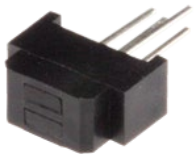
Reflective Object Sensor

OPB711, OPB712



Features:

- Choice of phototransistor or photodarlington output
- Unfocused for sensing diffuse surface
- Low-cost plastic housing
- Filtered to reduce effects of ambient light noise

Description:

OPB711 consists of an infrared emitting diode and an NPN silicon phototransistor, mounted “side-by-side” on parallel axes in a black opaque plastic housing. The **OPB712** consists of an infrared emitting diode and an NPN silicon photodarlington, mounted “side-by-side” on parallel axes in a black plastic housing.

OPB711’s, emitting diode and phototransistor are encapsulated in a filtering epoxy to reduce ambient light noise. Its phototransistor responds to light radiated from the emitter only when a reflective object passes within its field of view.

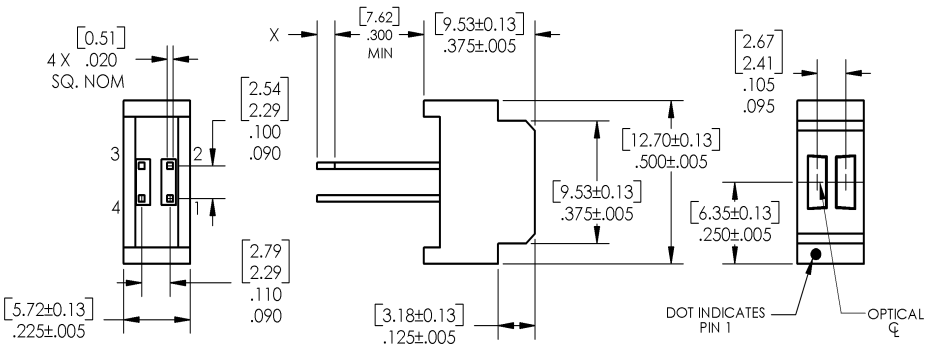
OPB712’s emitting diode and photodarlington are encapsulated in a filtering epoxy to reduce ambient light noise. Its photodarlington responds to radiation from the emitter only when a reflective object passes within its field of view.

For application information, see Application Bulletins 248 and 213

Applications:

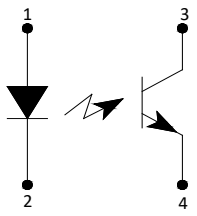
- Non-contact reflective object sensor
- Assembly line automation
- Machine automation
- Machine safety
- End of travel sensor
- Door sensor

Part Number	LED Peak Wavelength	Sensor	Reflection Distance Inch (mm)	Lead Length / Spacing
OPB711	890 nm	Transistor	0.080" (2.03 mm)	0.30" / 0.095" & 0.100" “X” = 0.06” (1.5 mm)
OPB712		Darlington		

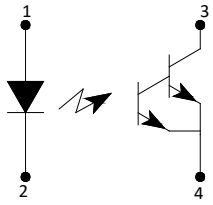


DIMENSIONS ARE IN: [MILLIMETERS] INCHES

OPB711



OPB712



Pin #	LED	Pin #	Transistor
1	Anode	3	Collector
2	Cathode	4	Emitter

RoHS

General Note
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Electrical Specifications

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

Storage & Operating Temperature Range	-40° C to +85° C
Lead Soldering Temperature [1/16 inch (1.6 mm) from the case for 5 sec. with soldering iron] (1)	260° C
Input Diode	
Forward DC Current	50 mA
Peak Forward Current (1 µs pulse width, 300 pps)	3 A
Reverse DC Voltage	2 V
Power Dissipation (2)	80 mW
Output Phototransistor (OPB711), **Output Photodarlington** (OPB712)	
Collector-Emitter Voltage OPB711 OPB712	 24 V 15 V
Emitter-Collector Voltage	5 V
Collector DC Current OPB711 OPB712	 25 mA 125 mA
Power Dissipation OPB711 (2) OPB712 (3)	 100 mW 125 mW

Notes:
(1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
(2) Derate linearly 1.00 mW/cm^2 above 25° C.
(3) Derate linearly 1.66 mW/° C above 25° C.

