

Optoelectronics Division
TRW Electronic Components Group

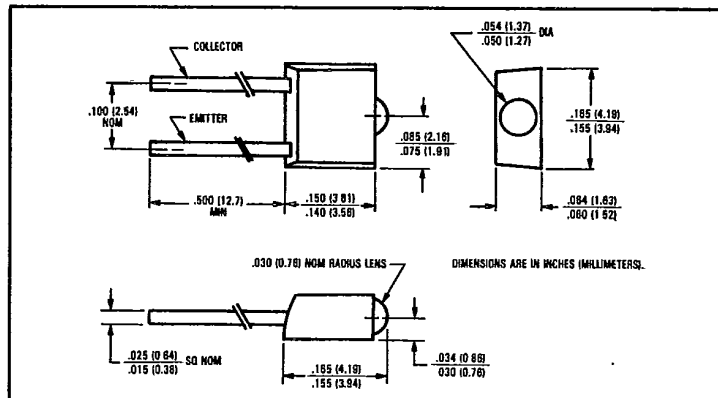
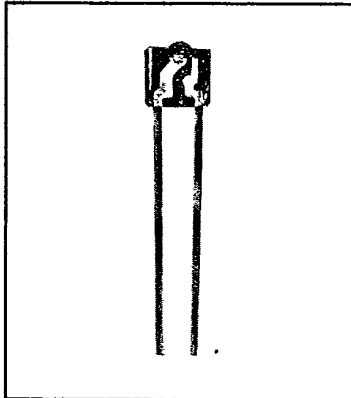
Product Bulletin 5114
January 1985



T-41-b)

NPN Silicon Phototransistors

Types OP509, OP509SLD, OP509SLC



Features

- Lensed for high sensitivity
- Can be mounted on 0.100" (2.54 mm) hole centers
- Low cost plastic package
- Mechanically and spectrally matched to the OP169SL and OP269SL series of infrared emitting diodes

Description

The OP509, OP509SLD, and OP509SLC each consist of an NPN silicon phototransistor mounted in a lensed, clear plastic, end looking package. The lensing effect of the package allows an acceptance half angle of 25° measured from the optical axis to the half power point.

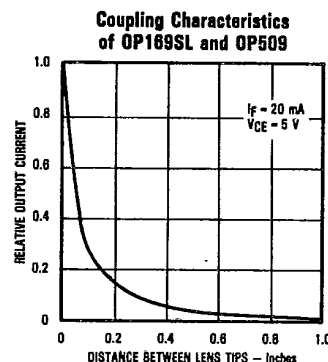
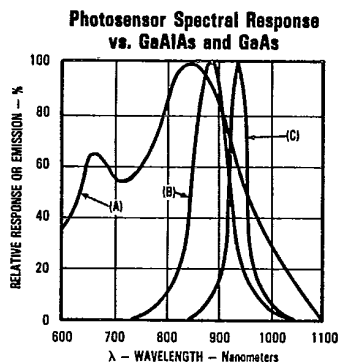
Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5.0 V
Storage and Operating Temperature Range	-40°C to +100°C
Lead Soldering Temperature (1/16 inch [1.6 mm] from case for 5 sec. with soldering iron) ⁽¹⁾	240°C
Power Dissipation	100 mW ⁽²⁾

Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 sec. max. when wave soldering.
- (2) Derate linearly 1.33 mW/°C above 25°C.
- (3) Junction temperature maintained at 25°C.
- (4) Light source is an unfiltered tungsten bulb operating at $T = 2870^\circ\text{K}$ or equivalent infrared source.
- (5) To calculate typical collector dark current in μA , use the formula $I_{CE0} = 10^{0.040 T_A - 3.4}$ where T_A is ambient temperature in °C.

Typical Performance Curves



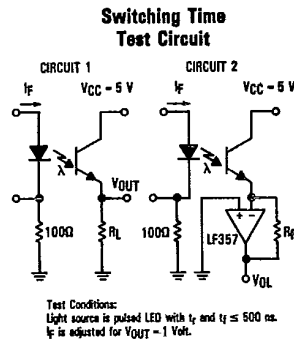
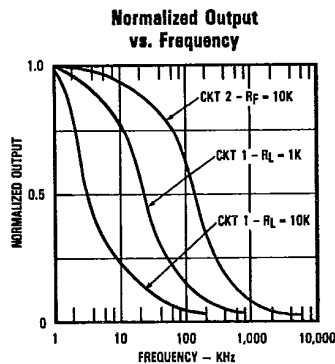
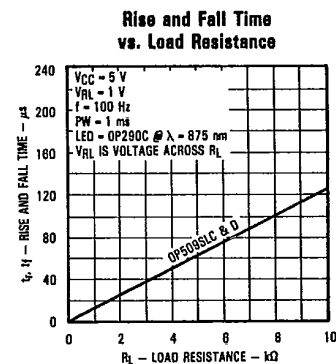
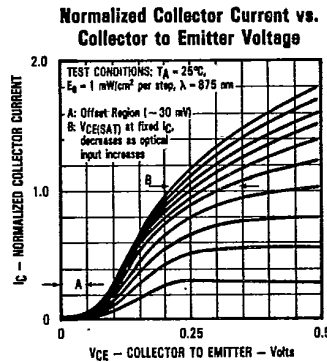
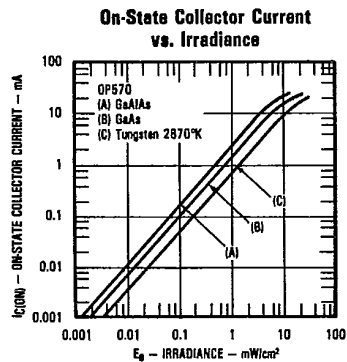
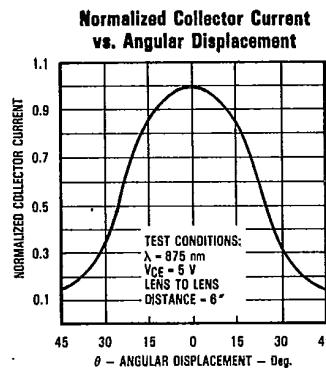
Types OP509, OP509SLD, OP509SLC

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _{CION} ⁽³⁾	On-State Collector Current	0.060		0.50	mA	V _{CE} = 5.0 V, E _B = 1.00 mW/cm ²⁽⁴⁾
		0.170			mA	V _{CE} = 5.0 V, E _B = 1.00 mW/cm ²⁽⁴⁾
		0.30			mA	V _{CE} = 5.0 V, E _B = 1.00 mW/cm ²⁽⁴⁾
ΔI _C /ΔT	Relative I _C Changes with Temperature		1.00		%/°C	V _{CE} = 5.0 V, E _B = 1.00 mW/cm ² , λ = 875 nm
I _{CEQ} ⁽⁵⁾	Collector Dark Current		100		nA	V _{CE} = 10.0 V, E _B = 0
V _{BRICEO}	Collector-Emitter Breakdown Voltage	30			V	I _C = 100 μA
V _{BRICEO}	Emitter-Collector Breakdown Voltage	5.0			V	I _E = 100 μA
V _{CEISAT} ⁽³⁾	Collector-Emitter Saturation Voltage		0.40		V	I _C = 250 μA, E _B = 5.0 mW/cm ²⁽⁴⁾

Typical Performance Curves



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

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