

# Hermetic Infrared Emitting Diode



OP123, OP124, OP223, OP224



## Features:

- Hermetically sealed package
- Mechanically and spectrally matched to other OPTEK devices
- Designed for direct mount to PCBoard

## Description:

Each **OP123** and **OP124** device is a 935 nanometer (nm) high intensity gallium arsenide infrared emitting diode (GaAs), mounted in a miniature hermetically sealed “pill” package with an enhanced temperature range and a high power output. These devices are designed for direct mounting to PCBoards.

Each **OP223** and **OP224** device is an 890 nm gallium aluminum arsenide infrared emitting diode (GaAlAs), mounted in a hermetically sealed “pill” package with an enhanced temperature range and a narrow irradiance pattern that provides high on-axis intensity for excellent coupling efficiency. These devices offer significantly higher power output than GaAs at equivalent drive currents and have a wavelength that is matched to silicon’s peak response. Their small package size permits high device density mounting.

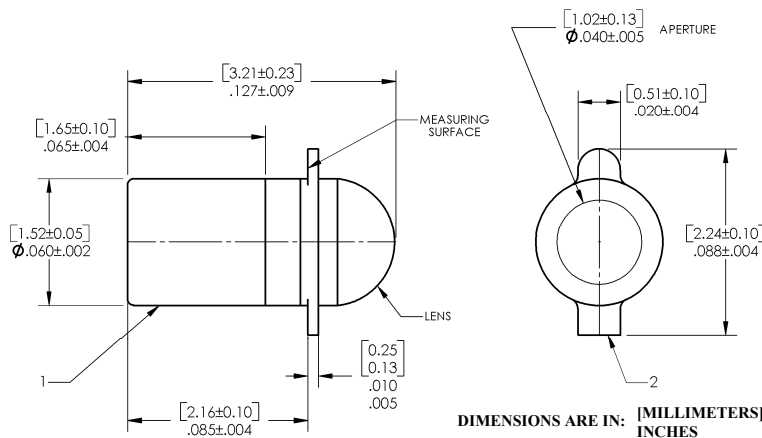
*All these LEDs are mechanically and spectrally matched to the OP300 series, OP600 series and OP640 series devices.*

Please refer to Application Bulletins 208 and 210 for additional design information and reliability (degradation) data, and to Application Bulletin 202 for pill-type soldering to PCBoard.

## 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	Total Beam Angle
OP123	935 nm	24°
OP124		
OP223	890 nm	
OP224		



Pin #	LED	Sensor
1	Anode	Collector
2	Cathode	Emitter



General Note  
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## Electrical Specifications

Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ 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 (2μs pulse with 0.1% duty cycle)	1.0 A
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 seconds with soldering iron]	260°C <sup>(1)(2)</sup>
Power Dissipation	150 mW <sup>(3)</sup>

Electrical Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted)						
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
<b>Input Diode</b>						
$E_{E(APT)}^{(3)}$	Apertured Radiant Incidence					
	OP123	0.40	-	-	mW/cm <sup>2</sup>	$I_F = 50\text{ mA}^{(4)}$
	OP124	1.00	-	-		
	OP223	1.00	-	-		
OP224	3.50	-	-			
$V_F$	Forward Voltage				V	$I_F = 50\text{ mA}$
	OP123	-	-	1.50		
	OP124	-	-	1.80		
$I_R$	Reverse Current	-	-	100	μA	$V_R = 2.0\text{ V}$
$\lambda_P$	Wavelength at Peak Emission				nm	$I_F = 50\text{ mA}$ $I_F = 10\text{ mA}$
	OP123, OP124	-	935	-		
	OP223, OP224	-	890	-		
B	Spectral Bandwidth between Half Power Points				nm	$I_F = 50\text{ mA}$ $I_F = 10\text{ mA}$
	OP123, OP124	-	50	-		
	OP223, OP224	-	80	-		
$\Delta\lambda_P/\Delta T$	Spectral Shift with Temperature				nm/°C	$I_F = \text{Constant}$
	OP123, OP124	-	+0.30	-		
	OP223, OP224	-	+0.18	-		
$\theta_{HP}$	Emission Angle at Half Power Points	-	24	-	Degree	$I_F = 50\text{ mA}$
$t_r$	Output Rise Time				ns	$I_{F(PK)} = 100\text{ mA}$ , PW=10 μs, and D.C.=10.0%
	OP123, OP124	-	1000	-		
	OP223, OP224	-	500	-		
$t_f$	Output Fall Time				ns	$I_{F(PK)} = 100\text{ mA}$ , PW=10 μs, and D.C.=10.0%
	OP123, OP124	-	500	-		
	OP223, OP224	-	250	-		

