TOSHIBA PHOTOCOUPLER GaAℓAs IRED + PHOTO-IC

TLP759

DIGITAL LOGIC GROUND ISOLATION

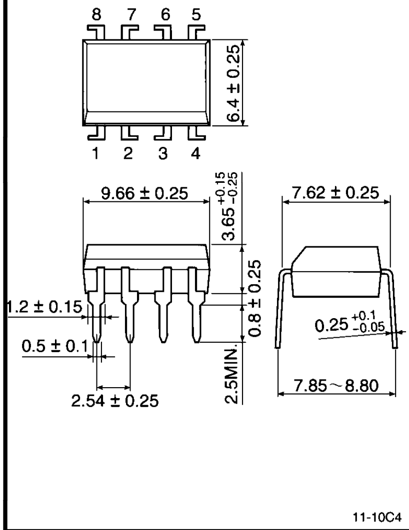
LINE RECEIVER

MICROPROCESSOR SYSTEM INTERFACES

SWITCHING POWER SUPPLY FEEDBACK CONTROL

TRANSISTOR INVERTOR

Unit in mm



TOSHIBA 11-10C4

Weight : 0.54g

The TOSHIBA TLP759 consists of a GaAℓAs high-output light emitting diode and a high speed detector of one chip photo diode-transistor. This unit is 8-lead DIP.

TLP759 has no internal base connection, and a Faraday shield integrated on the photodetector chip provides an effective common mode noise transient immunity.

So this is suitable for application in noisy environmental condition.

- Isolation Voltage : 5000 Vrms (Min.)
- Switching Speed : t_{pHL} = 0.2μs (Typ.)
  t_{pLH} = 0.3μs (Typ.) (R_L = 1.9kΩ)
- TTL Compatible
- UL Recognized : UL1577, File No. E67349
- Option (D4) type
  VDE Approved : DIN VDE0884 / 06.92
  Certificate No. 83676

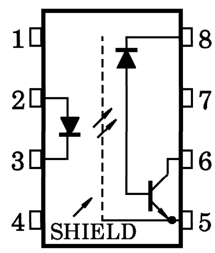
  Maximum Operating Insulation Voltage : 890V_{PK}

  Highest Permissible Over Voltage : 6000V_{PK}

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

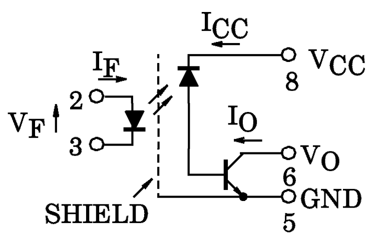
- Creepage Distance : 7.0mm (Min.)
  Clearance : 7.0mm (Min.)
  Insulation Thickness : 0.4mm (Min.)

PIN CONFIGURATION (TOP VIEW)



1 : N.C.
2 : ANODE
3 : CATHODE
4 : N.C.
5 : EMITTER (GND)
6 : COLLECTOR (OUTPUT)
7 : N.C.
8 : V_{CC}

SCHEMATIC



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	−0.5~20	V
	Supply Voltage	V_{CC}	−0.5~30	V
	Output Power Dissipation (Note 5)	P_O	100	mW
Operating Temperature Range		Topr	−55~100	°C
Storage Temperature Range		Topr	−55~125	°C
Lead Solder Temperature (10s) (Note 6)		Tsol	260	°C
Isolation Voltage (AC, 1min., R.H.≦60%) (Note 7)		BV_S	5000	Vrms

(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	$I_F = 16mA$	—	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 Terminals	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
		$I_{OH (2)}$	$I_F = 0mA$, $V_{CC} = 30V$, $V_O = 20V$	—	—	5	μA
		I_{OH}	$I_F = 0mA$, $V_{CC} = 30V$, $V_O = 20V$ Ta = 70°C	—	—	50	
	High Level Supply Voltage	I_{CCH}	$I_F = 0mA$, $V_{CC} = 30V$	—	0.01	1	μA
COUPLED	Current Transfer Ratio	I_O / I_F	$I_F = 16mA$, $V_{CC} = 4.5V$ $V_O = 0.4V$	20	40	—	%
	Low Level Output Voltage	V_{OL}	$I_F = 16mA$, $V_{CC} = 4.5V$ $I_O = 2.4mA$	—	—	0.4	V
	Resistance (Input-Output)	R_S	R.H. ≦ 60%, $V_S = 500V$ (Note 7)	1×10^{12}	10^{14}	—	Ω
	Capacitance (Input-Output)	C_S	$V_S = 0$, f = 1MHz (Note 7)	—	0.8	—	pF

