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 PC 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 PC 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.

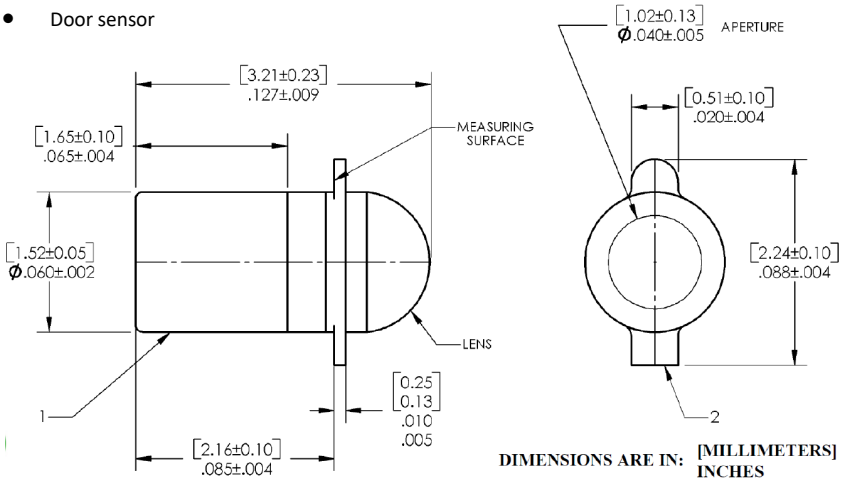
All these LEDs are mechanically and spectrally matched to the OP300 series, OP600 series and OP640 series devices.

Please refer to Application Bulletin 210 for additional thermal design information and to Application Bulletin 202 for pill-type soldering into a PC 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
TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

TT Electronics | OPTEK Technology
2900 E. Plano Pkwy, Plano, TX 75074 | Ph: +1 972 323 2200
www.ttelectronics.com | sensors@ttelectronics.com

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 for 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 OP124 OP223 OP224	 0.40 1.00 1.00 3.50	 - - - -	 - - - -	mW/cm^2	I_F = 50 mA
V_F	Forward Voltage OP123, OP124 OP223, OP224	 1.0 1.0	- -	 1.50 1.80	V	I_F = 50 mA
I_R	Reverse Current	-	-	100	µA	V_R = 2.0 V
λ_P	Wavelength at Peak Emission OP123, OP124 OP223, OP224	 - -	 935 890	 - -	nm	 I_F = 50 mA I_F = 50 mA
β	Spectral Bandwidth between Half Power Points OP123, OP124 OP223, OP224	 - -	 50 80	 - -	nm	 I_F = 50 mA I_F = 10 mA
$\Delta\lambda_P/\Delta_T$	Spectral Shift with Temperature OP123, OP124 OP223, OP224	 - -	 +0.30 +0.18	 - -	nm/° C	I_F = Constant
Θ_{HP}	Emission Angle at Half Power Points	-	24	-	Degree	I_F = 50 mA
t_r	Output Rise Time OP123, OP124 OP223, OP224	 - -	 1000 500	 - -	ns	$I_{F(PK)}$ = 100 mA, PW = 10.0 µs, D.C. = 10.0%
t_f	Output Fall Time OP123, OP124 OP223, OP224	 - -	 500 250	 - -	ns	

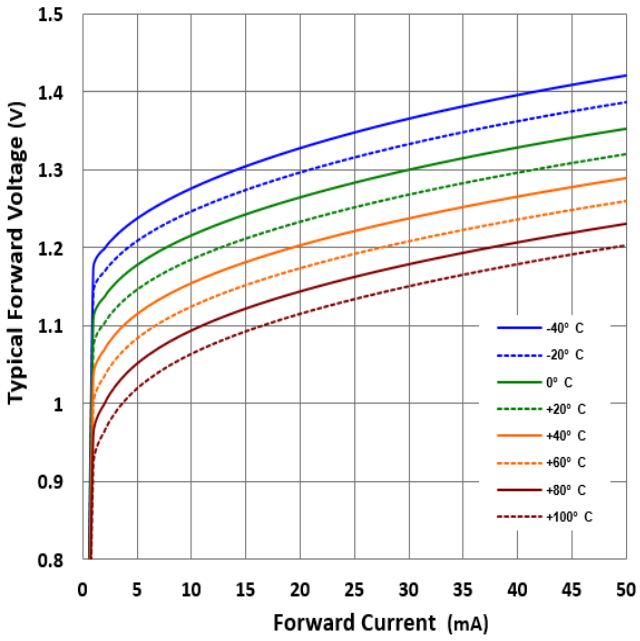
Notes:
1. Refer to Application Bulletin 202 which reviews proper soldering techniques for pill-type devices.
2. No clean or low solids. RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
3. Derate linearly 1.30 mW/° C above 25° C.
4. For OP123, OP124, OP223 and 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.

