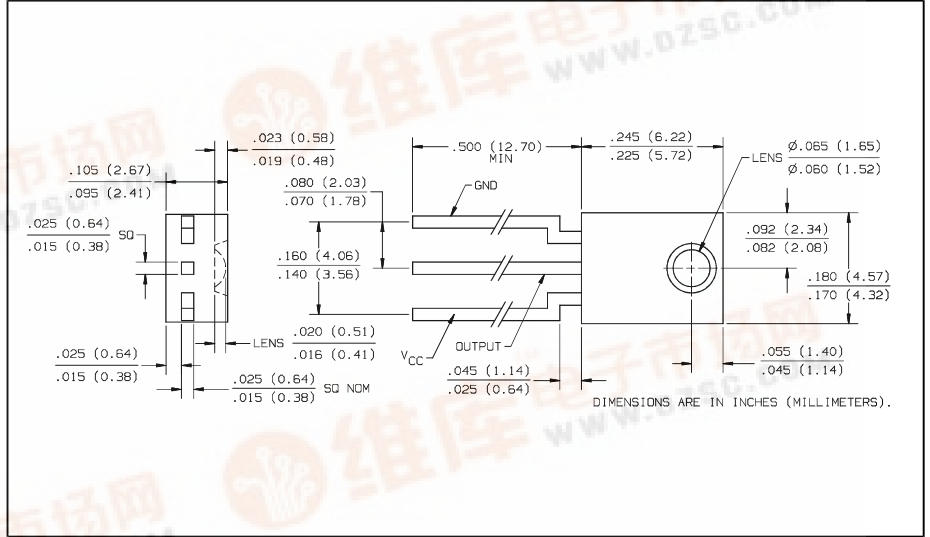




Product Bulletin OPL535
December 1997

Photologic[®] Sensors

Types OPL535, OPL535-OC, OPL536, OPL536-OC



Features

- Four output options
- High noise immunity
- Direct TTL/LSTTL CMOS interface
- Low cost plastic side-looking package
- Mechanically and spectrally matched to the OP145 and OP245 series LED's
- Data rates to 250 kBaud
- Low power consumption

Description

The OPL535, OPL535-OC, OPL536, OPL536-OC contain a monolithic integrated circuit which incorporates a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor on a single silicon chip. The OPL535 and OPL536 include a 10 K Ω pull-up resistor (R_L) from output to V_{CC} . The OPL535-OC and OPL536-OC have an open-collector output. These devices exhibit very stable performance over supply voltages ranging from 4.5 V to 16 V and a wide range of irradiance levels. The Photologic[®] chip is encapsulated in a molded plastic package which has a recessed integral lens for enhanced optical coupling combined with mechanical protection.

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

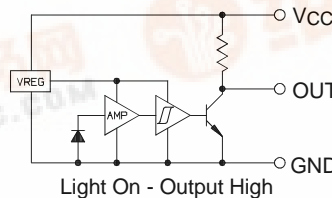
Supply Voltage, V_{CC}	18 V
Storage Temperature Range	-40°C to $+100^\circ\text{C}$
Operating Temperature Range	-40°C to $+85^\circ\text{C}$
Lead Soldering Temperature Range [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron]	240°C
Power Dissipation	90 mW
Voltage at Output Lead ⁽⁴⁾	35 V
Sinking Current	50 mA

Notes:

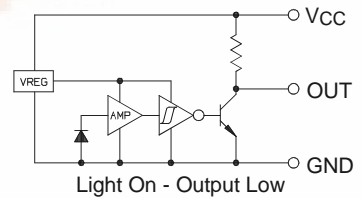
- (1) Derate linearly 2.67 mW/ $^\circ\text{C}$ above 70°C .
- (2) RMA flux is recommended. Duration can be extended to 10 sec. maximum when flow soldering. Max 20 grams force may be applied to the leads when soldering.
- (3) Irradiance measurements are made with $\lambda_i = 935\text{ nm}$.
- (4) OC versions only. For I_{CC} on pull-up versions add $V_{CC}/10\text{ k}\Omega$.

