TOSHIBA PHOTOCOUPLER GaAℓAs IRED + PHOTO IC

TLP750

DEGITAL LOGIC GROUND ISOLATION

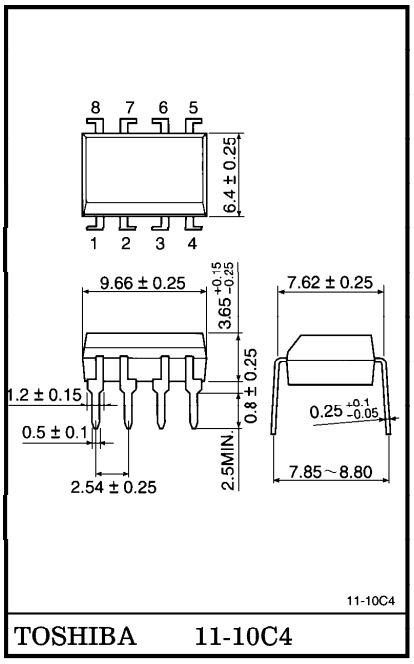
LINE RECEIVER

MICROPROCESSOR SYSTEM INTERFACES

SWITCHING POWER SUPPLY FEEDBACK CONTROL

ANALOG SIGNAL ISOLATION

Unit in mm



TOSHIBA 11-10C4

Weight : 0.54g

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} = 0.3μs (TYP.)
- Switching Speed : t_{pLH} = 0.5μs (TYP.) (R_L = 1.9kΩ)
- 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

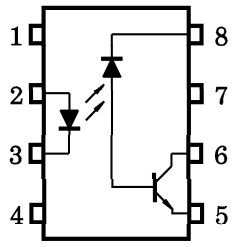
  Maximum Operating Insulation Voltage : 890V_{PK}

  Highest Permissible Over Voltage : 8000V_{PK}

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

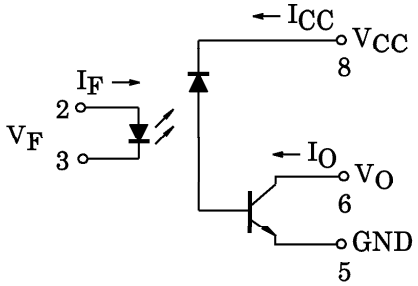
- Creepage Distance : 6.4mm (Min.)
  Clearance : 6.4mm (Min.)
  Insulation Thickness : 0.4mm (Min.)

PIN CONFIGURATION (TOP VIEW)



1 : N.C.
2 : ANODE
3 : CATHODE
4 : N.C.
5 : EMITTER
6 : COLLECTOR
7 : N.C.
8 : CATHODE

SCHEMATIC



961001EBC2

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 $\leqq 1\mu s$, 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 = 16mA		—	1.65	1.85	V
	Forward Voltage Temperature Coefficient	$\Delta V_F / \Delta Ta$	I_F = 16mA		—	−2	—	mV / °C
	Reverse Current	I_R	V_R = 5V		—	—	10	μA
	Capacitance Between Terminal	C_T	V_F = 0, f = 1MHz		—	45	—	pF
DETECTOR	High Level Output Current	I_{OH} (1)	I_F = 0mA, V_{CC} = V_O = 5.5V		—	3	500	nA
		I_{OH} (2)	I_F = 0mA, V_{CC} = V_O = 15V		—	—	5	μA
		I_{OH}	I_F = 0mA, V_{CC} = V_O = 15V Ta = 70°C		—	—	50	μA
	High Level Supply Voltage	I_{CCH}	I_F = 0mA, V_{CC} = 15V		—	0.01	1	μA
COUPLED	Current Transfer Ratio	I_O / I_F	I_F = 16 mA, V_{CC} = 4.5V, V_O = 0.4V	Ta = 25°C	10	30	—	%
				Rank : 0	19	30	—	
				Ta = 0~70°C	5	—	—	
				Rank : 0	15	—	—	
	Low Level Output Voltage	V_{OL}	I_F = 16mA, V_{CC} = 4.5V, I_O = 1.1mA (Rank 0 : I_O = 2.4mA)		—	—	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 = 1MHz (Note 8)		—	0.8	—	pF

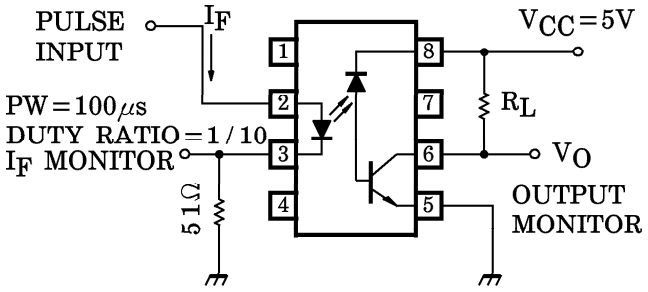
SWITCHING CHARACTERISTICS (Ta = 25°C, V_{CC} = 5V)

