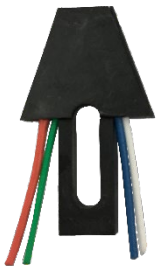
High Reliability Reflective Object Sensor

OPB700TX



Features:

- Non-contact switching
- Low profile to facilitate stacking
- Hermetically sealed components
- 24” (609.60 mm) minimum length wire, conforms to MIL-W-16878
- TX components processed to MIL-PRF-19500

Description:

Each **OPB700TX** sensor consists of a hermetically sealed gallium aluminum arsenide LED and a silicon phototransistor mounted side-by-side on converging optical axes in a high-temperature black plastic housing. The phototransistor responds to the radiation from the LED only when a reflective object passes within its field of view. Lead wires are #26 AWG polytetrafluoroethylene (PTEF) insulated, which conforms to MIL-W-16878.

TX device components are processed to OPTEK’s military screening program patterned after MIL-PRF-19500.

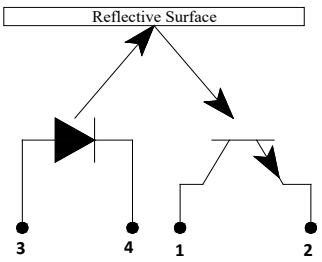
For application information, See Application Bulletins 248 and 213

Custom electrical, wire and connectors are available. Contact your local representative or OPTEK for more information.

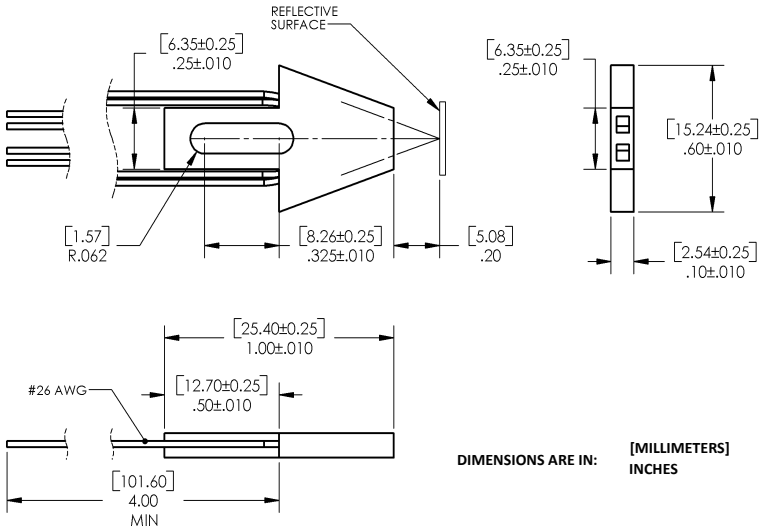
Applications:

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

Part Number	LED Peak Wavelength	Sensor	Reflection Distance Inch (mm)	$I_{C(ON)}$ (mA) Min	I_F (mA) Typ / Max	V_{CE} (Volts) Max	Lead Length / Spacing
OPB700TX	890 nm	Transistor	0.200" (5.08 mm)	0.03	40 / 50	50	24" #26 AWG Wire



Color/Pin #	LED	Color/Pin #	LED
Orange-3	Anode	White-1	Collector
Green-4	Cathode	Blue-2	Emitter



Electrical Specifications

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

Storage Temperature Range	-65° C to + 150° C
Operating Temperature Range	-65° C to + 125° C
Lead Soldering Temperature	260° C
Input Diode	
Forward DC Current	50 mA
Reverse Voltage	2 V
Power Dissipation (1)	100 mW
Output Phototransistor	
Collector-Emitter Voltage	50 V
Emitter-Collector Voltage	7 V
Power Dissipation (1)	100 mW

