

# Hermetic Infrared Emitting Diode

## OP230 Series

Obsolete (OP231W)



### 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 photo-transistors, 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 Bulletins 208 and 210 for additional design information and reliability (degradation) data.*

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 <sup>2</sup> ) Min / Max	Total Beam Angle	Lead Length
<b>OP231</b>	890 nm	1.5 / NA	18°	0.50"
<b>OP232</b>		2.0 / 6.0		
<b>OP233</b>		3.0 / NA		
<b>OP234</b>		5.0 / NA		
<b>OP235</b>		6.0 / NA		
<b>OP231W (Obsolete)</b>	890 nm	1.5 / NA	50°	
<b>OP232W</b>		3.5 / 7.0		
<b>OP233W</b>		5.0 / NA		
<b>OP234W</b>		5.0 / NA		
<b>OP235W</b>	850 nm	6.0 / NA		

#### General Note

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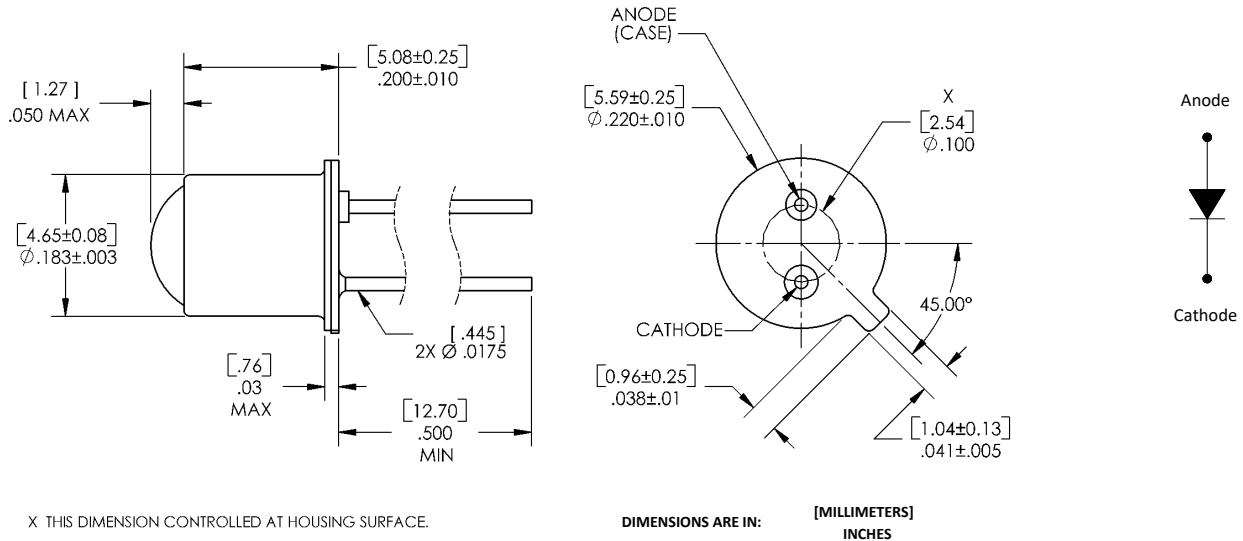
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## OP230 Series

