

Plastic Infrared Emitting Diode

OP140, OP145 Series



Features:

- IR-transmissive plastic package
- Side-looking package for space-limited applications
- Wide irradiance pattern
- Mechanically and spectrally matched to other OPTEK products

Description:

Each device in this series is a high intensity gallium arsenide infrared emitting diode that is suited for use as a PCBoard mounted slotted switch or an easy mount PCBoard interrupter.

Each **OP140** (A, B, C, D) and **OP145** (A, C) device is a domed-lens 935 nm diode that is molded in an IR-transmissive plastic side-looking package.

OP140 is mechanically and spectrally matched to the OP550 series of phototransistors and the OP560 series of photodarlington. OP145 is mechanically and spectrally matched to the OP555 and OP565 series devices.

Please refer to Application Bulletins 208 and 210 for additional design information and reliability (degradation) data.

Applications:

- Space-limited applications
- PCBoard mounted slotted switch
- PCBoard interrupter

| Ordering Information | | | | |
|----------------------|---------------------|-----------|------------------|--------------|
| Part Number | LED Peak Wavelength | Lens Type | Total Beam Angle | Lead Length |
| OP140A | 935 nm | Domed | 40° | min of 0.50" |
| OP140B | | | | |
| OP140C | | | | |
| OP140D | | | | |
| OP145A | | | | |
| OP145C | | | | |



RoHS

General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

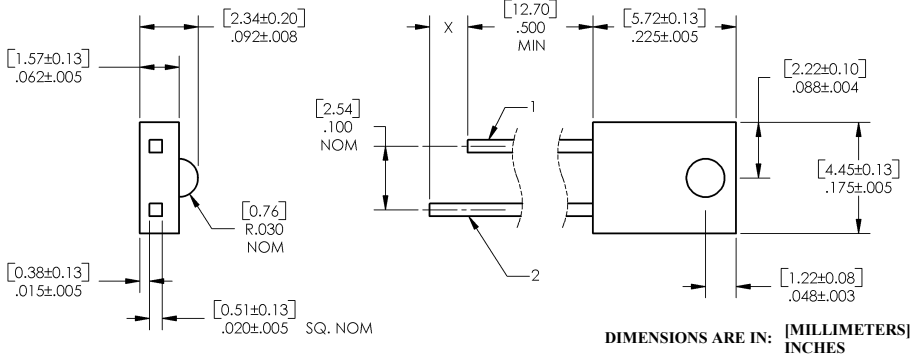
OPTEK Technology, Inc.
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www.optekinc.com | www.ttelectronics.com

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OP140, OP145 Series

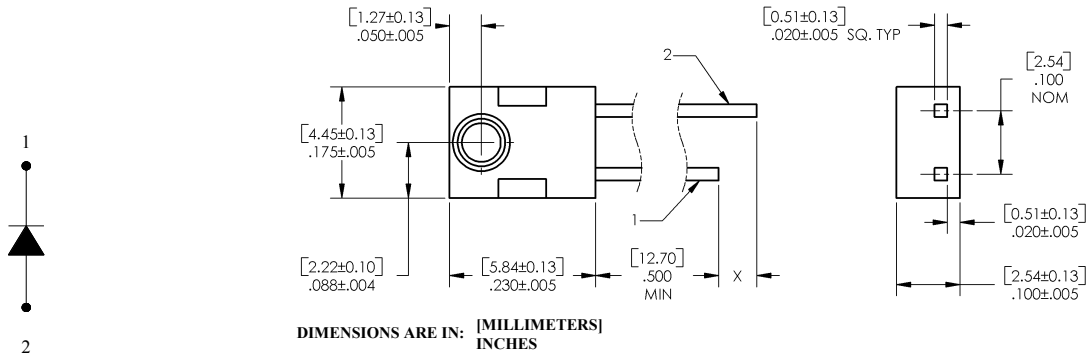


OP140 (A, B, C, D)



| Pin # | LED | Sensor |
|-------|---------|-------------------|
| 1 | Cathode | Emitter/Anode |
| 2 | Anode | Collector/Cathode |

OP145 (A, C)



| Pin # | LED | Sensor |
|-------|---------|-------------------|
| 1 | Cathode | Emitter/Anode |
| 2 | Anode | Collector/Cathode |

CONTAINS POLYSULFONE

To avoid stress cracking, we suggest using ND Industries' **Vibra-Tite** for thread-locking. **Vibra-Tite** evaporates fast without causing structural failure in OPTEK'S molded plastics.