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

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode						
V_F	Forward Voltage (6)	1.1	1.5	1.8	V	I_F = 50 mA
		1.3	1.7	2.0		I_F = 50 mA, T_A = -55° C
		0.9	1.3	1.7		I_F = 50 mA, T_A = 100° C
I_R	Reverse Current	-	0.1	100	µA	V_R = 2 V
Output Phototransistor						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	50	110	-	V	I_C = 1 mA, I_F = 0
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	7	10	-	V	I_E = 100 µA, I_F = 0
$I_{C(OFF)}$	Collector-Emitter Dark Current	-	-	100	nA	V_{CE} = 10 V, I_F = 0
		-	10	100	µA	V_{CE} = 10 V, I_F = 0, T_A = 100° C
$I_{C(ON)}$	On-State Collector Current d = 0.20" (5.08 mm) (2)(6)	50	200	-	µA	V_{CE} = 5 V, I_F = 40 mA
		25	-	-		V_{CE} = 5 V, I_F = 40 mA, T_A = -55° C
		25	-	-		V_{CE} = 5 V, I_F = 40 mA, T_A = 100° C
I_{CX}	Crosstalk (No reflective surface) (3)	-	2	-	µA	V_{CE} = 5 V, I_F = 40 mA
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage d = 0.20" (5.08 mm) (2)	-	-	0.4	V	I_C = 10 µA, I_F = 40 mA
t_r	Output Rise Time	-	12	20	µs	V_{CC} = 10 V, I_F = 20 mA, R_L = 1,000 Ω
t_f	Output Fall Time	-	12	20		

Notes:

(1) Derate linearly 0.80 mW/° C above 25° C.

(2) Measured using Eastman Kodak neutral white test card with 90% diffuse reflectance as a reflective surface.

(3) Crosstalk (I_{CX}) is the collector current measured with the indicated current in the input diode and no reflective surface.

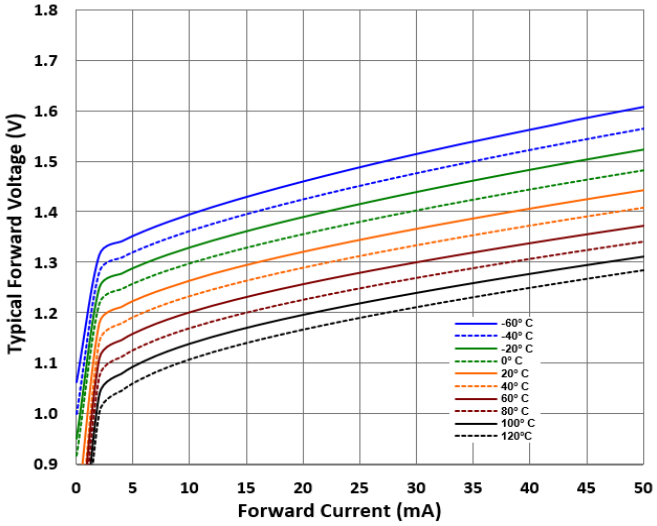
(4) The distance from the assembly head to the reflective surface is "d".

(5) Methanol or isopropyl alcohol is recommended as a cleaning agent.

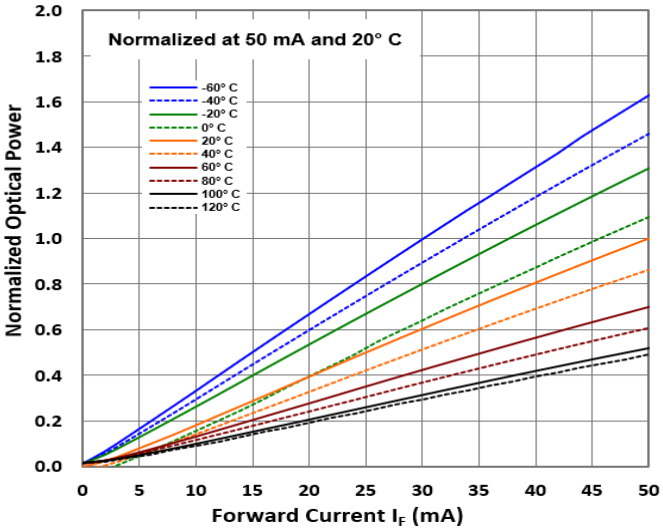
(6) Measurement is taken during the last 500 µs of a single 1.0 ms test phase. Heating due to increment pulse rate or pulse width can cause change in measurement results.

