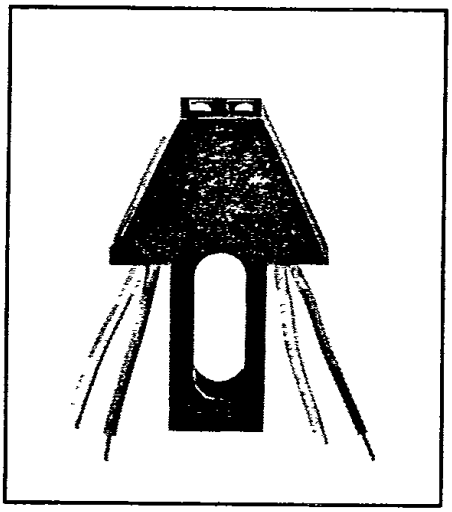
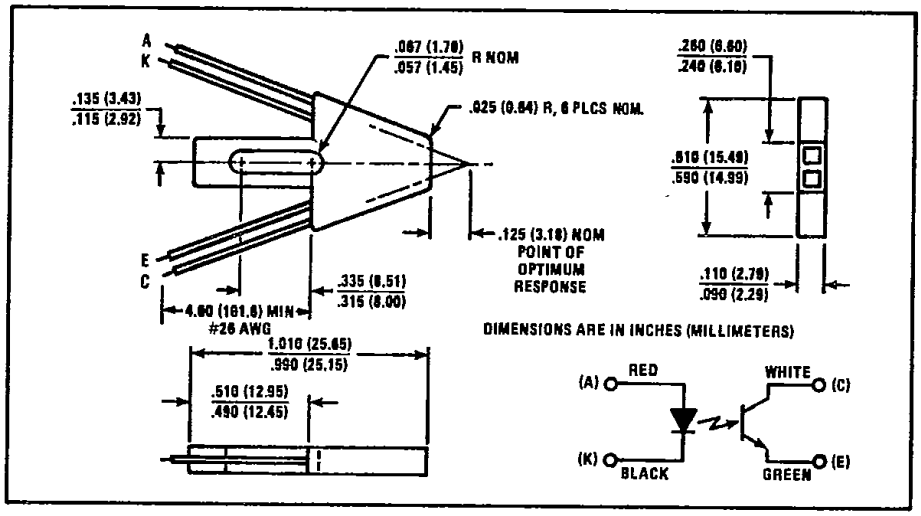
Optoelectronics Division
TRW Electronic Components Group

Product Bulletin 5282
January 1985

Reflective Object Sensor
Type OPB253A





Features
- Phototransistor output
- Low profile to facilitate stacking
- Low cost plastic housing
- 4.0 inches (101.6 mm) minimum length lead wire

Description
The OPB253A consists of an infrared emitting diode and an NPN silicon phototransistor mounted side-by-side on converging optical axes, in a black plastic housing. The phototransistor responds to radiation from the LED only when a reflective object passes within its field of view.

The OPB253A utilizes an OP123 or OP223 LED and an OP600 family sensor. Leads are #26 AWG, teflon insulation, 4.0" (101.6 mm) minimum length, stripped and tinned.

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

Storage Temperature Range	−40°C to +125°C
Operating Temperature Range	−40°C to +100°C
Input Diode	
Reverse Voltage	2.0 V
Continuous Forward Current	50 mA
Power Dissipation	80 mW[1]
Output Phototransistor	
Collector-Emitter Voltage	25 V
Emitter-Collector Voltage	5.0 V
Power Dissipation	50 mW[2]

Notes:
(1) Derate linearly 1.07 mW/°C above 25°C.
(2) Derate linearly 0.67 mW/°C above 25°C.
(3) Measured using an Eastman Kodak neutral white test card having 90% diffuse reflectance as a reflecting surface.
(4) Crosstalk (I_{CX}) is the collector current measured with the indicated current in the input diode and with no reflecting surface.
(5) Lower curve is based on a calculated worst case condition rather than the conventional -2σ limit.
(6) d is the distance from the assembly head to the reflective surface.