**Notes:**

1. Refer to Application Bulletin 202 which reviews proper soldering techniques for pill-type devices.
2. No clean or low solids. RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
3. Derate linearly 1.50 mW/°C above 25°C.
4. For OP123, OP124, OP223 and OP224,  $E_{E(APT)}$  is a measurement using a 0.031" (0.787 mm) diameter apertured sensor placed 0.50" (12.7 mm) from the measuring surface.  $E_{E(APT)}$  is not necessarily uniform within the measured area.

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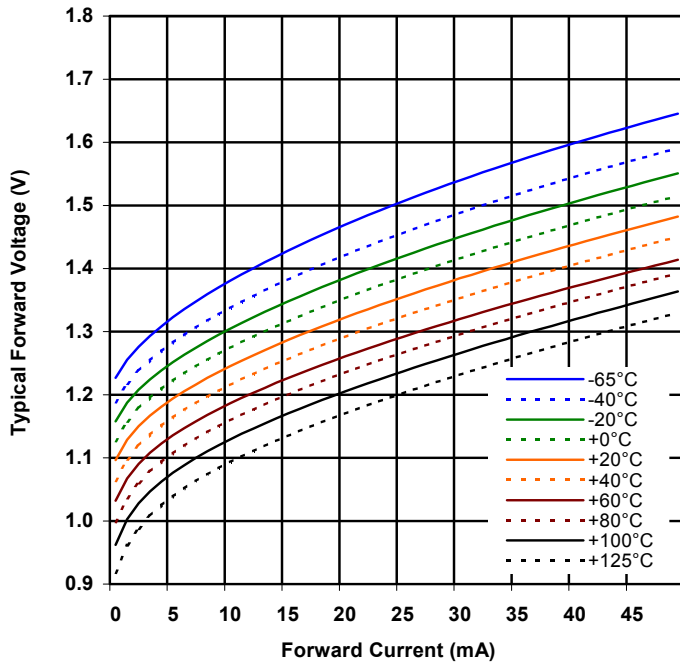
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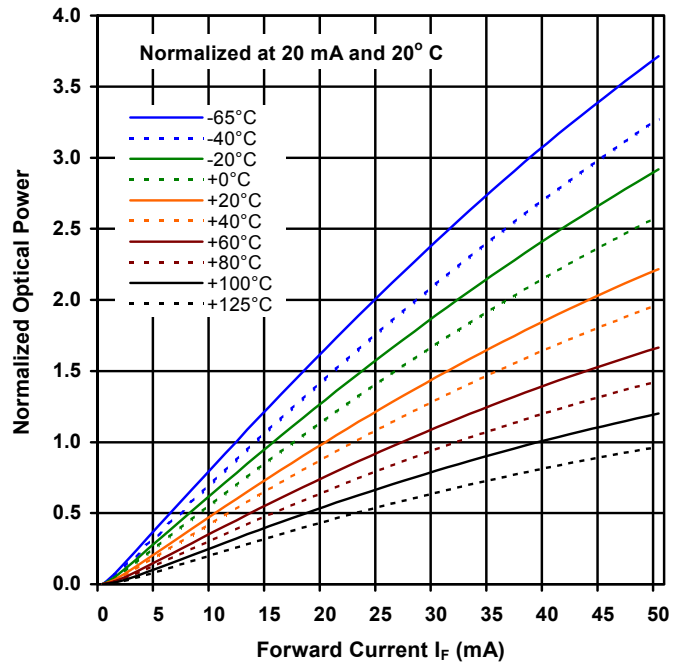
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## Performance OP123, OP124

