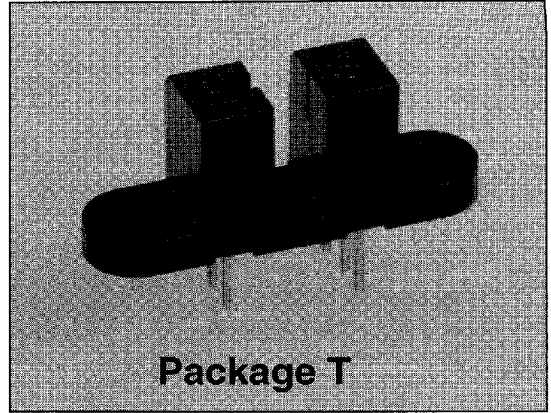
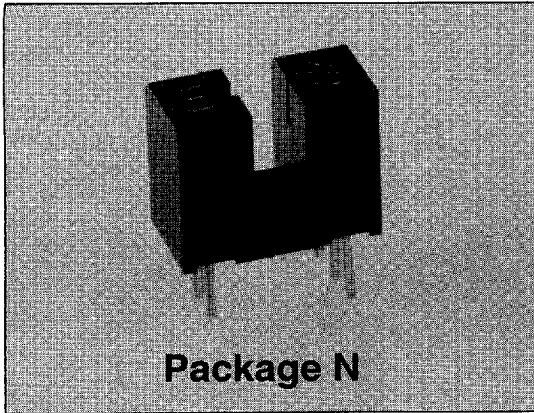


Photologic[®] Slotted Optical Switch

Types OPB665N/T, OPB666N/T, OPB667N/T, OPB668N/T



Features

- Four Output Options
- 0.125" (3.18 mm) Wide Gap
- 0.320" (8.13 mm) Lead Spacing
- N or T Package
- 0.010" Sensor Aperture

Description

The OPB665 series optical switches consist of a monolithic integrated circuit and an infrared emitting diode mounted on opposite sides of a 0.125" (3.18 mm) wide slot. The emitter has a 0.050" x 0.060" molded-in aperture while the sensor has a 0.010" x 0.060" molded-in aperture.

The device features TTL/LSTTL compatible logic level output, which can drive up to 10 TTL loads over a voltage range from 4.5 V to 16 V.

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

Storage Temperature Range	-40° C to +100° C
Operating Temperature Range	-40° C to +100° C
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron]	240° C ⁽¹⁾

Input Diode

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

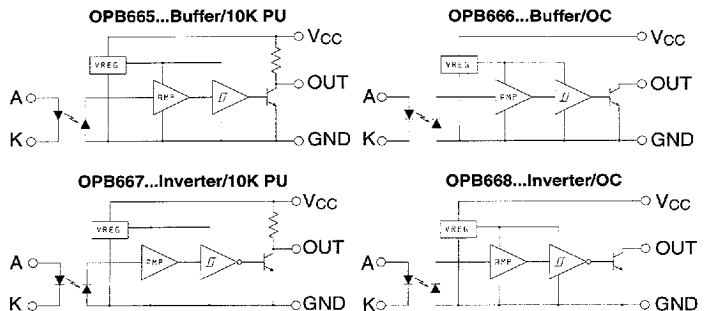
Output Photologic[®]

Supply Voltage, V_{CC}	18 V
Duration of Output Short To V_{CC}	1.0 sec
Voltage at Output	30 V
Low Level Output Current (sinking)	16 mA
Power Dissipation	240 mW ⁽³⁾

Notes:

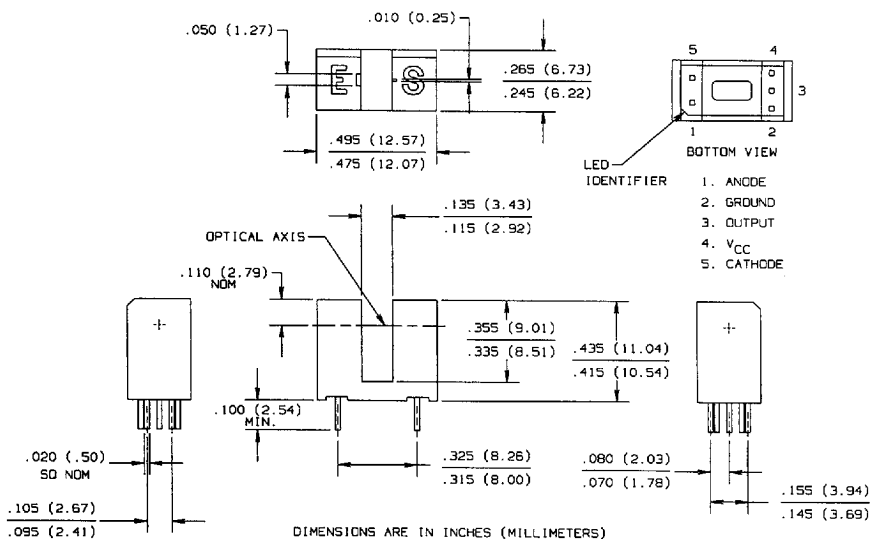
- (1) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
- (2) Derate linearly 1.33 mW/ $^\circ\text{C}$ above 25° C.
- (3) Derate linearly 2.50 mW/ $^\circ\text{C}$ above 30° C.