Typical Performance

LED Forward Voltage vs I_F vs Temp

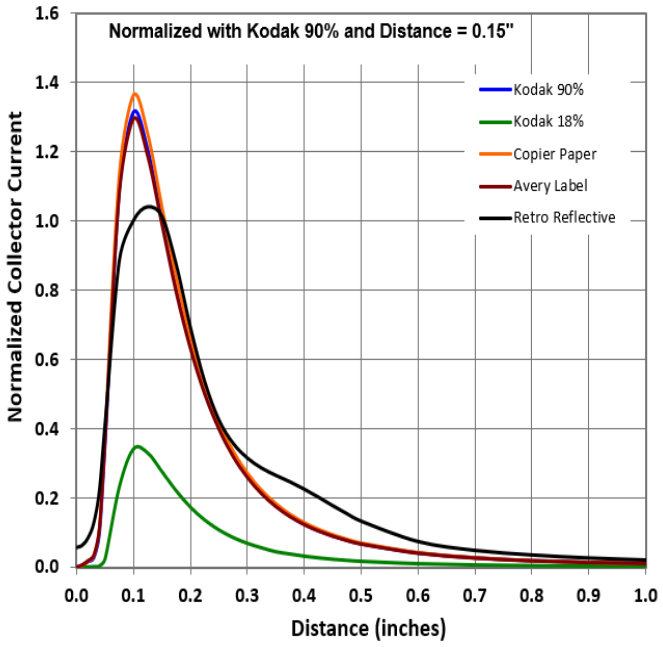


Optical Power vs I_F vs Temperature

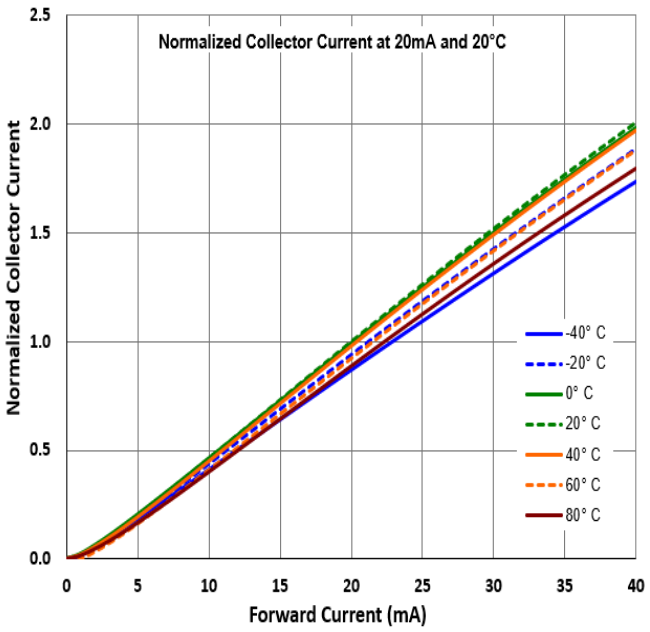


Typical Performance

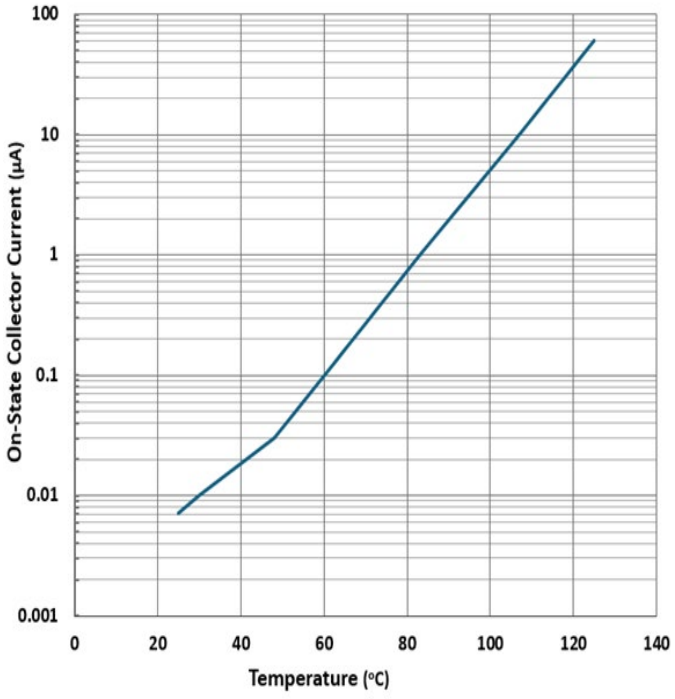
Collector Current vs Distance



Collector Current vs Forward Current vs Temperature



Collector Dark Current vs Temperature



Rise and Fall Times vs Load Resistance