

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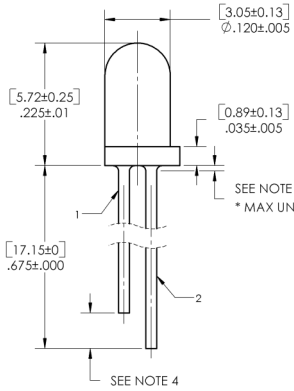
OPTEK Technology, Inc.
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www.optekinc.com | www.ttelectronics.com

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OP165, OP166 Series



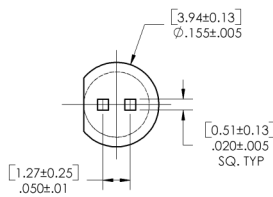
OP165 (A, B, C, D)



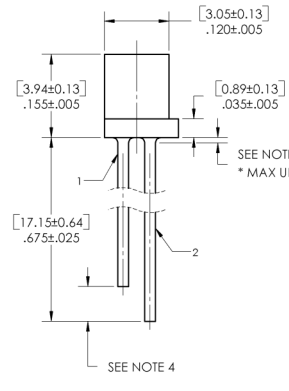
- NOTES:
1. OUTSIDE DISCRETE SHELL IS POLYSULFONE P1700 CLEAR.
 2. THIS LED IS BUILT WITH A 0.0011 X 0.011 GaAs CHIP.
 3. MAX ALLOWABLE EPOXY MINISCUS IS 0.030.
 4. FOR IDENTIFICATION PURPOSES, ANODE LEAD IS .065 ± .035 LONGER THAN THE CATHODE LEAD.

DISCRETE PIN-OUT

- 1 CATHODE
- 2 ANODE



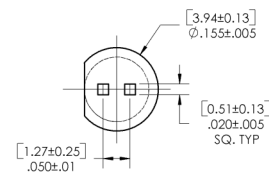
OP165W



- NOTES:
1. OUTSIDE DISCRETE SHELL IS POLYSULFONE P1700 CLEAR.
 2. THIS LED IS BUILT WITH A 0.011 X 0.011 GaAs CHIP.
 3. MAX ALLOWABLE EPOXY MINISCUS IS 0.030.
 4. FOR IDENTIFICATION PURPOSES, ANODE LEAD IS .065 ± .035 LONGER THAN THE CATHODE LEAD.

DISCRETE PIN-OUT

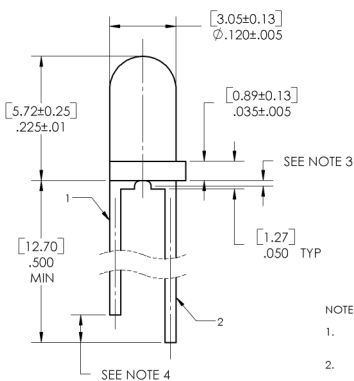
- 1 CATHODE
- 2 ANODE



DIMENSIONS ARE IN: [MILLIMETERS] INCHES

OP166 (A, B)

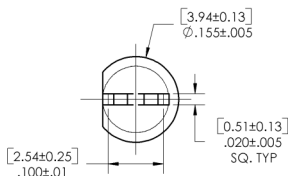
* MAX UNDERFILL ALLOWED IS .015".
** ELBOW OF LEADFRAME NOT MORE THAN .005" FROM FLANGE.



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 3. MAX ALLOWABLE EPOXY MINISCUS IS 0.030.
 4. FOR IDENTIFICATION PURPOSES, ANODE LEAD IS .050 MIN. LONGER THAN THE CATHODE LEAD.

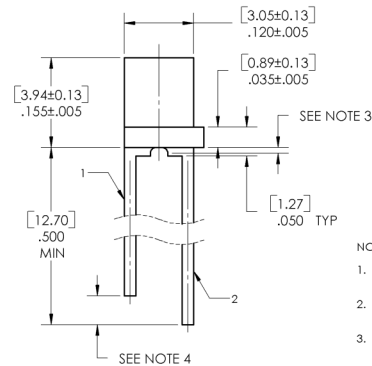
DISCRETE PIN-OUT

- 1 CATHODE
- 2 ANODE



OP166W

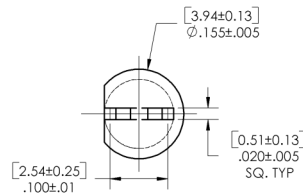
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- NOTES:
1. OUTSIDE DISCRETE SHELL IS POLYSULFONE P1700 CLEAR.
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DISCRETE PIN-OUT

- 1 CATHODE
- 2 ANODE



| 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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OP165, OP166 Series



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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Performance

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

Forward Voltage vs Forward Current vs Temperature



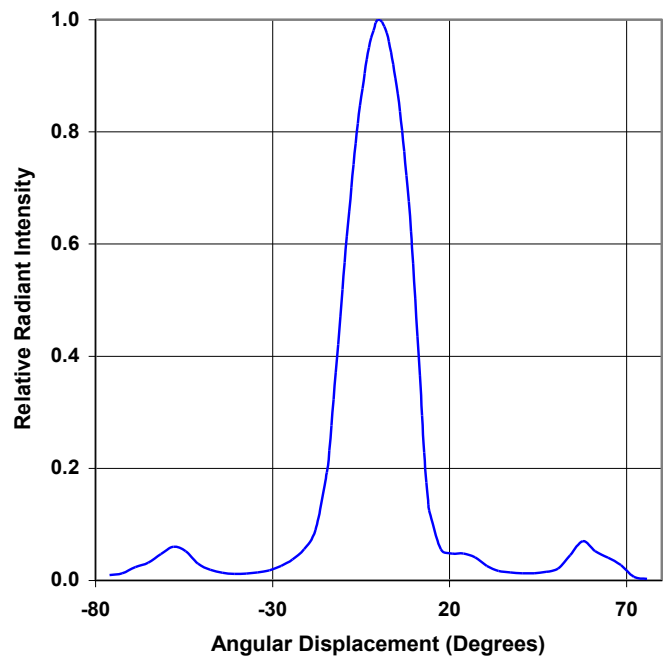
Optical Power vs I_F vs Temp



Distance vs Output Power vs Forward Current



Relative Radiant Intensity vs Angular Displacement



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