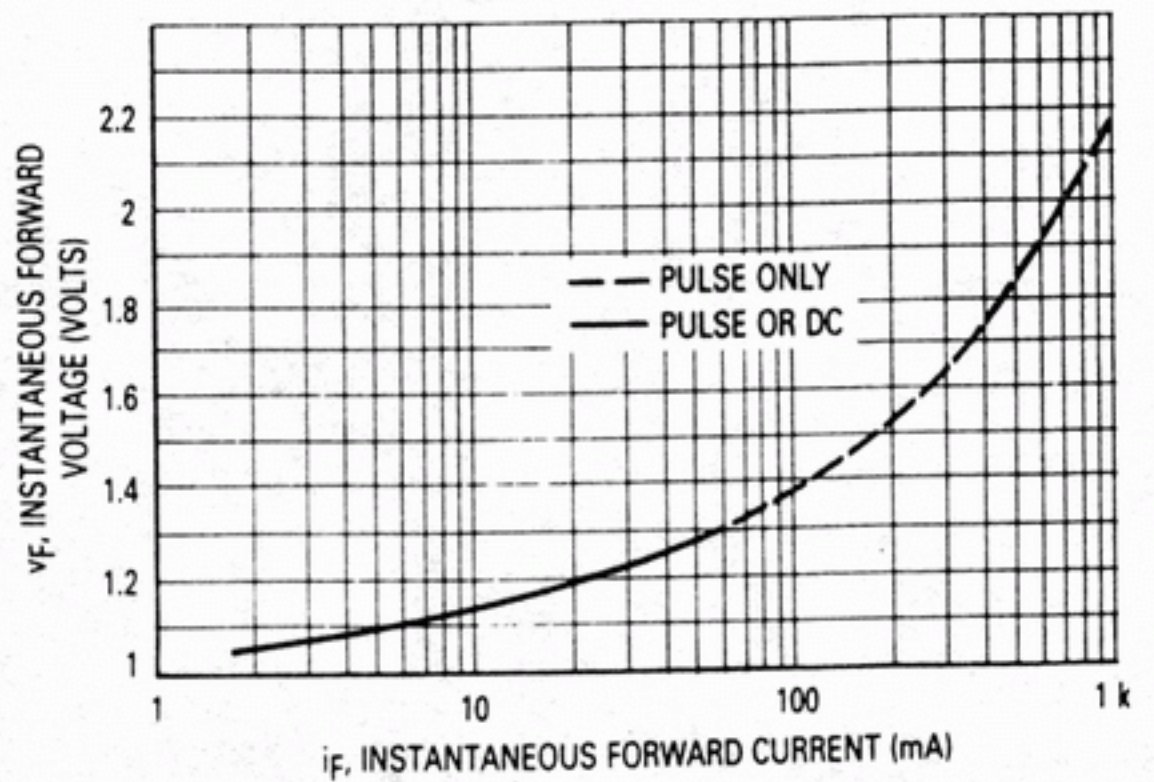


Figure 2. Forward Characteristics

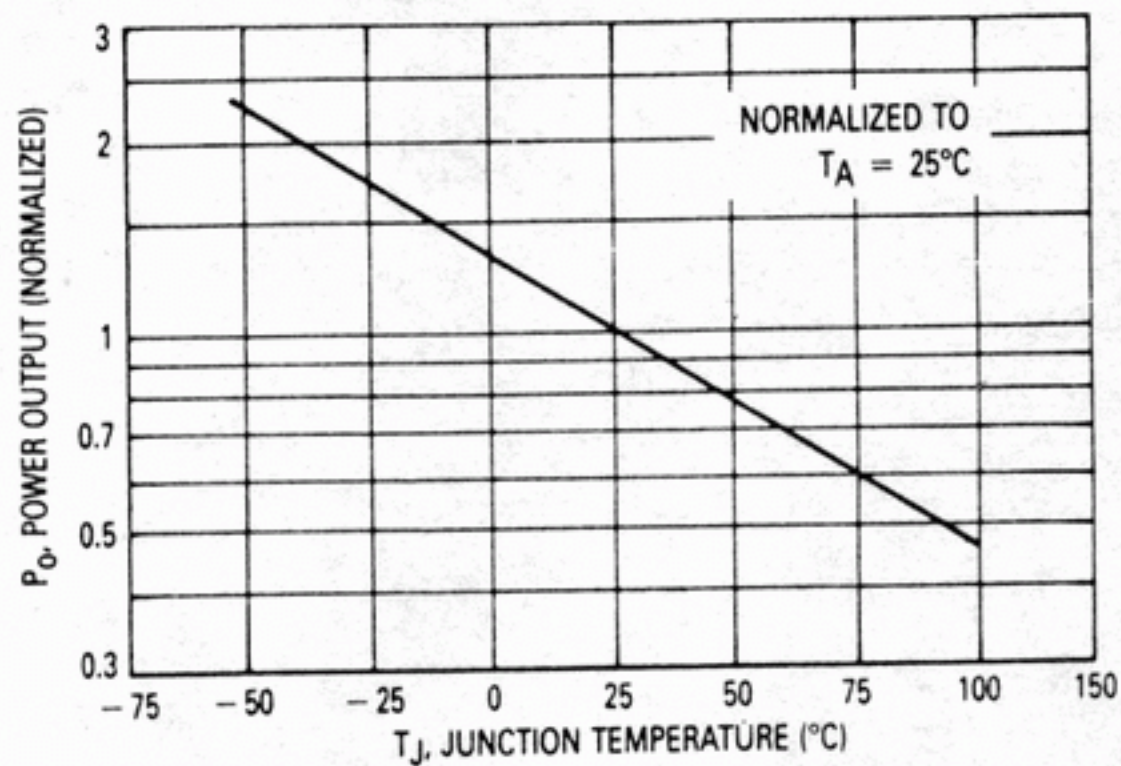


Figure 3. Power Output versus Junction Temperature

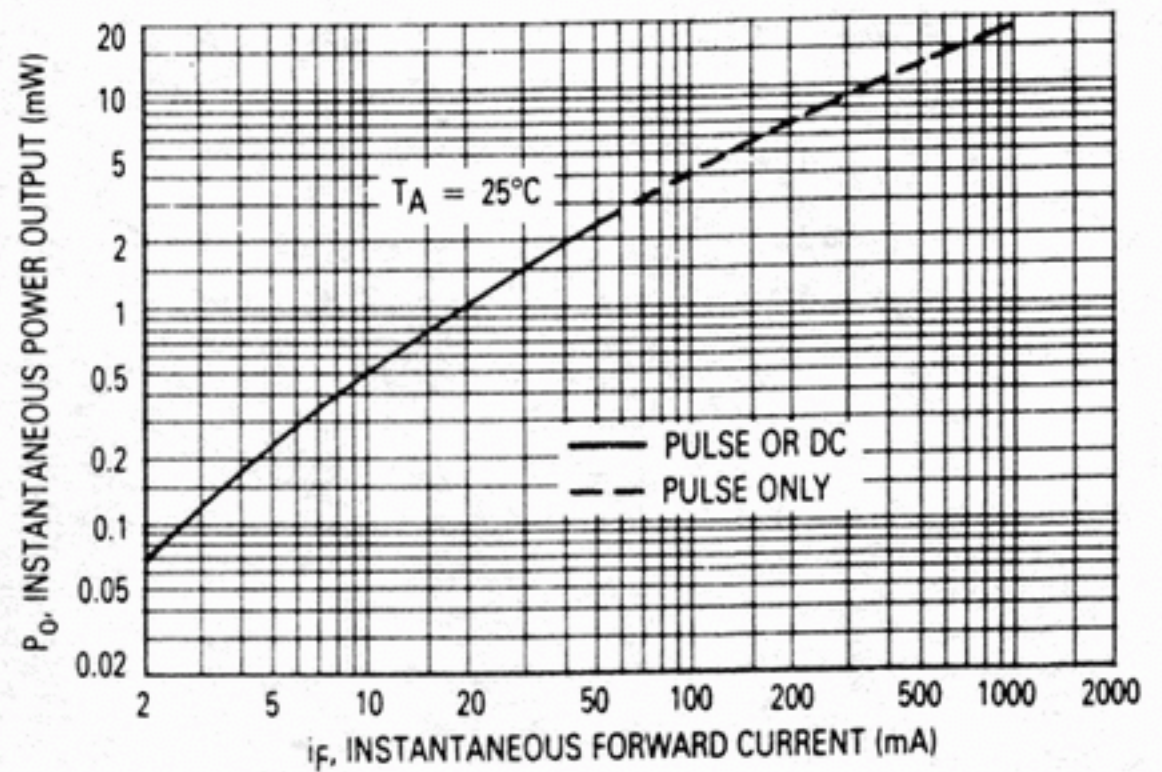


Figure 4. Instantaneous Power Output versus Forward Current

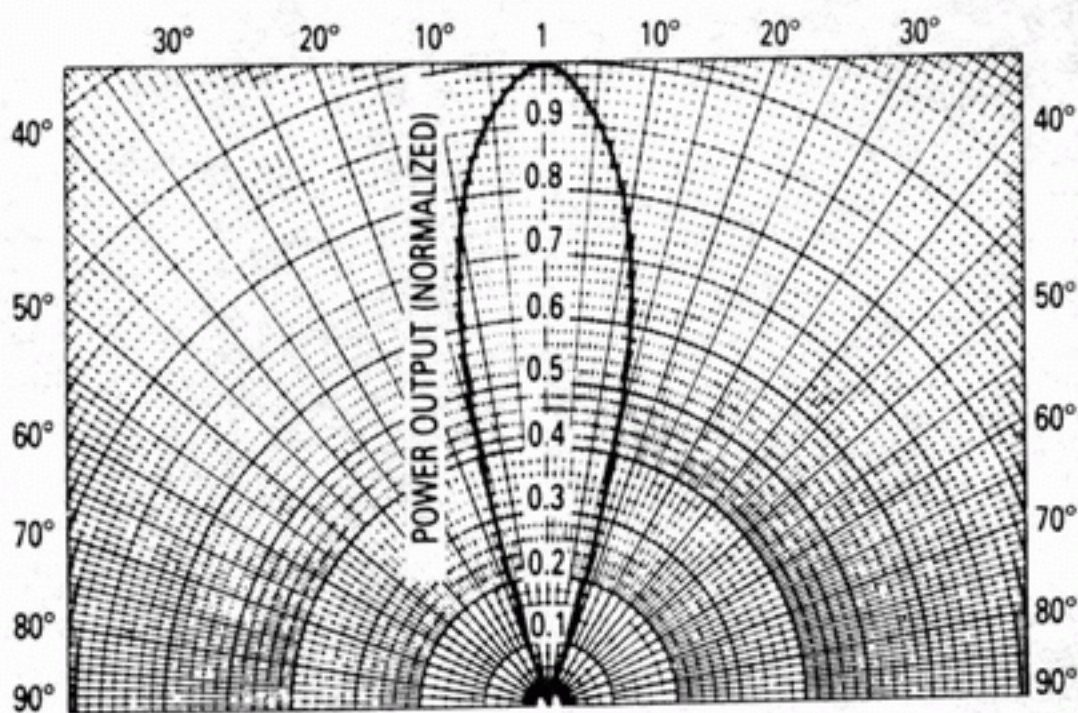


Figure 5. Spatial Radiation Pattern

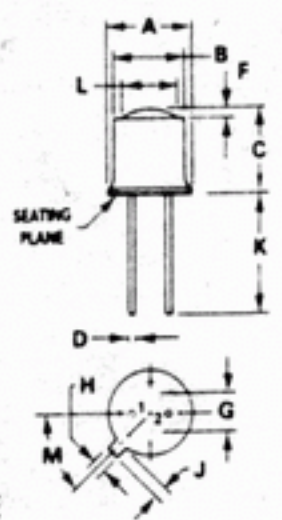
## OUTLINE DIMENSIONS

### NOTES:

- PIN 2 INTERNALLY CONNECTED TO CASE
- LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS |      | INCHES    |       |
|-----|-------------|------|-----------|-------|
|     | MIN         | MAX  | MIN       | MAX   |
| A   | 5.31        | 5.84 | 0.209     | 0.230 |
| B   | 4.52        | 4.95 | 0.178     | 0.195 |
| C   | 5.08        | 6.35 | 0.200     | 0.250 |
| D   | 0.41        | 0.48 | 0.016     | 0.019 |
| F   | 0.51        | 1.02 | 0.020     | 0.040 |
| G   | 2.54 BSC    |      | 0.100 BSC |       |
| H   | 0.99        | 1.17 | 0.039     | 0.046 |
| J   | 0.84        | 1.22 | 0.033     | 0.048 |
| K   | 12.70       | —    | 0.500     | —     |
| L   | 3.35        | 4.01 | 0.132     | 0.158 |
| M   | 45° BSC     |      | 45° BSC   |       |

STYLE 1:  
PIN 1. ANODE  
2. CATHODE



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