

Plastic Infrared Emitting Diode

OP165, OP166 Series



Features:

- T-1 (3 mm) package style
- Choice of narrow or wide irradiance pattern
- Choice of dome lens or flat lens
- Mechanically and spectrally matched to other OPTEK devices
- Higher power output than GaAs at equivalent drive currents



Description:

Each device in the **OP165** and **OP166** series is a high intensity gallium arsenide infrared emitting diode (GaAIAs) that is molded in an IR transmissive clear epoxy package with either a dome or flat lens. Devices feature narrow and wide irradiance patterns and a variety of electrical characteristics. The small T-1 package style makes these devices ideal for space-limited applications.

OP165 and OP166 devices are mechanically and spectrally matched to the OP505 and OP535 series devices.

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

Applications:

- Space-limited applications
- Applications requiring coupling efficiency

| Ordering Information | | | | | |
|----------------------|---------------------|---|----------------------------------|------------------|-------------|
| Part Number | LED Peak Wavelength | Output Power (mW/cm ²) Min / Max | I _F (mA) Typ / Max | Total Beam Angle | Lead Length |
| OP165A | 935 nm | 1.95 / NA | 20 / 50 | 18° | 0.50" |
| OP165B | | 1.40 / 2.20 | | | |
| OP165C | | 0.85 / 1.60 | | | |
| OP165D | | 0.28 / NA | | 90° | |
| OP165W | | 0.50 / NA | | | |
| OP166A | | 1.95 / NA | | 18° | |
| OP166B | | 1.40 / 2.20 | | | |
| OP166W | | 0.50 / NA | | 90° | |



RoHS

General Note

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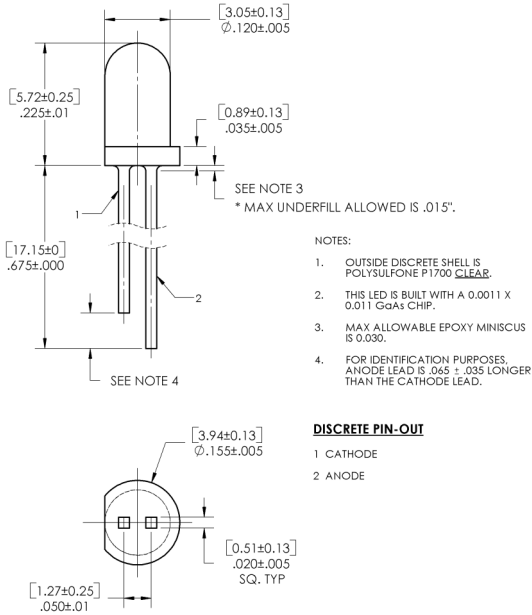
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Plastic Infrared Emitting Diode

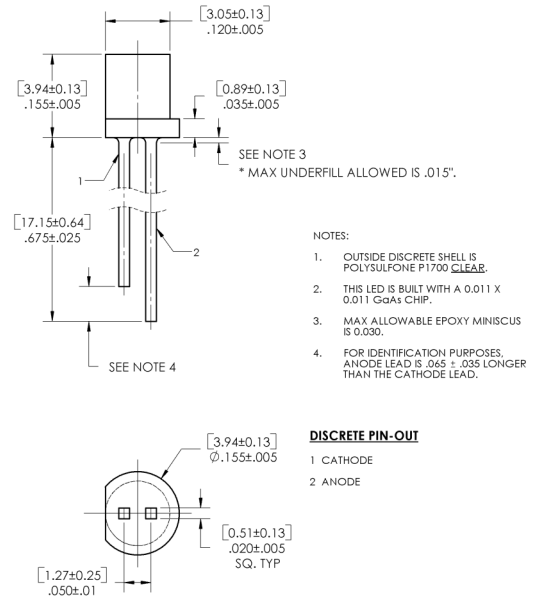
OP165, OP166 Series



OP165 (A, B, C, D)



