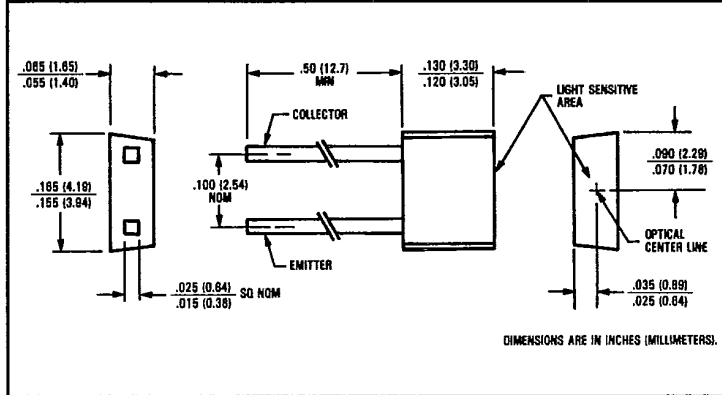
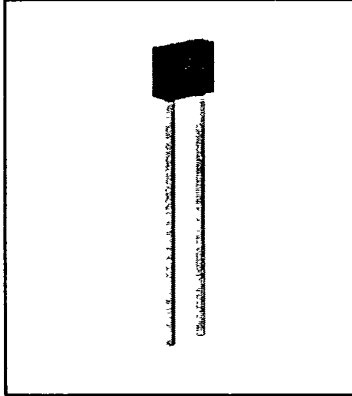


# NPN Silicon Photodarlington

## Types OP538F, OP538FC, OP538FB, OP538FA



### Features

- Flat lensed for wide acceptance angle
- Can be mounted on 0.100" (2.54 mm) hole centers
- Low cost plastic package
- Mechanically matched to the OP188F and OP268F infrared emitting diodes

### Description

The OP538F series consists of NPN silicon photodarlington mounted in flat lensed, black plastic, end looking packages. The flat sensing surface allows an acceptance half angle of 65° measured from the optical axis to the half power point. The black plastic package significantly reduces ambient light noise. These devices can be mounted on 0.100" (2.54 mm) hole centers making them an ideal low cost alternative to hermetic pill discretes.

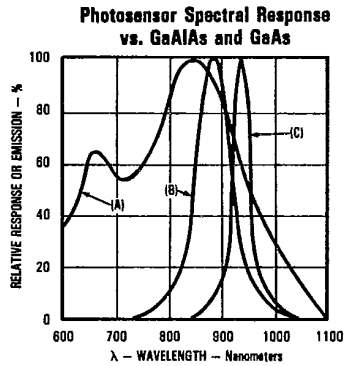
### Absolute Maximum Ratings (T<sub>A</sub> = 25°C unless otherwise noted)

Collector-Emitter Voltage	15.0 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) <sup>(1)</sup>	240°C
Power Dissipation	100 mW <sup>(2)</sup>

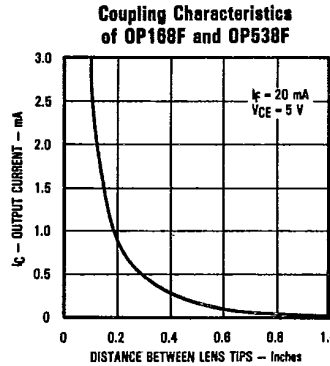
### Notes:

- (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) Light source is an unfiltered tungsten bulb operating at CT = 2870°K or equivalent infrared source.
- (4) Due to high gain of photodarlington, a load resistor should be used to avoid thermal runaways.

