Hermetic Infrared Emitting Diode

OP230 Series



Features:

- Focused and non-focused optical light pattern
- Enhanced temperature range
- TO-46 hermetically sealed package
- Mechanically and spectrally matched to other Optek devices
- Choice of power ranges
- Choice of narrow or wide irradiance pattern

Description:

Each device in this series is a gallium aluminum arsenide (GaAlAs) infrared emitting diode, mounted in a hermetic metal TO-46 housing. The gallium aluminum arsenide feature provides a higher radiated output than gallium arsenide at the same forward current.

Each **OP231**, **OP232**, **OP233**, **OP234** and **OP235** device is lensed to provide a narrow beam angle (18°) between half power points. The 890 nm wavelength closely matches the spectral response of silicon phototransistors, while the narrow beam angle – combined with the specified radiant intensity of the OP231 series – facilitates easy design in beam interrupt applications in conjunction with the OP800 or OP598 series photosensors. The OP231 series is mechanically and spectrally matched to OP800, OP593 and OP598 phototransistors.

Each **OP232W**, **OP233W**, **OP234W** and **OP235W** device is lensed to provide a wide beam angle (50°) between half power points. The 890 nm wavelength closely matches the spectral response of silicon phototransistors, while the wide beam angle provides relatively even illumination over a large area. The OP23xW series is mechanically and spectrally matched to the OP800WSL and OP830SL series devices.

Please refer to Application Bulletin 210 for additional thermal design information.

Custom electrical, wire and cabling and connectors are available. Contact your local representative or OPTEK for more information.

Applications:

- Non-contact reflective object sensor
- Assembly line automation
- Machine automation
- Machine safety
- End of travel sensor
- Door sensor

Ordering Information

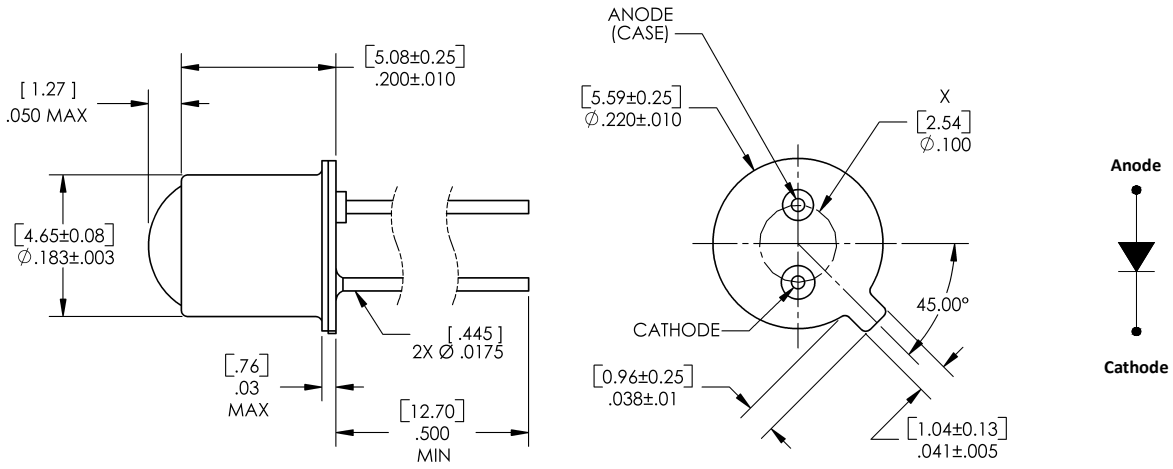
Part Number	LED Peak Wavelength	Output Power (mW/cm^2) Min / Max	Total Beam Angle	Lead Length
OP231	890 nm	1.5 / NA	18°	0.50”
OP232		2.0 / 6.0		
OP233		3.0 / NA		
OP234	850 nm	5.0 / NA		
OP235		6.0 / NA		
OP232W	890 nm	3.5 / 7.0	50°	
OP233W		5.0 / NA		
OP234W	850 nm	5.0 / NA		
OP235W		6.0 / NA		

