

# 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 <sup>2</sup> ) Min / Max	I <sub>F</sub> (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			



RoHS

### General Note

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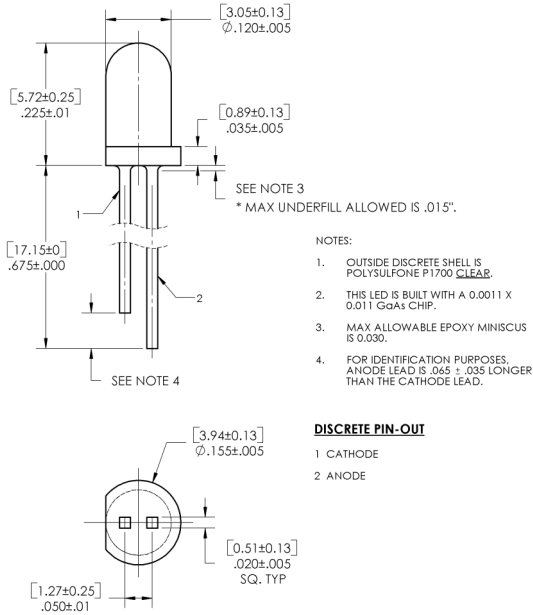
OPTEK Technology, Inc.  
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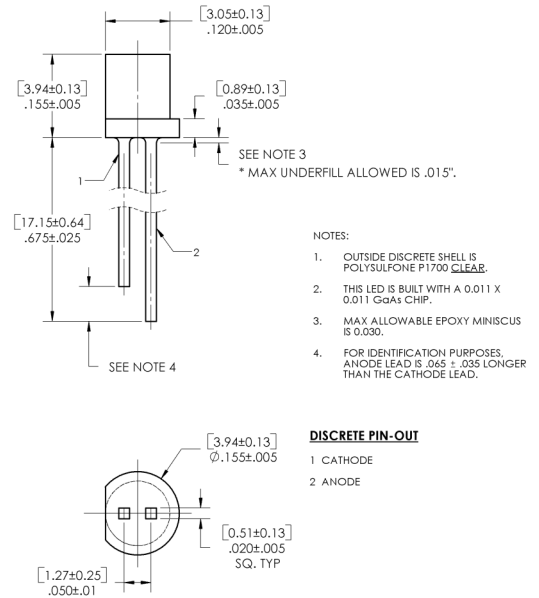
## OP165, OP166 Series



