

TOSHIBA PHOTOCOUPLER GaAlAs IRED + PHOTO IC

TLP750

DIGITAL LOGIC GROUND ISOLATION

LINE RECEIVER

MICROPROCESSOR SYSTEM INTERFACES

SWITCHING POWER SUPPLY FEEDBACK CONTROL

ANALOG SIGNAL ISOLATION

The TOSHIBA TLP750 consists of GaAlAs high-output light emitting diode and a high speed detector of one chip photo diode-transistor. This unit is 8-lead DIP.

TLP750 has no internal base connection, and is suitable for application in noisy environmental conditions.

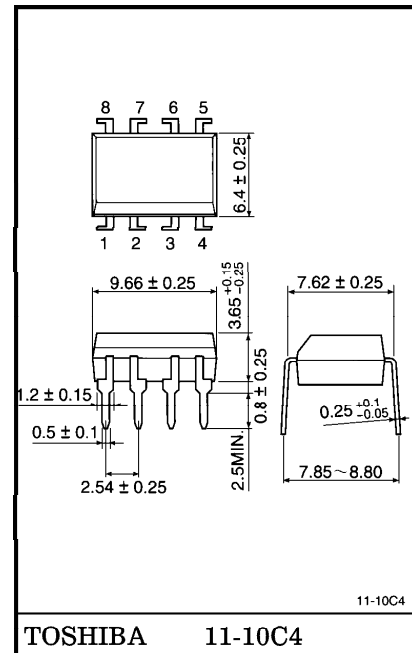
- Switching Speed : $t_{pHL} = 0.3\mu s$ (TYP.)
- Switching Speed : $t_{pLH} = 0.5\mu s$ (TYP.) ($R_L = 1.9k\Omega$)
- UL Recognized : UL1577, File No. E67349
- BSI Approved : BS EN60065 : 1994,
Certificate No. 7613
BS EN60950 : 1992,
Certificate No. 7614
- Isolation Voltage : $5000V_{rms}$ (MIN.)
- Option (D4) type
VDE Approved : DIN VDE0884 / 06.92,
Certificate No. 68384

Maximum Operating Insulation Voltage : $890V_{PK}$ Highest Permissible Over Voltage : $8000V_{PK}$

(Note) When a VDE0884 approved type is needed,
please designate the "Option (D4)"

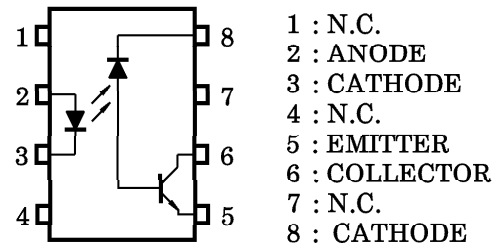
- Creepage Distance : 6.4mm (Min.)
- Clearance : 6.4mm (Min.)
- Insulation Thickness : 0.4mm (Min.)

Unit in mm

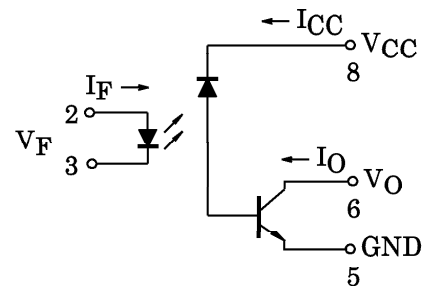


Weight : 0.54g

PIN CONFIGURATION (TOP VIEW)



SCHEMATIC



961001EBC2

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MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current (Note 1)	I _F	25	mA
	Pulse Forward Current (Note 2)	I _{FP}	50	mA
	Peak Transient Forward Current (Note 3)	I _{FPT}	1	A
	Reverse Voltage	V _R	5	V
	Diode Power Dissipation (Note 4)	P _D	45	mW
DETECTOR	Output Current	I _O	8	mA
	Peak Output Current	I _{OP}	16	mA
	Output Voltage	V _O	−0.5~15	V
	Supply Voltage	V _{CC}	−0.5~15	V
	Output Power Dissipation (Note 5)	P _O	100	mW
Operating Temperature Range		T _{opr}	−55~100	°C
Storage Temperature Range		T _{stg}	−55~125	°C
Lead Solder Temperature (10s) (Note 6)		T _{sol}	260	°C
Isolation Voltage (AC, 1min., R.H=60%) (Note 7)		BV _S	5000	V _{rms}

(Note 1) Derate 0.8mA/°C above 70°C.

(Note 2) 50% duty cycle, 1ms pulse width.

Derate 1.6mA/°C above 70°C.

(Note 3) Pulse width ≤ 1μs, 300pps.

(Note 4) Derate 0.9mW/°C above 70°C.

(Note 5) Derate 2mW/°C above 70°C.

(Note 6) Soldering portion of lead : up to 2mm from the body of the device.

(Note 7) Device considered a two terminal device : Pins 1, 2, 3 and 4 shorted together and pins 5, 6, 7 and 8 shorted together.