Schematics

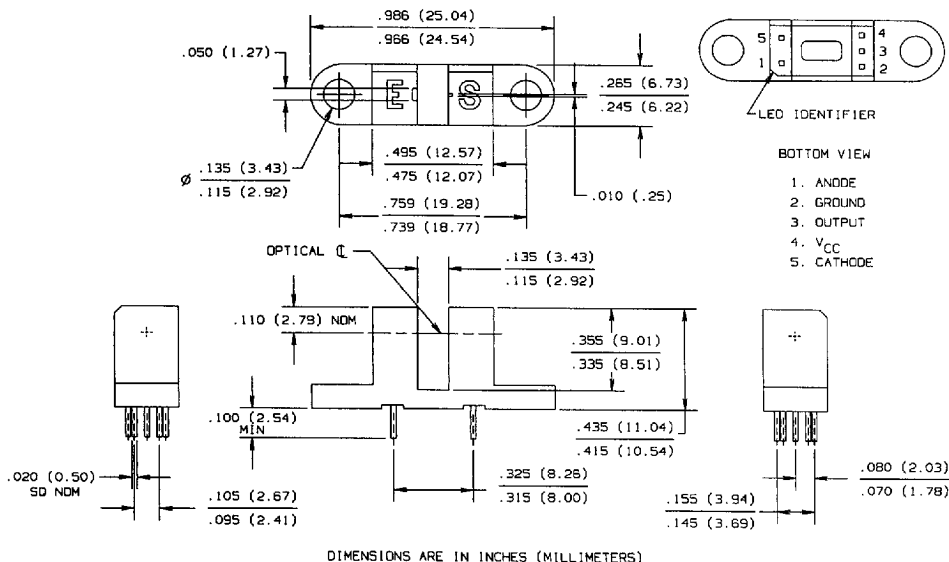


Types OPB665N/T, OPB666N/T, OPB667N/T, OPB668N/T

SLOTTED
OPTICAL
SWITCHES



Package N



Package T

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Types OPB665N/T, OPB666N/T, OPB667N/T, OPB668N/T