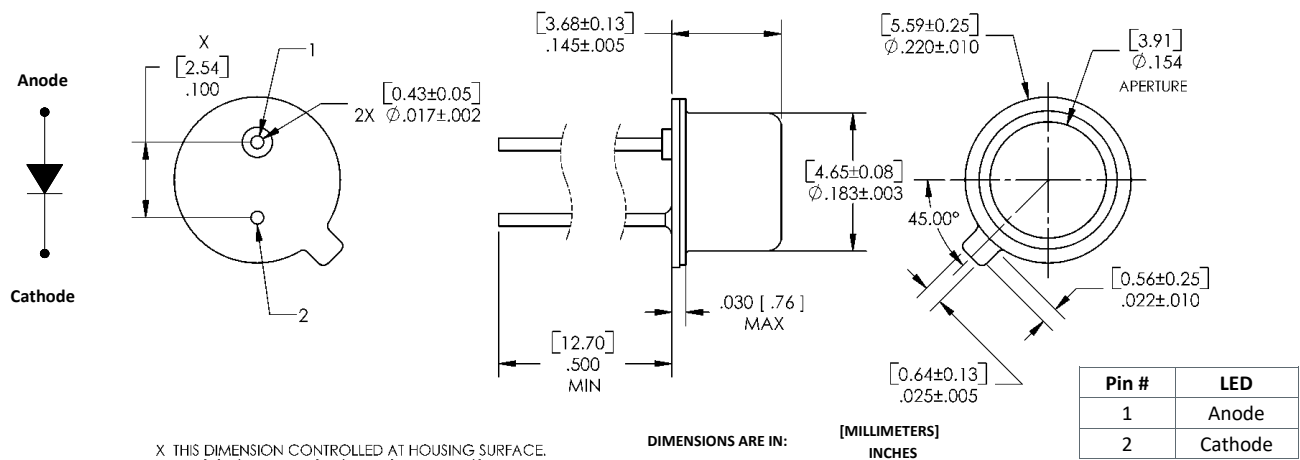
Obsolete (OP231W)



### Electrical Specifications



### OP232W, OP233W, OP234W, OP235W



### Absolute Maximum Ratings (T<sub>A</sub> = 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	10.0 A
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 seconds with soldering iron]	260° C <sup>(1)</sup>
Power Dissipation	200 mW <sup>(2)</sup>

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### Electrical Specifications

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 OP231 OP232 OP233 OP234 OP235	1.5 2.0 3.0 5.0 6.0	- - - - -	- 6.0 - - -	mW/ cm <sup>2</sup>	$I_F = 100\text{ mA}^{(3)(4)}$ Aperture = 0.250" Distance = 1.429"
	OP232W OP233W OP234W OP235W	3.5 5.0 5.0 6.0	- - - -	7.0 - - -	mW/ cm <sup>2</sup>	$I_F = 100\text{ mA}^{(3)(4)}$ Aperture = 0.250" Distance = 0.466"
$P_O$	Radiant Power Output OP231 OP232 OP233	- - -	6.0 8.0 10.0	- - -	mW	$I_F = 100\text{ mA}^{(3)}$
$V_F$	Forward Voltage	-	-	2.0	V	$I_F = 100\text{ mA}^{(3)}$
$I_R$	Reverse Current	-	-	100	$\mu\text{A}$	$V_R = 2.0\text{ V}$
$\lambda_P$	Wavelength at Peak Emission OP231, OP232, OP233 OP234, OP235	-	890	-	nm	$I_F = 10\text{ mA}$
		-	850	-		
$\beta$	Spectral Bandwidth between Half Power Points	-	80	-	nm	$I_F = 10\text{ mA}$
$\Delta\lambda_P/\Delta T$	Spectral Shift with Temperature	-	+0.30	-	nm/ $^\circ\text{C}$	$I_F = \text{Constant}$
$\theta_{HP}$	Emission Angle at Half Power Points OP231 - OP235 OP231W - OP235W	-	18	-	Degree	$I_F = 100\text{ mA}$
		-	50	-		
$t_r$	Output Rise Time	-	500	-	ns	$I_{F(PK)} = 100\text{ mA}$ , PW = 10 $\mu\text{s}$ , 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 2.0 mW/ $^\circ\text{C}$  above 25 $^\circ\text{C}$ .
3. Measurement made with 100  $\mu\text{s}$  pulse measured at the trailing edge of the pulse with a duty cycle of 0.1 % and an  $I_F = 100\text{ mA}$ .
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 $^\circ$  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 $^\circ$  cone.  $E_{E(APT)}$  is not necessarily uniform within the measured area.

