ICPL2533

HIGH SPEED DUAL CHANNEL OPTICALLY COUPLED ISOLATOR PHOTOTRANSISTOR OUTPUT

APPROVALS

- UL recognised, File No. E91231

DESCRIPTION

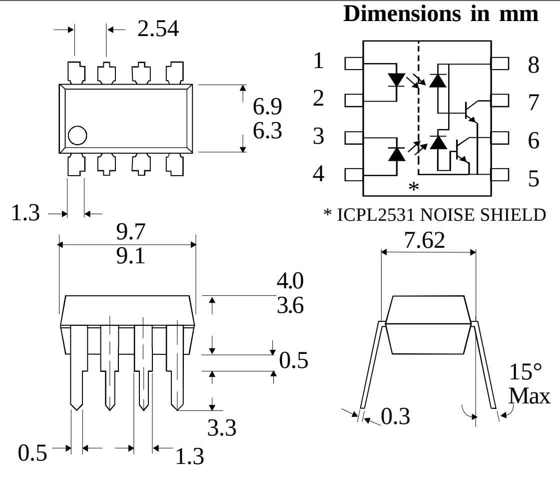
These dual channel diode-transistor optocouplers use a light emitting diode and an integrated photon detector to provide 2500Volts $_{RMS}$ electrical isolation between input and output. Seperate connection for the photodiode bias and output transistor collector improve the speed up to a hundred times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

FEATURES

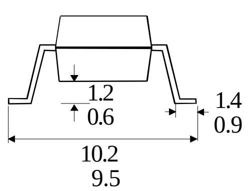
- High speed - 250k b/s NRZ
- High Common Mode Transient Immunity 1000V/µs
- TTL Compatible
- Open Collector Outputs
- 2500V $_{RMS}$ Withstand Test Voltage,1 Min
- Options :-
  10mm lead spread - add G after part no.
  Surface mount - add SM after part no.
  Tape&reel - add SMT&R after part no.
- All electrical parameters 100% tested
- Custom electrical selections available

APPLICATIONS

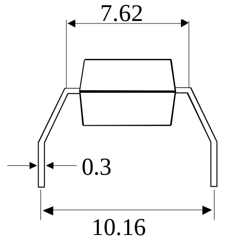
- Line receivers
- Pulse transformer replacement
- Wide bandwidth analog coupling
- Output interface to CMOS-LSTTL-TTL



OPTION SM
SURFACE MOUNT



OPTION G



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 Voltage	-0.5 to +30V
Output Voltage	-0.5 to +20V
Power Dissipation	35mW(4)

ISOCOM COMPONENTS LTD
Unit 25B, Park View Road West,
Park View Industrial Estate, Brenda Road
Hartlepool, Cleveland, TS25 1YD
Tel: (01429) 863609 Fax :(01429) 863581

ISOCOM INC
1024 S. Greenville Ave, Suite 240,
Allen, TX 75002 USA
Tel: (214) 495-0755 Fax: (214) 495-0901
e-mail info@isocom.com
http://www.isocom.com

ELECTRICAL CHARACTERISTICS (T_A= 0°C to 70°C Unless otherwise noted)

PARAMETER	SYM	DEVICE	MIN	TYP*	MAX	UNITS	TEST CONDITION
Current Transfer Ratio (note 5,6)	CTR		15	21		%	I_F = 8mA, V_O = 0.5V, V_{CC} = 4.5V, T_A= 25°C
			12	19		%	I_F = 16mA, V_O = 0.5V, V_{CC} = 4.5V, T_A= 25°C
			11	14		%	I_F = 8mA, V_O = 0.5V, V_{CC} = 4.5V
			9	12		%	I_F = 16mA, V_O = 0.5V, V_{CC} = 4.5V
Logic Low Output Voltage (note 5)	V_{OL}			0.2	0.5	V	I_F = 8mA, I_O=0.7mA, V_{CC} = 4.5V
				0.2	0.5	V	I_F = 16mA, I_O=1.1mA, V_{CC} = 4.5V
Logic High Output Current (note 5)	I_{OH}			0.02	500	nA	I_{F1}= I_{F2}=0mA,T_A= 25°C, V_{O1} = V_{O2} = V_{CC} = 5.5V
					50	µA	I_{F1} = I_{F2}= 0mA, V_{O1} = V_{O2} = V_{CC} = 15V
Logic Low Supply Current	I_{CCL}			40		µA	I_{F1}= I_{F2}=8mA,V_{CC}=5.5V, V_{O1} = V_{O2} = open
				80		µA	I_{F1}= I_{F2}=16mA,V_{CC}=5.5V, V_{O1} = V_{O2} = open
Logic High Supply Current	I_{CCH}			0.05	4	µA	I_{F1}= I_{F2}= 0mA,V_{CC}=5.5V, V_{O1} = V_{O2} = open
Input Forward Voltage (note 5)	V_F			1.5	1.7	V	I_F = 8mA, T_A= 25°C
				1.5	1.7	V	I_F = 16mA, T_A= 25°C
Temperature Coefficient of Forward Voltage (note 5)	$\frac{\Delta V_F}{\Delta T_A}$			-1.6		mV/°C	I_F = 8mA
				-1.6		mV/°C	I_F = 16mA
Input Reverse Voltage (note 5)	V_R		5			V	I_R = 10µA,T_A= 25°C
Input Capacitance (note 5)	C_{IN}			60		pF	f = 1MHz, V_F = 0
Input-output Isolation Voltage (note 7)	V_{ISO}		2500	5000		V_{RMS}	R.H.equal to or less than 50%, t = 1min. T_A= 25°C
Resistance (Input to Output)(note 7)	R_{I-O}			10^{12}		Ω	V = 500V dc
Capacitance (Input to Output)(note7)	C_{I-O}					pF	f = 1MHz
	I_{I-I}					µA	45 % Relative Humidity t = 5s, V = 500V dc
Resistance (Input to Input)(note8)	R			10^{11}		Ω	V_{I-I} = 500V dc
Capacitance (Input to Input)(note8)	C_{I-I}			0.25		pF	f = 1MHz

