



# THE DATASHEET OF OP165A



# Plastic Infrared Emitting Diode

OP165 Series, OP166A, OP166B

Obsolete (OP166W)



## 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
- 935 nm diode

## Description:

Each device in the **OP165** and **OP166** series is a high intensity gallium arsenide infrared emitting diode (GaAs) 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
- Battery-operated or voltage-limited applications

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			
OP166B		1.40 / 2.20			
OP166W (Obsolete)		0.50 / NA		90°	



RoHS

## General Note

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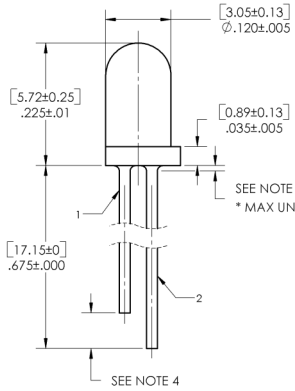
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Obsolete (OP166W)



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

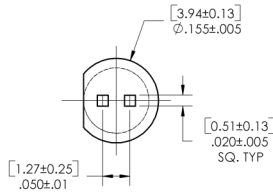


**NOTES:**

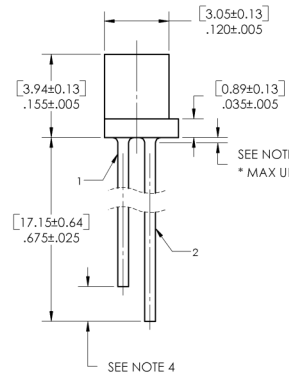
1. OUTSIDE DISCRETE SHELL IS POLYSULFONE P1700 CLEAR.
2. THIS LED IS BUILT WITH A 0.0011 X 0.011 GaAs CHIP.
3. MAX ALLOWABLE EPOXY MINISCUS IS 0.030.
4. FOR IDENTIFICATION PURPOSES, ANODE LEAD IS .065 ± .035 LONGER THAN THE CATHODE LEAD.

**DISCRETE PIN-OUT**

- 1 CATHODE
- 2 ANODE



### OP165W

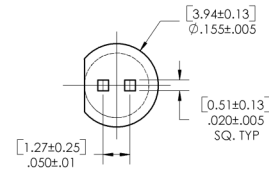


**NOTES:**

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**

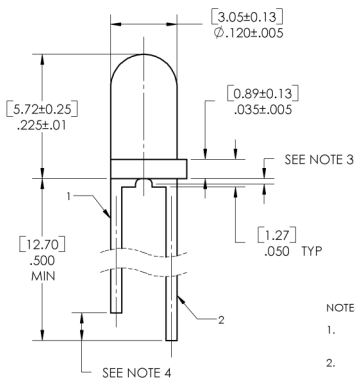
- 1 CATHODE
- 2 ANODE



### OP166 (A, B)

DIMENSIONS ARE IN: [MILLIMETERS] [INCHES]

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

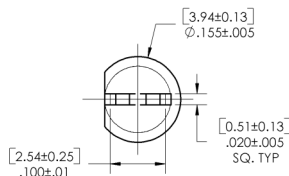


**NOTES:**

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 .050 MIN. LONGER THAN THE CATHODE LEAD.

**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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## Electrical Specifications

**Absolute Maximum Ratings** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

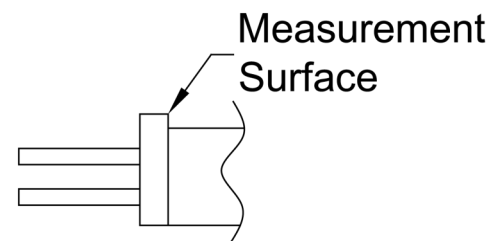
Storage and Operating Temperature Range	-40° C to +100° C
Reverse Voltage	2.0 V
Continuous Forward Current	50 mA
Peak Forward Current (1 $\mu\text{s}$ pulse width, 300 pps)	3.0 A
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 seconds with soldering iron]	260° C
Power Dissipation	100 mW <sup>(1)</sup>