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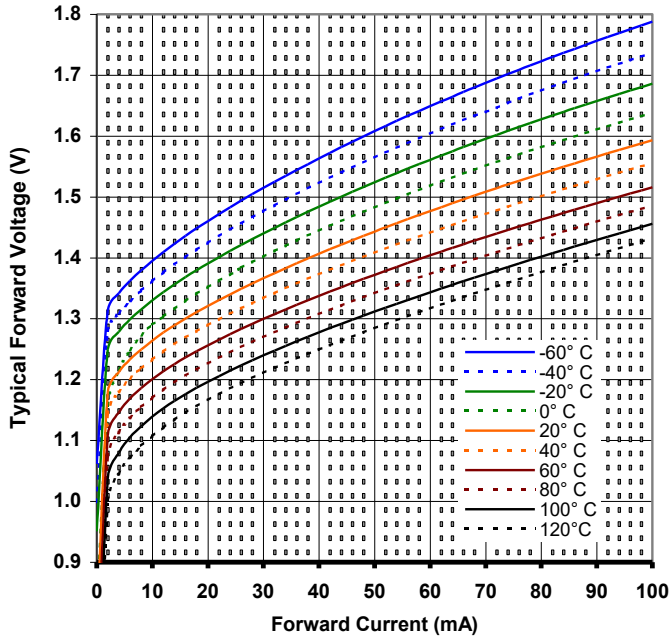
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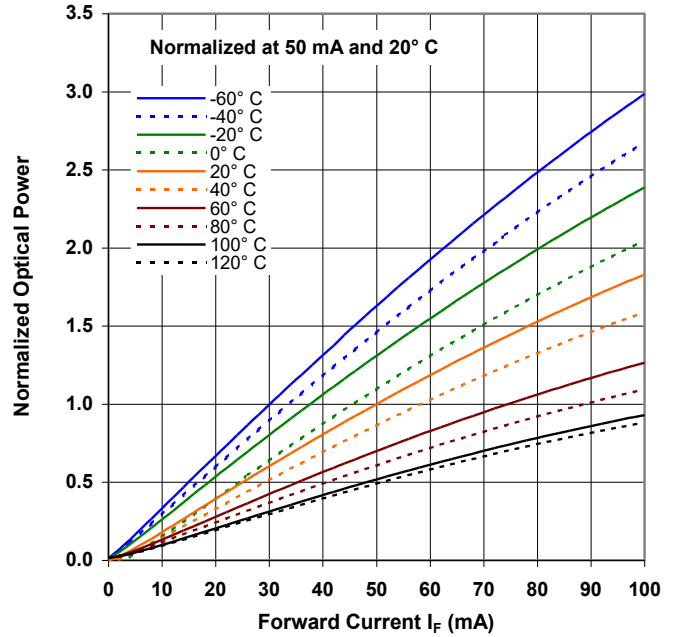
## Performance

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

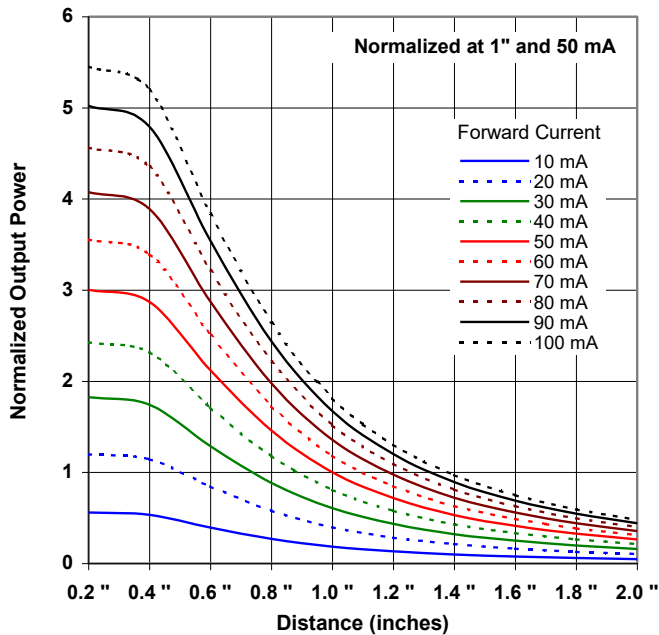
Forward Voltage vs Forward Current vs Temperature