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Electrical Specifications

| Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted) | |
|--|---|
| Storage and Operating Temperature Range | -40°C to $+100^\circ\text{C}$ |
| Reverse Voltage | 2.0 V |
| Continuous Forward Current | 50 mA |
| Peak Forward Current | 3.0 A |
| Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 seconds with soldering iron] ⁽¹⁾ | 260°C |
| Power Dissipation ⁽²⁾ | 100 mW |

| Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | | | | |
|---|--|------|------------|------|----------------------|--|
| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
| Input Diode | | | | | | |
| $E_{E(APT)}$ | Apertured Radiant Incidence | 0.40 | - | - | mW/cm ² | $I_F = 20\text{ mA}^{(3)}$ |
| | OP140A, OP145A | 0.30 | - | 0.55 | | |
| | OP140B | 0.20 | - | 0.40 | | |
| | OP140C, OP145C | 0.10 | - | - | | |
| V_F | Forward Voltage | - | - | 1.60 | V | $I_F = 20\text{ mA}$ |
| I_R | Reverse Current | - | - | 100 | μA | $V_R = 2.0\text{ V}$ |
| λ_p | Wavelength at Peak Emission | - | 935 | - | nm | $I_F = 10\text{ mA}$ |
| B | Spectral Bandwidth between Half Power Points | - | 50 | - | nm | $I_F = 10\text{ mA}$ |
| $\lambda_p / \Delta T$ | Spectral Shift with Temperature | - | ± 0.30 | - | nm/ $^\circ\text{C}$ | $I_F = \text{Constant}$ |
| θ_{HP} | Emission Angle at Half Power Points | - | 40 | - | Degree | $I_F = 20\text{ mA}$ |
| t_r | Output Rise Time | - | 1000 | - | ns | $I_{F(PK)} = 100\text{ mA}$, $PW = 10\ \mu\text{s}$, and $D.C. = 10.0\%$ |
| t_f | Output Fall Time | - | 500 | - | ns | |

- Notes:
1. RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering. A maximum of 20 grams force may be applied to the leads when soldering.
 2. Derate linearly 1.33 mW/ $^\circ\text{C}$ above 25°C .
 3. $E_{E(APT)}$ is a measurement of the average apertured radiant energy incident upon a sensing area 0.180" (4.57 mm) in diameter perpendicular to and centered on the mechanical axis of the lens and 0.653" (6.60 mm) from the lens tip. $E_{E(APT)}$ is not necessarily

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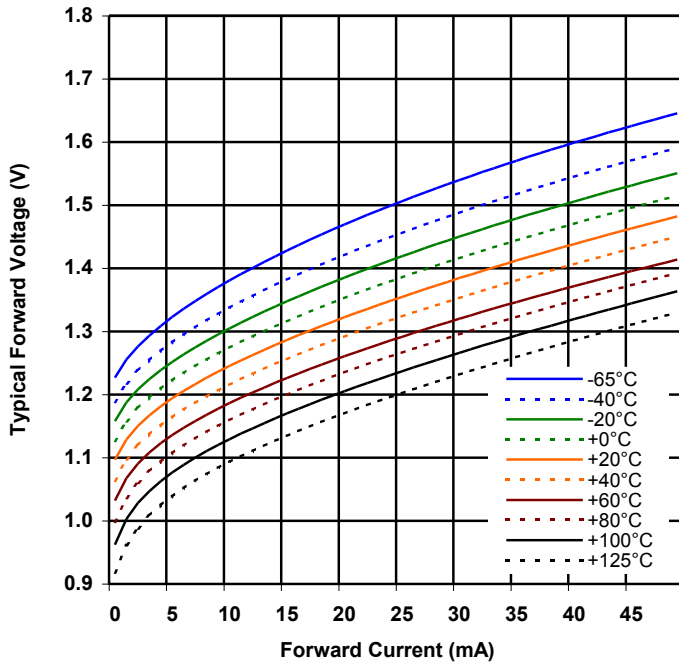
OP140, OP145 Series