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Electrical Specifications

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

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode						
V_F	Forward Voltage	1.0	-	1.7	V	I_F = 20 mA
I_R	Reverse Current	-	-	100	µA	V_R = 2 V
Output Phototransistor (OPB711), **Output Photodarlington** (OPB712)						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage OPB711 OPB712	 24 15	 - -	 - -	V	I_C = 100 µA
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	5	-	-	V	I_E = 100 µA
I_{CEO}	Collector Dark Current OPB711 OPB712	 - -	 - -	 100 250	nA	V_{CE} = 10 V, I_F = 0, E_E = ≤ 0.1 µW/cm^2
Combined (4)						
$V_{CE(SAT)}$ (1)(2)	Collector-Emitter Saturation Voltage OPB711 OPB712	 - -	 - -	 .4 1.1	V	I_F = 20 mA, I_C = 50 µA, d = 0.080" (2.03 mm)
$I_{C(ON)}$ (1)(2)	On-State Collector Current OPB711 OPB712	 .35 20	 - -	 4.5 50	 mA mA	I_F = 20 mA, V_{CE} = 5 V, d = .080" (2.03 mm)
I_{CX} (3)	Crosstalk OPB711 OPB712	 - -	 - -	 100 25	 nA µA	V_{CE} = 5 V, I_F = 20 mA (no reflecting surface)

Notes:
(1) On OPB711, D is the distance from the assembly measurement surface to the reflective surface. On OPB712, D is the distance from the assembly face to the reflective surface.
(2) Measured using Eastman Kodak neutral white test card with 90% diffuse reflectance as a reflecting surface. Reference: Eastman Kodak, Catalog #E 152 7795.
(3) Crosstalk (I_{CX}) is the collector current measured with the indicated current in the input diode and with no reflective surface.
(4) All parameters were tested using pulse techniques.

