

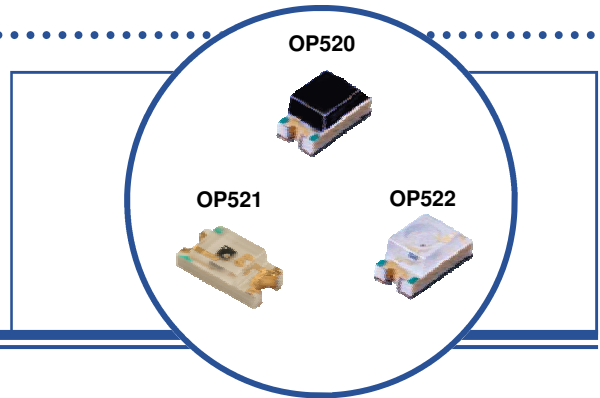
Silicon Phototransistor in Miniature SMT Package

OP520, OP521, OP522



Features:

- High photo sensitivity
- Fast response time
- 1206 package size
- Choice of opaque or water clear flat lens and Water clear inner lens



Description:

Each of these devices consists of a NPN silicon phototransistor mounted in a miniature SMT package with a 1206 size chip carrier that is compatible with most automated mounting equipment.

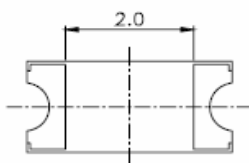
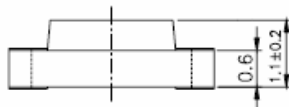
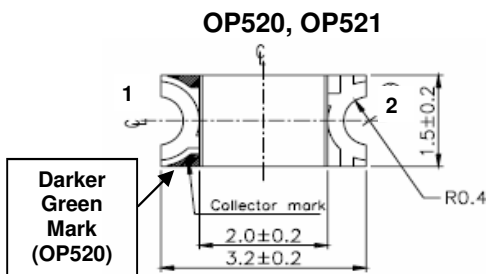
Both **OP520** and **OP521** have a flat lens. **OP520** has an opaque lens that shields the device from stray light, whereas **OP521** has a water clear lens. **OP522** has an integral molded lens, which enables a narrow acceptance angle and higher collector current than devices without lenses.

OP520, **OP521**, and **OP522** are mechanically and spectrally matched to the **OP250** series infrared LEDs.

Applications:

- Non-contact position sensing
- Datum detection
- Machine automation
- Optical encoders

Ordering Information			
Part Number	Sensor	Viewing Angle	Lead Length
OP520	Phototransistor	160°	N/A
OP521			
OP522		90°	

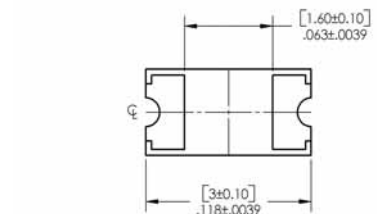
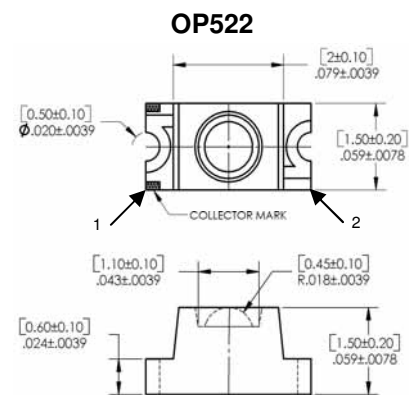


OP520, OP521
OP522



Pin #	Transistor
1	Collector
2	Emitter

DIMENSIONS ARE IN: [MILLIMETERS]
INCHES



DIMENSIONS ARE IN INCHES AND [MILLIMETERS].



