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 printed circuit board

Description:

Each **OP123** and **OP124** device is a 935 nanometer (nm) high intensity gallium arsenide (GaAs) infrared emitting diode 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 printed circuit boards.

Each **OP223** and **OP224** device is an 890 nm gallium aluminum arsenide (GaAlAs) infrared emitting diode 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.

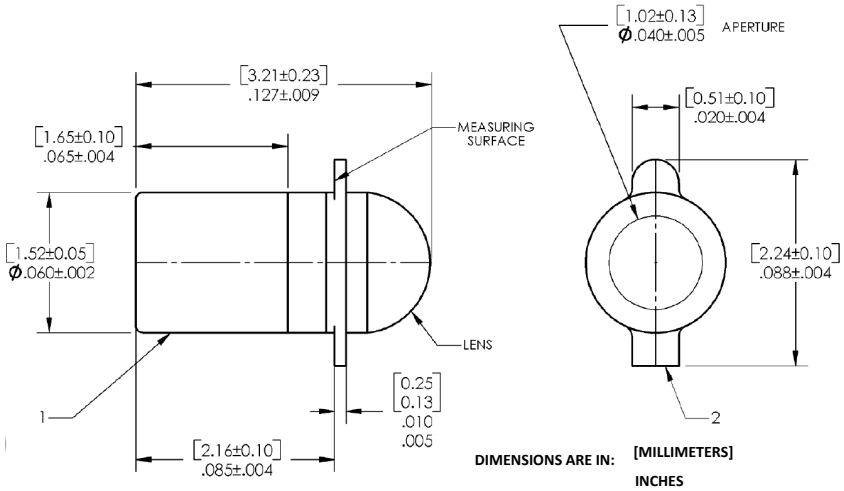
All these LEDs are mechanically and spectrally matched to the OP300 series, OP600 series and OP640 series devices.

Please refer to Application Bulletin 210 for additional thermal design information and to Application Bulletin 202 for pill-type soldering into a printed circuit board.

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
1	Anode
2	Cathode

General Note
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Electrical Specifications

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 with 0.1% duty cycle)	1.0 A
Lead Soldering Temperature (5 seconds with soldering iron) (1)(2)	260° C
Power Dissipation (3)	150 mW