General Note
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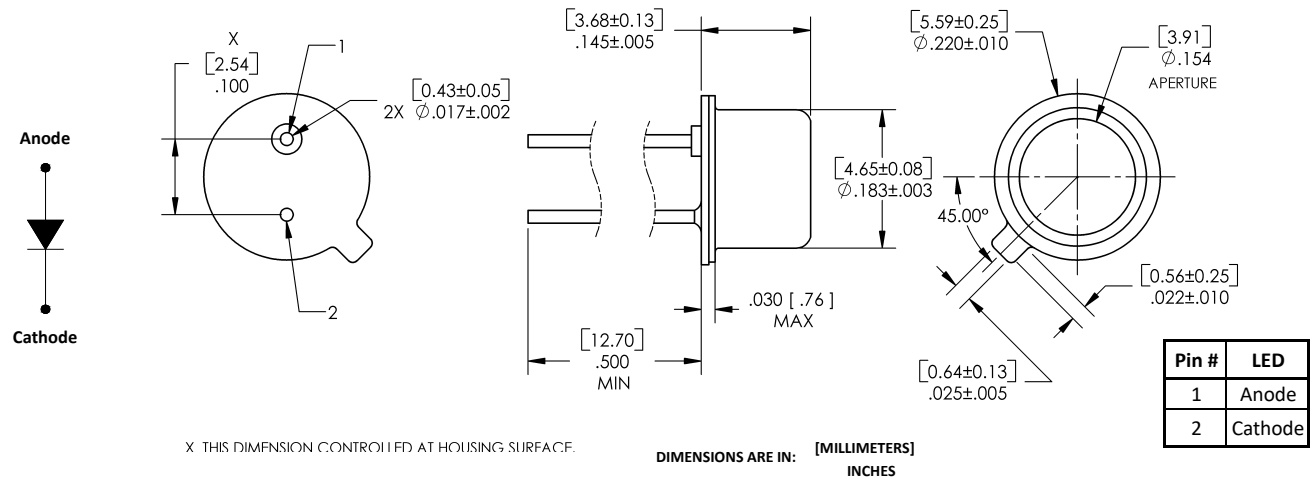
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Electrical Specifications



X THIS DIMENSION CONTROLLED AT HOUSING SURFACE.

OP232W, OP233W, OP234W, OP235W



X THIS DIMENSION CONTROLLED AT HOUSING SURFACE.

Pin #	LED
1	Anode
2	Cathode

Absolute Maximum Ratings (T_A = 25° C unless otherwise noted)

Storage Temperature Range	-65° C to +150° C
Operating Temperature Range	-65° C to +125° C
Reverse Voltage	2.0 V
Continuous Forward Current	100 mA
Peak Forward Current (2 µS pulse width, 0.1% duty cycle)	10.0 A
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 seconds with soldering iron] (1)	260° C
Power Dissipation (2)	200 mW

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Electrical Specifications

Electrical Characteristics (T_A = 25° C unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode						
$E_{E(APT)}$ (3)(4)	Apertured Radiant Incidence					
	OP231	1.5	-	-	mW/cm²	I_F = 100 mA Aperture = 0.250” Distance = 1.429”
	OP232	2.0	-	6.0		
	OP233	3.0	-	-		
	OP234	5.0	-	-		
	OP235	6.0	-	-		
	OP232W	3.5	-	7.0	mW/cm²	I_F = 100 mA Aperture = 0.250” Distance = 0.466”
	OP233W	5.0	-	-		
	OP234W	5.0	-	-		
	OP235W	6.0	-	-		
P_O (3)	Radiant Power Output				mW	I_F = 100 mA
	OP231	-	6.0	-		
	OP232	-	8.0	-		
	OP233	-	10.0	-		
V_F (3)	Forward Voltage	1.0	-	2.0	V	I_F = 100 mA
I_R	Reverse Current	-	-	100	µA	V_R = 2.0 V
λ_P	Wavelength at Peak Emission				nm	I_F = 10 mA
	OP231, OP232, OP233	-	890	-		
	OP234, OP235	-	850	-		
β	Spectral Bandwidth between Half Power Points	-	80	-	nm	I_F = 10 mA
$\Delta\lambda_P / \Delta_T$	Spectral Shift with Temperature	-	+0.30	-	nm/° C	I_F = Constant
θ_{HP}	Emission Angle at Half Power Points				Degree	I_F = 100 mA
	OP231 - OP235	-	18	-		
	OP232W - OP235W	-	50	-		
t_r	Output Rise Time	-	500	-	ns	$I_{F(PK)}$ = 100 mA, PW = 10 µs, and D.C. = 10.0 %
t_f	Output Fall Time	-	250	-	ns	

Notes:

(1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.