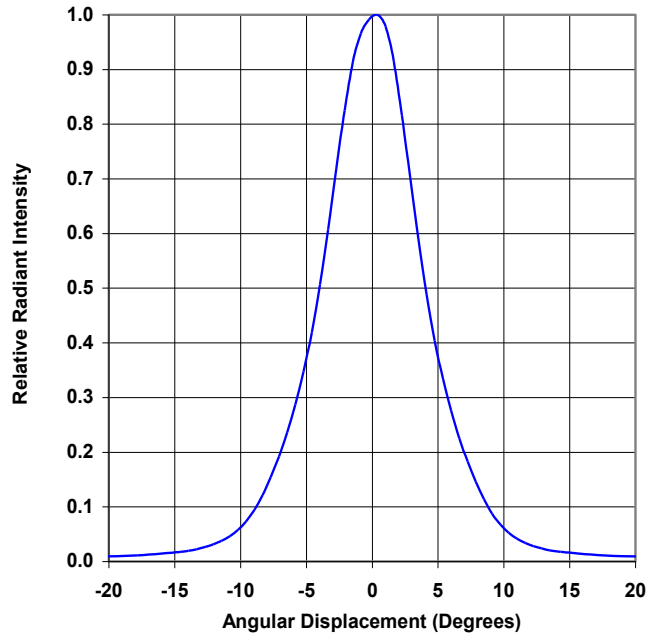
Optical Power vs  $I_F$  vs Temperature



Distance vs Output Power vs Forward Current



Relative Radiant Intensity vs. Angular Displacement



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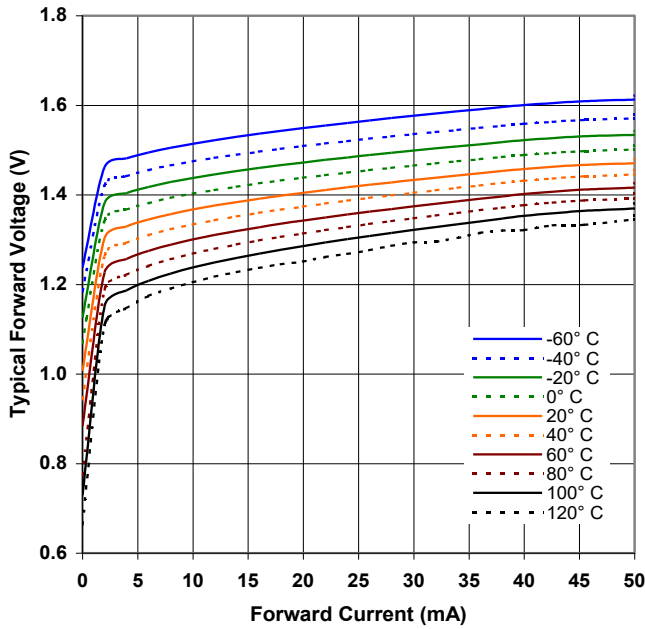
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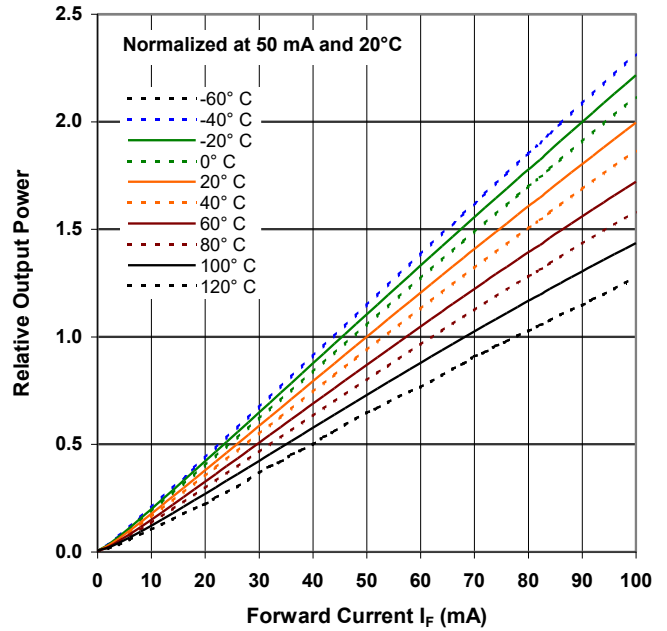
## Performance