*All typicals at T_A= 25°C

SWITCHING SPECIFICATIONS AT T_A = 25°C (V_{CC} = 5V Unless otherwise noted)

PARAMETER	SYM	DEVICE	MIN	TYP	MAX	UNITS	TEST CONDITION
Propagation Delay Time to Logic Low at Output (fig 1)	t_{PHL}			0.8	1.5	µs	I_F = 8mA,R_L= 7.5kΩ (note 10)
				0.3	1.5	µs	I_F = 16mA,R_L = 4.7kΩ, (note11)
Propagation Delay Time to Logic High at Output (fig 1)	t_{PLH}			1.0	2.5	µs	I_F = 8mA,R_L= 7.5kΩ, (note 10)
				1.1	2.5	µs	I_F = 16mA,R_L = 4.7kΩ, (note11)
Common Mode Transient Immunity at Logic High Level Output (fig 2)	CM_H			1000		V/µs	I_F = 0mA, V_{CM} = 10V_{PP} R_L= 7.5kΩ,(note9,10)
				1000		V/µs	I_F = 0mA, V_{CM} = 10V_{PP} R_L = 4.7kΩ,(note9,11)
Common Mode Transient Immunity at Logic Low Level Output (fig 2)	CM_L			-1000		V/µs	I_F = 8mA,V_{CM} = 10V_{PP} R_L = 7.5kΩ,(note9,10)
				-1000		V/µs	I_F = 16mA,V_{CM}= 10V_{PP} R_L = 1.9kΩ,(note9,11)

NOTES:-

1. Derate linearly above 70°C free air temperature at a rate of 0.8 mA/°C.
2. Derate linearly above 70°C free air temperature at a rate of 1.6 mA/°C.
3. Derate linearly above 70°C free air temperature at a rate of 0.9 mW/°C.
4. Derate linearly above 70°C free air temperature at a rate of 1.0 mW/°C.
5. Each channel.
6. CURRENT TRANSFER RATIO is defined as the ratio of output collector current,I_O , to the forward LED input current, I_F times 100%.
7. Device considered a two-terminal device: pins 1,2,3,and 4 shorted together and pins 5,6,7,and 8 shorted together.
8. Measured between pins 1 and 2 shorted together, and pins 3 and 4 shorted together.
9. Common mode transient immunity in Logic High level is the maximum tolerable (positive) dVcm/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 > 2.0V). Common mode transient immunity in Logic Low level is the maximum tolerable (negative) dVcm/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< 0.8V).
10. The 7.5kΩ load represents 1 LSTTL unit load of 0.36mA and a 20kΩ pull-up resistor.
11. The 4.7kΩ load represents 1 LSTTL unit load of 0.36mA and a 8.2kΩ pull-up resistor.
12. The 2500 V_{RMS}/ 1minute capability is validated by a factory 3.1k V_{RMS} / 1 second dielectric test.

FIG.1 SWITCHING TEST CIRCUIT

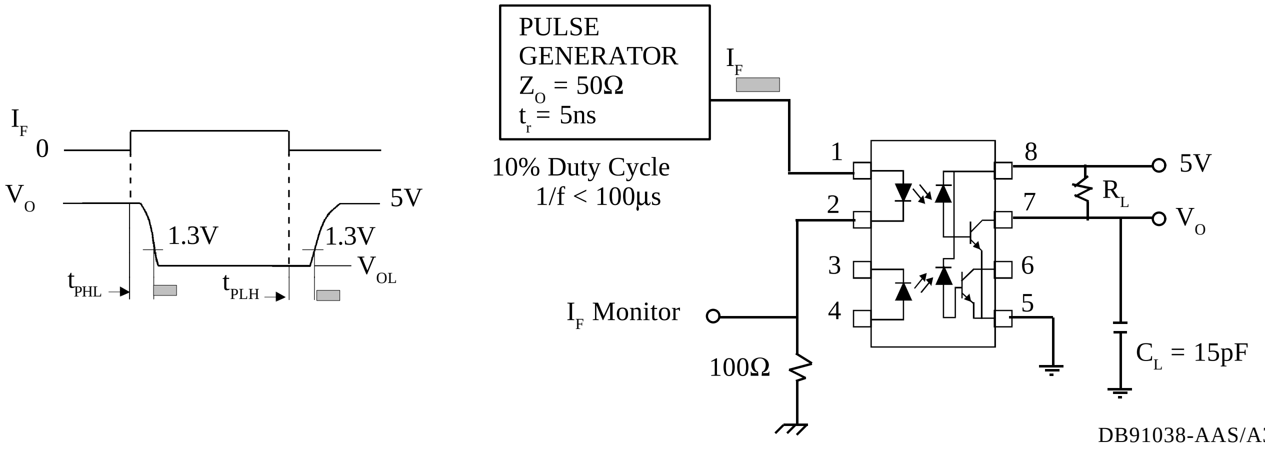


FIG. 2 TEST CIRCUIT FOR TRANSIENT IMMUNITY AND TYPICAL WAVEFORMS