(2) Derate linearly 1.80 mW/° C above 25° C.

(3) Measurement made with 100 µs pulse measured at the trailing edge of the pulse with a duty cycle of 0.1 % and an I_F = 100 mA.

(4) For the OP231 series, $E_{E(APT)}$ is a measurement of the average radiant intensity within the cone formed by the measurement surface, a radius of 1.429” (36.30 mm) measured from the lens side of the tab to the sensing surface and a sensing surface of 0.250” (6.35 mm) in diameter forming a 10° cone. For the OP23xW series, $E_{E(APT)}$ is a measurement of the average radiant intensity within the cone formed by the measurement surface, a radius of 0.466” (11.84 mm) measured from the lens side of the tab to the sensing surface and a sensing surface of 0.250” (6.35 mm) in diameter forming a 10° cone. $E_{E(APT)}$ is not necessarily uniform within the measured area.

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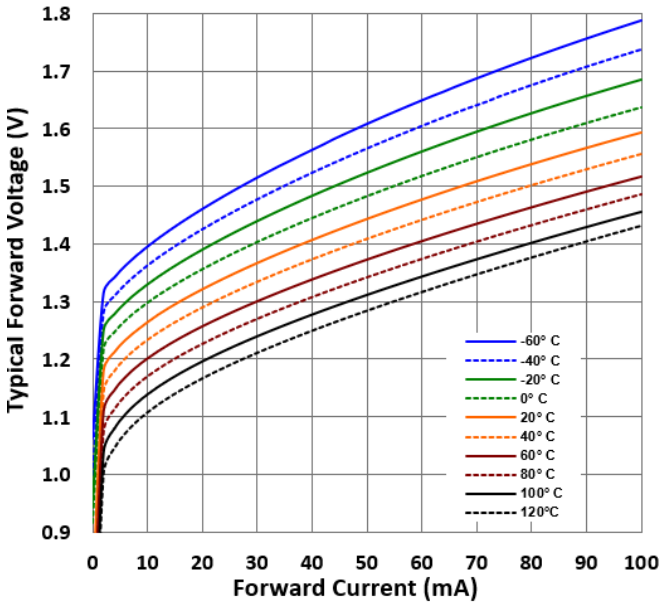
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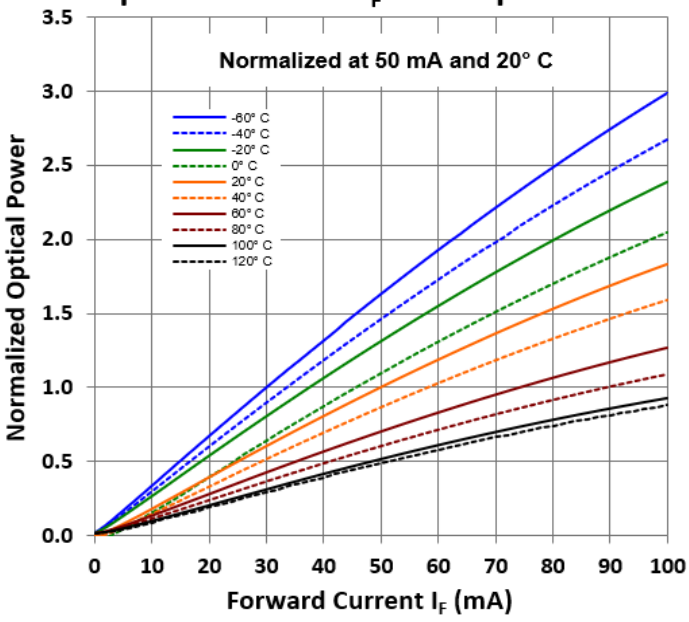
Typical Performance

OP231, OP232, OP233 (including "W" devices)