RoHS

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**Silicon Phototransistor
in Miniature SMT Package
OP520, OP521, OP522**



Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Storage Temperature Range	-40° C to +85° C
Operating Temperature Range	-25° C to +85° C
Lead Soldering Temperature ⁽¹⁾	260° C
Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Collector Current	20 mA
Power Dissipation ⁽²⁾	75 mW

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

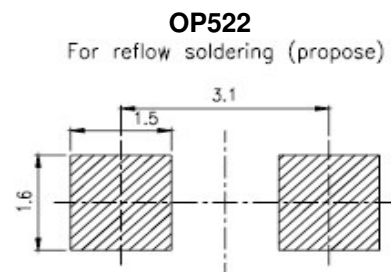
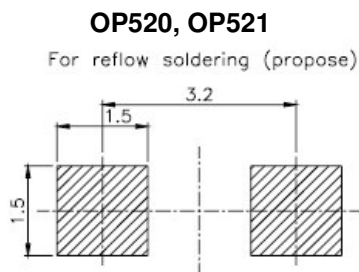
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
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Input Diode

$I_{C(ON)}$	On-State Collector Current OP520, OP521 OP522	0.25 0.50	- -	- -	mA	$V_{CE} = 5.0\text{ V}, E_E = 5.0\text{ mW/cm}^2$ ⁽³⁾
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage OP520, OP521 OP522	- -	- -	0.4 0.4	V	$I_C = 100\ \mu\text{A}, E_E = 5.0\text{ mW/cm}^2$ ⁽³⁾ $I_C = 100\ \mu\text{A}, E_E = 2.0\text{ mW/cm}^2$ ⁽³⁾
I_{CEO}	Collector-Emitter Dark Current	-	-	100	nA	$V_{CC} = 20.0\text{ V}$ ⁽⁴⁾
$V_{BR(CEO)}$	Collector-Emitter Breakdown Voltage	30	-	-	V	$I_C = 100\ \mu\text{A}, E_E = 0$
$V_{BR(ECO)}$	Emitter-Collector Breakdown Voltage OP520, OP521 OP522	5 5	- -	- -	V	$I_E = 100\ \mu\text{A}, E_E = 0$ $I_C = 100\ \mu\text{A}, E_E = 0$
t_r, t_f	Rise and Fall Times	-	15	-	μs	$V_{CE} = 5.0\text{V}, I_C = 1\text{ mA}, R_L = 1\text{K}\Omega$

Notes:

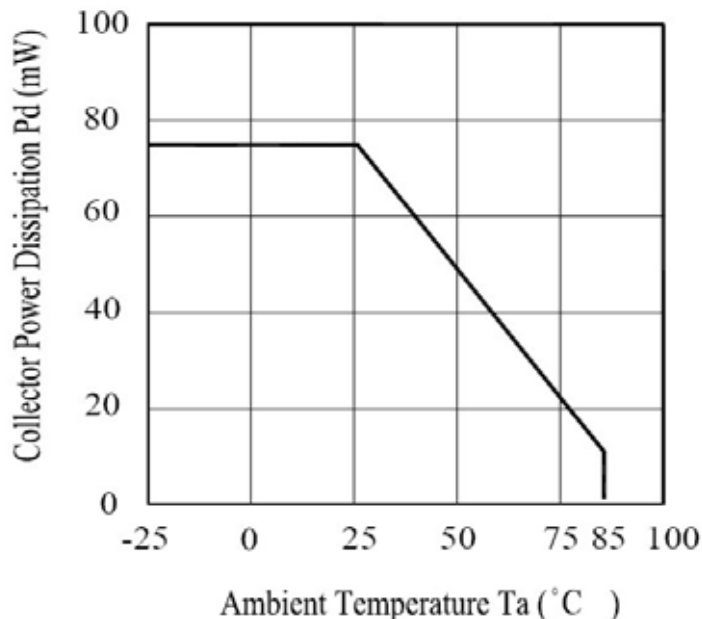
- Solder time less than 5 seconds at temperature extreme.
- Derate linearly at 2.17 mW/° C above 25° C.
- Light source is an unfiltered GaAs LED with a peak emission wavelength of 935 nm and a radiometric intensity level which varies less than 10% over the entire lens surface of the phototransistor being tested.
- To calculate typical collector dark current in μA , use the formula $I_{CEO} = 10^{(0.04 t - 3/4)}$, where T_A is the ambient temperature in ° C.