TT Electronics | OPTEK Technology
2900 E. Plano Pkwy, Plano, TX 75074 | Ph: +1 972 323 2200
www.ttelectronics.com | sensors@ttelectronics.com

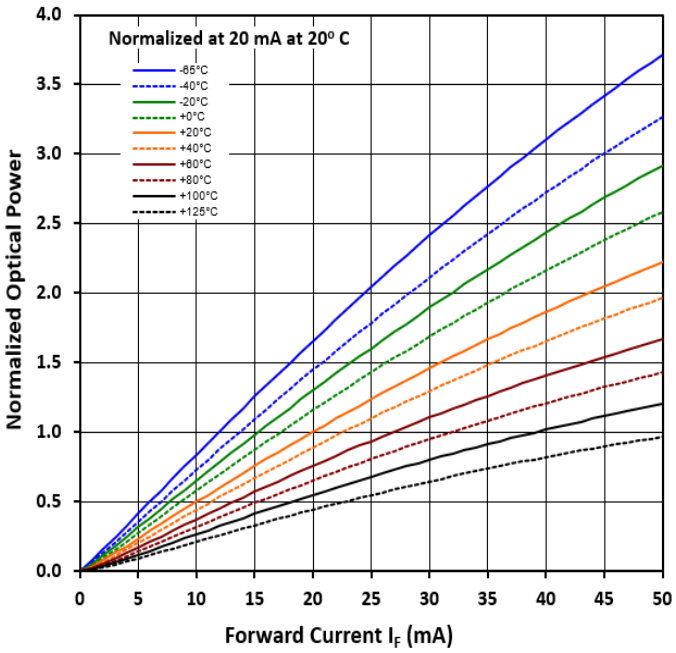
Typical Performance

OP123, OP124

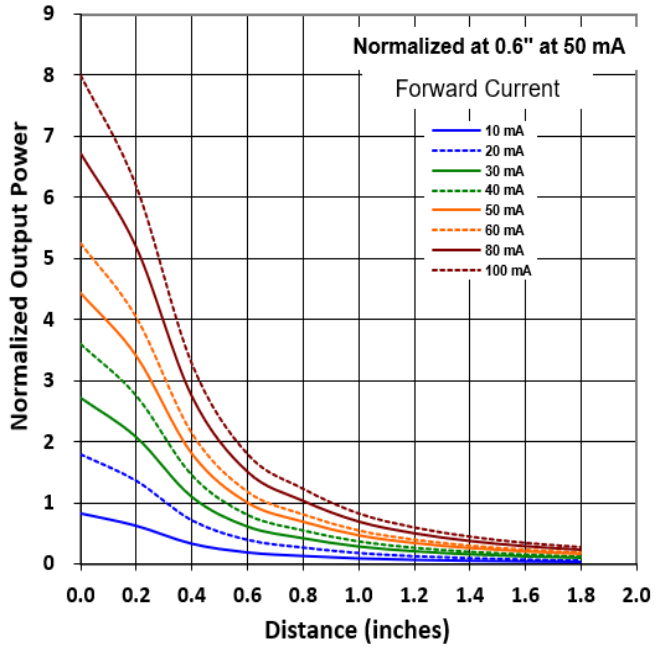
935nm LED Forward Voltage vs I_F vs Temp