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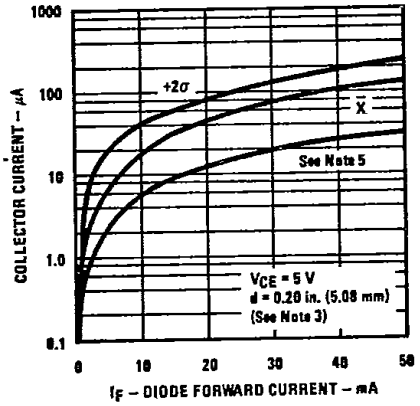
Electrical Characteristics (T_A = 25°C unless otherwise noted)

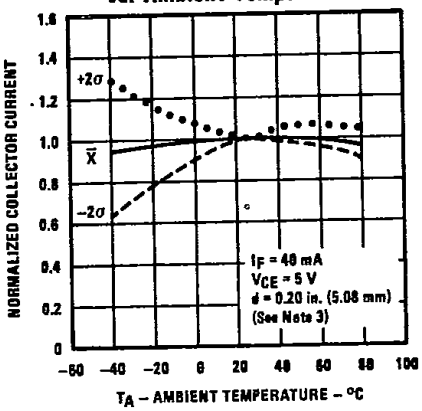
Symbol	Parameter	Min.	Max.	Units	Test Conditions
Input Diode					
V_F	Forward Voltage		1.70	V	I_F = 50 mA
I_R	Reverse Current		100	μA	V_R = 2.0 V
Output Phototransistor					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	25		V	I_C = 100 μA
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	5.0		V	I_E = 100 μA
I_{CEO}	Collector Dark Current		100	nA	V_{CE} = 10.0 V, I_F = 0, $E_e \leq 0.1$ μW/cm²
Combined					
$I_{C(ON)}$	On-State Collector Current	25		μA	I_F = 40 mA, V_{CE} = 5.0 V, d = 0.20 in. (5.08 mm).[6] See Note 3.
I_{CX}	Crosstalk		2.0	μA	I_F = 40 mA, V_{CE} = 5.0 V. No Reflecting Surface
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage		0.40	V	I_F = 40 mA, I_C = 10.0 μA, d = 0.20 in. (5.08 mm).[6] See Note 3.

Typical Performance Curves

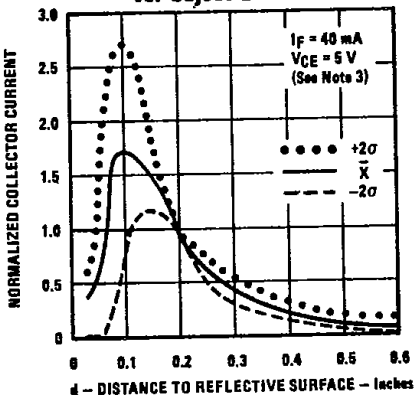
Collector Current vs. Diode Forward Current



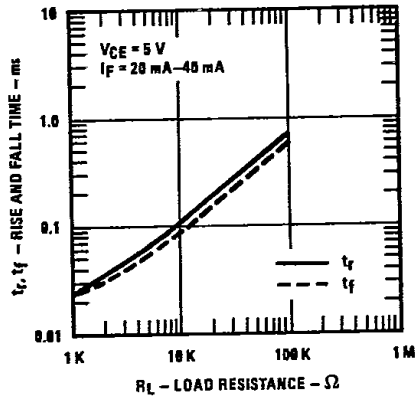
Normalized Collector Current vs. Ambient Temperature



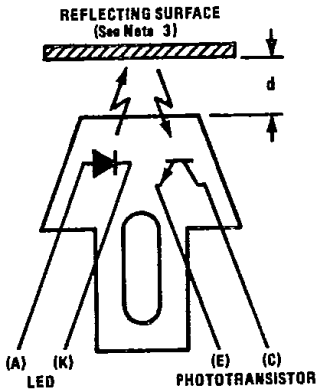
Normalized Collector Current vs. Object Distance



Rise and Fall Time vs. Load Resistance



Test Condition



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