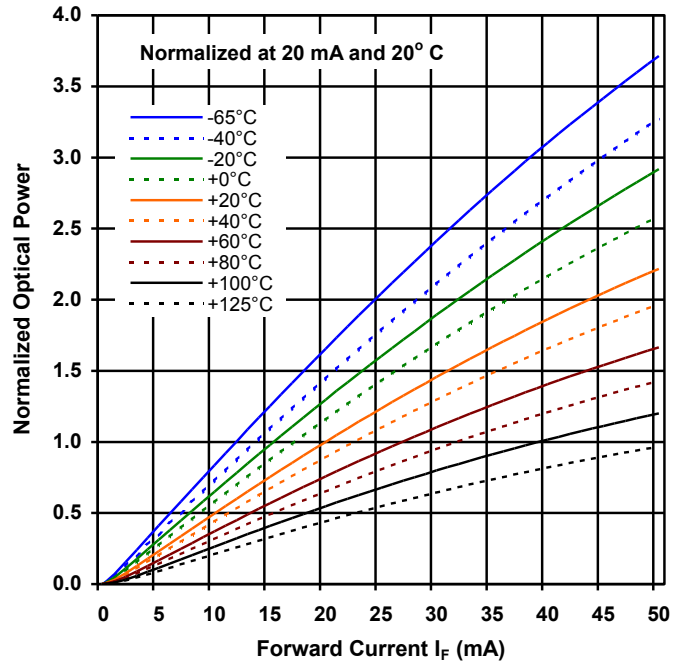
Performance

OP140, OP145 (A, B, C, D)

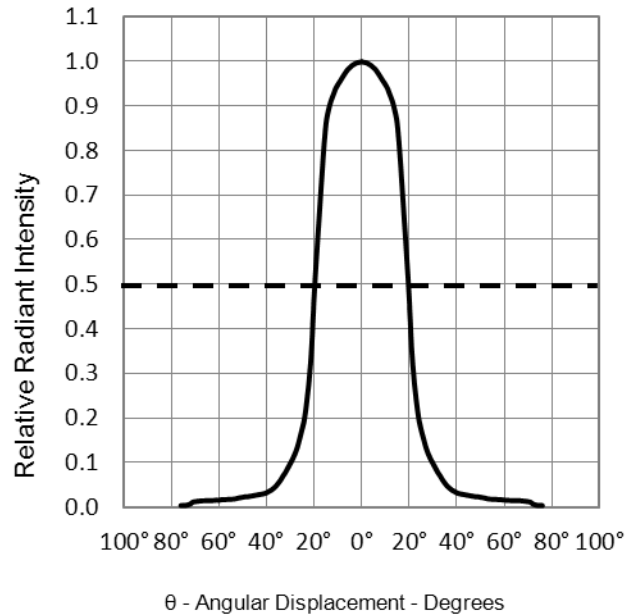
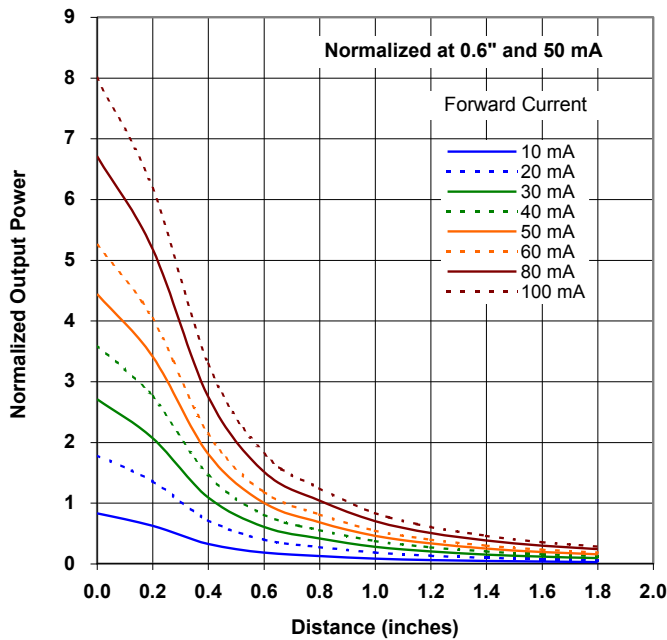
Forward Voltage vs Forward Current vs Temperature