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

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$E_{E(APT)}$ (4)	Apertured Radiant Incidence					
	OP123	0.40	-	-	mW/cm²	I_F = 50 mA
	OP124	1.00	-	-		
	OP223	1.00	-	-		
	OP224	3.50	-	-		
V_F	Forward Voltage					
	OP123, OP124	1.0	-	1.50	V	I_F = 50 mA
	OP223, OP224	1.0	-	1.80		
I_R	Reverse Current	-	-	100	µA	V_R = 2.0 V
λ_P	Wavelength at Peak Emission					
	OP123, OP124	-	935	-	nm	I_F = 50 mA
	OP223, OP224	-	890	-		I_F = 50 mA
β	Spectral Bandwidth between Half Power Points					
	OP123, OP124	-	50	-	nm	I_F = 50 mA
	OP223, OP224	-	80	-		I_F = 10 mA
$\Delta\lambda_P/\Delta_T$	Spectral Shift with Temperature					
	OP123, OP124	-	+0.30	-	nm/° C	I_F = Constant
	OP223, OP224	-	+0.18	-		
θ_{HP}	Emission Angle at Half Power Points	-	24	-	Degree	I_F = 50 mA
t_r	Output Rise Time					
	OP123, OP124	-	1000	-	ns	$I_{F(PK)}$ = 100 mA, PW = 10.0 µs, D.C. = 10.0%
	OP223, OP224	-	500	-		
t_f	Output Fall Time					
	OP123, OP124	-	500	-	ns	
	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 1.30 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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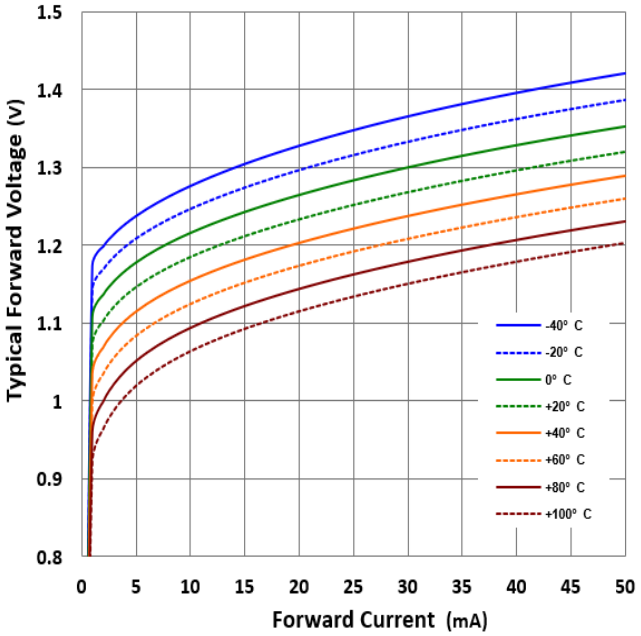
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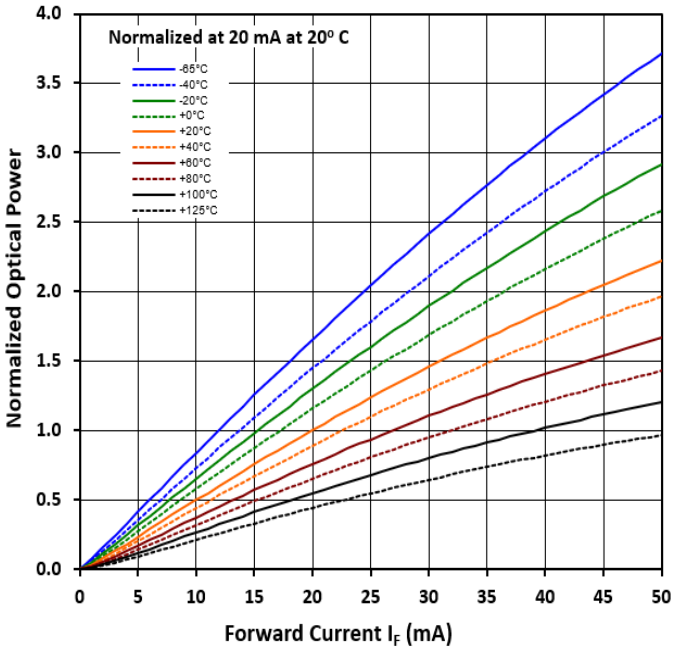
Typical Performance

OP123, OP124

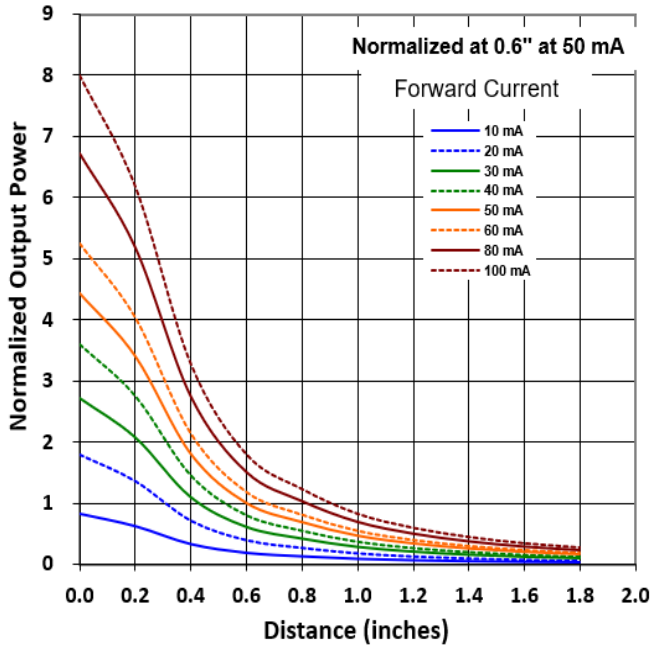
935nm LED Forward Voltage vs I_F vs Temp