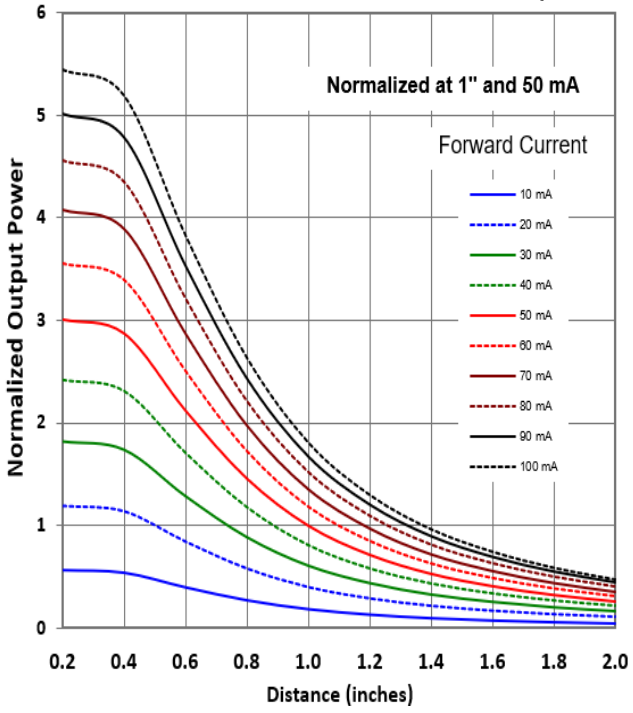
LED Forward Voltage vs I_F vs Temp



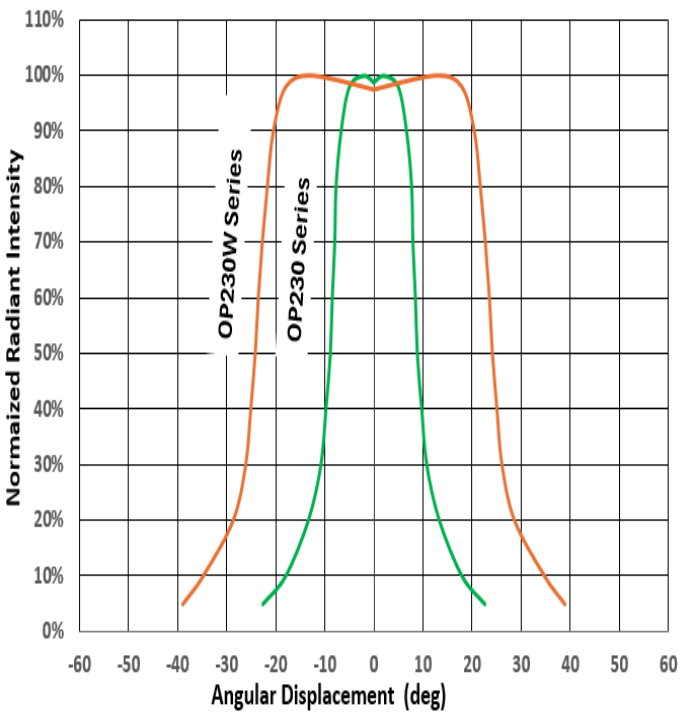
Optical Power vs I_F vs Temperature



Distance vs Output Power vs I_F



Normalized Radiant Intensity vs Angular Displacement



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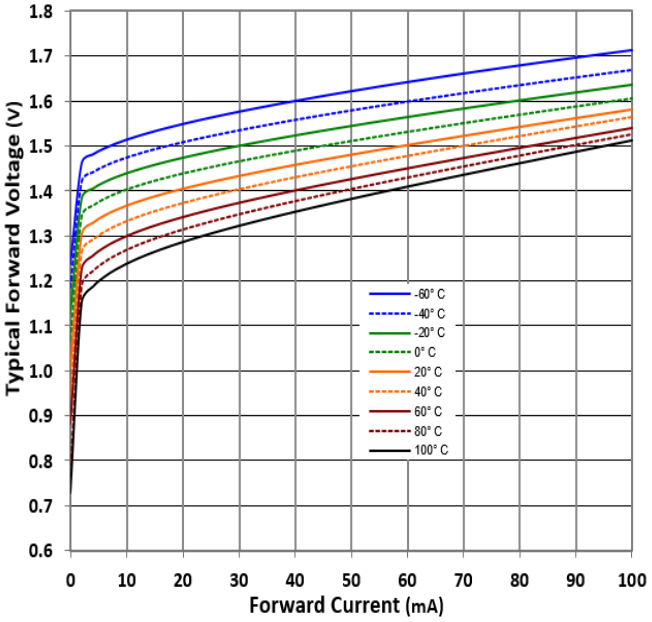
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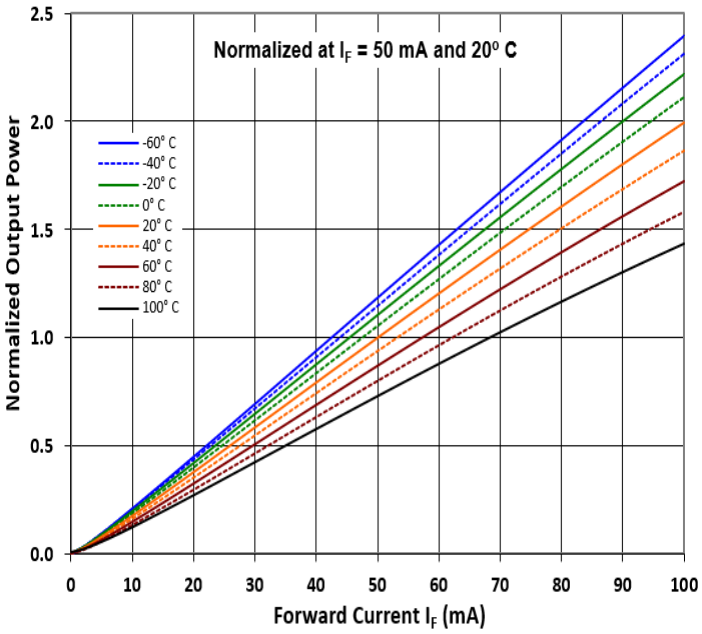
Typical Performance