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

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode						
V_F	Forward Voltage			1.6	V	$I_F = 10\text{ mA}$
I_R	Reverse Current			100	μA	$V_R = 3.0\text{ V}$
Output Photologic™ Sensor						
V_{CC}	Operating D.C. Supply Voltage	4.5		16.0	V	
$I_F(+)$	LED Positive-Going Threshold Current	0.1	1.6	10	mA	$V_{CC} = 5.0\text{ V}$
$I_F(+)/I_F(-)$	Hysteresis Ratio	1.05	1.20	1.60		$V_{CC} = 5.0\text{ V}$
I_{CCH}	High Level Supply Current:					
	Buffer, 10K Pull-up OPB665		5.0	12.0	mA	$V_{CC} = 16\text{ V}$, No Load On Output, $I_F = 10\text{ mA}$
	Buffer, Open-Collector OPB666					
	Inverter, 10K Pull-up OPB667		4.0	12.0	mA	$V_{CC} = 16\text{ V}$, No Load On Output, $I_F = 0\text{ mA}$
	Inverter, Open-Collector OPB668					
I_{CCL}	Low Level Supply Current:					
	Buffer, 10K Pull-up OPB665		5.5	12.0	mA	$V_{CC} = 16\text{ V}$, No Load On Output, $I_F = 0\text{ mA}$
	Buffer, Open-Collector OPB666		4.0	12.0		
	Inverter, 10K Pull-up OPB667		6.5	12.0	mA	$V_{CC} = 16\text{ V}$, No Load On Output, $I_F = 10\text{ mA}$
	Inverter, Open-Collector OPB668		5.0	12.0		
V_{OH}	High Level Output Voltage:					
	Buffer, 10K Pull-up OPB665	$(V_{CC}-1.5)^{(5)}$			V	$I_{OH} = 100\text{ }\mu\text{A}$, $I_F = 10\text{ mA}$
	Inverter, 10K Pull-up OPB667	$(V_{CC}-1.5)^{(5)}$			V	$I_{OH} = 100\text{ }\mu\text{A}$, $I_F = 0\text{ mA}^{(4)}$
I_{OH}	High Level Output Current:					
	Buffer, Open-Collector OPB666			100	μA	$V_{CC} = 16\text{ V}$, $V_{OH} = 30\text{ V}$, $I_F = 10\text{ mA}$
	Inverter, Open-Collector OPB668			100	μA	$V_{CC} = 16\text{ V}$, $V_{OH} = 30\text{ V}$, $I_F = 0\text{ mA}$
V_{OL}	Low Level Output Voltage:					
	Buffer, 10K Pull-up OPB665			0.4	V	$V_{CC} = 4.5\text{ V}$, $I_{OL} = 16\text{ mA}$, $I_F = 0\text{ mA}^{(4)}$
	Buffer, Open-Collector OPB666					
	Inverter, 10K Pull-up OPB667			0.4	V	$V_{CC} = 4.5\text{ V}$, $I_{OL} = 16\text{ mA}$, $I_F = 10\text{ mA}$
	Inverter, Open-Collector OPB668					
t_r, t_f	Output Rise Time, Output Fall Time		30		ns	$V_{CC} = 5\text{ V}$, $I_F = 0$ or 10 mA , $f = 10\text{ kHz}$, $DC = 50\%$, $R_L = 300\text{ }\Omega$
t_{PLH}	Propagation Delay, Low-High					
	Buffer, 10K Pull-up OPB665		1.0		μs	
	Buffer, Open-Collector OPB666					
	Inverter, 10K Pull-up OPB667		2.0		μs	
	Inverter, Open-Collector OPB668					
t_{PHL}	Propagation Delay, High-Low					
	Buffer, 10K Pull-up OPB665		2.0		μs	
	Buffer, Open-Collector OPB666					
	Inverter, 10K Pull-up OPB667		1.0		μs	
	Inverter, Open-Collector OPB668					
Data Rate	Data Rate		100		kHz	$V_{CC} = 5\text{ V}$, $I_F = 0$ or 10 mA , $DC = 50\%$, $R_L = 300\text{ }\Omega$

(4) Normal application would be with light source blocked, simulated by $I_F = 0\text{ mA}$.

(5) $V_{OH} = V_{CC}-1.5$ for $V_{CC} = 4.5\text{ V}$ to 16 V .

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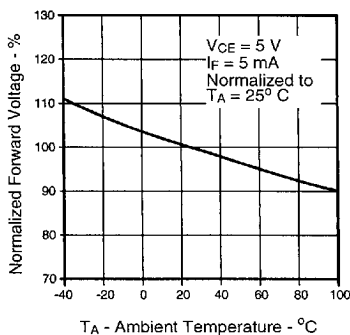
12-50

Types OPB665N/T, OPB666N/T, OPB667N/T, OPB668N/T

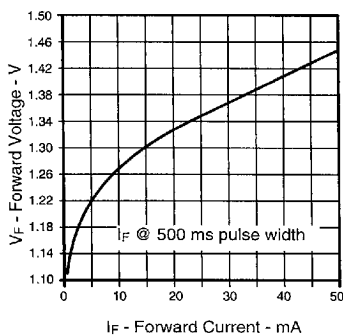
Typical Performance Curves

SLOTTED
OPTICAL
SWITCHES

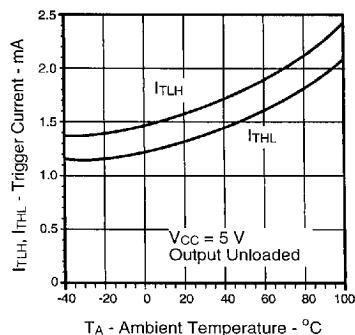
Normalized Forward Voltage vs Ambient Temperature



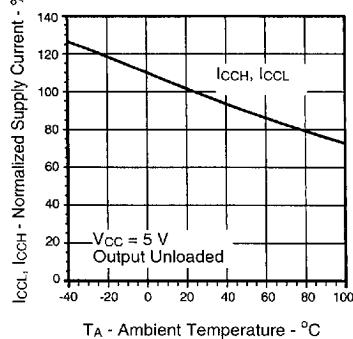
Forward Current vs Forward Voltage Input Diode