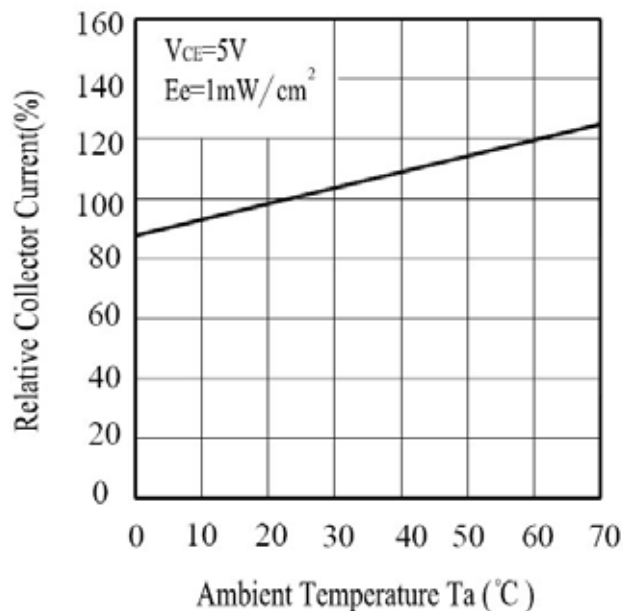
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OP520

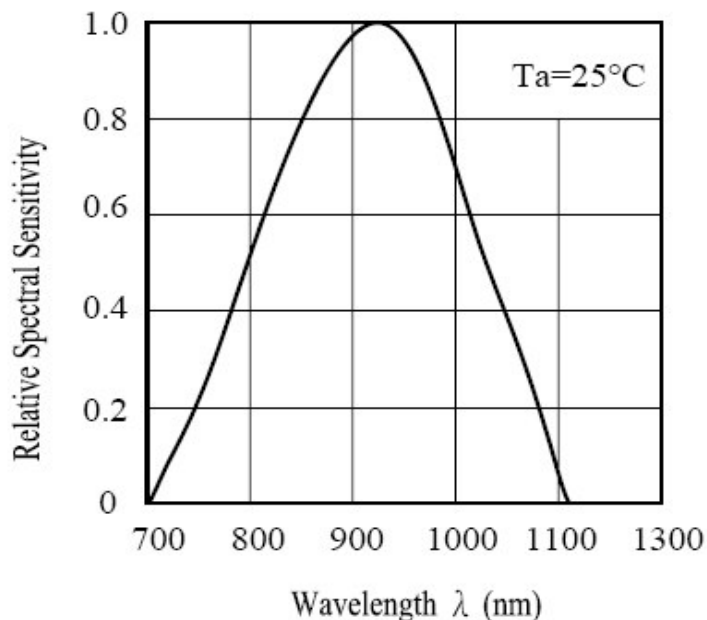
Collector Power Dissipation vs. Ambient Temperature



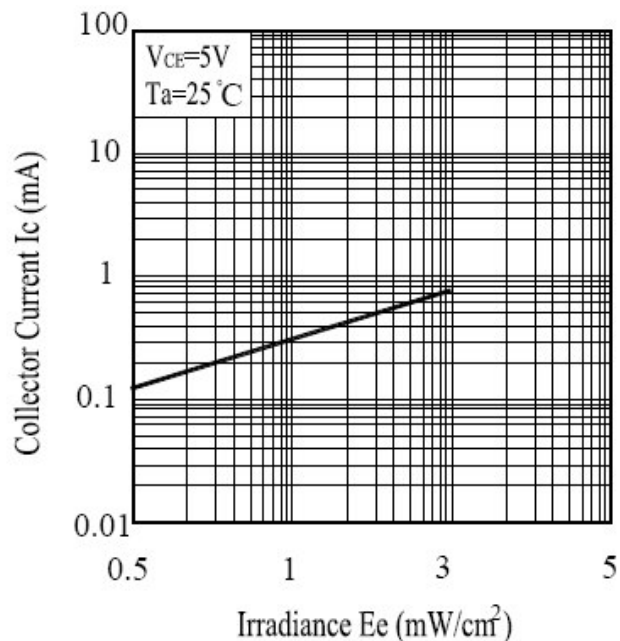
Relative Collector Current vs. Ambient Temperature