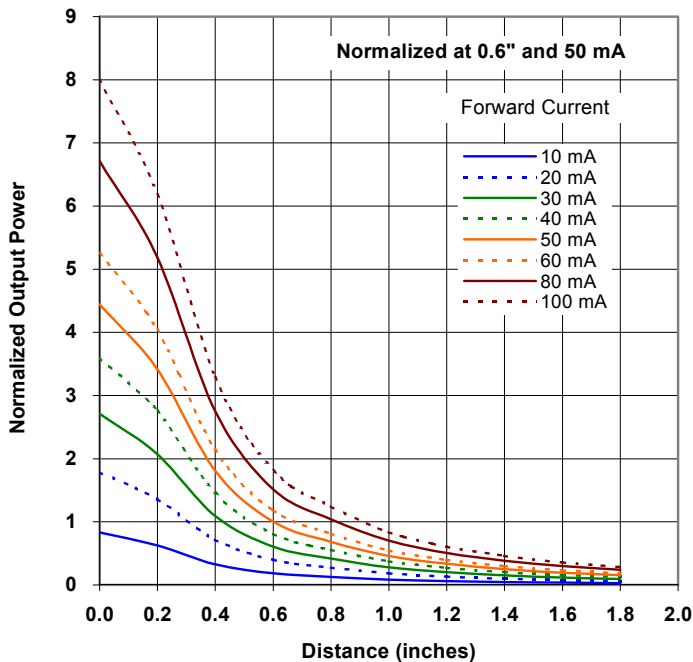
Forward Voltage vs Forward Current vs Temperature



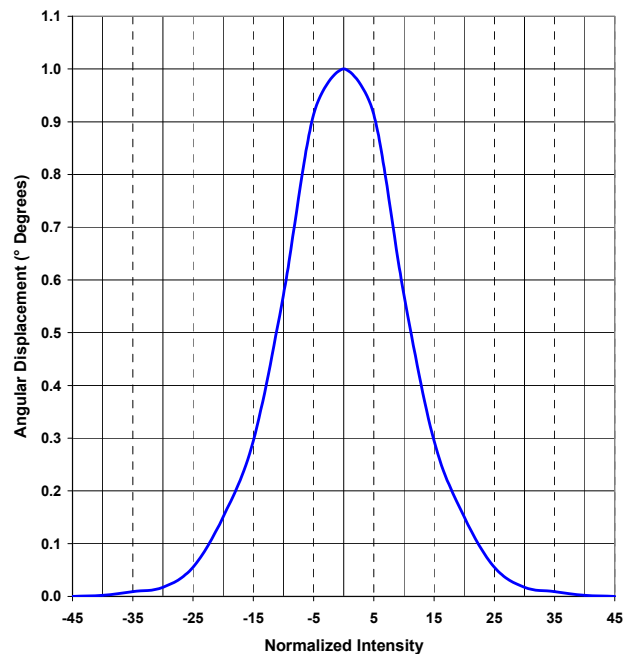
Optical Power vs  $I_F$  vs Temp



Distance vs Output Power vs Forward Current



Normalized Intensity vs Beam Angle



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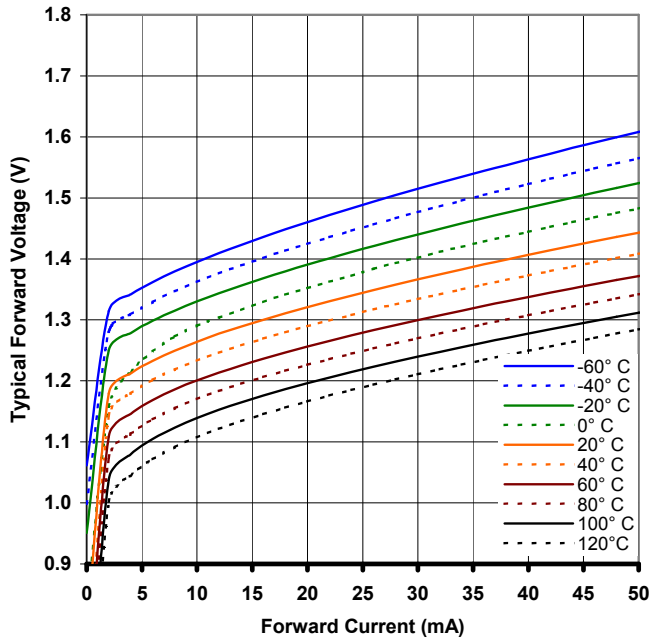
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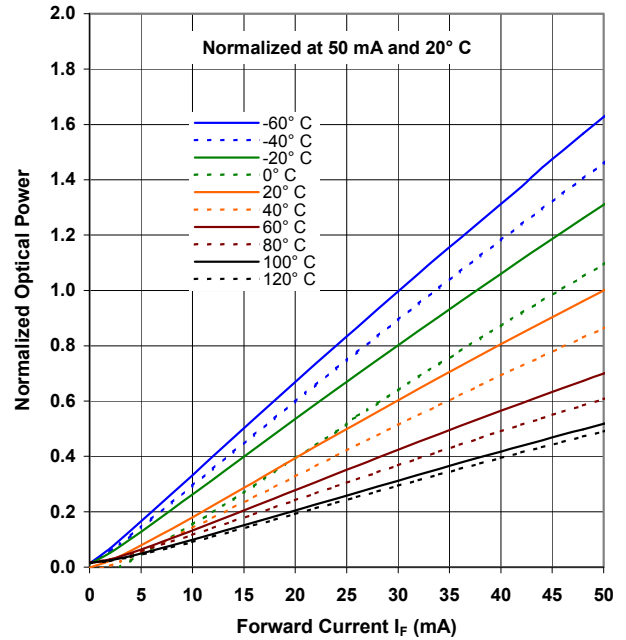
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## Performance OP223, OP224