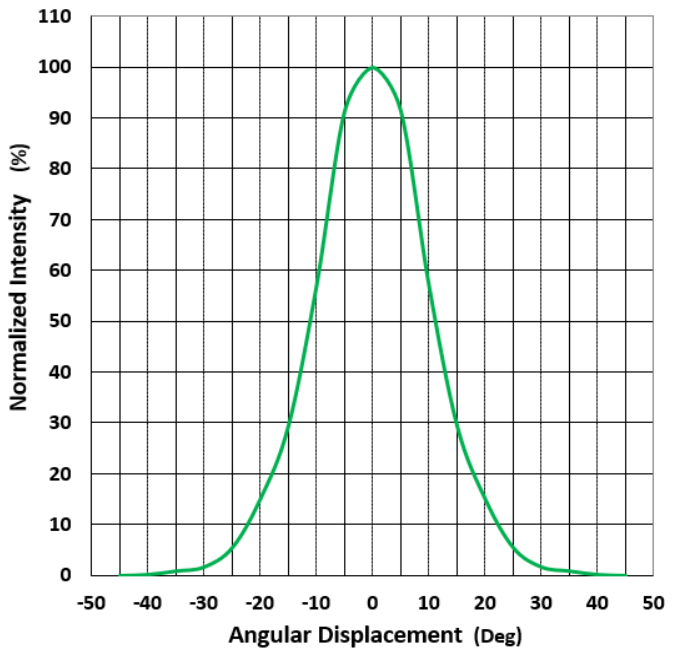
Optical Power vs I_F vs Temperature



Distance vs Output Power vs I_F



Normalized Intensity vs Beam Angle



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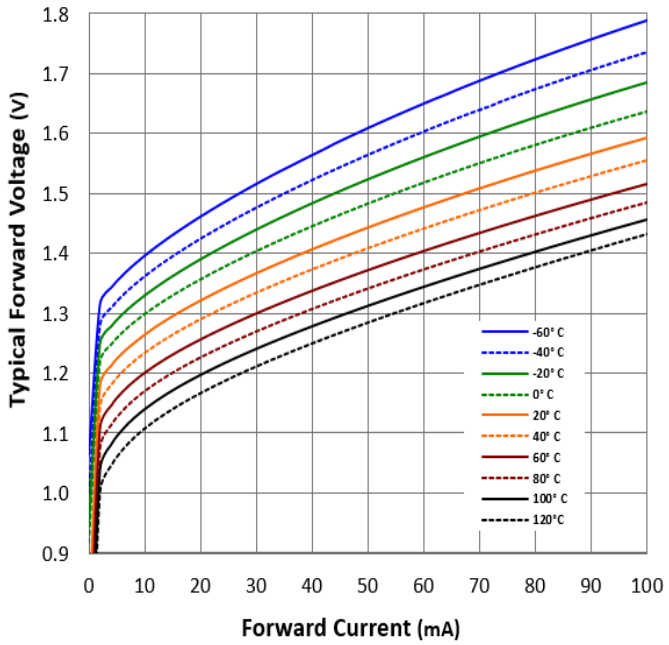
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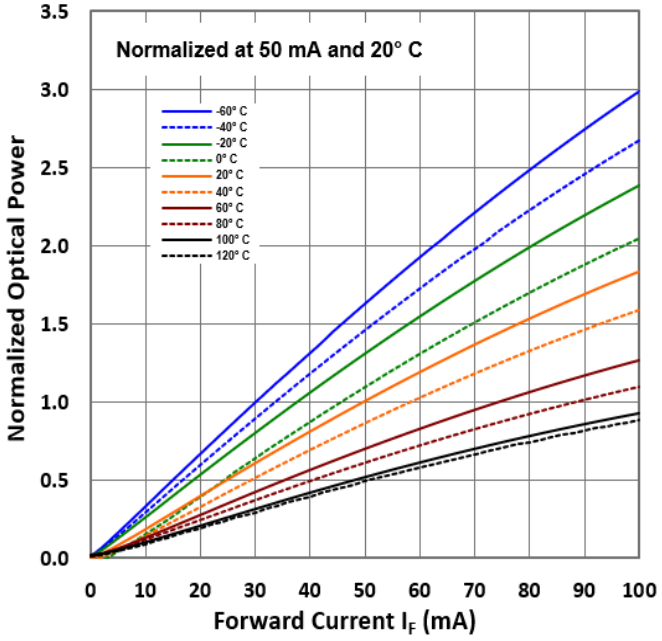
Typical Performance

