

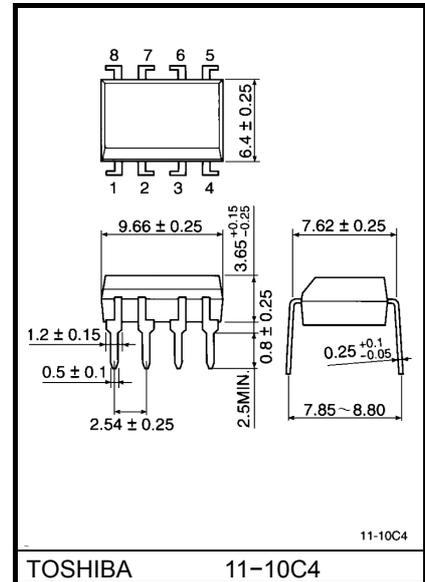
TLP759

Digital Logic Ground Isolation
 Line Receiver
 Microprocessor System Interfaces
 Switching Power Supply Feedback Control
 Transistor Inverter

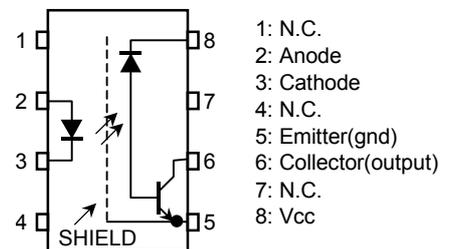
The TOSHIBA TLP759 consists of a GaAlAs high-output light emitting diode and a high speed detector of one chip photo diode-transistor. This unit is 8-lead DIP.
 TLP759 has no internal base connection, and a Faraday shield integrated on the photodetector chip provides an effective common mode noise transient immunity.
 So this is suitable for application in noisy environmental condition.

- Isolation voltage: 5000 Vrms (min)
 - Switching speed: $t_{pHL} = 0.2\mu s$ (typ.)
 $t_{pLH} = 0.3\mu s$ (typ.) ($R_L=1.9 k\Omega$)
 - TTL compatible
 - UL recognized: UL1577, file No. E67349
 - BSI approved: BS EN60065:2002, certificate no.8869
 BS EN60950-1:2002, certificate no.8870
 - Option (D4) type
 VDE Approved: DIN EN 60747-5-2
 Certificate No. 40009302
 Maximum operating insulation voltage: 890V_{PK}
 Highest permissible over voltage: 6000V_{PK}
- (Note) When a EN 60747-5-2 approved type is needed, please designate the "Option (D4)"**
- Creepage distance: 7.0 mm (min)
 Clearance: 7.0 mm (min)
 Insulation thickness: 0.4 mm (min)

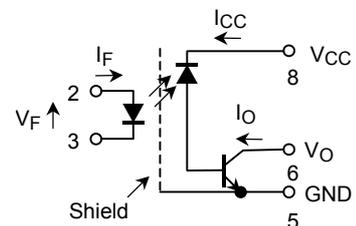
Unit: mm



Pin Configuration (top view)



Schematic



Start of commercial production
 1993/01

Absolute 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 to 20	V
	Supply voltage	V _{CC}	-0.5 to 30	V
	Output power dissipation (Note 5)	P _O	100	mW
Operating temperature range		T _{opr}	-55 to 100	°C
Storage temperature range		T _{stg}	-55 to 125	°C
Lead solder temperature (10s) (Note 6)		T _{sol}	260	°C
Isolation voltage (AC, 1 minute, R.H. ≤ 60%) (Note 7)		BV _S	5000	V _{rms}

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

(Note 1) Derate 0.8mA / °C above 70°C.

(Note 2) 50% duty cycle, 1 ms 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
LDE	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 terminals	C_T	$V = 0, f = 1\text{MHz}$	—	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
		$I_{OH(2)}$	$I_F = 0\text{mA}, V_{CC} = 30\text{V}, V_O = 20\text{V}$	—	—	5	μA
		I_{OH}	$I_F = 0\text{mA}, V_{CC} = 30\text{V}, V_O = 20\text{V}$ $T_a = 70^\circ\text{C}$	—	—	50	
	High level supply voltage	I_{CCH}	$I_F = 0\text{mA}, V_{CC} = 30\text{V}$	—	0.01	1	μA
Coupled	Current transfer ratio	I_O / I_F	$I_F = 16\text{mA}, V_{CC} = 4.5\text{V}$ $V_O = 0.4\text{V}$	20	40	—	%
	Low level output voltage	V_{OL}	$I_F = 16\text{mA}, V_{CC} = 4.5\text{V}$ $I_O = 2.4\text{mA}$	—	—	0.4	V
	Resistance (input-output)	R_S	R.H. $\leq 60\%$, $V_S = 500\text{V}$ (Note 7)	1×10^{12}	10^{14}	—	Ω
	Capacitance (input-output)	C_S	$V_S = 0, f = 1\text{MHz}$ (Note 7)	—	0.8	—	pF
	Isolation voltage	BV_S	AC, 1 minute	5000	—	—	Vrms
AC, 1 second, in oil			—	10000	—		
DC, 1 minute, in oil			—	10000	—	Vdc	

