



**HIGH SPEED, NON BASE LEAD
OPTICALLY COUPLED ISOLATOR
PHOTOTRANSISTOR OUTPUT**

APPROVALS

- UL recognised, File No. E91231

DESCRIPTION

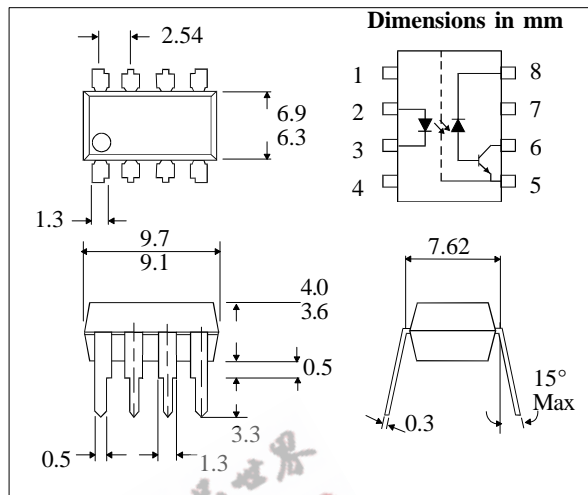
These diode-transistor optocouplers use a light emitting diode and an integrated photon detector to provide 2500Volts_{RMS} electrical isolation between input and output. Seperate connection for the photodiode bias and output transistor collector improve the speed up to a hundred times that of a conventional photo-transistor coupler by reducing the base-collector capacitance.

FEATURES

- High speed - 1 MBits/s
- High Common Mode Transient Immunity 10000V/μs typical
- Pin 7 not connected to give enhanced Noise Immunity
- TTL Compatible
- 2 MHz Bandwidth
- Open Collector Output
- 2500V_{RMS} Withstand Test Voltage, 1 Min
- Options :-
10mm lead spread - add G after part no.
Surface mount - add SM after part no.
Tape&reel - add SMT&R after part no.
- All electrical parameters 100% tested
- Custom electrical selections available

APPLICATIONS

- Line receivers
- Pulse transformer replacement
- Wide bandwidth analog coupling
- Output interface to CMOS-LSTTL-TTL



**ABSOLUTE MAXIMUM RATINGS
(25°C unless otherwise specified)**

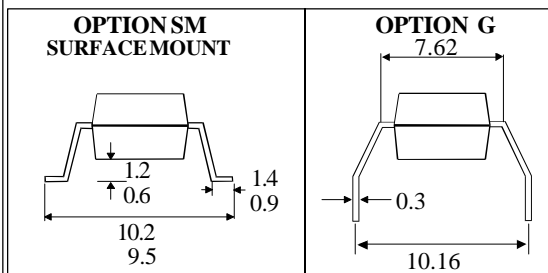
Storage Temperature	-55°C to + 125°C
Operating Temperature	-55°C to + 100°C
Lead Soldering Temperature (1/16 inch (1.6mm) from case for 10 secs)	260°C

INPUT DIODE

Average Forward Current	25mA (1)
Peak Forward Current (50% duty cycle, 1ms pulse width)	50mA (2)
Peak Transient Current (equal to or less than 1μs P.W., 300 pps)	1.0A
Reverse Voltage	5V
Power Dissipation	45mW (3)

DETECTOR

Average Output Current	8mA
Peak Output Current	16mA
Supply and Output Voltage	-0.5 to +15V
Power Dissipation	100mW(4)



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ELECTRICAL CHARACTERISTICS ($T_A = 0^\circ\text{C}$ to 70°C Unless otherwise noted)

PARAMETER	SYM	MIN	TYP*	MAX	UNITS	TEST CONDITION
Current Transfer Ratio (note 5)	CTR	19	24		%	$I_F = 16\text{mA}, V_O = 0.4\text{V}$ $V_{CC} = 4.5\text{V}, T_A = 25^\circ\text{C}$
		15	25		%	$I_F = 16\text{mA}, V_O = 0.5\text{V}$ $V_{CC} = 4.5\text{V}$
Logic Low Output Voltage	V_{OL}		0.1	0.4	V	$I_F = 16\text{mA}, I_O = 2.4\text{mA}$ $V_{CC} = 4.5\text{V}, T_A = 25^\circ\text{C}$
Logic High Output Current	I_{OH}		0.02	500	nA	$I_F = 0\text{mA}, T_A = 25^\circ\text{C}$ $V_O = V_{CC} = 5.5\text{V}$
			0.01	1	μA	$I_F = 0\text{mA}, T_A = 25^\circ\text{C}$ $V_O = V_{CC} = 15\text{V}$
				50	μA	$I_F = 0\text{mA}$ $V_O = V_{CC} = 15\text{V}$
Logic Low Supply Current	I_{CCL}			40	μA	$I_F = 16\text{mA}, V_O = \text{open}$ $V_{CC} = 15\text{V}$
Logic High Supply Current	I_{CCH}		0.02	1	μA	$I_F = 0\text{mA}, V_O = \text{open}$ $V_{CC} = 15\text{V}, T_A = 25^\circ\text{C}$
				2	μA	$I_F = 0\text{mA}, V_O = \text{open}$ $V_{CC} = 15\text{V}$
Input Forward Voltage	V_F		1.5	1.7	V	$I_F = 16\text{mA}, T_A = 25^\circ\text{C}$
Temperature Coefficient of Forward Voltage	$\frac{\Delta V_F}{\Delta T_A}$		-1.6		mV/ $^\circ\text{C}$	$I_F = 16\text{mA}$
Input Reverse Voltage	V_R	5			V	$I_R = 10\mu\text{A}, T_A = 25^\circ\text{C}$
Input Capacitance	C_{IN}		60		pF	$f = 1\text{MHz}, V_F = 0$
Input-output Isolation Voltage	V_{ISO}	2500	5000		V_{RMS}	R.H.equal to or less than 50%, $t = 1\text{min}, T_A = 25^\circ\text{C}$
Resistance (Input to Output)	R_{IO}		10^{12}		Ω	$V_{IO} = 500\text{V dc}$ (note 6)
Capacitance (Input to Output)	C_{IO}		0.6		pF	$f = 1\text{MHz}$ (note 6)
Transistor DC Current Gain	H_{FE}		150			$V_O = 5\text{V}, I_O = 3\text{mA}$