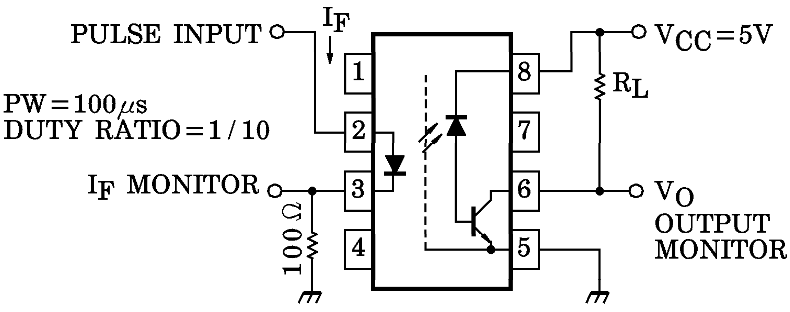
SWITCHING CHARACTERISTICS (Ta = 25°C, VCC = 5V)

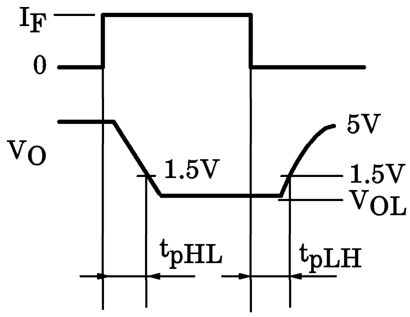
CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Propagation Delay Time (H→L)	t_{pHL}	1	$I_F = 0 \rightarrow 16mA$, $V_{CC} = 5V$ $R_L = 1.9k\Omega$	—	0.2	0.8	μs
Propagation Delay Time (L→H)	t_{pLH}		$I_F = 16 \rightarrow 0mA$, $V_{CC} = 5V$ $R_L = 1.9k\Omega$	—	0.3	0.8	μs
Common Mode Transient Immunity at Logic High Output (Note 8)	CM_H	2	$I_F = 0mA$, $V_{CM} = 400Vp\text{-}p$ $R_L = 4.1k\Omega$	5000	10000	—	V / μs
Common Mode Transient Immunity at Logic Low Output (Note 8)	CM_L		$I_F = 16mA$ $V_{CM} = 400Vp\text{-}p$ $R_L = 4.1k\Omega$	−5000	−10000	—	V / μs

(Note 8) CM_L is the maximum rate of fall of the common mode voltage that can be sustained with the output voltage in the logic low state ($V_O < 0.8V$).
CM_H is the maximum rate of rise of the common mode voltage that can be sustained with the output voltage in the logic high state ($V_O > 2.0V$).

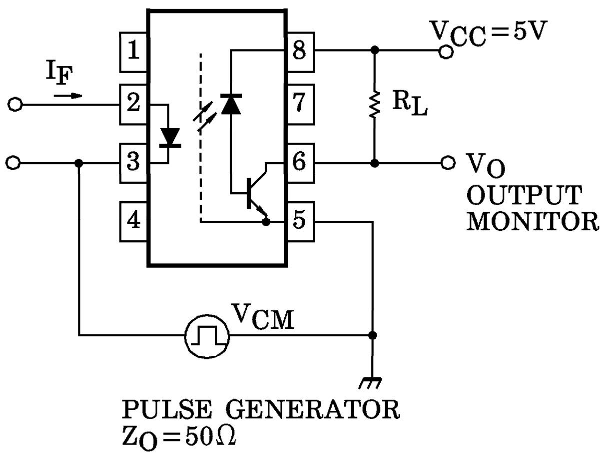
(Note 9) Maximum electrostatic discharge voltage for any pins : 100V (C = 200pF, R = 0)

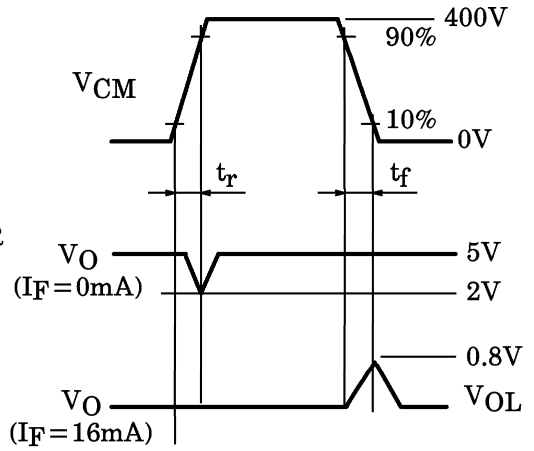
TEST CIRCUIT 1 : Switching Time Test Circuit