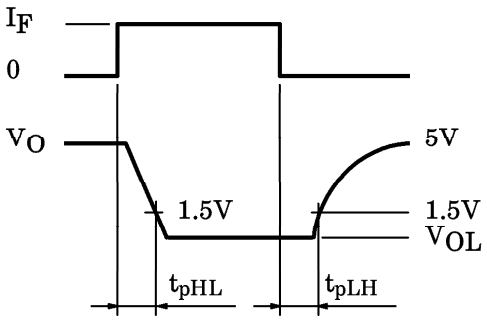
CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Propagation Delay Time (H→L)	t_{pHL}	1	I_F = 0→16mA, V_{CC} = 5V,		—	0.2	0.8	μs
			R_L = 4.1kΩ	Rank 0 : R_L = 1.9kΩ	—	0.3	0.8	
Propagation Delay Time (L→H)	t_{pLH}		I_F = 16→0mA, V_{CC} = 5V,		—	1.0	2.0	μs
			R_L = 4.1kΩ	Rank 0 :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

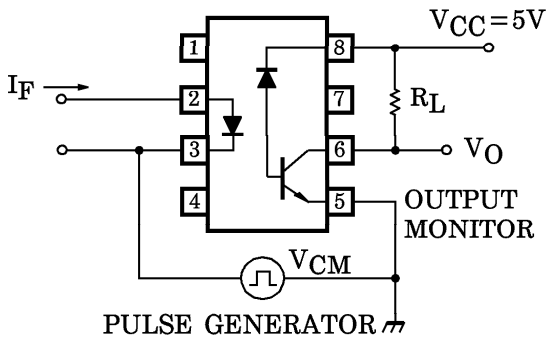
(Note 9) Maximum electrostatic discharge voltage for any pins : 100V (C=200pF, R=0).

TEST CIRCUIT 1 : Switching Time Test Circuit



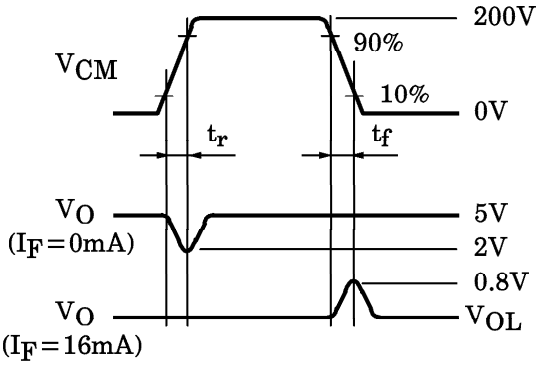


TEST CIRCUIT 2 : Common Mode Noise Immunity Test Circuit

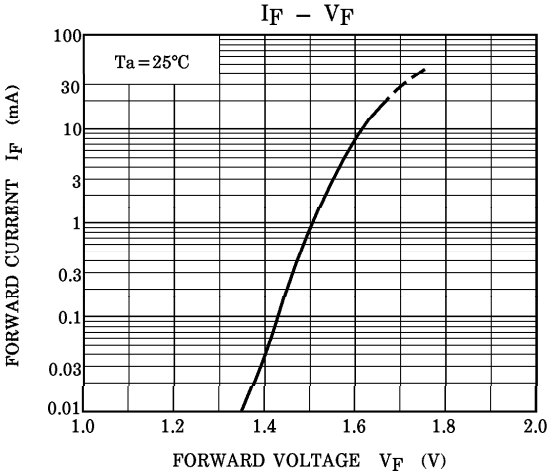


Z_O=50Ω

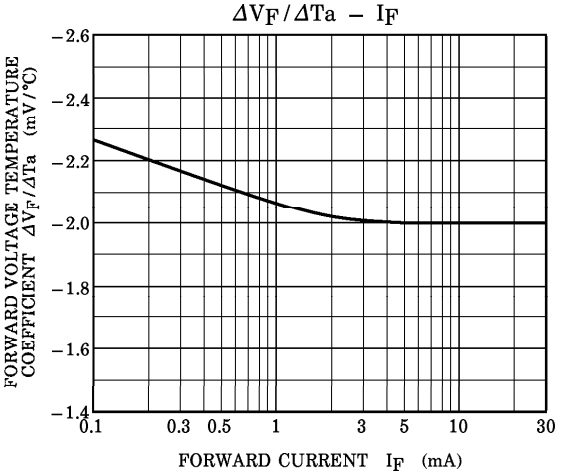
$CM_H = \frac{160\,(V)}{t_r\,(\mu s)}$, $CM_L = \frac{160\,(V)}{t_f\,(\mu s)}$