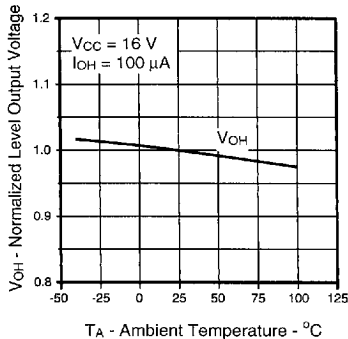
Trigger Current vs Ambient Temperature



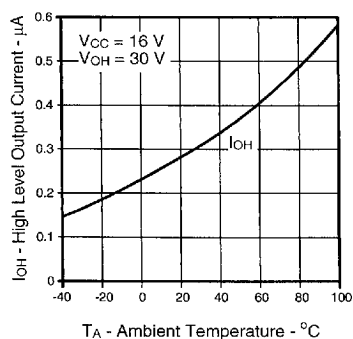
Normalized Supply Current vs Ambient Temperature



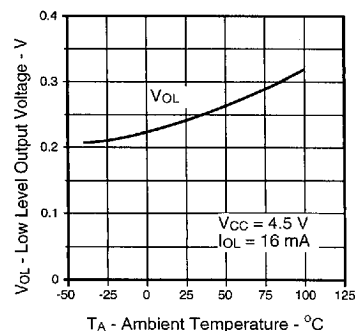
OPB665, OPB667 Normalized High Level Output Voltage vs Ambient Temperature



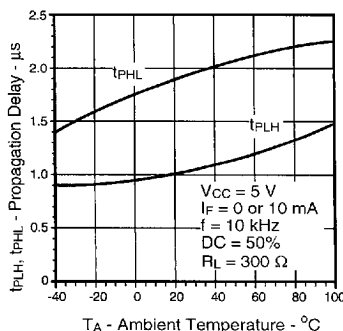
OPB666, OPB668 High Level Output Current vs Ambient Temperature



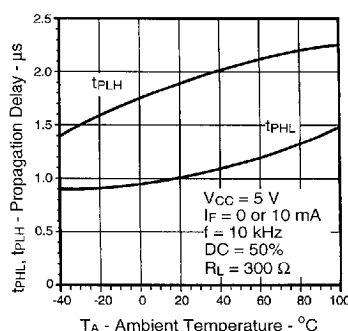
Low Level Output Voltage vs Ambient Temperature



OPB665, OPB666 Propagation Delay vs Ambient Temperature



OPB667, OPB668 Propagation Delay vs Ambient Temperature



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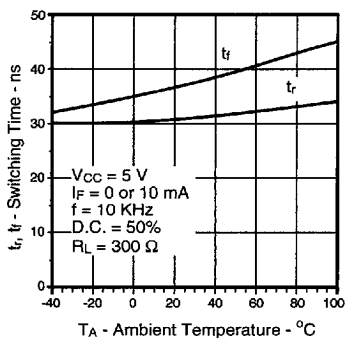
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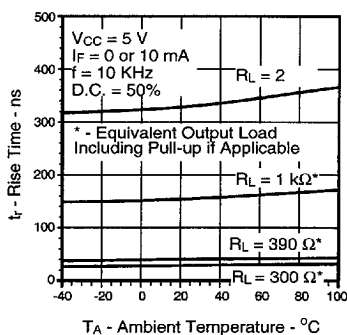
Types OPB665N/T, OPB666N/T, OPB667N/T, OPB668N/T

Typical Performance Curves

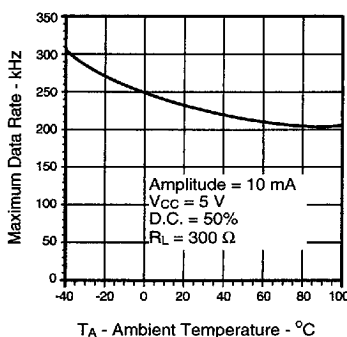
Switching Time vs Ambient Temperature



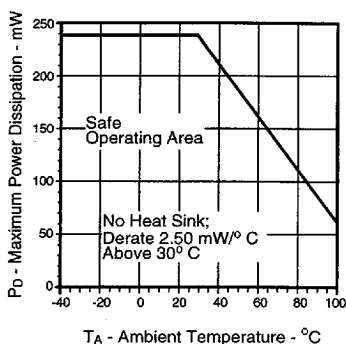
Rise Time vs Output Load vs Ambient Temperature



Maximum Data Rate vs Ambient Temperature



Typical Thermal Derating Curve



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