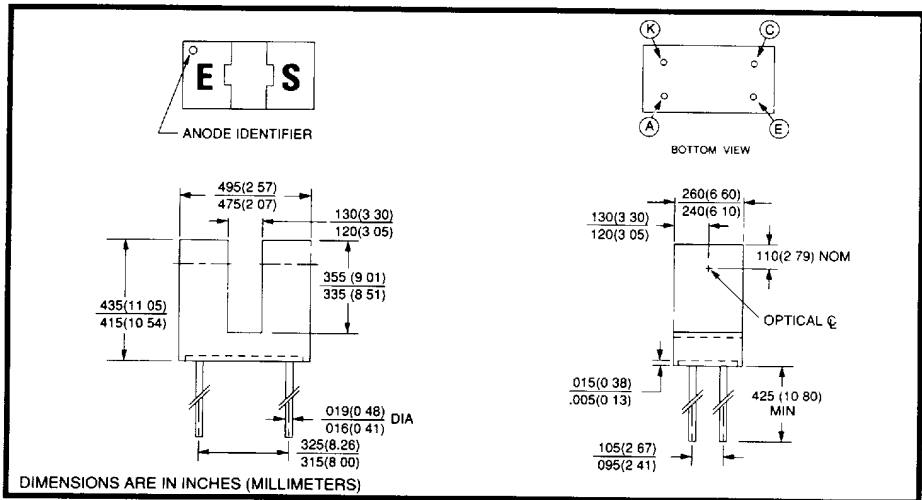
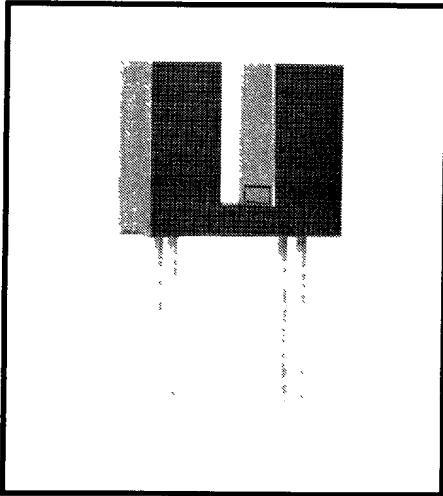


Hi-Rel Slotted Optical Switches

Type OPB870N Series

T-41-73



Features

- Non-contact switching
- Choice of apertures
- Choice of minimum $I_{C(ON)}$
- Soldering per MIL-S-45743
- Hermetically sealed components
- Components processed to Optek's screening program patterned after MIL-S-19500 for TX and TXV devices
- Leads are hot solder dipped

Description

The OPB870N series of slotted optical switches consists of a gallium aluminum arsenide LED and a silicon phototransistor soldered into a printed circuit board, then mounted in a high temperature black plastic housing on opposite sides of a 0.125 inch (3.18 mm) wide slot. Phototransistor switching takes place whenever an opaque object passes through the slot. Options include phototransistor aperture widths of 0.050 inches (1.27 mm) or 0.100 inches (0.25 mm) for high resolution positioning sensing.

The OPB870N series of slotted optical switches utilize optoelectronic components that have been processed and tested as either TX or TXV components per MIL-S-19500

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

Operating Temperature	-65°C to +125°C
Storage Temperature	-65°C to +150°C
Lead Soldering Temperature [1/16 inch (1.6 mm) from case 5 sec. with soldering iron]	240°C ⁽¹⁾

Input Diode

Forward DC Current	50 mA
Reverse Voltage	2.0 V
Power Dissipation	100 mW ⁽²⁾

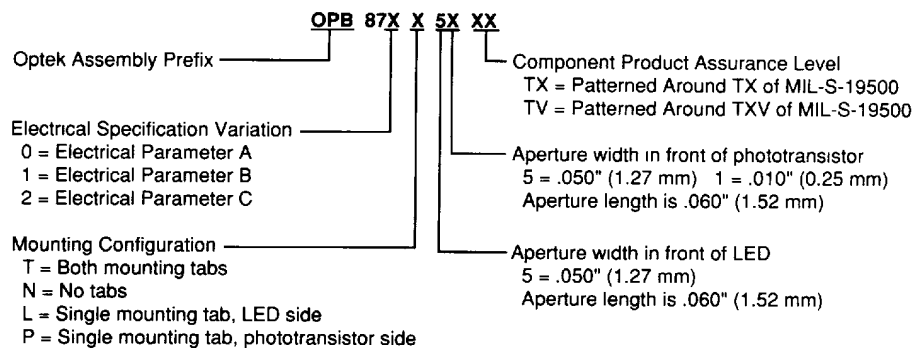
Output Phototransistor

Collector-Emitter Voltage	50 V
Emitter-Collector Voltage	7.0 V
Power Dissipation	100 mW ⁽²⁾

Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 sec. max. when wave soldering.
- (2) Derate linearly 1.00 mW/°C above 25°C.
- (3) Methanol or isopropyl alcohols are recommended as cleaning agents.
- (4) Plastic housings and symbolization will meet Resistance to Solvents test per MIL-STD-750, Method 1022 provided (1) ethylbenzene is omitted from solution A, (2) solution B is omitted, and (3) Freon TMC and methylene chloride is omitted from solution C.

Part Numbering Guide



Optek Technology, Inc., 1215 West Crosby Road, Carrollton, Texas 75006 (214) 323-2200 TLX 215849 Fax (214) 323-2396

Type OPB870N Series

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

Symbol	Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions
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Input Diode

V_F	Forward Voltage		1.00		1.70	V	$I_F = 20.0\text{ mA}$
			1.20		1.90	V	$I_F = 20.0\text{ mA}, T_A = -55^\circ\text{C}$
			0.80		1.60	V	$I_F = 20.0\text{ mA}, T_A = 100^\circ\text{C}$
I_R	Reverse Current			100	μA	$V_R = 2.0\text{ V}$	

Output Phototransistor

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage		50			V	$I_C = 1.0\text{ mA}, I_F = 0$
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage		7.0			V	$I_E = 100\text{ }\mu\text{A}, I_F = 0$
$I_{C(OFF)}$	Collector-Emitter Dark Current				100	nA	$V_{CE} = 10\text{ V}, I_F = 0$
					100	μA	$V_{CE} = 10\text{ V}, I_F = 0, T_A = 100^\circ\text{C}$

Coupled

$I_{C(ON)}$	On-State Collector Current ⁽⁵⁾						
	Parameter A	OPB870	500			μA	$V_{CE} = 10.0\text{ V}, I_F = 20.0\text{ mA}$
		OPB870	200			μA	$V_{CE} = 10.0\text{ V}, I_F = 20.0\text{ mA}, T_A = -55^\circ\text{C}$
		OPB870	200			μA	$V_{CE} = 10.0\text{ V}, I_F = 20.0\text{ mA}, T_A = 100^\circ\text{C}$
	Parameter B	OPB871	1000		3000	μA	$V_{CE} = 5.0\text{ V}, I_F = 10.0\text{ mA}$
		OPB871	400			μA	$V_{CE} = 5.0\text{ V}, I_F = 10.0\text{ mA}, T_A = -55^\circ\text{C}$
		OPB871	400			μA	$V_{CE} = 5.0\text{ V}, I_F = 10.0\text{ mA}, T_A = 100^\circ\text{C}$
	Parameter C	OPB872	1800			μA	$V_{CE} = 0.4\text{ V}, I_F = 20.0\text{ mA}$
		OPB872	800			μA	$V_{CE} = 0.4\text{ V}, I_F = 20.0\text{ mA}, T_A = -55^\circ\text{C}$
OPB872		800			μA	$V_{CE} = 0.4\text{ V}, I_F = 20.0\text{ mA}, T_A = 100^\circ\text{C}$	
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	OPB870			0.30	V	$I_C = 400\text{ }\mu\text{A}, I_F = 20.0\text{ mA}$
		OPB871			0.30	V	$I_C = 800\text{ }\mu\text{A}, I_F = 10.0\text{ mA}$
		OPB872			0.30	V	$I_C = 1800\text{ }\mu\text{A}, I_F = 20.0\text{ mA}$
t_r	Output Rise Time	OPB870			15.0	μs	$V_{CC} = 10.0\text{ V},$
		OPB871			20.0	μs	$I_F = 20.0\text{ mA},$
		OPB872			20.0	μs	$R_L = 1,000\text{ }\Omega$
t_f	Output Fall Time	OPB870			15.0	μs	$V_{CC} = 10.0\text{ V},$
		OPB871			20.0	μs	$I_F = 20.0\text{ mA},$
		OPB872			20.0	μs	$R_L = 1,000\text{ }\Omega$

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

Optek 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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