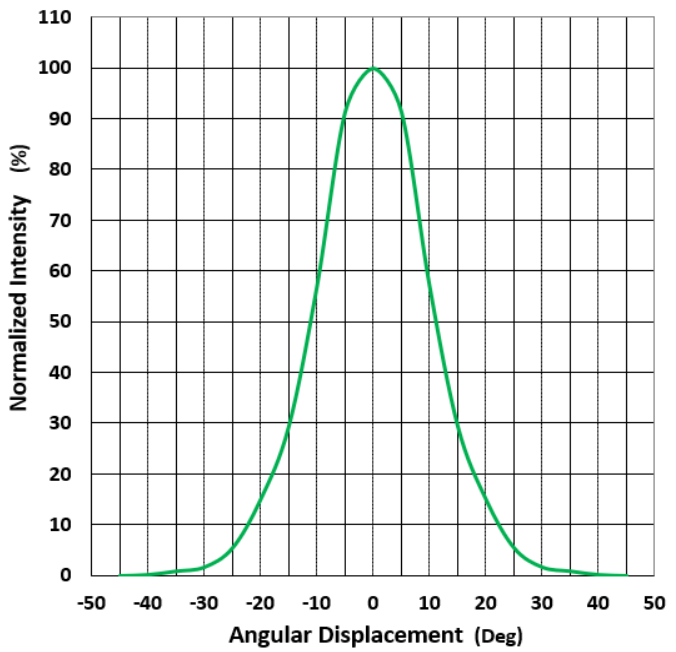
Optical Power vs I_F vs Temperature



Distance vs Output Power vs I_F



Normalized Intensity vs Beam Angle



TT Electronics | OPTEK Technology

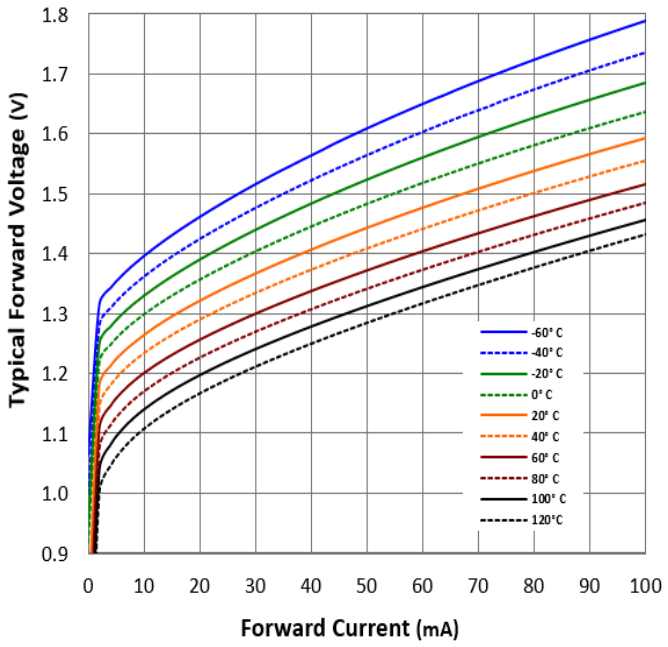
2900 E. Plano Pkwy, Plano, TX 75074 | Ph: +1 972 323 2200

