

# High Reliability NPN Silicon Phototransistor

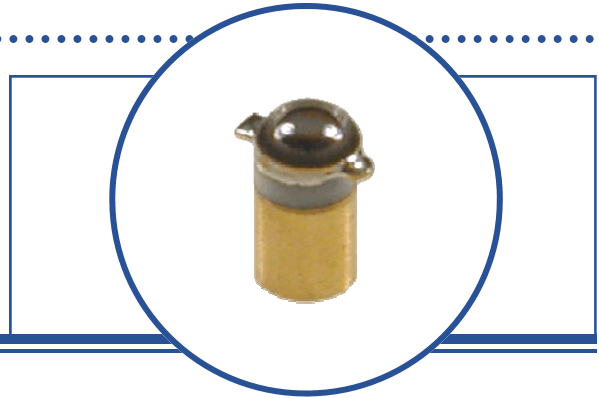
## OP602, OP603, OP604 (TX, TXV)

## OP604 (S)



### Features:

- Miniature hermetically sealed package
- Wide range of collector currents
- Ideal for direct mounting to PCBoard
- TX, TXV & S devices are processed to MIL-PRF-19500



### Description:

Each device in the **OP600** high reliability series consists of a high-reliability NPN silicon phototransistor that is mounted in a glass-lensed miniature hermetically sealed "pill" package with an 18° half angle, as measured from the optical axis to the half-power point.

After electrical testing by manufacturing, devices are processed to OPTEK's 100 percent screening program, which is patterned after MIL-PRF-19500. *Components in the high reliability OP600 series are mechanically and spectrally matched to the OP223 and OP224 high reliability series of infrared emitting diodes.*

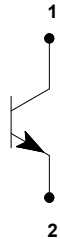
*TX, TXV and S devices are processed to OPTEK's military screening program patterned after MIL-PRF-19500.*

*Please refer to Application Bulletins 208 and 210 for additional design information and reliability (degradation) and to Application Bulletin OP202 for pill-type soldering to PCBoard.*

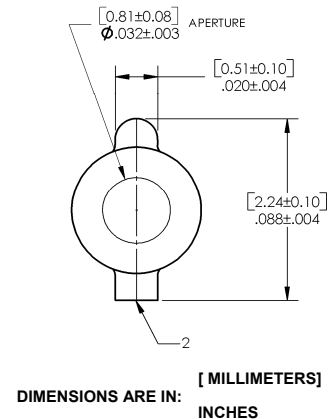
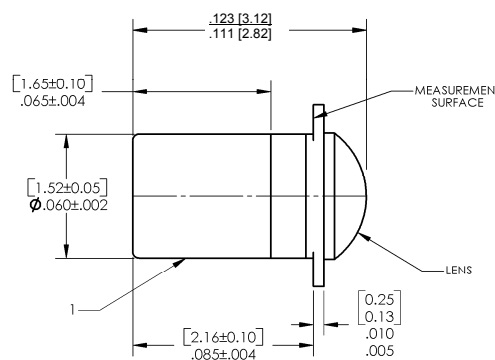
### Applications:

- Non-contact reflective object sensor
- Assembly line automation
- Machine automation
- Machine safety
- End of travel sensor
- Door sensor

Part Number	Light Current I <sub>C(ON)</sub> (mA) Min / Max	V <sub>CE</sub> Typ / Max	Input Power E <sub>E</sub> (mW/cm <sup>2</sup> )	Viewing Angle
OP602TX	2.00 / 5.00	5 / 50	20.0	35°
OP602TXV				
OP603TX	4.00 / 8.00			
OP603TXV				
OP604S	7.00 / NA			
OP604TX				
OP604TXV				



Pin #	Sensor
1	Collector/Cathode
2	Emitter/Anode



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

**High Reliability NPN Silicon Phototransistor**  
**OP602, OP603, OP604 (TX, TXV)**  
**OP604 (S)**



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

Storage Temperature Range	-65° C to +150° C
Operating Temperature Range	-55° C to +125° C
Collector-Emitter Voltage	50 V
Emitter-Collector Voltage	7.0 V
Soldering Temperature (5 seconds with soldering iron) <sup>(1)</sup>	260° C
Power Dissipation <sup>(2)</sup>	50 mW

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

**Input Diode**

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$I_{C(ON)}$	On-State Collector Current OP602TX, OP602TXV OP603TX, OP603TXV OP604TX, OP604TXV, OP604S	2	-	5	mA	$V_{CE} = 5.0\text{ V}, E_E = 20\text{ mW/cm}^{2(3)(4)}$
		4		8		
		7		-		
$I_{CEO}$	Collector Dark Current	-	-	25	nA	$V_{CE} = 10.0\text{ V}, E_E = 0$
		-	-	100	$\mu\text{A}$	$V_{CE} = 30.0\text{ V}, E_E = 0, T_A = 100^\circ\text{ C}$
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	50	-	-	V	$I_C = 100\ \mu\text{A}, E_E = 0$
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	7	-	-	V	$I_C = 100\ \mu\text{A}, E_E = 0$
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	-	-	0.4	V	$I_C = 0.4\text{ mA}, E_E = 20\text{ mW/cm}^{2(3)(4)}$
$t_r$	Rise Time	-	-	20	$\mu\text{s}$	$V_{CC} = 30\text{ V}, I_C = 1.00\text{ mA},$ $RL = 100\ \Omega^{(2)(3)(4)}$
$t_f$	Fall Time	-	-	20		

Notes:

- (1) Refer to Application Bulletin 202, which discusses proper techniques for soldering pill-type devices to PCBoards.
- (2) No clean or low solids. RMA flux is recommended. Duration can be extended to 10 seconds maximum when wave soldering.
- (3) Derate linearly 0.5 mW/° C above 25° C.
- (4) Junction temperature maintained at 25° C.
- (5) Light source is an unfiltered tungsten lamp operating at  $CT=2870\text{ K}$  or equivalent source.

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