### OP165 (A, B, C, D)

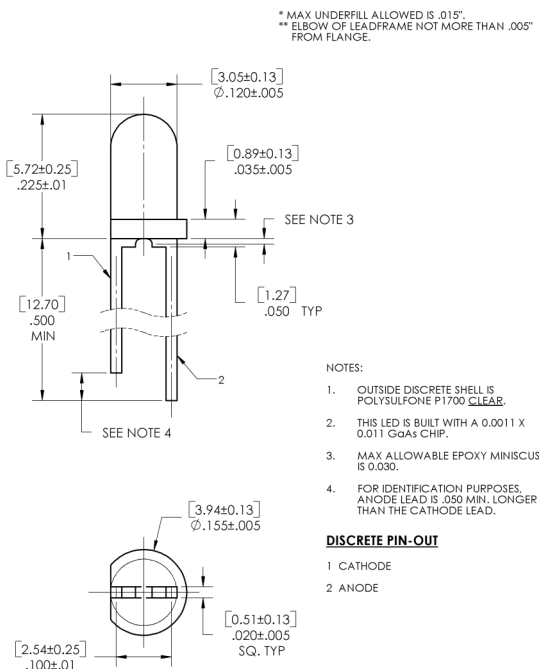


### OP165W

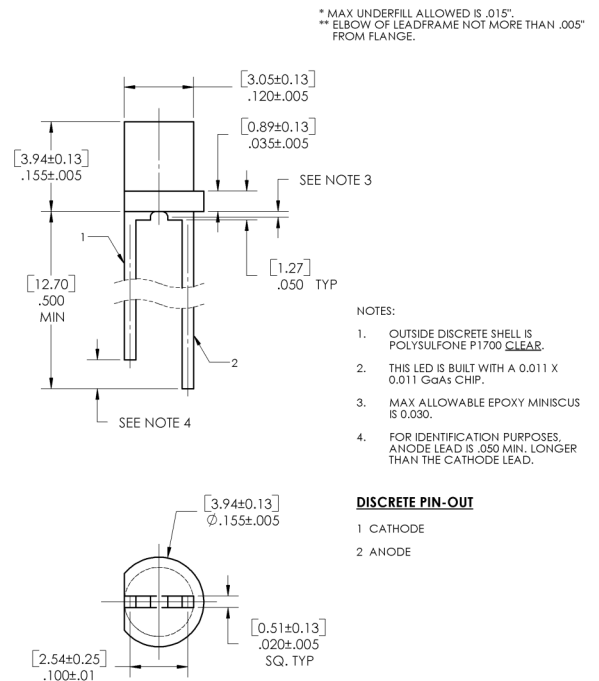


DIMENSIONS ARE IN: [MILLIMETERS]  
INCHES

### OP166 (A, B)



### OP166W



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

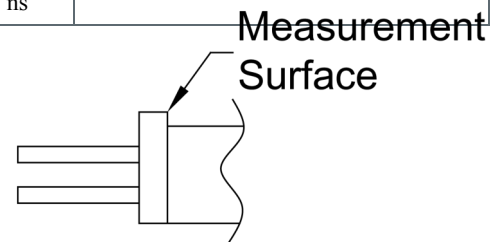


## Electrical Specifications

Absolute Maximum Ratings (T <sub>A</sub> = 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 <sup>(1)</sup>

Electrical Characteristics (T <sub>A</sub> = 25° C unless otherwise noted)						
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
<b>Input Diode</b>						
E <sub>E (APT)</sub>	Apertured Radiant Incidence OP165A, OP166A	1.95	-	-	mW/cm <sup>2</sup>	I <sub>F</sub> = 20 mA <sup>(2)</sup>
P <sub>O</sub>	Radiant Power Output OP165W, OP166W	0.50	-	-	mW	I <sub>F</sub> = 20 mA
V <sub>F</sub>	Forward Voltage	-	-	1.60	V	I <sub>F</sub> = 20 mA
I <sub>R</sub>	Reverse Current	-	-	100	μA	V <sub>R</sub> = 2 V
λ <sub>p</sub>	Wavelength at Peak Emission	-	935	-	nm	I <sub>F</sub> = 10 mA
B	Spectral Bandwidth between Half Power Points	-	50	-	nm	I <sub>F</sub> = 10 mA
Δλ <sub>p</sub> /ΔT	Spectral Shift with Temperature OP165, OP166 (A, B, C, D) OP165W, OP166W	-	-	-	nm/°C	I <sub>F</sub> = Constant
θ <sub>HP</sub>	Emission Angle at Half Power Points OP165, OP166 (A, B, C, D) OP165W, OP166W	-	18	-	Degree	I <sub>F</sub> = 20 mA
t <sub>r</sub>	Output Rise Time	-	1000	-	ns	I <sub>F(PK)</sub> = 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<sub>E(APT)</sub> 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<sub>E(APT)</sub> is not necessarily uniform within the measured areas.



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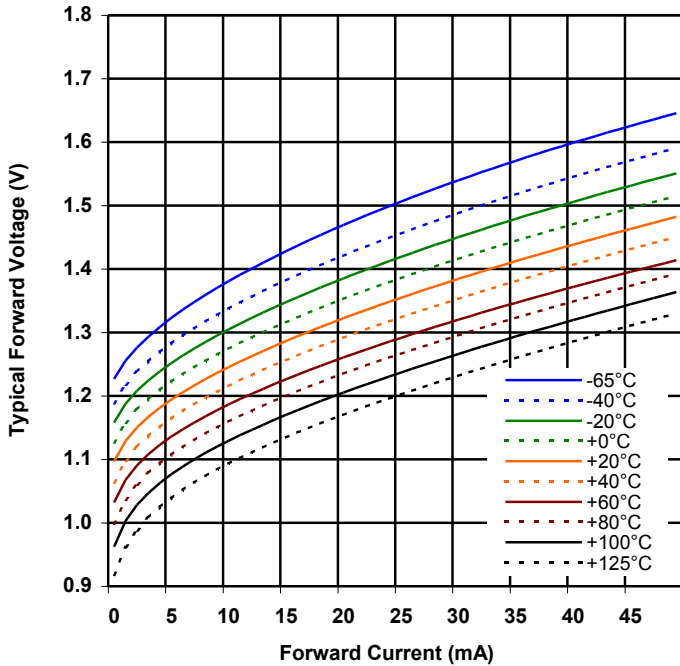
OP165, OP166 Series



