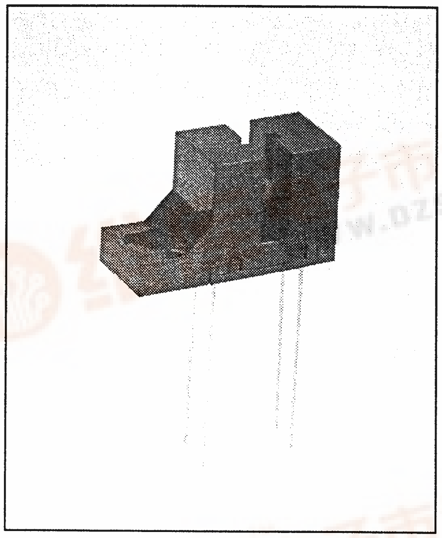
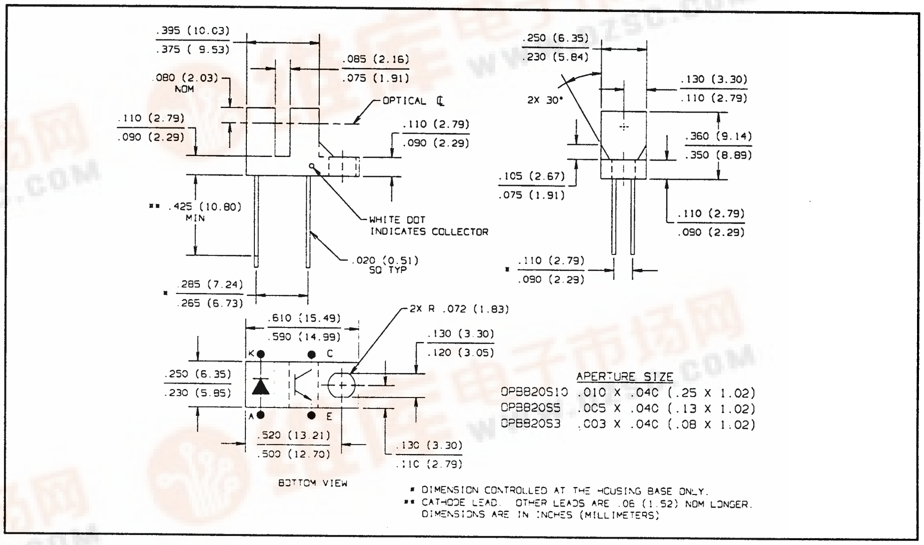
OPTEK

Product Bulletin OPB820
July 1996

Slotted Optical Switches
Types OPB820, OPB820S10, OPB820S5, OPB820S3





Features

- Non-contact switching
- Three standard aperture sizes for high resolution
- Low profile
- 0.080" (2.03 mm) wide gap
- 0.275" (6.96 mm) lead spacing

Description

The OPB820, OPB820S10, OPB820S5, and OPB820S3 each consist of an infrared emitting diode and an NPN silicon phototransistor mounted in a low cost black plastic housing on opposite sides of a 0.080" (2.03 mm) wide slot. Phototransistor switching takes place whenever an opaque object passes through the slot. All assemblies have 0.040" (1.02 mm) wide apertures located in front of the infrared diode. For phototransistor side aperture size, see chart below. Available with 4.5" min, 26 AWG wires as OPB821 series.

OPB#	Phototransistor Aperture Width
OPB820	0.040"
OPB820S10	0.010"
OPB820S5	0.005"
OPB820S3	0.003"

Absolute Maximum Ratings (T$_A$ = 25° C unless otherwise noted)

Storage and Operating Temperature Range . . . . -40° C to +85° C
Lead Soldering Temperature [1/16 inch (1.6mm) from case for 5 sec. with soldering iron] . . . . 240° C(1)

Input Diode

Continuous Forward Current . . . . 50 mA
Peak Forward Current (1 µs pulse width, 300 pps) . . . . 3.0 A
Reverse Voltage . . . . 2.0 V
Power Dissipation. . . . . 100 mW(2)

Output Phototransistor

Collector-Emitter Voltage . . . . 30 V
Emitter-Collector Voltage . . . . 5.0 V
Power Dissipation. . . . . 100 mW(2)

Notes:

(1) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
(2) Derate linearly 1.67 mW/° C above 25° C.
(3) Methanol or isopropanol are recommended as cleaning agents. Plastic housing is soluble in chlorinated hydrocarbons and ketones.
(4) All parameters tested using pulse technique.