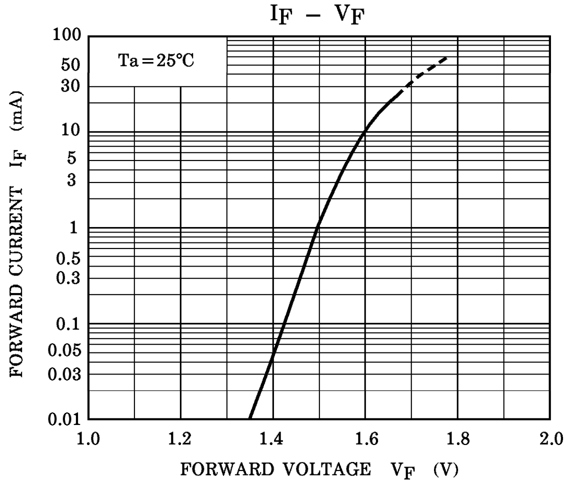
TEST CIRCUIT 2 : Common Mode Noise Immunity Test Circuit



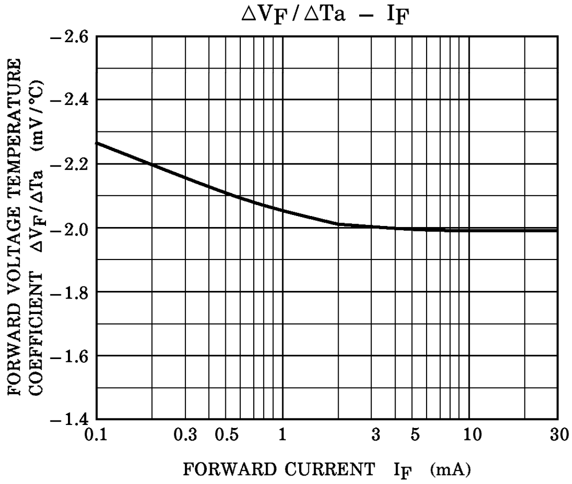


$$CM_H = \frac{320\ (V)}{t_r\ (\mu s)}, \quad CM_L = \frac{320\ (V)}{t_f\ (\mu s)}$$

