Silicon Phototransistor and Photo Darlington in 1210 SMD Package

OP525, OP525DA, OP525F

TT electronics
OPTEK Technology

Features:

- High Speed and High photo sensitivity
- Fast response time
- 1210 package size
- High Current Gain
- Water clear and black lens choices
- Narrow Viewing Receiving Angle
- Compatible with IR Reflow soldering process
- Moisture Sensitivity Level: MSL3



Description:

These devices consist of an NPN silicon phototransistor and photo darlington mounted in a miniature SMD package with a 1210 size chip carrier that is compatible with most automated mounting and position sensing equipment.

The **OP525** devices have a 1.8mm domed lens and viewing acceptance angle of 25° with higher collector current gains due to the lenses on package. The **OP525** and **OP525DA** have a water clear lens that senses ambient light to higher wavelengths for applications from 450nm to 1120nm. The **OP525F** has a black domed lens to reduce ambient light noise.

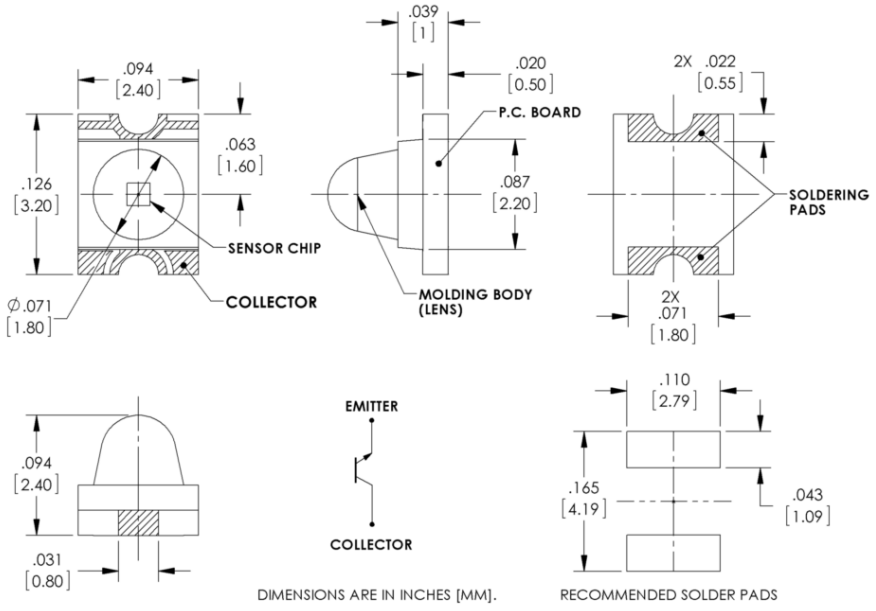
The **OP525** series are tested using infrared light for close correlation with Optek GaAs and GaAlAs emitters. Photo darlington devices are normally used in application where light signals are low and more current gain is needed than is possible with phototransistors.

Applications:

- Non-contact position sensing
- Datum detection
- Machine automation
- Optical encoders
- Reflective and transmissive sensors

Ordering Information		
Part Number	**Sensor**	**Viewing Angle**
OP525	Phototransistor	25º
OP525DA	Photo Darlington	25º
OP525F	Phototransistor	25º