Types OPB820, OPB820S10, OPB820S5, OPB820S3

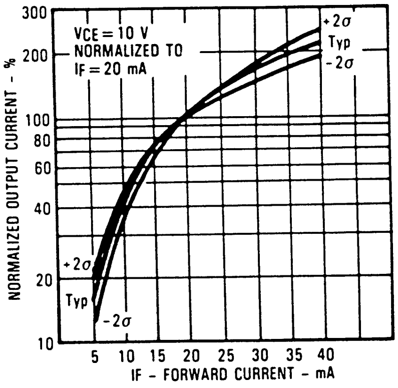
Electrical Characteristics ($T_A = 25^\circ$ C unless otherwise noted)

SYMBOL	PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode							
V_F	Forward Voltage				1.70	V	$I_F = 20$ mA
I_R	Reverse Current				100	µA	$V_R = 2$ V
Output Phototransistor							
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage			30		V	$I_C = 1$ mA
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage			5.0		V	$I_E = 100$ µA
I_{CEO}	Collector-Emitter Dark Current				100	nA	$V_{CE} = 10$ V, $I_F = 0$, $I_E = 0$
Coupled							
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	OPB820			0.4	V	$I_C = 250$ µA, $I_F = 20$ mA
		OPB820S10			0.4	V	$I_C = 250$ µA, $I_F = 20$ mA
		OPB820S5			0.4	V	$I_C = 125$ µA, $I_F = 20$ mA
		OPB820S3			0.4	V	$I_C = 40$ µA, $I_F = 20$ mA
$I_{C(ON)}$	On-State Collector Current	OPB820	500			µA	$V_{CE} = 5$ V, $I_F = 20$ mA
		OPB820S10	400			µA	$V_{CE} = 5$ V, $I_F = 20$ mA
		OPB820S5	300			µA	$V_{CE} = 5$ V, $I_F = 20$ mA
		OPB820S3	60			µA	$V_{CE} = 5$ V, $I_F = 20$ mA

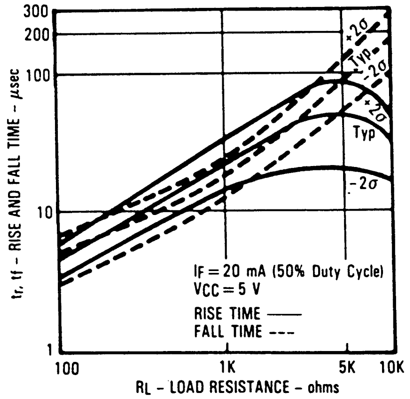
Typical Performance Curves

OPB820S12, OPB820S7, OPB820S5

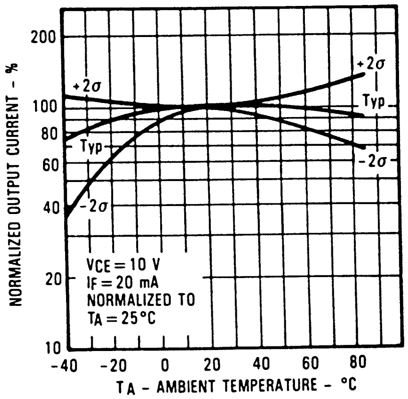
Normalized Output Current vs Input Current



Rise and Fall Time vs Load Resistance

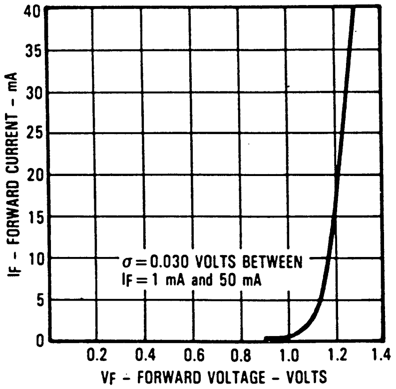


Normalized Output Current vs Ambient Temperature

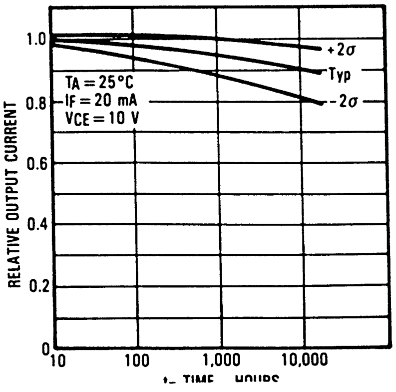


All Assemblies

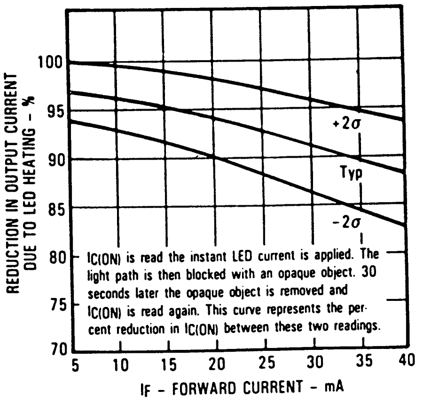
Forward Current vs Forward Voltage Input Diode



Relative Output Current vs Time



Reduction in Output Current Due to LED Heating vs Forward Current



IC(ON) is read the instant LED current is applied. The light path is then blocked with an opaque object. 30 seconds later the opaque object is removed and IC(ON) is read again. This curve represents the percent reduction in IC(ON) between these two readings.