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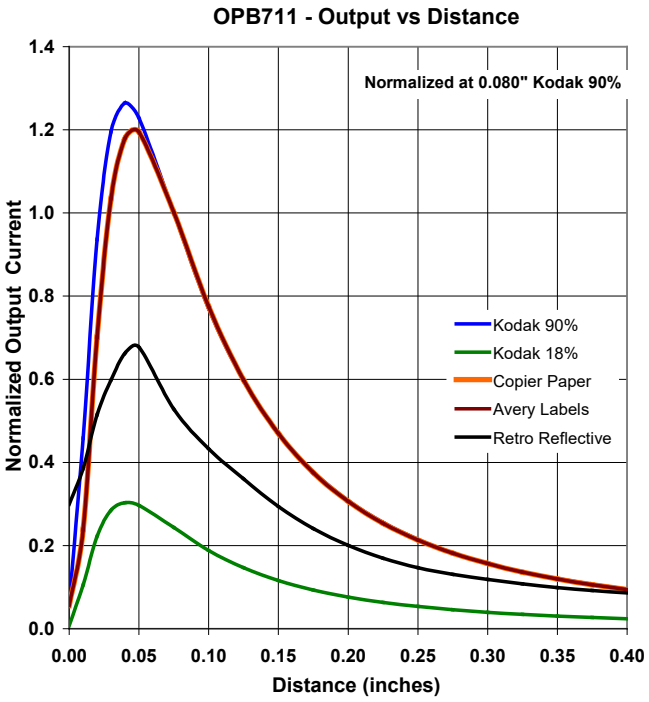
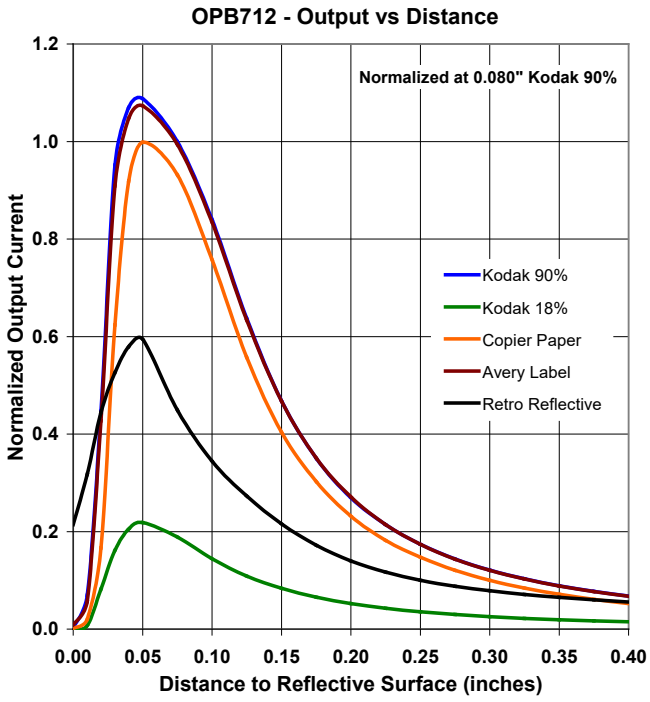
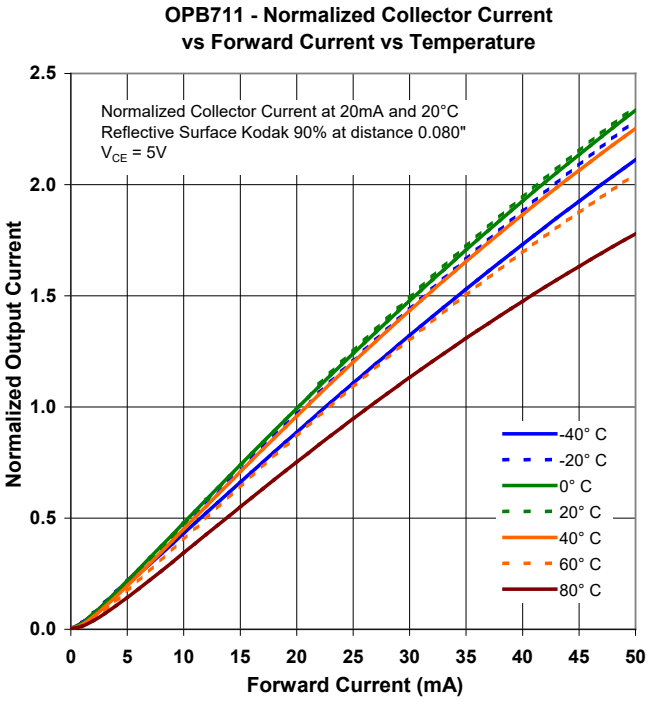
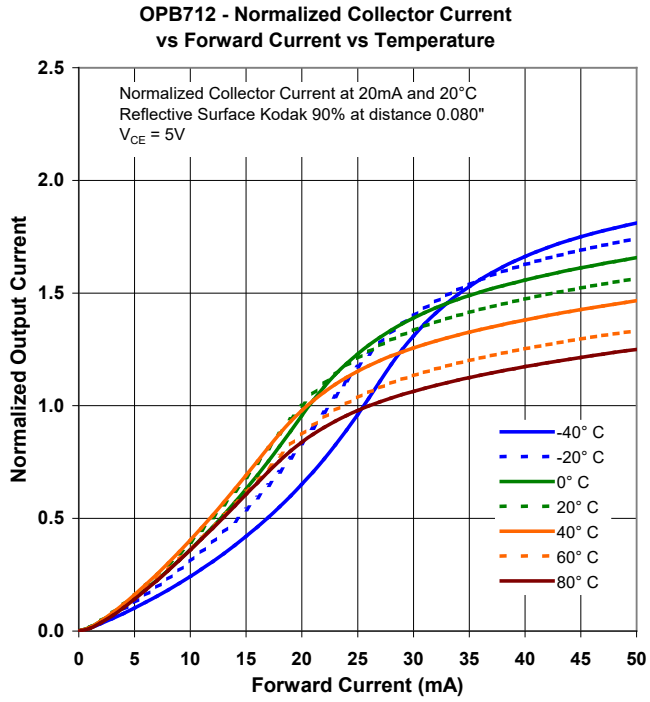
Typical Performance