OP525 and OP525F



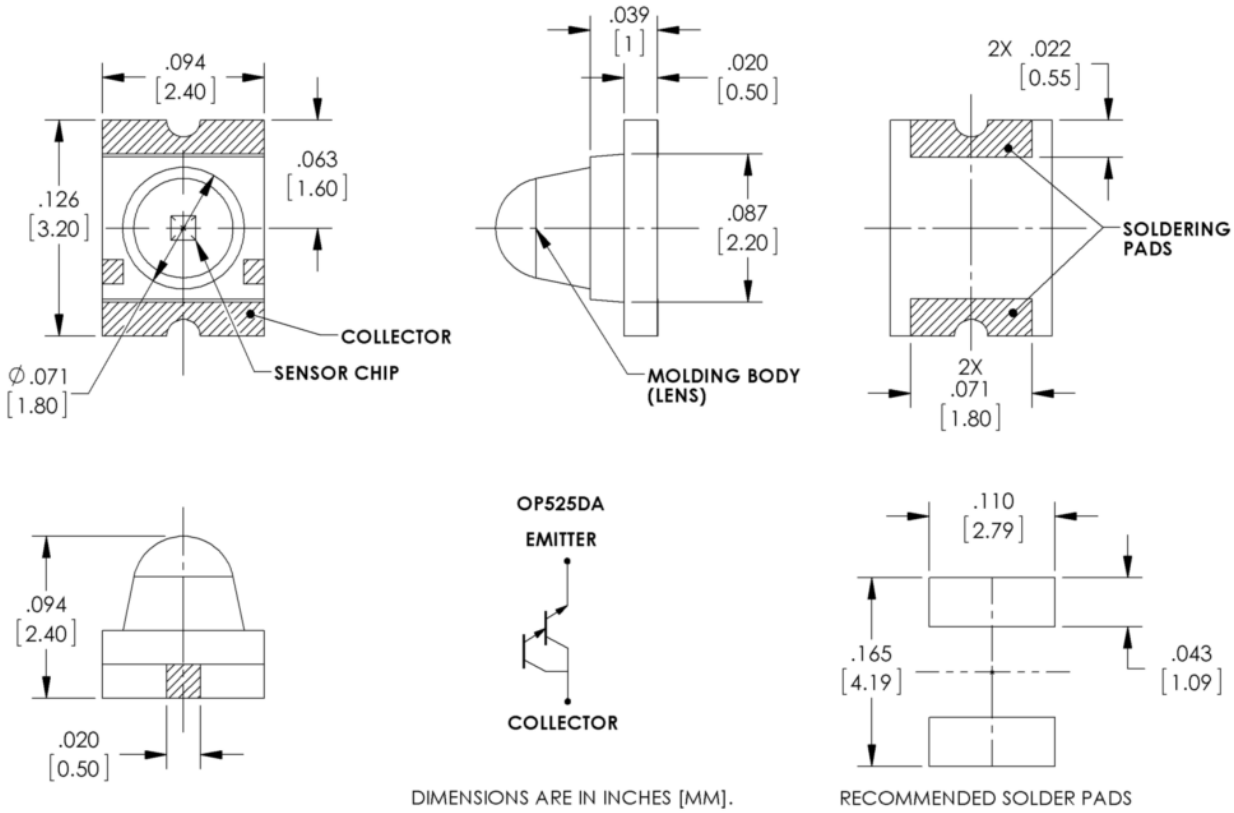
Pin #	Transistor
1	Collector
2	Emitter

Pb

RoHS

OPTEK reserves the right to make changes at any time in order to improve design and to supply the best product possible.

OP525DA Package Dimensions

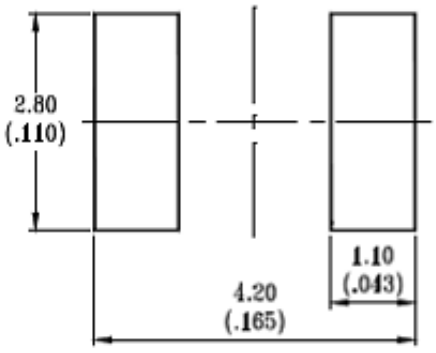


DIMENSIONS ARE IN INCHES [MM].

RECOMMENDED SOLDER PADS

Pin #	Transistor
1	Collector
2	Emitter

Recommended Solder Pad Patterns



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

Storage Temperature Range	-40° C to +100° C
Operating Temperature Range	-40° C to +80° C
Lead Soldering Temperature[1]	260° C
Collector-Emitter Voltage OP525, OP525F OP525DA	 30 V 35 V
Emitter-Collector Voltage	5 V
Collector Current OP525, OP525F OP525DA	 20 mA 30 mA
Power Dissipation[2] OP525, OP525F OP525DA	 75 mW 100 mW