### Typical Performance Curves



Test Conditions (LED): T<sub>A</sub> = T<sub>J</sub> = 25°C, I<sub>F</sub> = 100 mA, DC = 0.1%, PW = 100 μs  
Peak Wavelength - λ<sub>p</sub>: (A) XSTR - 850 ± 30 nm, (B) LED GaAlAs - 875 ± 20 nm, (C) LED GaAs - 930 ± 15 nm



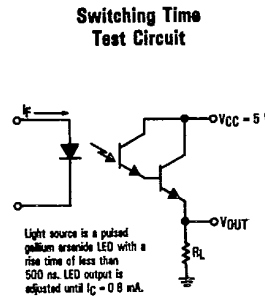
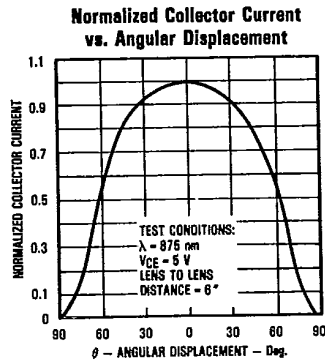
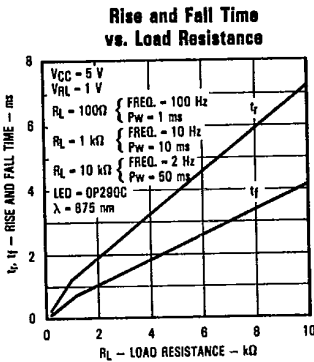
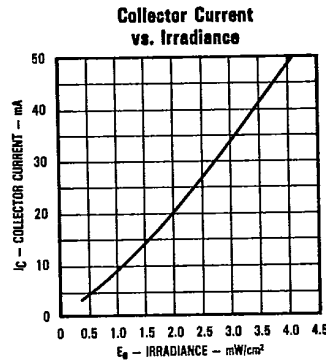
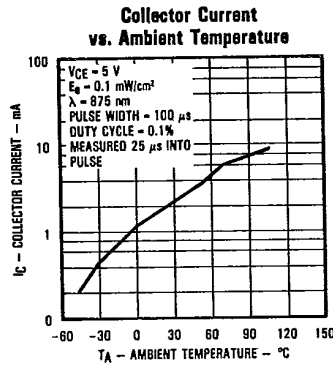
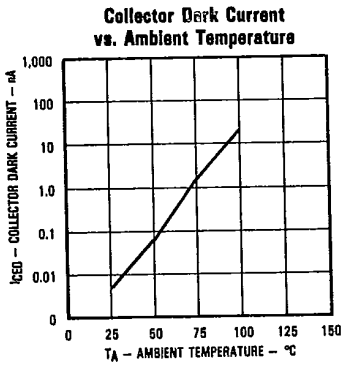
Types OP538F, OP538FC, OP538FB, OP538FA

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Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions	
I <sub>C(ON)</sub> <sup>(4)</sup>	On-State Collector Current	OP538F	1.00			mA	V <sub>CE</sub> = 5.0 V, E <sub>B</sub> = 1.00 mW/cm <sup>2(3)</sup>
		OP538FC	2.4			mA	V <sub>CE</sub> = 5.0 V, E <sub>B</sub> = 1.00 mW/cm <sup>2(3)</sup>
		OP538FB	3.2		7.2	mA	V <sub>CE</sub> = 5.0 V, E <sub>B</sub> = 1.00 mW/cm <sup>2(3)</sup>
		OP538FA	4.0			mA	V <sub>CE</sub> = 5.0 V, E <sub>B</sub> = 1.00 mW/cm <sup>2(3)</sup>
I <sub>CEO</sub>	Collector Dark Current			225	nA	V <sub>CE</sub> = 10.0 V, E <sub>B</sub> = 0	
V <sub>(BR)CEO</sub>	Collector-Emitter Breakdown Voltage	15.0			V	I <sub>C</sub> = 1.00 mA, E <sub>B</sub> = 0	
V <sub>(BR)ECO</sub>	Emitter-Collector Breakdown Voltage	5.0			V	I <sub>E</sub> = 100 μA, E <sub>B</sub> = 0	
V <sub>CE(SAT)</sub>	Collector-Emitter Saturation Voltage			1.00	V	I <sub>C</sub> = 0.50 mA, E <sub>B</sub> = 1.00 mW/cm <sup>2(3)</sup>	

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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