OP234, OP234W

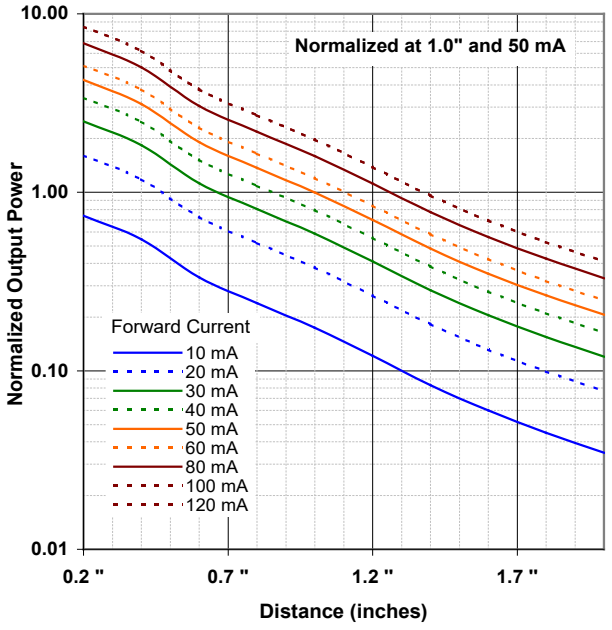
Forward Voltage vs Forward Current vs Temperature



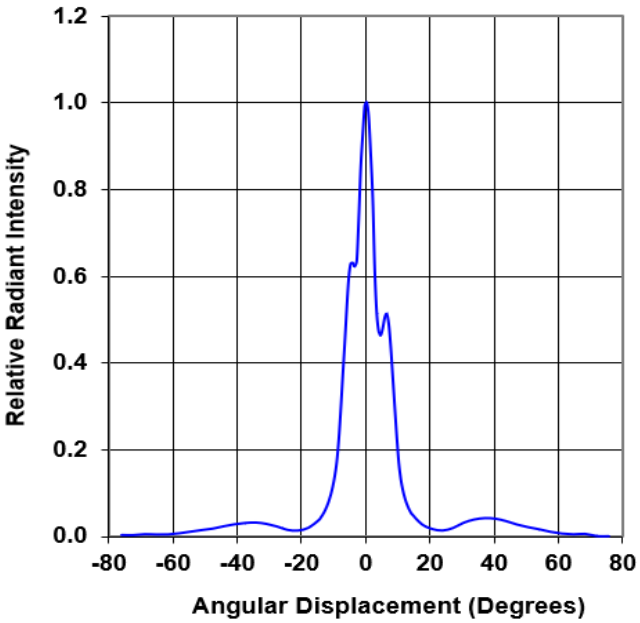
Optical Power vs Forward Current vsTemperature