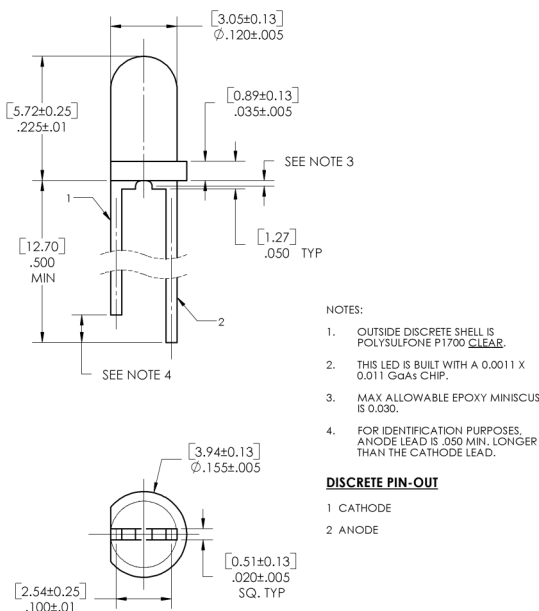
OP165W



DIMENSIONS ARE IN: [MILLIMETERS]
INCHES

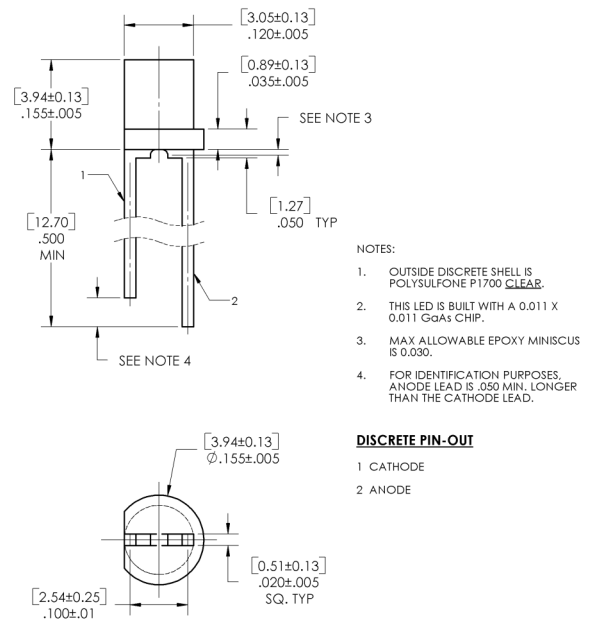
OP166 (A, B)

* MAX UNDERFILL ALLOWED IS .015".
** ELBOW OF LEADFRAME NOT MORE THAN .005" FROM FLANGE.



OP166W

* MAX UNDERFILL ALLOWED IS .015".
** ELBOW OF LEADFRAME NOT MORE THAN .005" FROM FLANGE.



| Pin # | LED |
|-------|---------|
| 1 | Cathode |
| 2 | Anode |

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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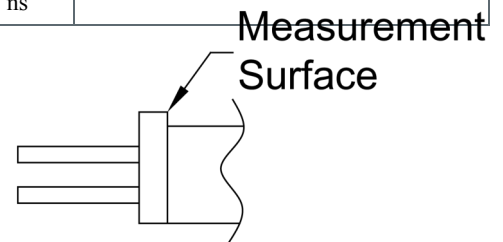


Electrical Specifications

| Absolute Maximum Ratings (T _A = 25° C unless otherwise noted) | |
|---|-----------------------|
| Storage and Operating Temperature Range | -40° C to +100° C |
| Reverse Voltage | 2.0 V |
| Continuous Forward Current | 50 mA |
| Peak Forward Current (1 μs pulse width, 300 pps) | 3.0 A |
| Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 seconds with soldering iron] | 260° C |
| Power Dissipation | 100 mW ⁽¹⁾ |