**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
<b>Input Diode</b>						
$E_{E(APT)}$	Apertured Radiant Incidence OP165A, OP166A	1.95	-	-	mW/cm <sup>2</sup>	$I_F = 20\text{ mA}^{(2)}$
$P_O$	Radiant Power Output OP165W	0.50	-	-	mW	$I_F = 20\text{ mA}$
$V_F$	Forward Voltage	-	-	1.60	V	$I_F = 20\text{ mA}$
$I_R$	Reverse Current	-	-	100	$\mu\text{A}$	$V_R = 2\text{ V}$
$\lambda_P$	Wavelength at Peak Emission	-	935	-	nm	$I_F = 10\text{ mA}$
B	Spectral Bandwidth between Half Power Points	-	50	-	nm	$I_F = 10\text{ mA}$
$\Delta\lambda_P/\Delta T$	Spectral Shift with Temperature OP165 (A, B, C, D), OP166 (A, B) OP165W	-	-	-	nm/° C	$I_F = \text{Constant}$
$\theta_{HP}$	Emission Angle at Half Power Points OP165 (A, B, C, D), OP166 (A, B) OP165W	-	18	-	Degree	$I_F = 20\text{ mA}$
		-	90	-		
$t_r$	Output Rise Time	-	1000	-	ns	$I_{F(PK)} = 100\text{ mA}$ , PW = 10 $\mu\text{s}$ , D.C. = 10.0 %
$t_f$	Output Fall Time	-	500	-		

Notes:

- 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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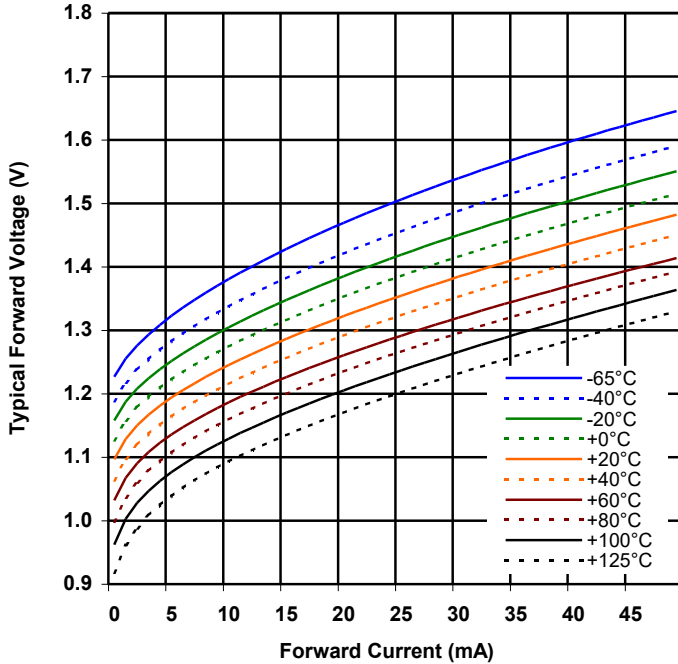
Obsolete (OP166W)