Distance vs Output Power vs Forward Current



Relative Radiant Intensity vs Angular Displacement



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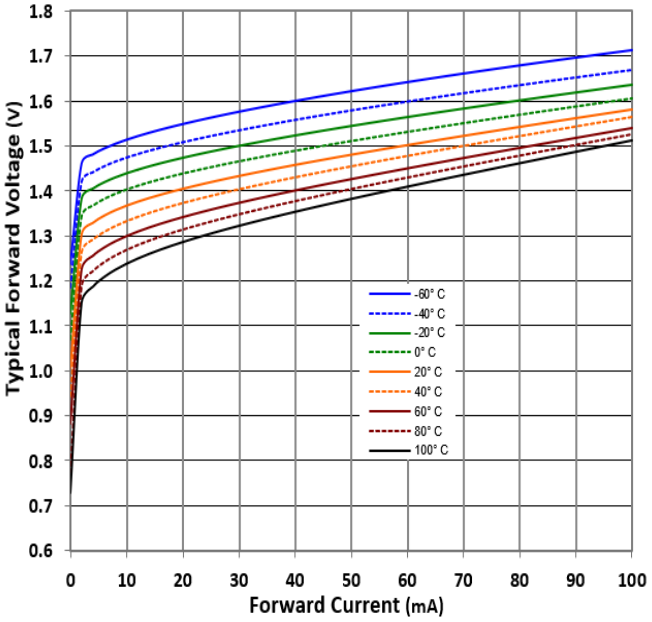
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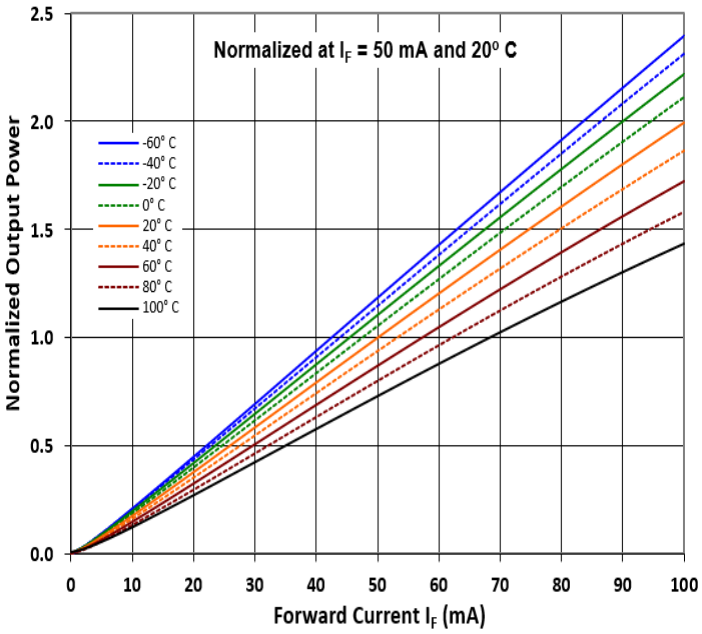
Typical Performance

OP235, OP235W

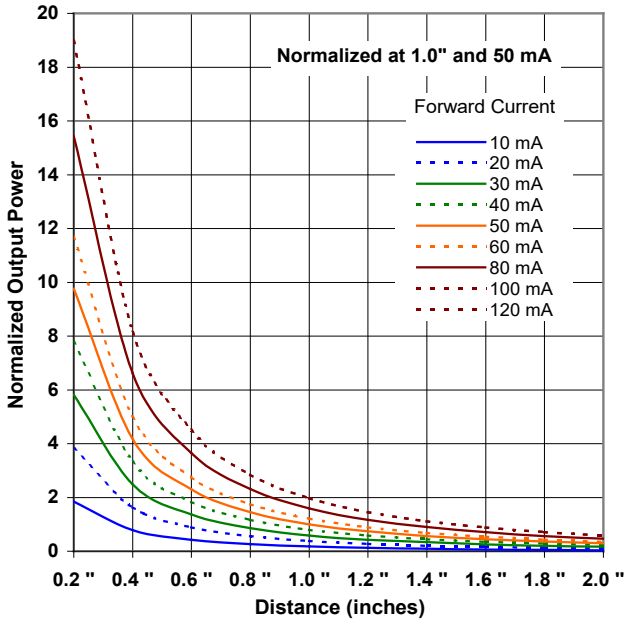
Forward Voltage vs Forward Current vs Temperature