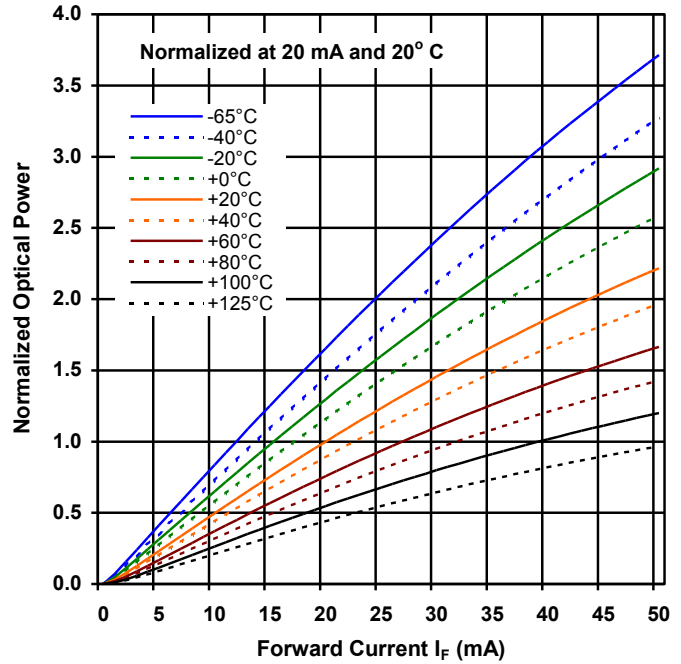
## Performance

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

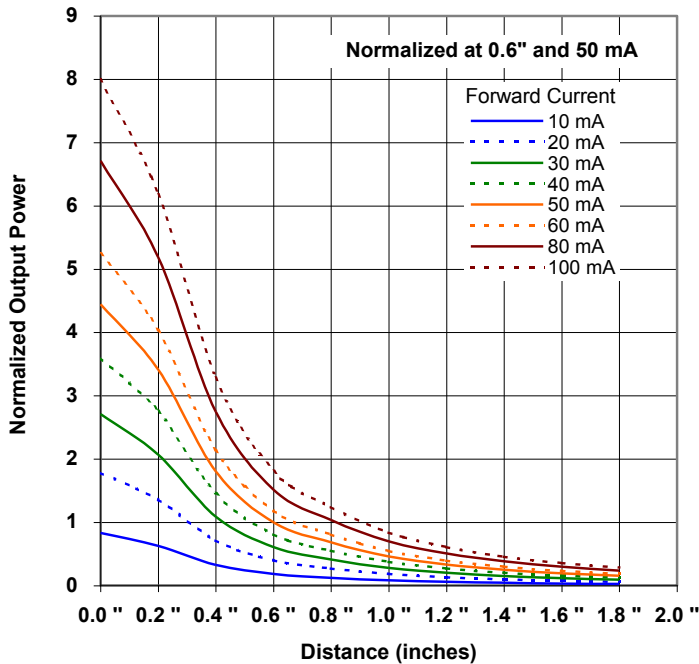
Forward Voltage vs Forward Current vs Temperature



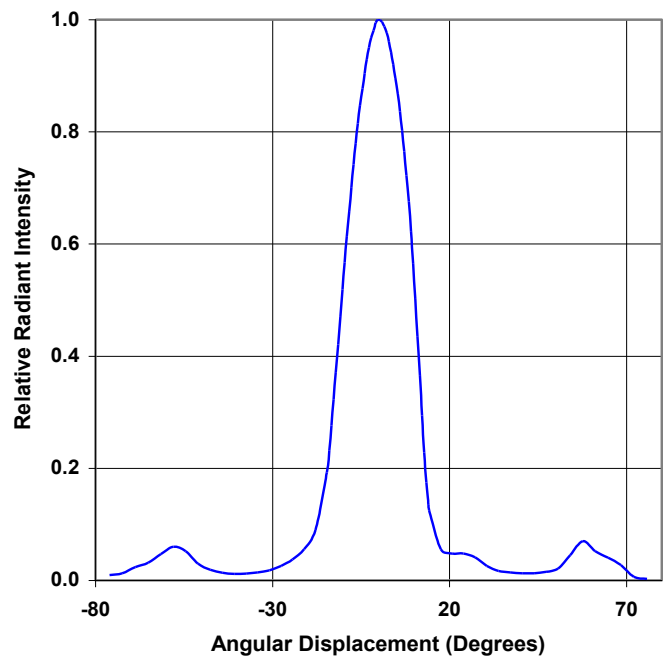
Optical Power vs  $I_F$  vs Temp



Distance vs Output Power vs Forward Current



Relative Radiant Intensity vs Angular Displacement



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