Spectral Sensitivity



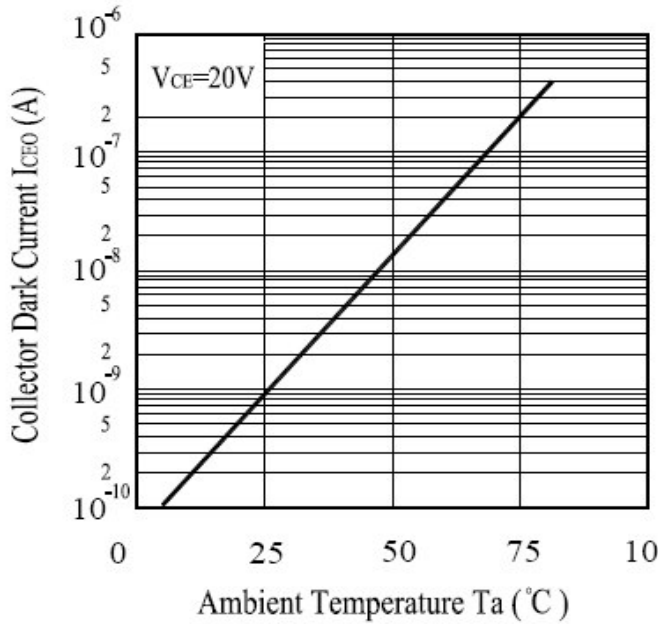
Collector Current vs. Irradiance



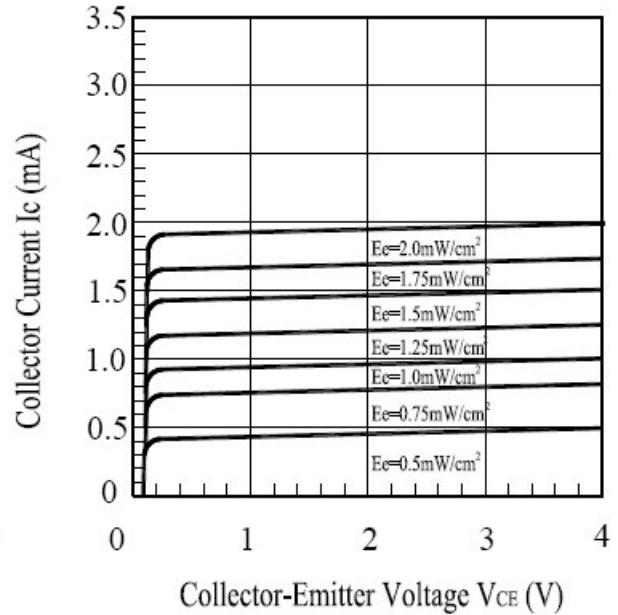
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OP520

Collector Dark Current vs. Ambient Temperature



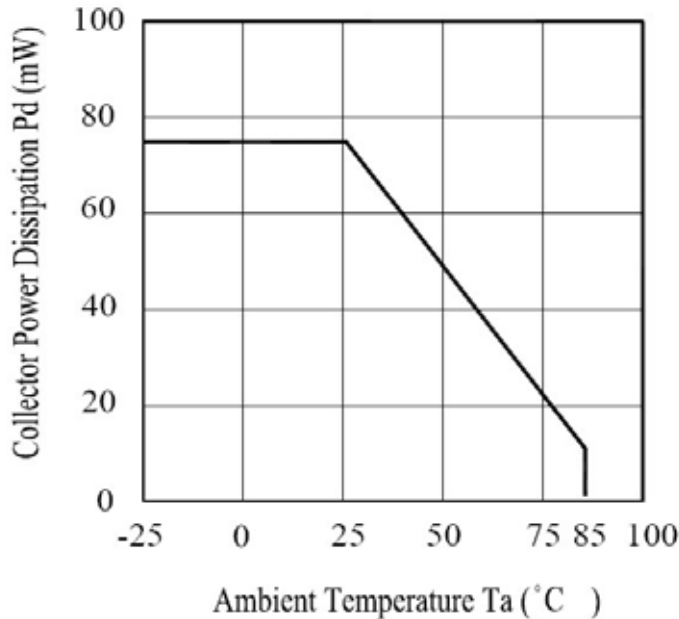
Collector Current vs. Collector-Emitter Voltage