Optical Power vs I_F vs Temp



Distance vs Output Power vs Forward Current



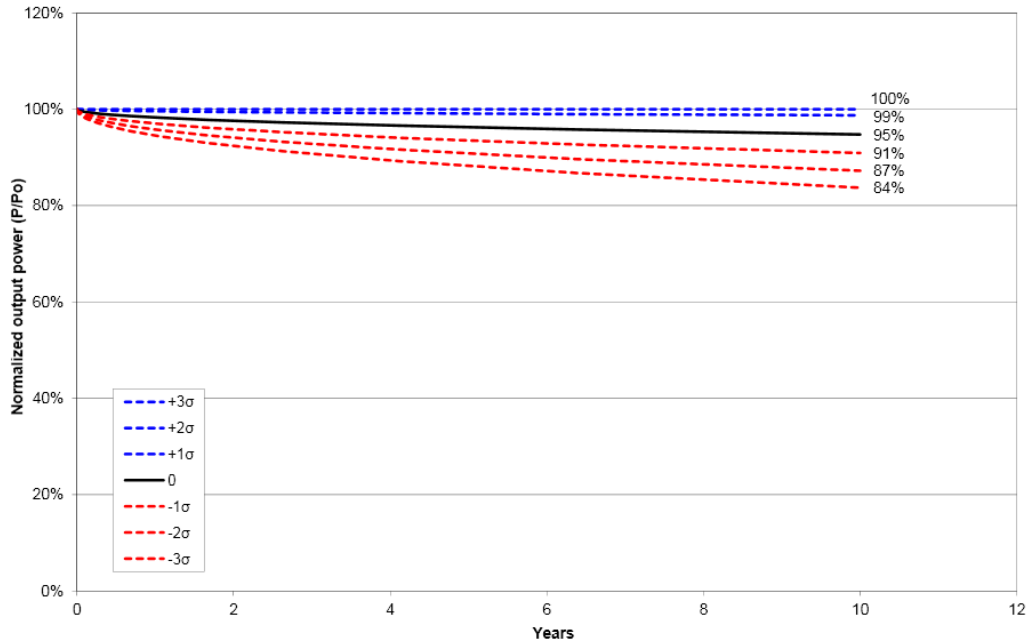
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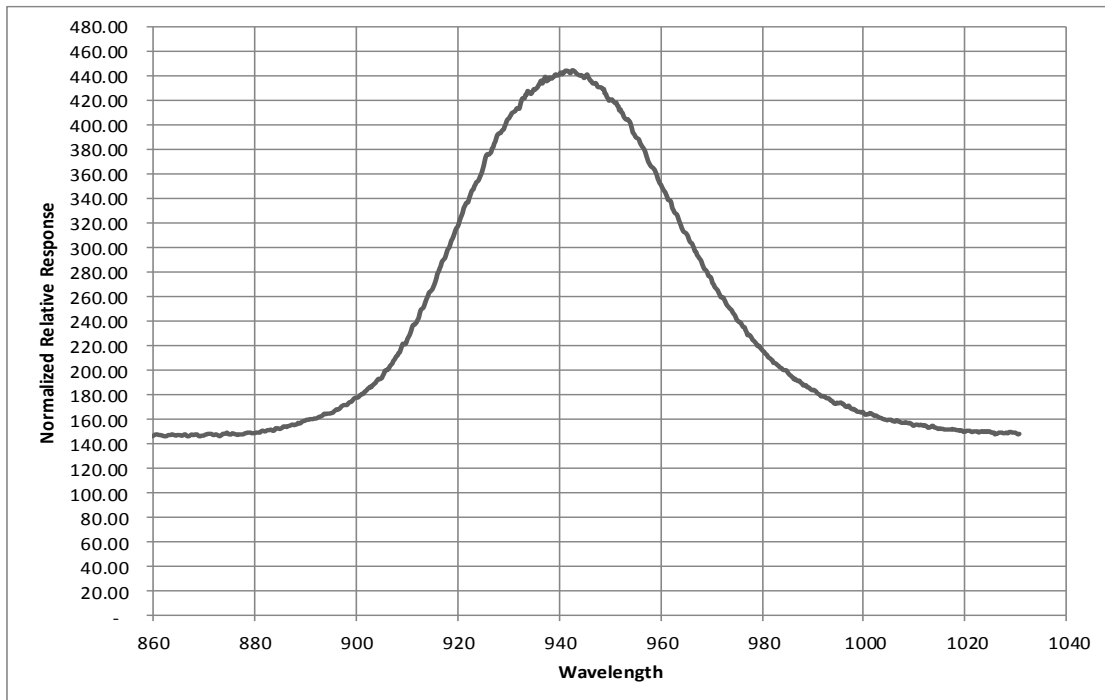
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Performance

Degradation curves of OP140 +/- 3 standard deviations
Conditions: $I_f = 20 \text{ mA}$



Spectral Response



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