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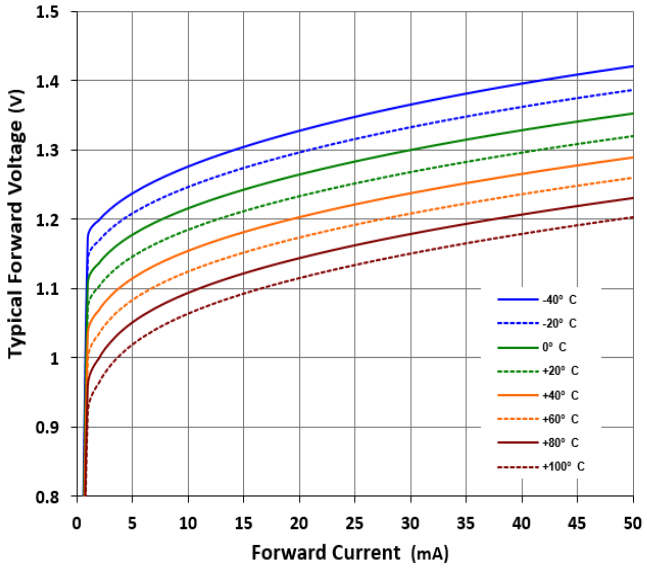
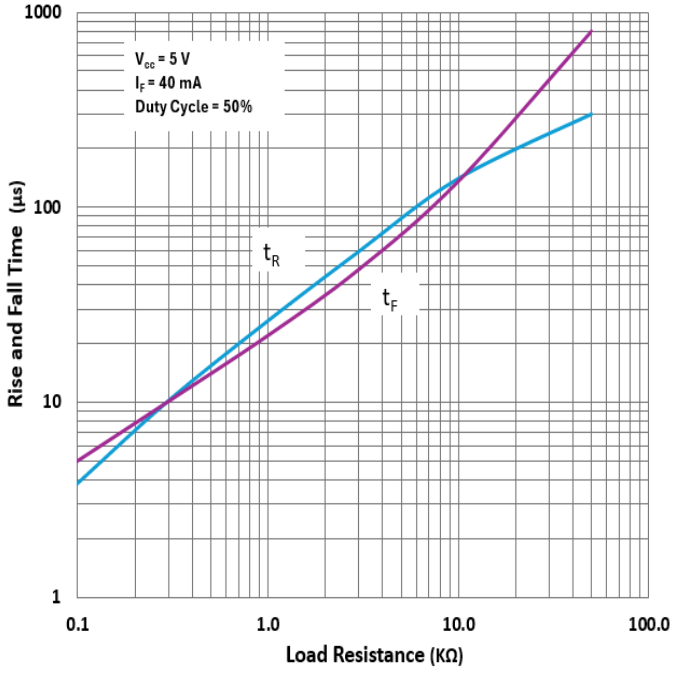
Typical Performance

935nm LED Forward Voltage vs Current vs Temp

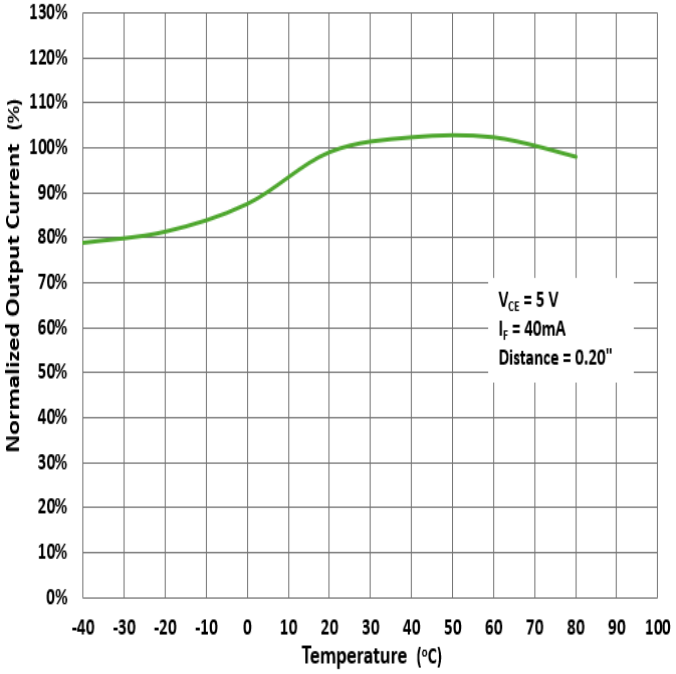


OPB711 Performance

Transistor Output - Rise and Fall Time



Collector Current vs Temperature



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