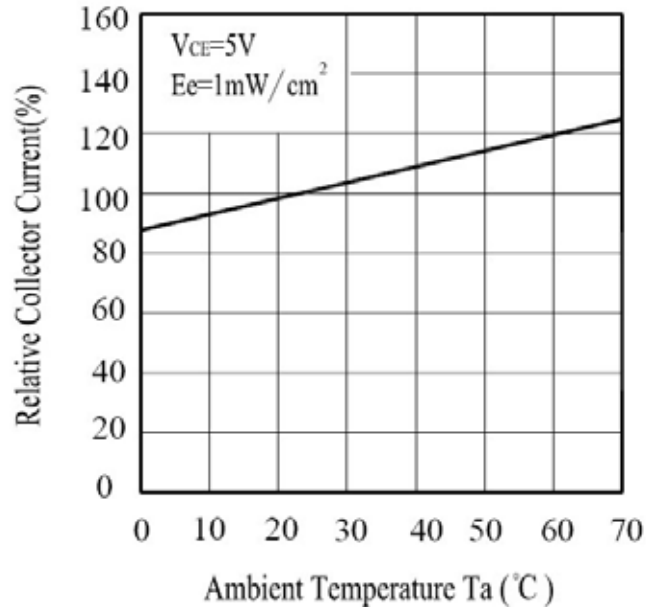
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OP521, OP522

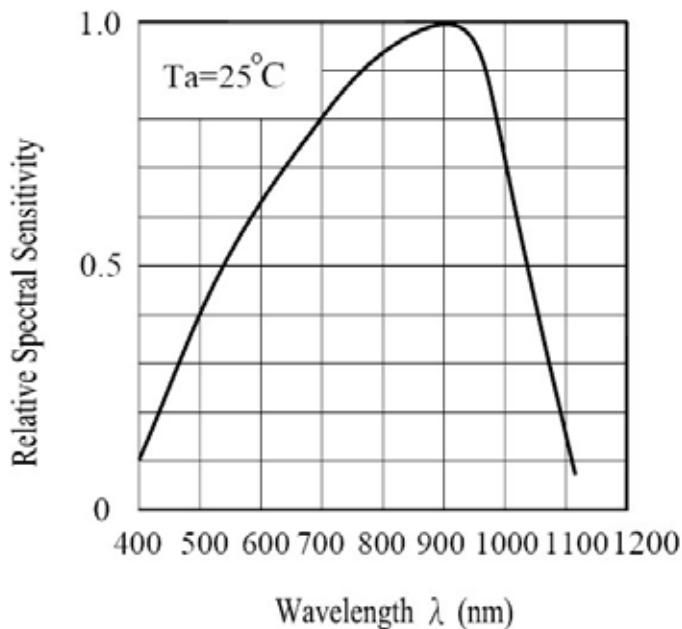
Collector Power Dissipation vs. Ambient Temperature



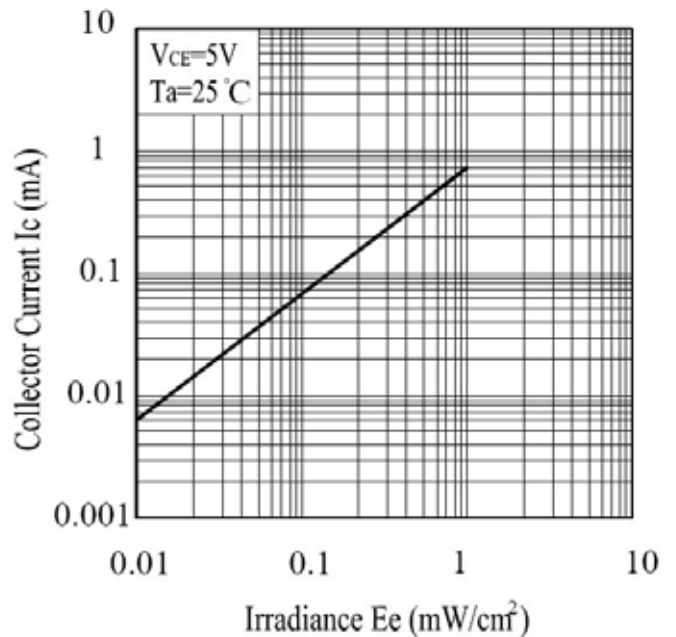
Relative Collector Current vs. Ambient Temperature