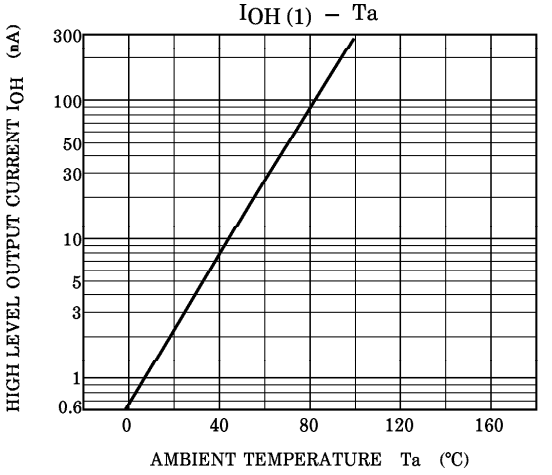
$I_F - V_F$



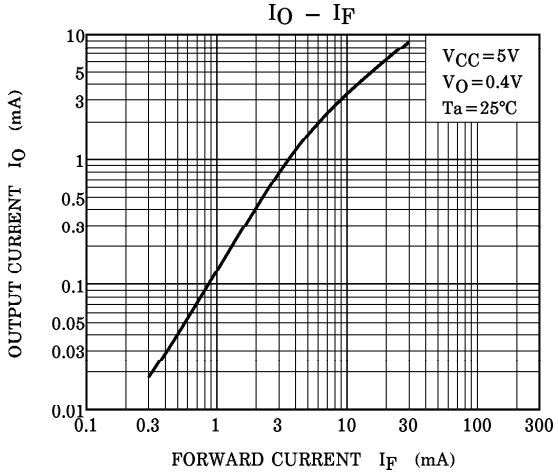
$\Delta V_F / \Delta Ta - I_F$



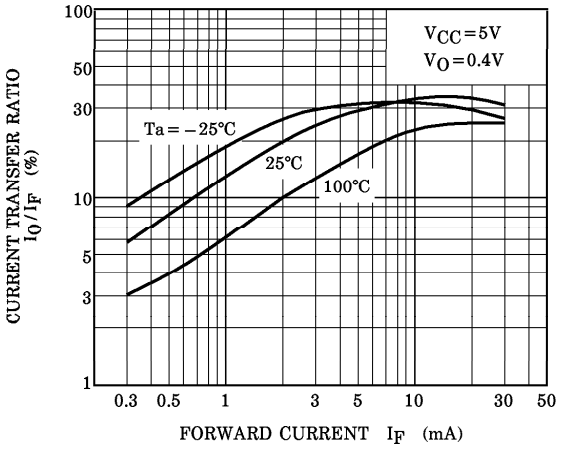
$I_{OH\,(1)} - Ta$



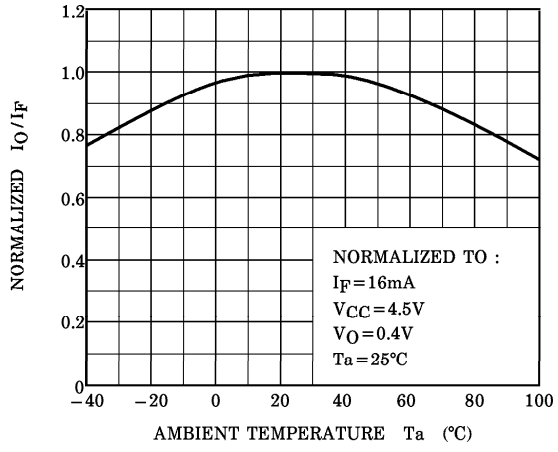
$I_O - I_F$



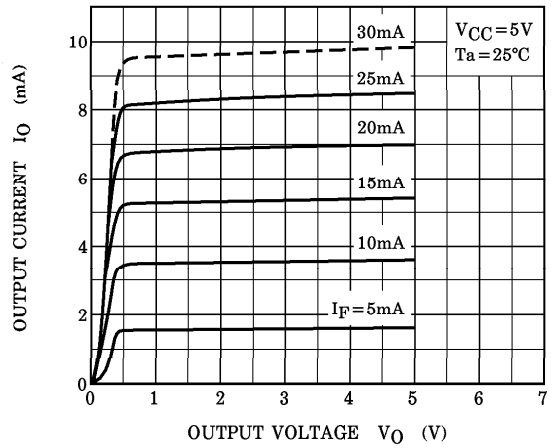
$I_O / I_F - I_F$



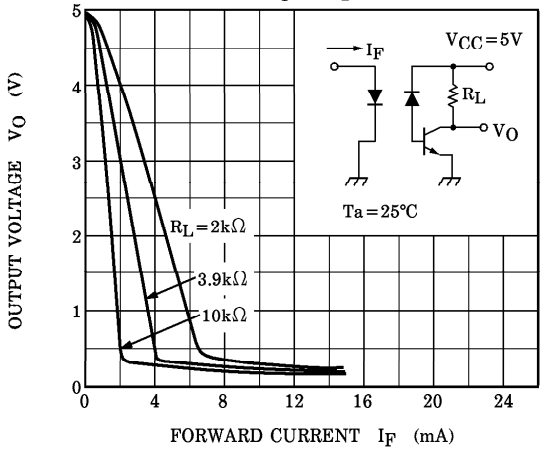
$I_O / I_F - Ta$



$I_O - V_O$



$V_O - I_F$



t_{pHL}, t_{pLH} – R_L