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

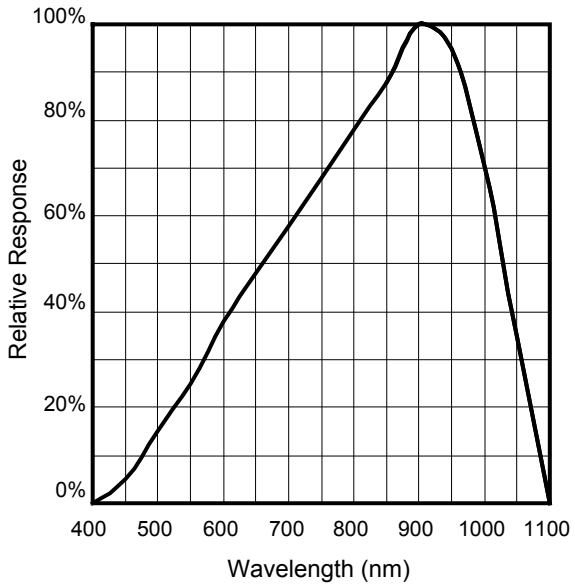
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode						
$I_{C(ON)}$	On-State Collector Current OP525F OP525 OP525DA	 2.0 1.0 10.0	 - - -	 - - -	mA	V_{CE} = 5.0 V, E_E = 0.5 mW/cm^2 V_{CE} = 5.0 V, E_E = 1.5 mW/cm^2 [3] V_{CE} = 5.0 V, E_E = 0.15 mW/cm^2 [3]
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage OP525, OP525F OP525DA	 - -	 - -	 0.4 1.7	 V	 I_C = 100 µA, E_E = 1.0 mW/cm^2 [3] I_C = 1 mA, E_E = 0.5 mW/cm^2 [3]
I_{CEO}	Collector-Emitter Dark Current OP525, OP525F OP525DA	 -	 -	 100 200	 nA	 V_{CC}= 10.0 V [4]
$V_{BR(CEO)}$	Collector-Emitter Breakdown Voltage OP525, OP525F OP525DA	 30 35	 -	 -	 V	 I_C= 100 µA, E_E = 0 I_C= 1 mA, E_E = 0
$V_{BR(ECO)}$	Emitter-Collector Breakdown Voltage OP525, OP525F OP525DA	 5 5	 - -	 - -	 V	 I_E= 100 µA, E_E = 0 I_E= 100 µA, E_E = 0
t_r, t_f	Rise and Fall Times OP525, OP525F OP525DA	 -	 15 50	 - -	 µs	 I_C= 1 mA, R_L = 1KΩ I_C= 1 mA, R_L = 1KΩ
λ 0.5	Spectral Bandwidth OP525F	750	-	1100	nm	-

Notes:
1. Solder time less than 5 seconds at temperature extreme.
2. Derate linearly at 1.33 mW/° C above 25° C.
3. Light source is an unfiltered GaAs LED with a peak emission wavelength of 935 nm and a radiometric intensity level which varies less than 10% over the entire lens surface of the phototransistor being tested.
4. To calculate typical collector dark current in µA, use the formulate $I_{CEO} = 10^{(0.04\,t\,-\,¾)}$, where T_A is the ambient temperature in ° C.

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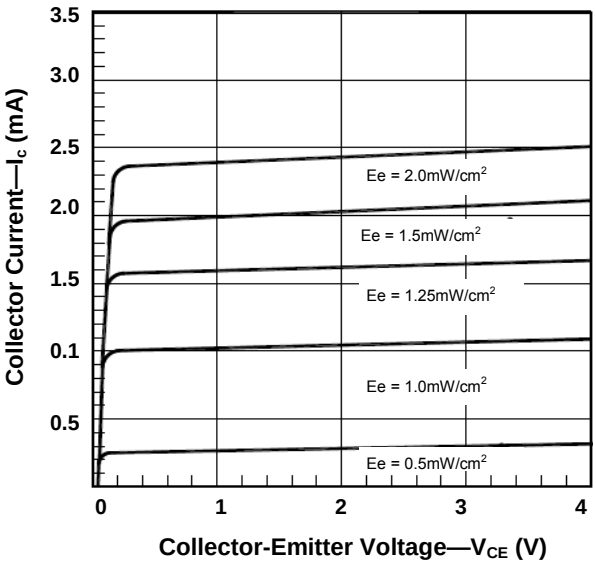
OP525 and OP525DA

Relative Response vs. Wavelength

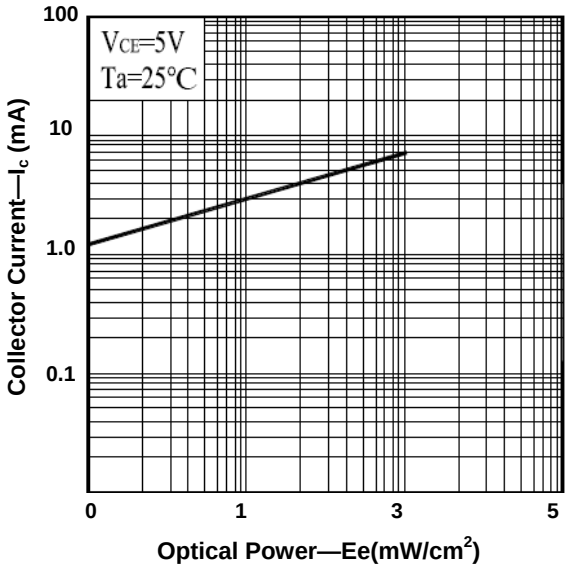


OP525

Collector Current—I_C (mA) vs Collector-Emiiter Voltage V_{CE} (V)