OP234, OP234W

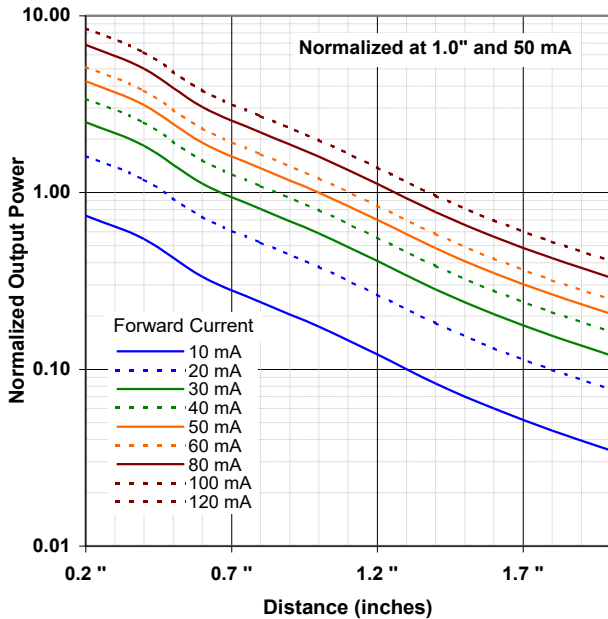
Forward Voltage vs Forward Current vs Temperature



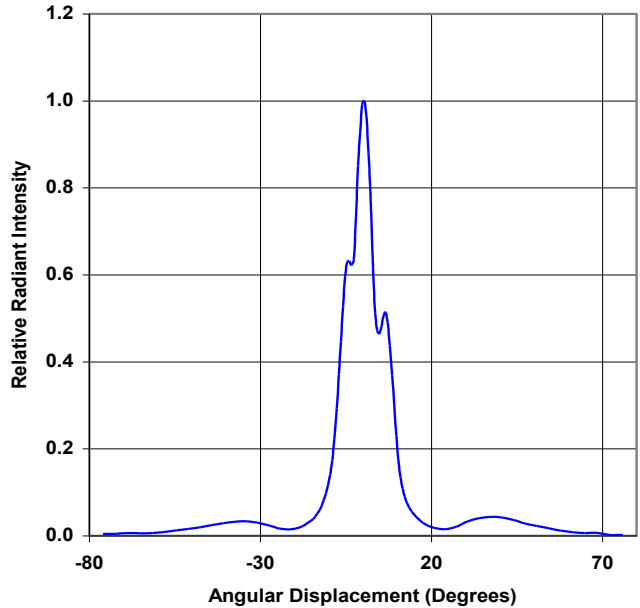
Optical Power vs Forward Current vs Temperature