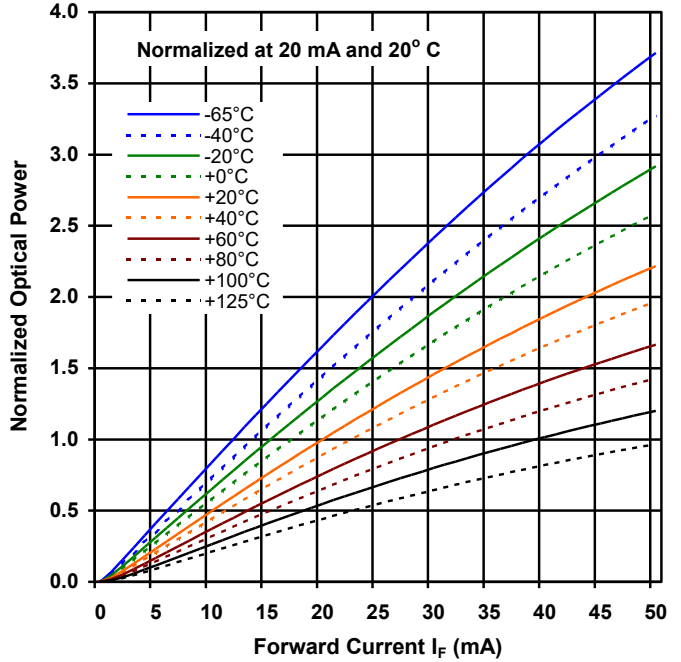
## Performance

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

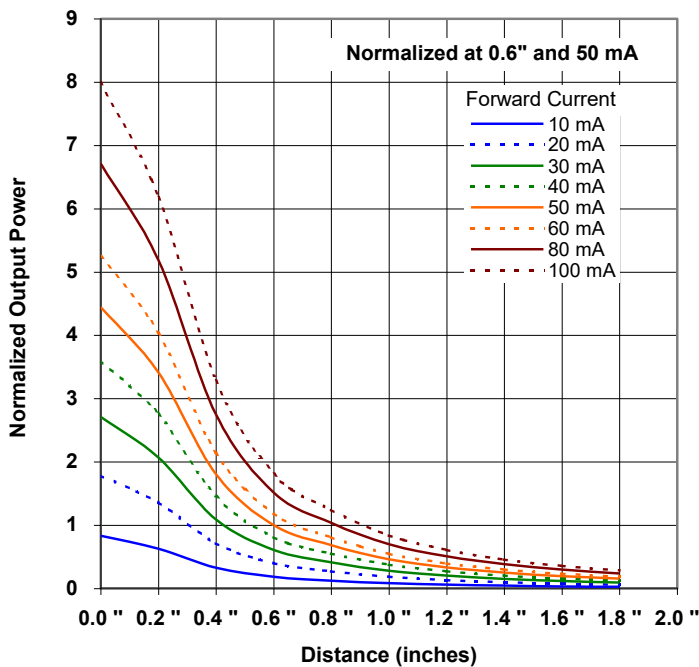
Forward Voltage vs Forward Current vs Temperature



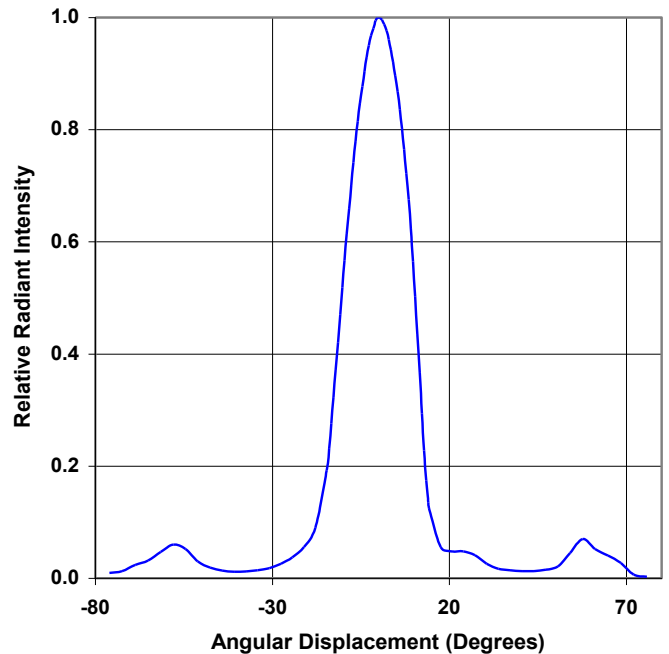
Optical Power vs  $I_F$  vs Temp



Distance vs Output Power vs Forward Current



Relative Radiant Intensity vs Angular Displacement



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