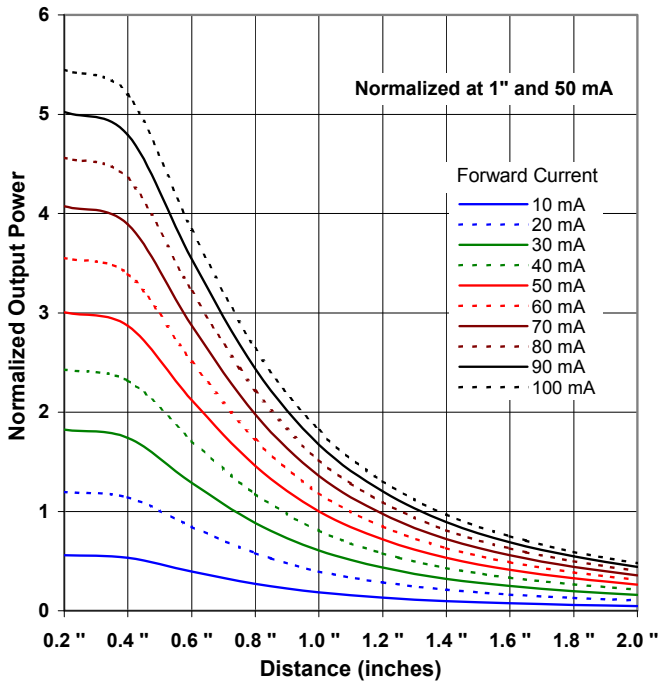
Forward Voltage vs Forward Current vs Temperature



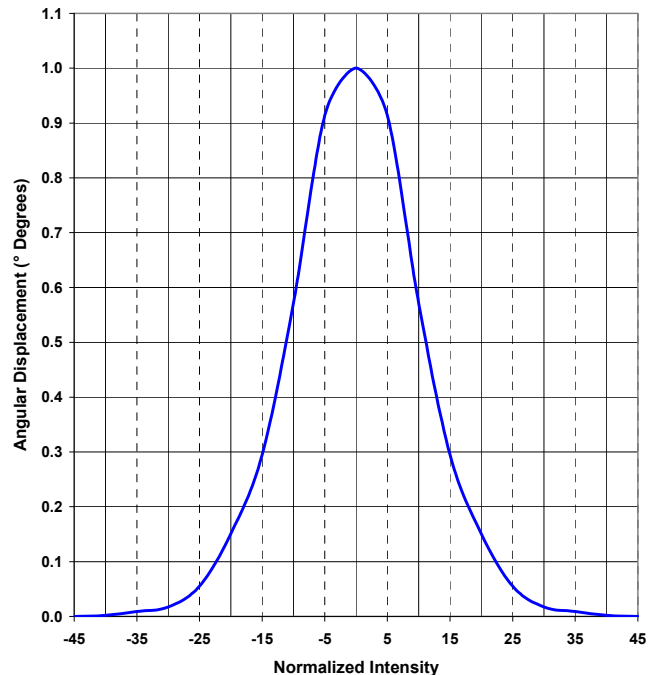
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