* All typicals at $T_A = 25^\circ\text{C}$

SWITCHING SPECIFICATIONS AT $T_A = 25^\circ\text{C}$ ($V_{CC} = 5\text{V}$, $I_F = 16\text{mA}$ Unless otherwise noted)

PARAMETER	SYM	DEVICE	MIN	TYP	MAX	UNITS	TEST CONDITION
Propagation Delay Time To Logic Low at Output (fig 1)	t_{PHL}			0.2	0.8	μs	$R_L = 1.9\text{k}\Omega$, (note 8)
Propagation Delay Time To Logic High at Output (fig 1)	t_{PLH}			0.2	0.8	μs	$R_L = 1.9\text{k}\Omega$, (note 8)
Common Mode Transient Immunity at Logic High Level Output (fig 2)	CM_H			10000		$\text{V}/\mu\text{s}$	$I_F = 0\text{mA}$, $V_{CM} = 10V_{PP}$ $R_L = 1.9\text{k}\Omega$, (note 7,8)
Common Mode Transient Immunity at Logic Low Level Output (fig 2)	CM_L			-10000		$\text{V}/\mu\text{s}$	$V_{CM} = 10V_{PP}$ $R_L = 1.9\text{k}\Omega$, (note 7,8)
Bandwidth	BW			2		MHz	$R_L = 100\Omega$, (note 9)

NOTES:-

1. Derate linearly above 70°C free air temperature at a rate of $0.8 \text{ mA}/^\circ\text{C}$.
2. Derate linearly above 70°C free air temperature at a rate of $1.6 \text{ mA}/^\circ\text{C}$.
3. Derate linearly above 70°C free air temperature at a rate of $0.9 \text{ mW}/^\circ\text{C}$.
4. Derate linearly above 70°C free air temperature at a rate of $1.0 \text{ mW}/^\circ\text{C}$.
5. CURRENT TRANSFER RATIO is defined as the ratio of output collector current, I_O , to the forward LED input current, I_F times 100%.
6. Device considered a two-terminal device: pins 1,2,3, and 4 shorted together and pins 5,6,7 and 8 shorted together.
7. Common mode transient immunity in Logic High level is the maximum tolerable (positive) dV_{CM}/dt on the leading edge of the common mode pulse V_{CM} to assure that the output will remain in a Logic High state (i.e. $V_O > 2.0\text{V}$). Common mode transient immunity in Logic Low level is the maximum tolerable (negative) dV_{CM}/dt on the trailing edge of the common mode pulse signal, V_{CM} to assure that the output will remain in Logic Low state (i.e. $V_O < 0.8\text{V}$).
8. The $1.9\text{k}\Omega$ load represents 1 TTL unit load of 1.6mA and the $5.6\text{k}\Omega$ pull-up resistor.
9. The frequency at which the a.c. output voltage is 3dB below the low frequency asymptote.

FIG.1 SWITCHING TEST CIRCUIT

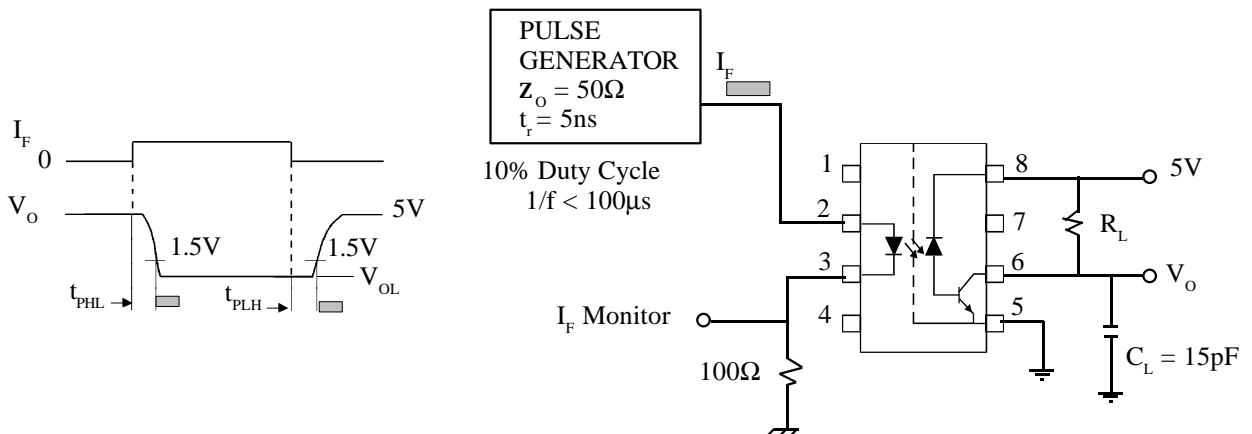


FIG. 2 TEST CIRCUIT FOR TRANSIENT IMMUNITY AND TYPICAL WAVEFORMS