OP223, OP224

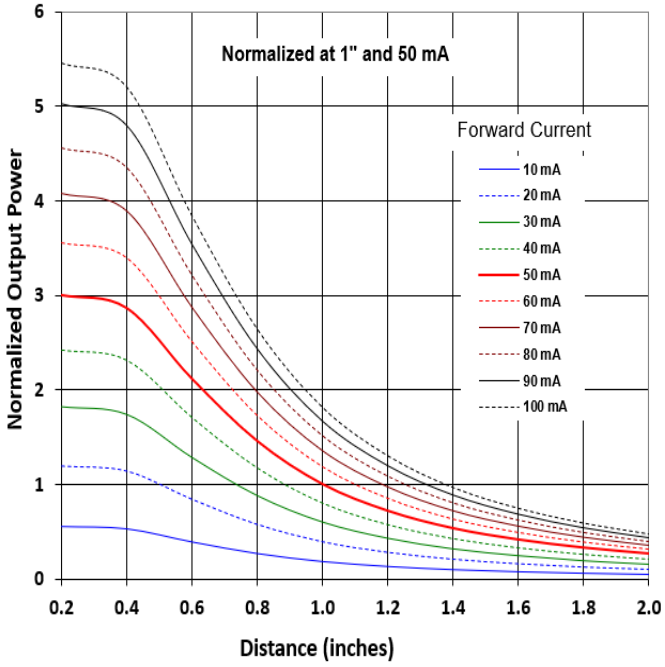
890nm LED Forward Voltage vs I_F vs Temp