www.ttelectronics.com | sensors@ttelectronics.com

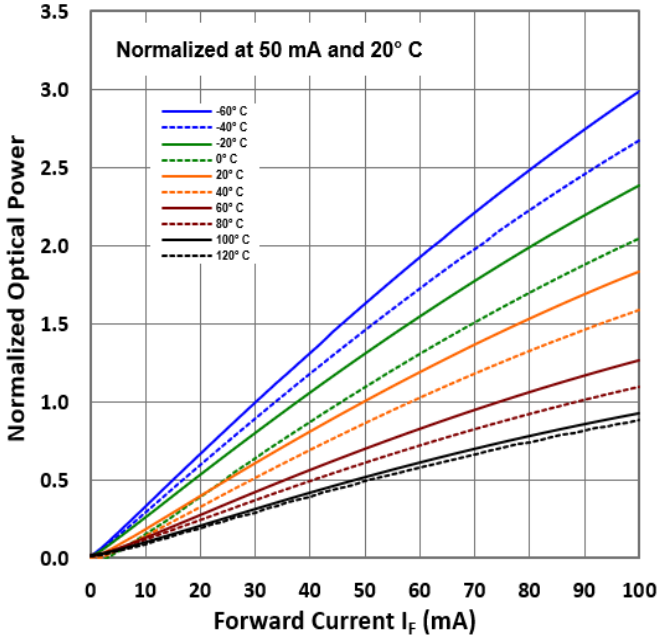
Typical Performance

OP223, OP224

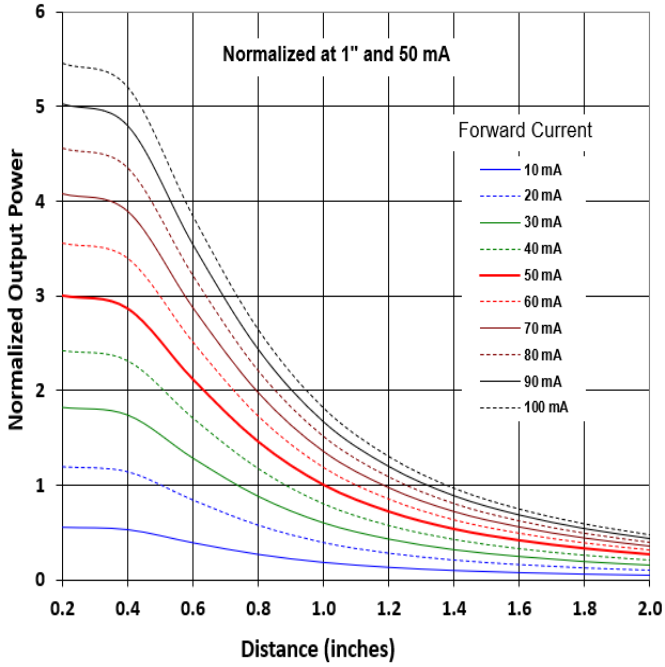
890nm LED Forward Voltage vs I_F vs Temp