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	$I_F = 16\text{mA}$		—	1.65	1.85	V
	Forward Voltage Temperature Coefficient	$\Delta V_F / \Delta T_a$	$I_F = 16\text{mA}$		—	-2	—	mV/°C
	Reverse Current	I_R	$V_R = 5\text{V}$		—	—	10	μA
	Capacitance Between Terminal	C_T	$V_F = 0, f = 1\text{MHz}$		—	45	—	pF
DETECTOR	High Level Output Current	$I_{OH(1)}$	$I_F = 0\text{mA}, V_{CC} = V_O = 5.5\text{V}$		—	3	500	nA
		$I_{OH(2)}$	$I_F = 0\text{mA}, V_{CC} = V_O = 15\text{V}$		—	—	5	μA
		I_{OH}	$I_F = 0\text{mA}, V_{CC} = V_O = 15\text{V}$ $T_a = 70^\circ\text{C}$		—	—	50	μA
	High Level Supply Voltage	I_{CCH}	$I_F = 0\text{mA}, V_{CC} = 15\text{V}$		—	0.01	1	μA
COUPLED	Current Transfer Ratio	I_O / I_F	$I_F = 16\text{mA}$ $V_{CC} = 4.5\text{V}$ $V_O = 0.4\text{V}$	$T_a = 25^\circ\text{C}$	10	30	—	%
				Rank : 0	19	30	—	
				$T_a = 0 \sim 70^\circ\text{C}$	5	—	—	
				Rank : 0	15	—	—	
	Low Level Output Voltage	V_{OL}	$I_F = 16\text{mA}, V_{CC} = 4.5\text{V},$ $I_O = 1.1\text{mA}$ (Rank 0 : $I_O = 2.4\text{mA}$)		—	—	0.4	V
	Isolation Resistance	R_S	R.H. = 60%, $V = 5000V_{DC}$ (Note 7)		1×10^{12}	10^{14}	—	Ω
	Capacitance Between Input to Output	C_S	$V_S = 0, f = 1\text{MHz}$ (Note 8)		—	0.8	—	pF

SWITCHING CHARACTERISTICS (Ta = 25°C, VCC = 5V)

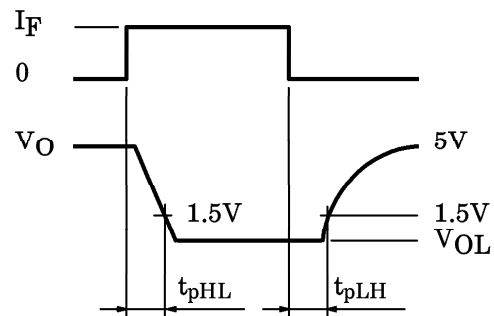
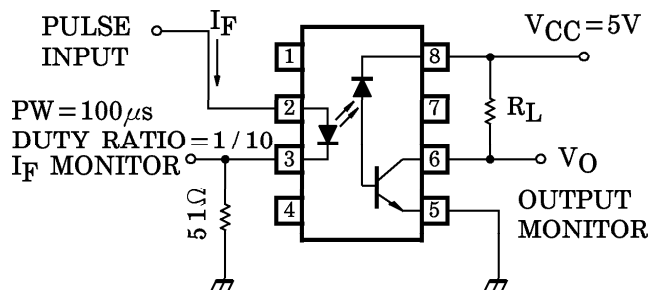
CHARACTERISTIC	SYMBOL	TEST CIR- CUTT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Propagation Delay Time (H→L)	t_{pHL}	1	$I_F = 0 \rightarrow 16\text{mA}, V_{CC} = 5\text{V},$ $R_L = 4.1\text{k}\Omega$	—	0.2	0.8	μs
			Rank 0 : $R_L = 1.9\text{k}\Omega$	—	0.3	0.8	
Propagation Delay Time (L→H)	t_{pLH}	1	$I_F = 16 \rightarrow 0\text{mA}, V_{CC} = 5\text{V},$ $R_L = 4.1\text{k}\Omega$	—	1.0	2.0	μs
			Rank 0 : $R_L = 1.9\text{k}\Omega$	—	0.5	1.2	
Common Mode Transient Immunity at Logic High Output (Note8)	C_{MH}	2	$I_F = 0\text{mA}, V_{CM} = 200\text{Vp-p}$ $R_L = 4.1\text{k}\Omega$ (Rank 0 : $R_L = 1.9\text{k}\Omega$)	—	1500	—	V / μs
Common Mode Transient Immunity at Logic Low Output (Note8)	C_{ML}		$I_F = 16\text{mA}, V_{CM} = 200\text{Vp-p}$ $R_L = 4.1\text{k}\Omega$ (Rank 0 : $R_L = 1.9\text{k}\Omega$)	—	-1500	—	V / μs

(Note 8) C_{ML} is the maximum rate of fall of the common mode voltage that can be sustained with the output voltage in the logic low state ($V_O < 0.8V$).

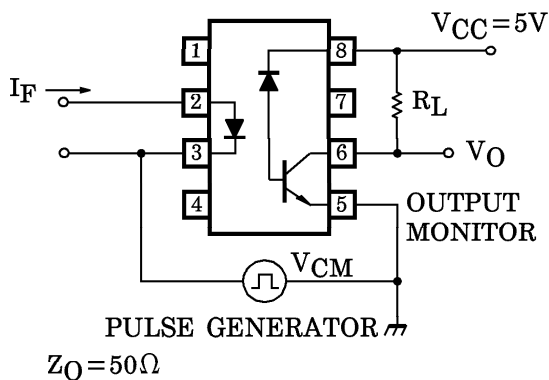
C_{MH} is the maximum rate of rise of the common mode voltage that can be sustained with the output voltage in the logic high state ($V_O > 2.0V$).

(Note 9) Maximum electrostatic discharge voltage for any pins : 100V ($C=200pF$, $R=0$).

TEST CIRCUIT 1 : Switching Time Test Circuit



TEST CIRCUIT 2 : Common Mode Noise Immunity Test Circuit



$$CM_H = \frac{160(V)}{t_r(\mu s)}, CM_L = \frac{160(V)}{t_f(\mu s)}$$

