



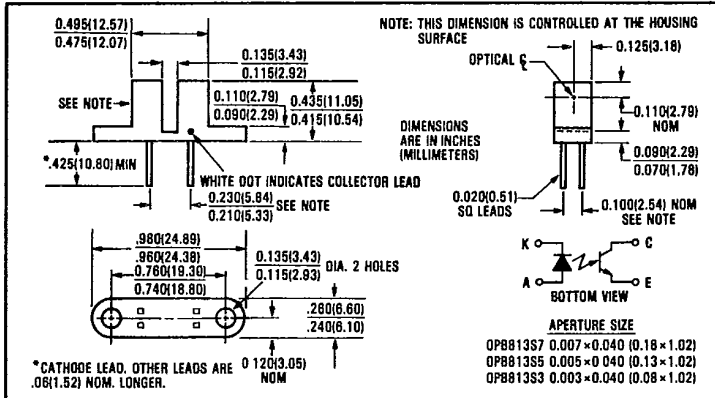
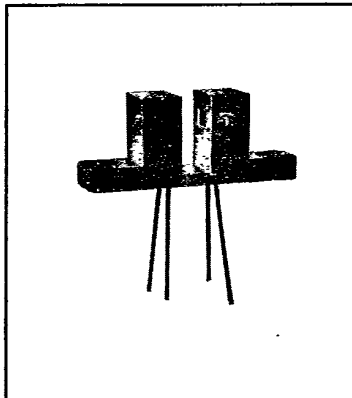
Optoelectronics Division
TRW Electronic Components Group

Product Bulletin 5319
January 1985

T-41-73

High Resolution Slotted Optical Switches

Types OPB813S7, OPB813S5, OPB813S3



Features

- Non-contact switching
- Four standard aperture sizes
- Completely sealed polysulfone housing
- Fast switching speed

Description

The OPB813S7, OPB813S5 and OPB813S3 each consist of an infrared emitting diode and an NPN silicon phototransistor mounted on opposite sides of a 0.125" (3.18 mm) wide slot. Phototransistor switching takes place whenever an opaque object passes through the slot. The low cost polysulfone housing reduces possible interference from ambient light and provides dirt and dust protection. High resolution position sensing is achieved by using one of four standard aperture sizes.

The OPB813S7, OPB813S5, and OPB813S3 utilize an OP140 or OP240 LED and an OP550 family sensor.

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 [1.6 mm] from case for 5 sec. with soldering iron) 240°C⁽¹⁾

Input Diode

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

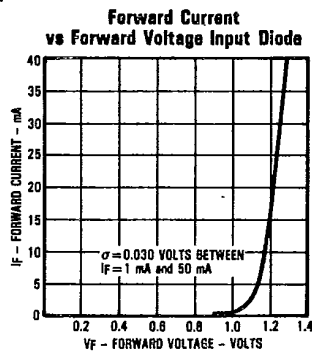
Output Phototransistor

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 wave soldering.
- (2) Derate linearly 1.33 mW/°C above 25°C.
- (3) Plastic housing is soluble in chlorinated hydrocarbons and ketones. Methanol or isopropanol are recommended as cleaning agents.

Typical Performance Curves



Type OPB813S7, OPB813S5, OPB813S3

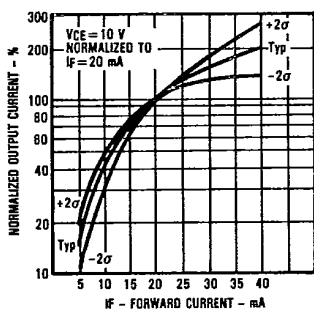
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Electrical Characteristics (TA = 25°C unless otherwise noted)

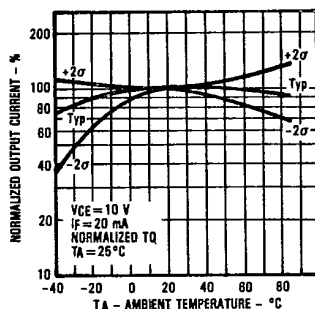
Symbol	Parameter	Min.	Max.	Units	Test Conditions
Input Diode					
V _F	Forward Voltage		1.70	V	I _F = 20 mA
I _R	Reverse Current		100	μA	V _R = 2.0 V
Output Phototransistor					
V _{BR(CEO)}	Collector-Emitter Breakdown Voltage	30		V	I _C = 1.0 mA
V _{BR(IECO)}	Emitter-Collector Breakdown Voltage	5.0		V	I _E = 100 μA
I _{CEO}	Collector-Emitter Dark Current		100	nA	V _{CE} = 10.0 V, I _F = 0, E _G = 0
Coupled					
V _{CE(SAT)}	Collector-Emitter Saturation Voltage	OPB813S7	0.40	V	I _F = 20 mA, I _C = 175 μA
		OPB813S5	0.40	V	I _F = 20 mA, I _C = 125 μA
		OPB813S3	0.40	V	I _F = 20 mA, I _C = 40 μA
I _{C(ON)}	On-State Collector Current	OPB813S7	350	μA	I _F = 20 mA, V _{CE} = 10 V
		OPB813S5	250	μA	I _F = 20 mA, V _{CE} = 10 V
		OPB813S3	75	μA	I _F = 20 mA, V _{CE} = 10 V

Typical Performance Curves

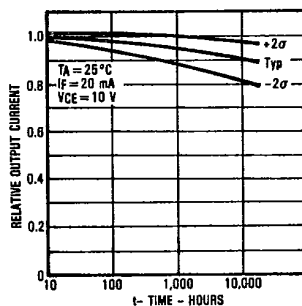
Normalized Output Current vs Input Current



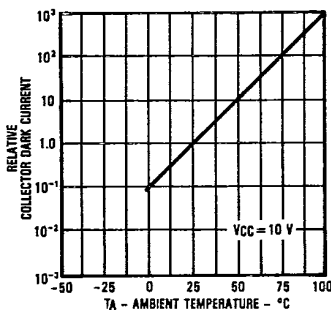
Normalized Output Current vs Ambient Temperature



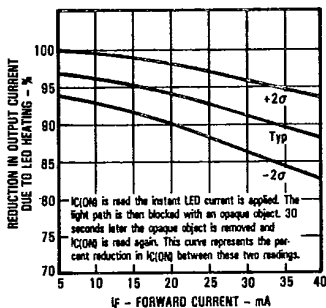
Relative Output Current vs Time



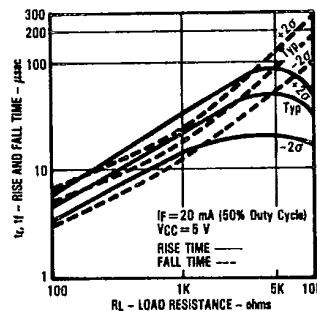
Relative Collector Dark Current vs Ambient Temperature



Reduction in Output Current Due to LED Heating vs Forward Current



Rise and Fall Time vs Load Resistance



TRW 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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