Spectral Sensitivity

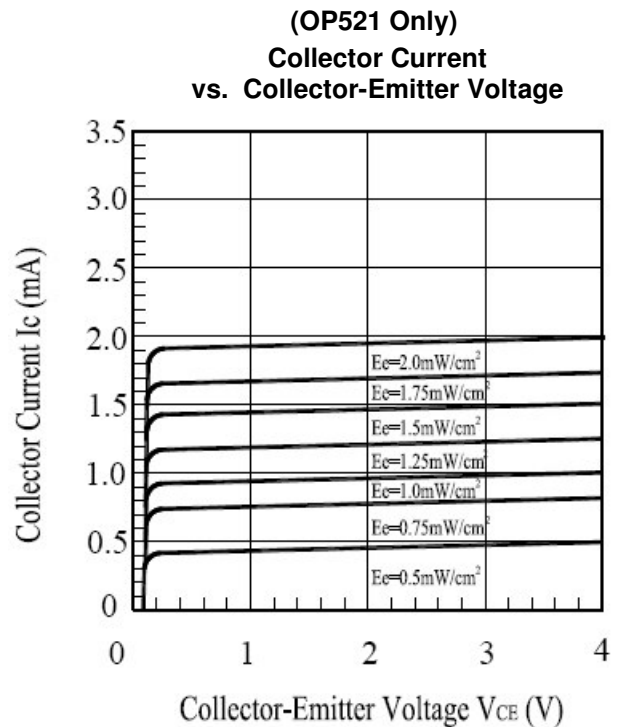
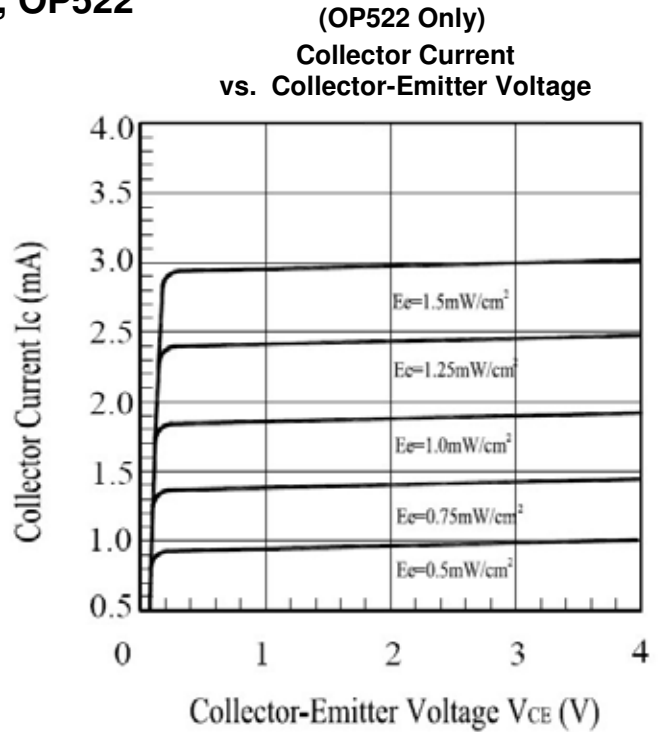
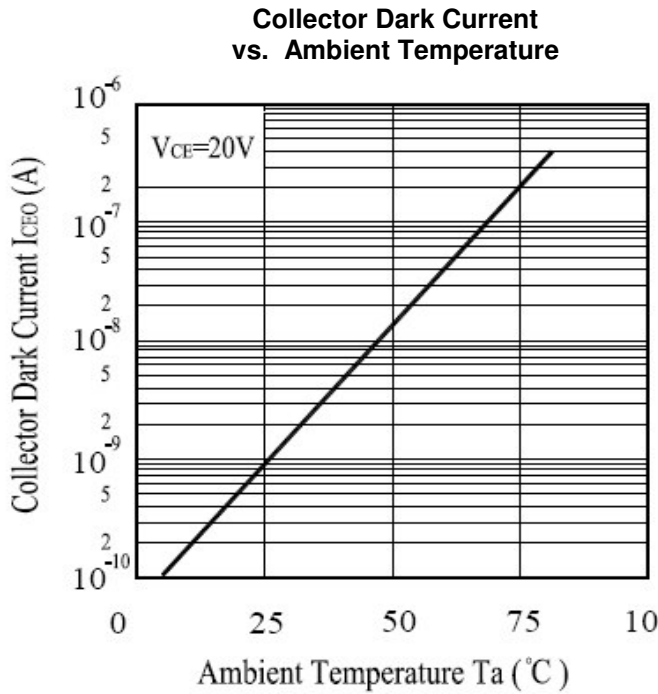


Collector Current vs. Irradiance



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OP521, OP522



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