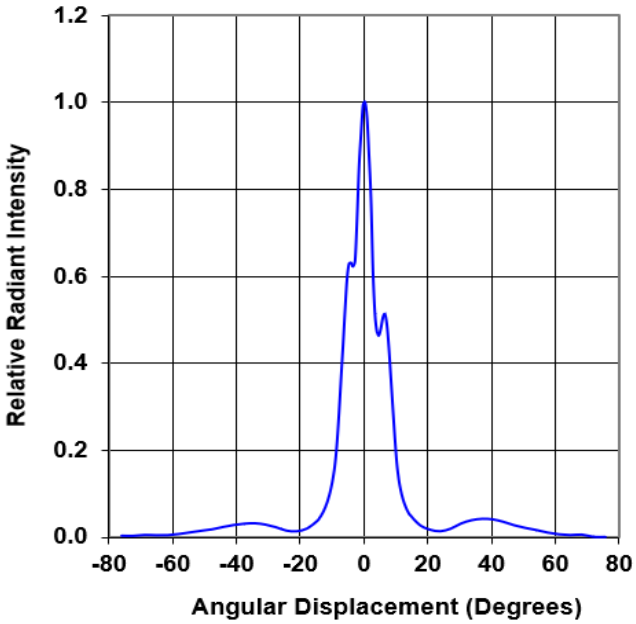
Optical Power vs Forward Current vsTemperature



Distance vs Output Power vs Forward Current



Relative Radiant Intensity vs Angular Displacement



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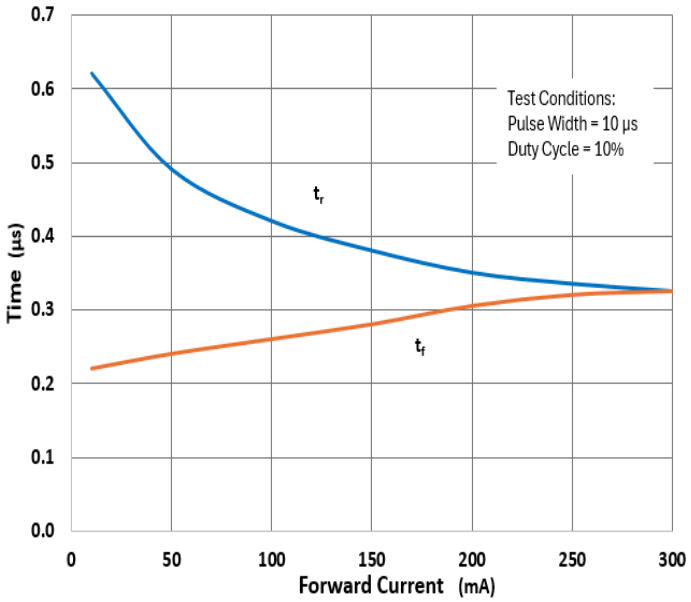
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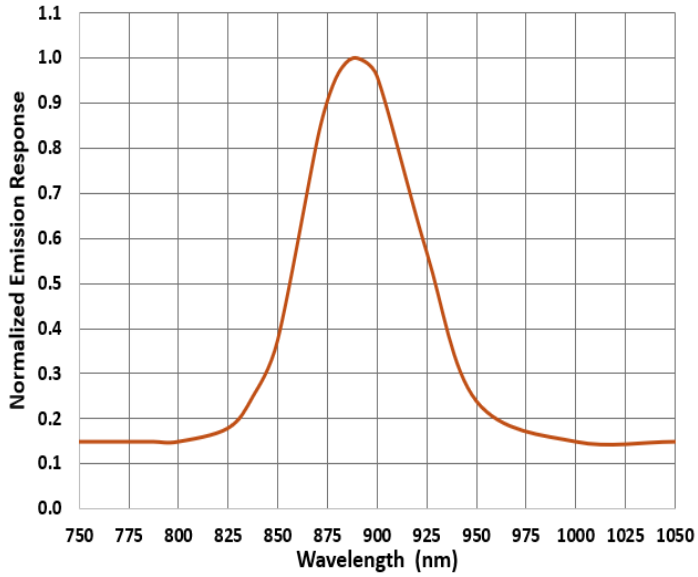
Typical Performance

OP231, OP232, OP233, OP233W

Rise and Fall Time vs Forward Current



GaAlAs LED Spectral Output



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