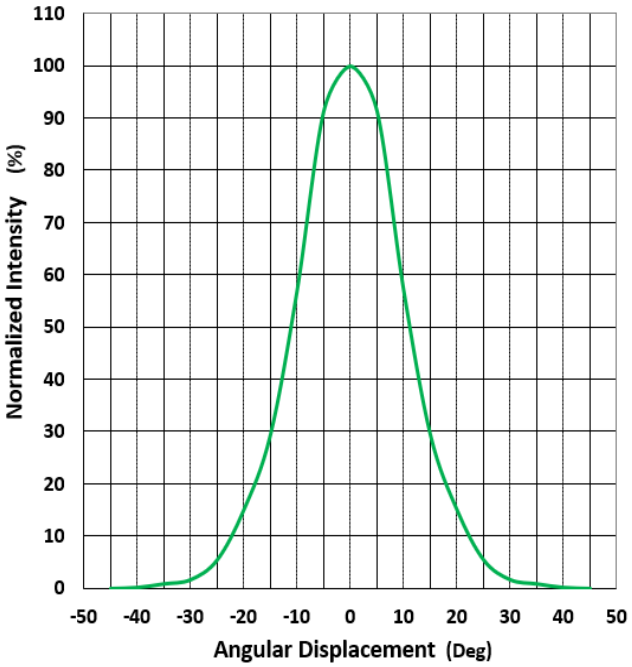
Optical Power vs I_F vs Temperature



Distance vs Output Power vs Forward Current



Normalized Intensity vs Beam Angle



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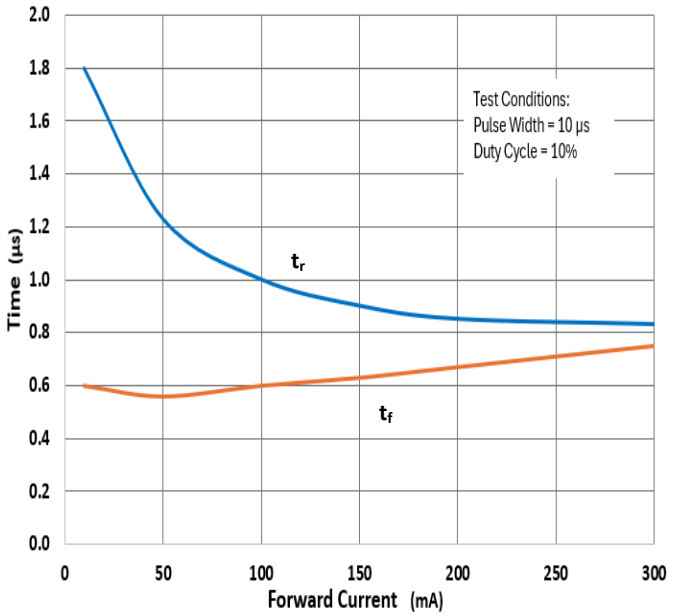
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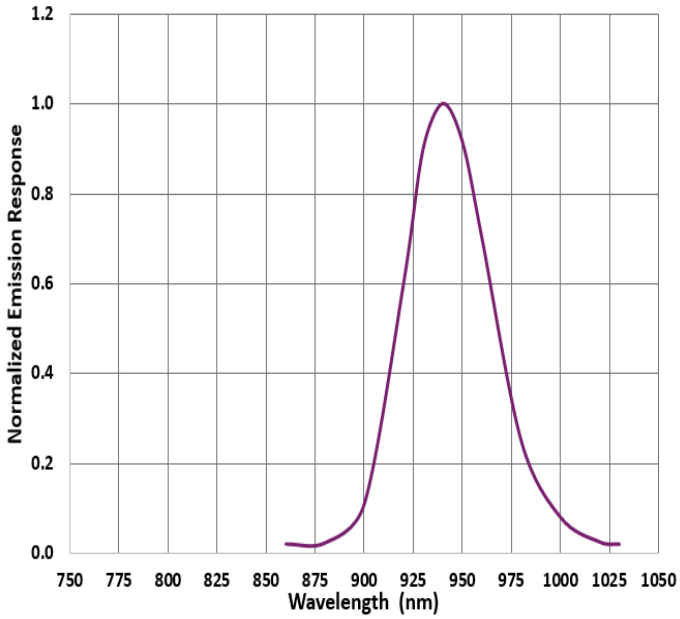
Typical Performance

OP123, OP124

Rise and Fall Time vs Forward Current

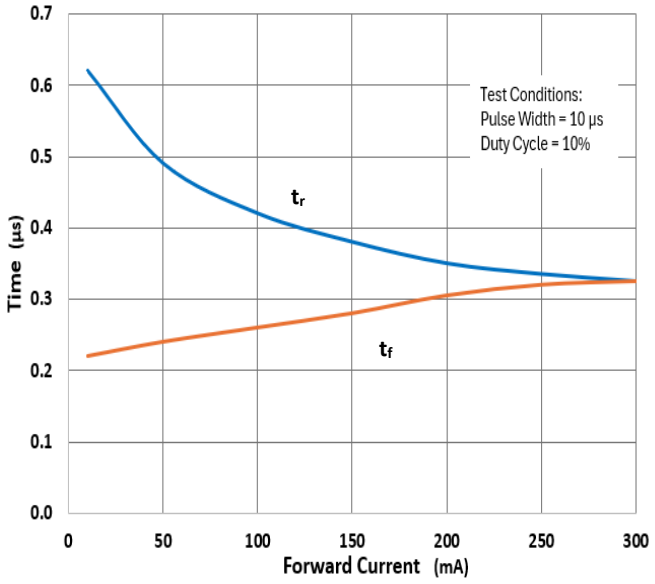


GaAs LED Spectral Output

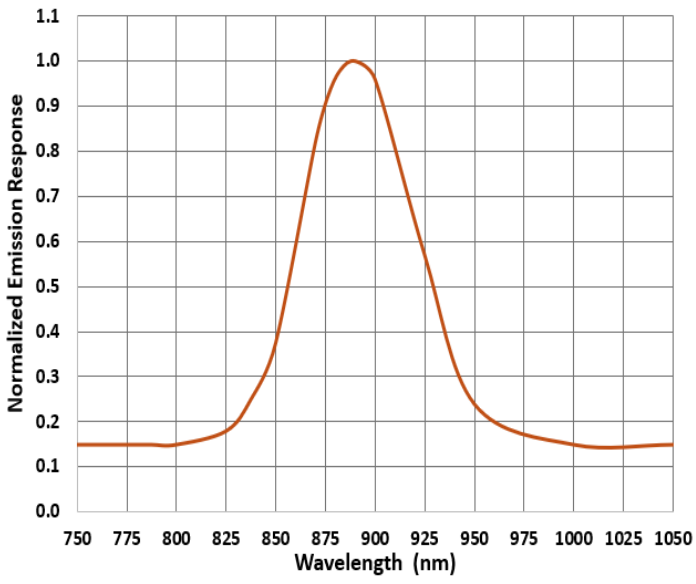


OP223, OP224

Rise and Fall Time vs Forward Current



GaAlAs LED Spectral Output



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