| Electrical Characteristics (T _A = 25° C unless otherwise noted) | | | | | | |
|--|--|------|------|------|--------------------|---|
| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
| Input Diode | | | | | | |
| E _{E (APT)} | Apertured Radiant Incidence OP165A, OP166A | 1.95 | - | - | mW/cm ² | I _F = 20 mA ⁽²⁾ |
| P _O | Radiant Power Output OP165W, OP166W | 0.50 | - | - | mW | I _F = 20 mA |
| V _F | Forward Voltage | - | - | 1.60 | V | I _F = 20 mA |
| I _R | Reverse Current | - | - | 100 | μA | V _R = 2 V |
| λ _p | Wavelength at Peak Emission | - | 935 | - | nm | I _F = 10 mA |
| B | Spectral Bandwidth between Half Power Points | - | 50 | - | nm | I _F = 10 mA |
| Δλ _p /ΔT | Spectral Shift with Temperature OP165, OP166 (A, B, C, D) OP165W, OP166W | - | - | - | nm/°C | I _F = Constant |
| θ _{HP} | Emission Angle at Half Power Points OP165, OP166 (A, B, C, D) OP165W, OP166W | - | 18 | - | Degree | I _F = 20 mA |
| t _r | Output Rise Time | - | 1000 | - | ns | I _{F(PK)} = 100 mA, PW = 10 μs, D.C. = 10.0% |
| Notes: | Output Fall Time | - | 500 | - | ns | |

- Derate linearly 1.33 mW/°C above 25°C
- E_{E(APT)} is a measurement of the average apertured radiant incidence upon a sensing area 0.081" (2.06 mm) in diameter, perpendicular to and centered on the mechanical axis of the lens, and 0.590" (14.99 mm) from the measurement surface. E_{E(APT)} is not necessarily uniform within the measured areas.



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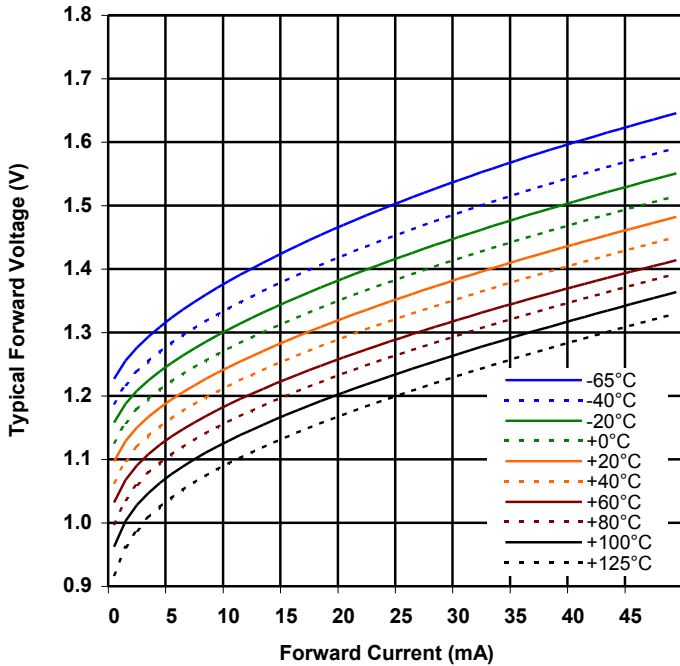
OP165, OP166 Series