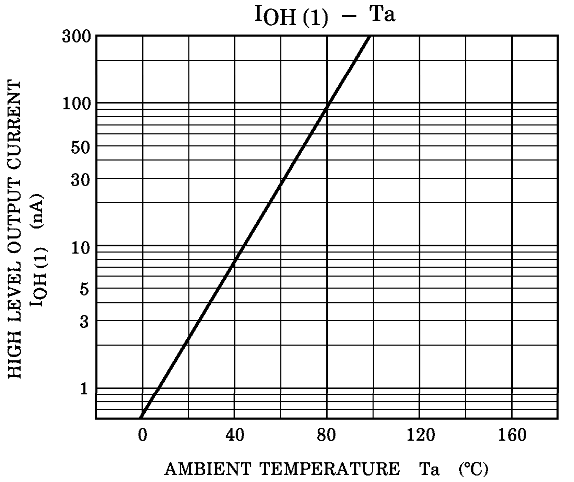
I_F – V_F



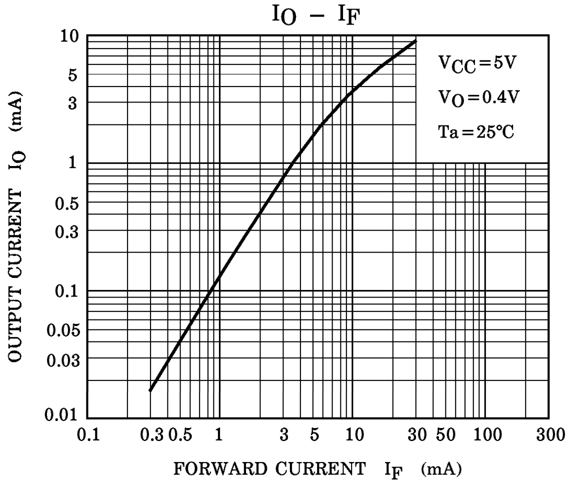
$\Delta V_F / \Delta Ta$ – I_F



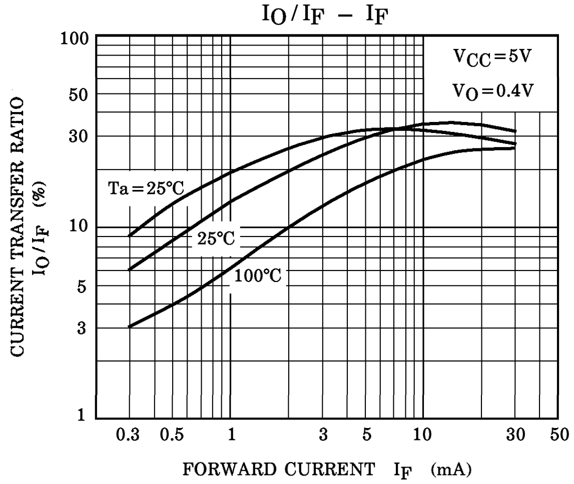
$I_{OH(1)}$ – Ta



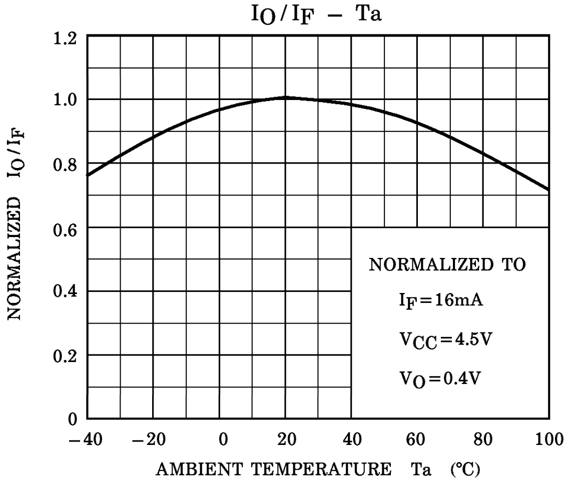
I_O – I_F

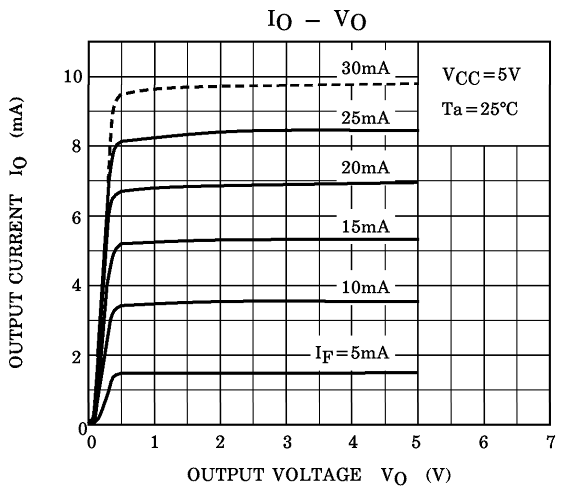


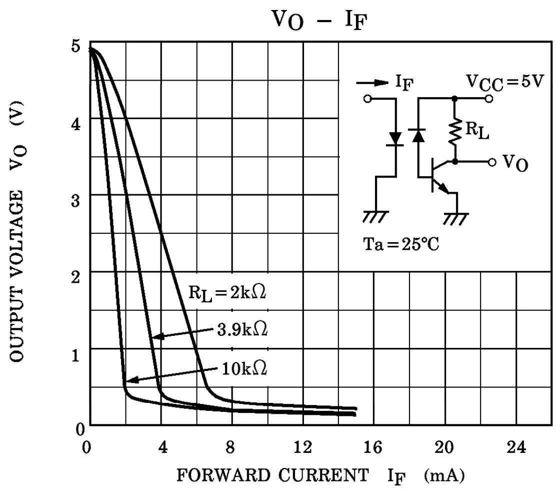
I_O / I_F – I_F

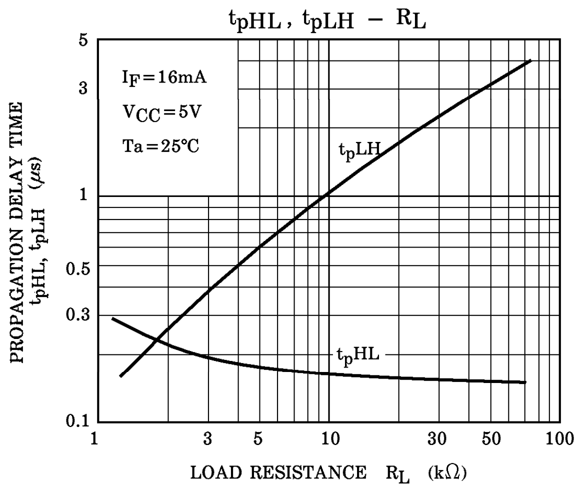


I_O / I_F – Ta




IO – VO
30mA
25mA
20mA
15mA
10mA
IF = 5mA
VCC = 5V
Ta = 25°C
OUTPUT CURRENT IO (mA)
OUTPUT VOLTAGE VO (V)


VO – IF
IF
VCC = 5V
RL
VO
Ta = 25°C
RL = 2kΩ
3.9kΩ
10kΩ
OUTPUT VOLTAGE VO (V)
FORWARD CURRENT IF (mA)


tpHL, tpLH – RL
IF = 16mA
VCC = 5V
Ta = 25°C
tpLH
tpHL
PROPAGATION DELAY TIME tpHL, tpLH (μs)
LOAD RESISTANCE RL (kΩ)

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000707EBC

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