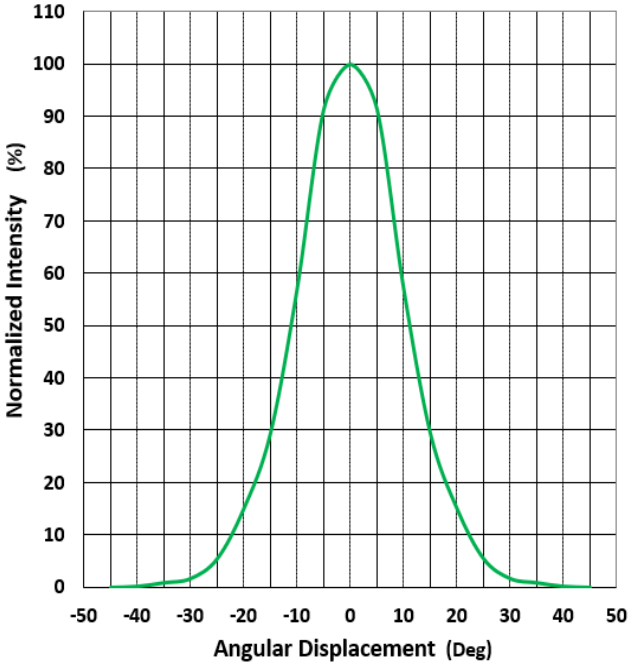
Optical Power vs I_F vs Temperature



Distance vs Output Power vs Forward Current



Normalized Intensity vs Beam Angle



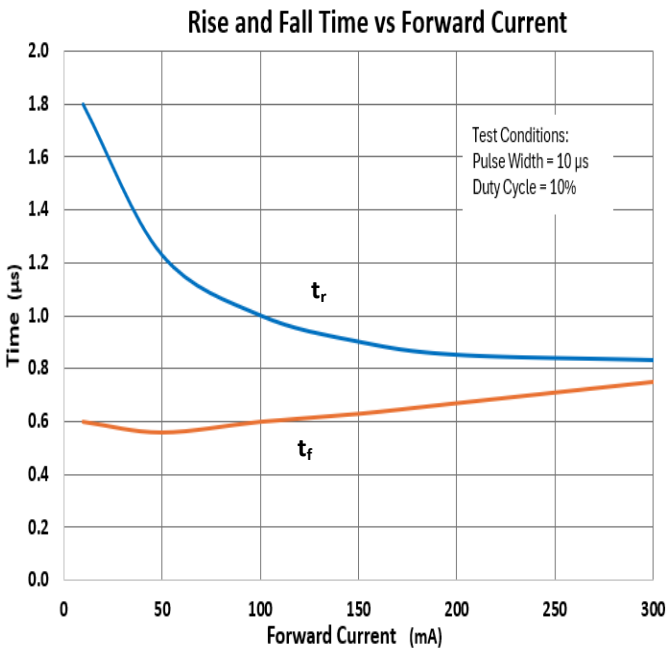
TT Electronics | OPTEK Technology

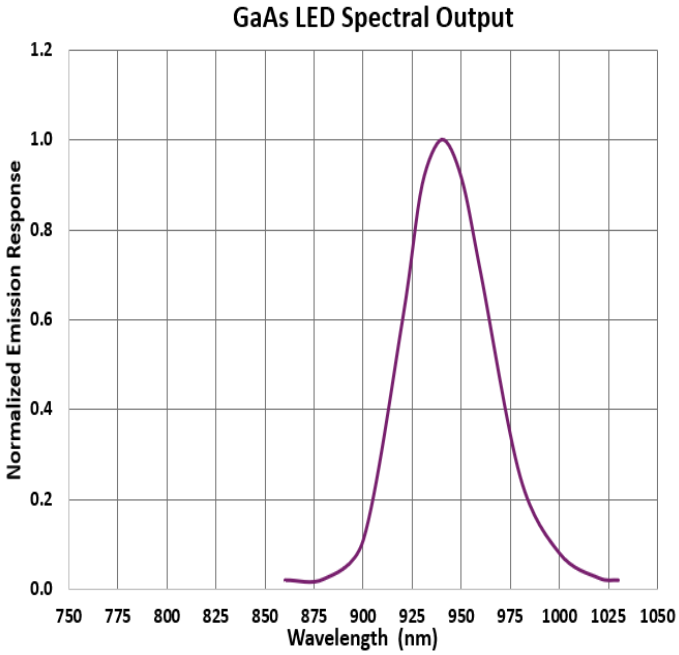
2900 E. Plano Pkwy, Plano, TX 75074 | Ph: +1 972 323 2200

www.ttelectronics.com | sensors@ttelectronics.com

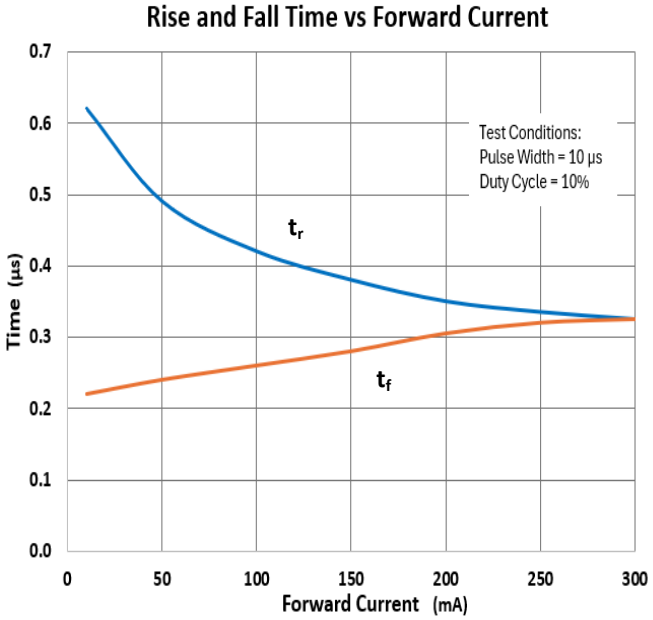
Typical Performance

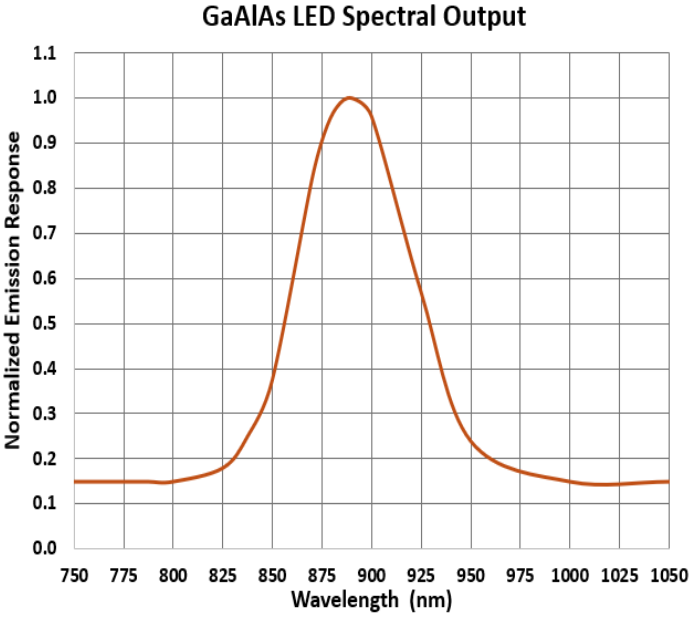
OP123, OP124





OP223, OP224





TT Electronics | OPTEK Technology
2900 E. Plano Pkwy, Plano, TX 75074 | Ph: +1 972 323 2200
www.ttelectronics.com | sensors@ttelectronics.com