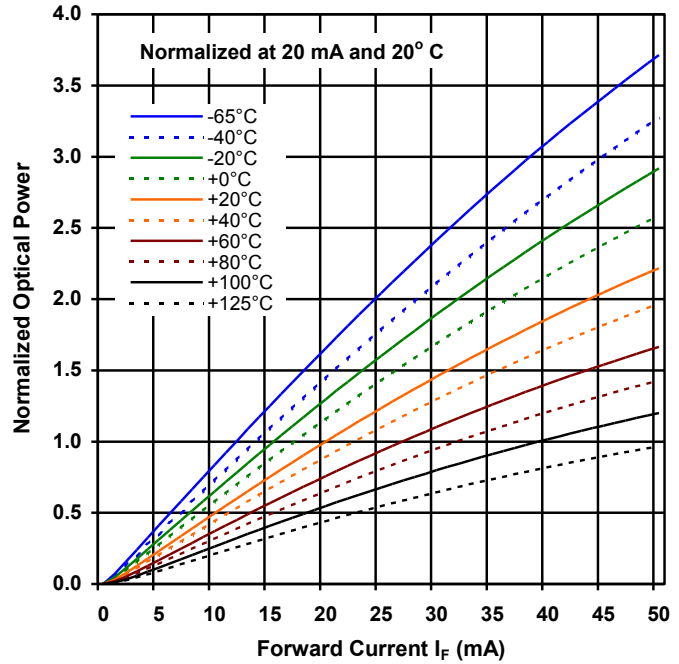
Performance

OP165, OP166 (A, B, C, D, W)

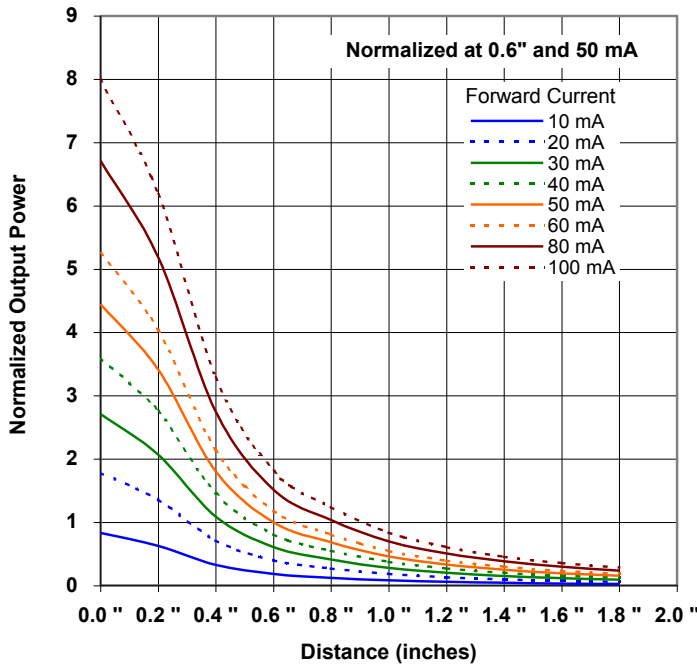
Forward Voltage vs Forward Current vs Temperature



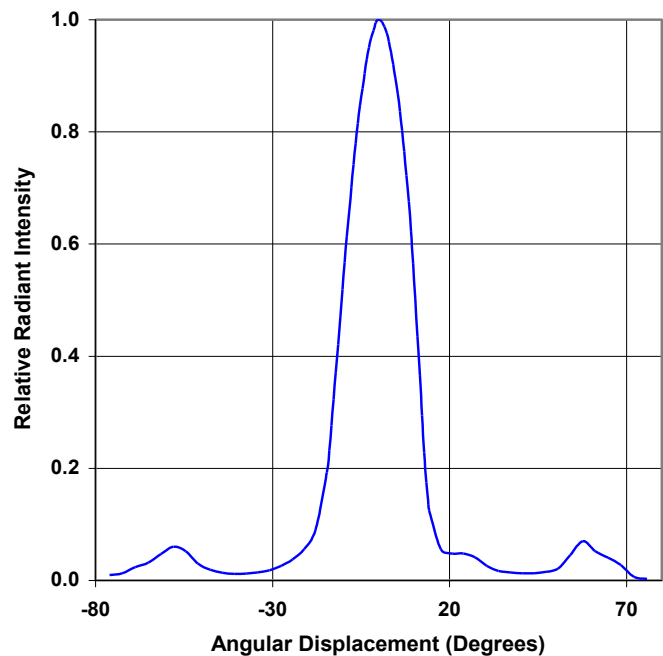
Optical Power vs I_F vs Temp



Distance vs Output Power vs Forward Current



Relative Radiant Intensity vs Angular Displacement



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