Schematics

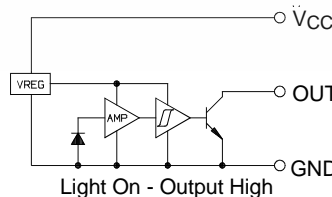
OPL535 Buffer/Pull-up Resistor



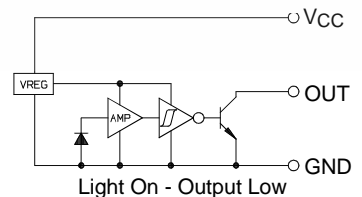
OPL536 Inverter/Pull-up Resistor



OPL535-OC Buffer/OC



OPL536-OC Inverter/OC



Types OPL535, OPL535-OC, OPL536, OPL536-OC

Electrical Characteristics (-40° C to +85° C unless otherwise noted) $V_{CC} = 4.5 \text{ V to } 16 \text{ V}$

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
V_{CC}	Operating Supply Voltage	4.5		16.0	V	
	Peak-to-Peak V_{CC} Ripple Necessary to Cause False Triggering of Output			2	V	$f = \text{DC to } 50 \text{ MHz}$
I_{CC}	Supply Current ⁽⁴⁾		2.7	5.0	mA	$E_e = 0 \text{ or } 1 \text{ mW/cm}^2$
$E_{eT(+)}$	Positive-Going Threshold Irradiance ⁽³⁾					$T_A = 25^\circ \text{ C}$
	OPL535, OPL535-OC, OPL536, OPL536-OC	0.12		0.38	mW/cm^2	$T_A = 25^\circ \text{ C}$
	OPL535A, OPL535-OCA, OPL536A, OPL536-OCA OPL535B, OPL535-OCB, OPL536B, OPL536-OCB	0.12 0.23		0.28 0.38	mW/cm^2 mW/cm^2	$T_A = 25^\circ \text{ C}$ $T_A = 25^\circ \text{ C}$
$E_{eT(+)} / E_{eT(-)}$	Hysteresis Ratio	1.20		1.80		
$\Delta E_{eT(+)}(\Delta T)$	Temperature Coefficient	>0° C		-0.6	%/° C	
		<0° C		-1.6	%/° C	
OPL535, OPL535-OC (Buffers)						
I_{OH}	High Level Output Current ⁽⁴⁾		0.1	10	μA	$V_{OH} = 30 \text{ V}$, $E_e = 1 \text{ mW/cm}^2$
V_{OL}	Low Level Output Voltage		0.2	0.40	V	$I_{OL} = 16 \text{ mA}$, $E_e = 0$
OPL536, OPL536-OC (Inverters)						
I_{OH}	High Level Output Current ⁽⁴⁾		0.1	10	μA	$V_{OH} = 30 \text{ V}$, $E_e = 0$
V_{OL}	Low Level Output Voltage		0.2	0.40	V	$I_{OL} = 16 \text{ mA}$, $E_e = 1 \text{ mW/cm}^2$
OPL535, OPL536						
t_r	Output Rise Time		1.5		μs	$E_e = 0 \text{ or } 1 \text{ mW/cm}^2$, $C_L = 50 \text{ pF}$
t_f	Output Fall Time		20		ns	
OPL535-OC, OPL536-OC						
t_r	Output Rise Time		50		ns	$E_e = 0 \text{ or } 1 \text{ mW/cm}^2$, $R_L = 300 \Omega \text{ to } 5 \text{ V}$, $C_L = 50 \text{ pF}$
t_f	Output Fall Time		20		ns	
OPL535, OPL535-OC, OPL536, OPL536-OC						
$t_{pE_{eT}(+)}$	Propagation Delay		1.0		μs	$E_e = 0 \text{ or } 1 \text{ mW/cm}^2$
$t_{pE_{eT}(-)}$	Propagation Delay		3.0		μs	$R_L = 300 \Omega \text{ to } 5 \text{ V}$, $C_L = 50 \text{ pF}$