Collector Current—I_C (mA) vs Optical Power-Ee(mW/cm^2)

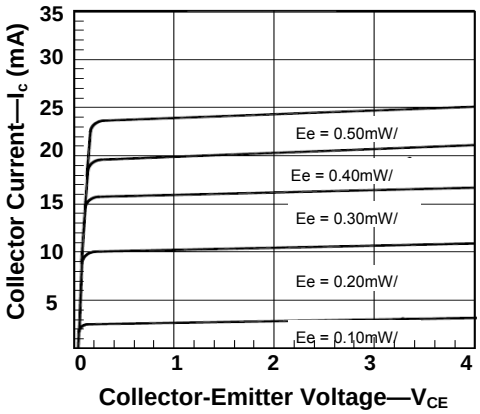


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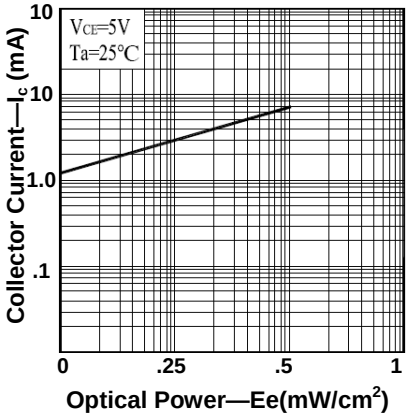
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OP525DA

Collector Current—I_C (mA) vs

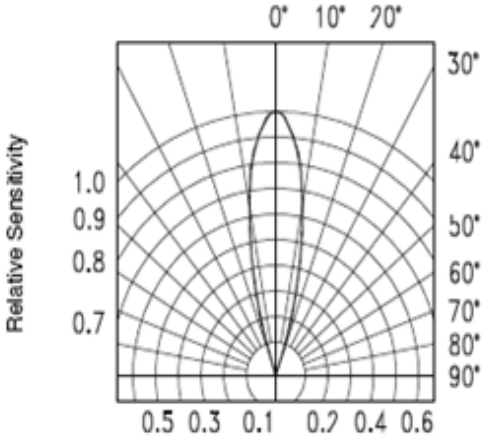


Collector Current—I_C

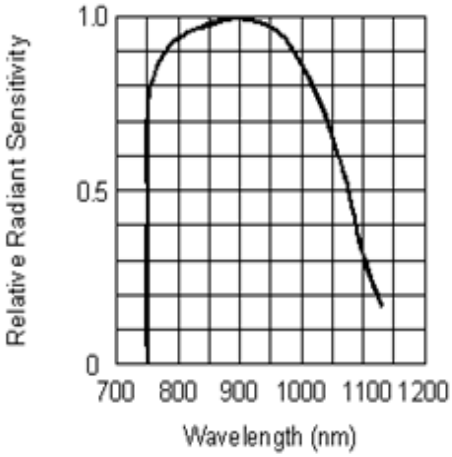


OP525F

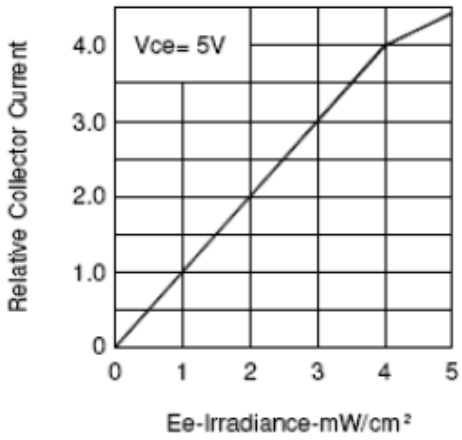
Sensitivity Chart



Spectral Sensitivity
Relative Response Vs. Wavelength



Relative Collector Current vs.Irradiance



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