Distance vs Output Power vs Forward Current



Relative Radiant Intensity vs Angular Displacement



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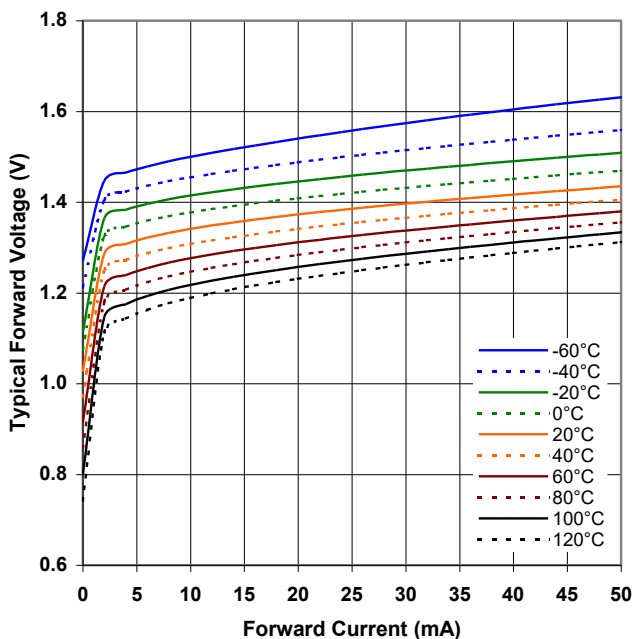
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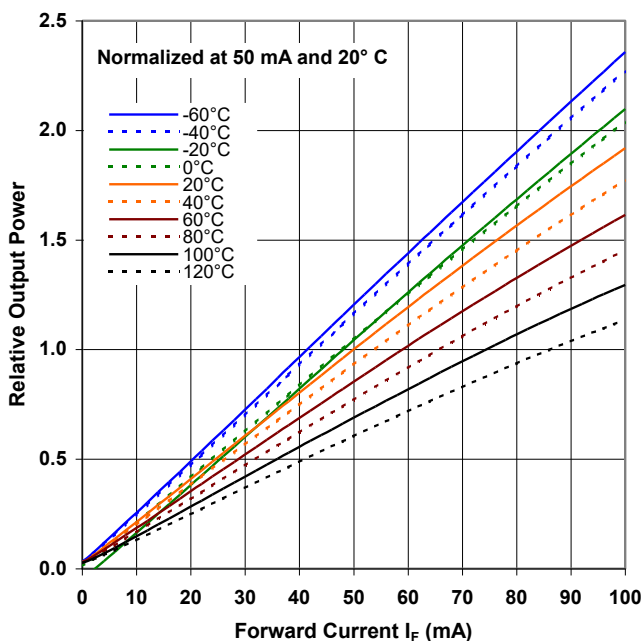
## Performance

OP235, OP235W

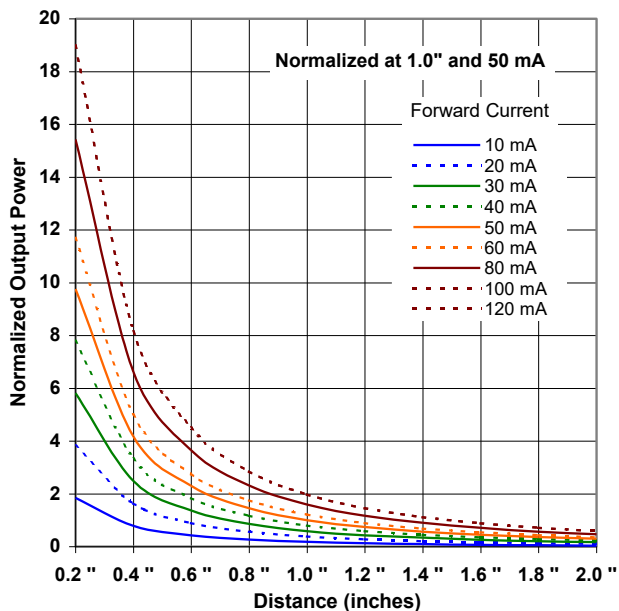
Forward Voltage vs Forward Current vs Temperature



Optical Power vs Forward Current vs Temperature



Distance vs Output Power vs Forward Current



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