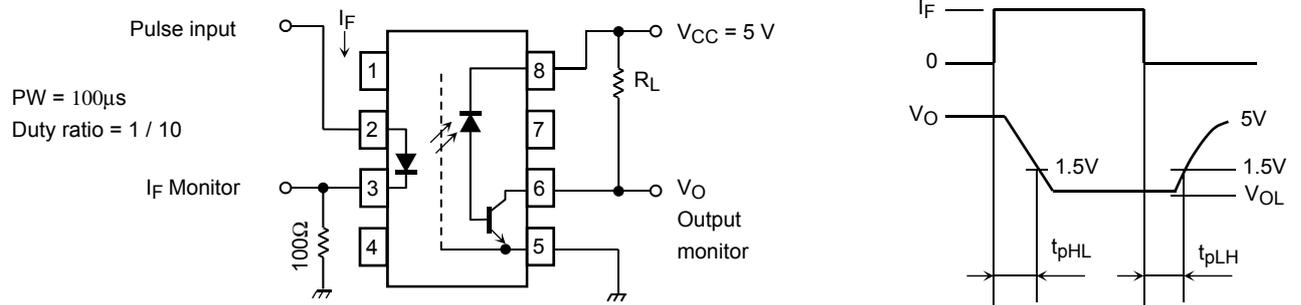
Switching Characteristics (Ta = 25°C, VCC = 5V)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Propagation delay time (H → L)	t_{pHL}	1	$I_F = 0 \rightarrow 16\text{mA}, V_{CC} = 5\text{V}$ $R_L = 1.9\text{k}\Omega$	—	0.2	0.8	μs
Propagation delay time (L → H)	t_{pLH}		$I_F = 16 \rightarrow 0\text{mA}, V_{CC} = 5\text{V}$ $R_L = 1.9\text{k}\Omega$	—	0.3	0.8	μs
Common mode transient immunity at logic high output (Note 8)	CM_H	2	$I_F = 0\text{mA}, V_{CM} = 400\text{V}_{p-p}$ $R_L = 4.1\text{k}\Omega$	5000	10000	—	V / μs
Common mode transient immunity at logic low output (Note 8)	CM_L		$I_F = 16\text{mA}, V_{CM} = 400\text{V}_{p-p}$ $R_L = 4.1\text{k}\Omega$	-5000	-10000	—	V / μs

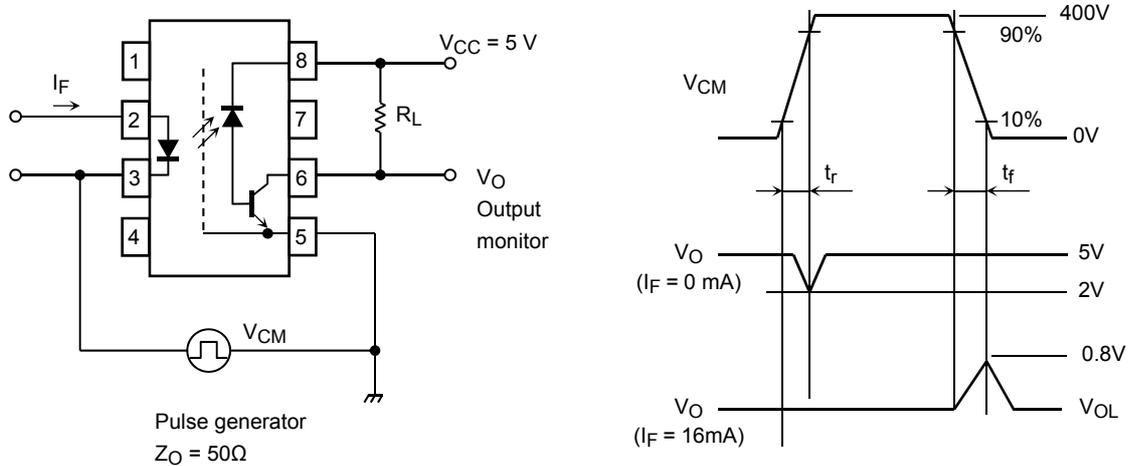
(Note 8) CM_L is the maximum rate of fall of the common mode voltage that can be sustained with the output voltage in the logic low state ($V_O < 0.8\text{V}$).

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 ($V_O > 2.0\text{V}$).

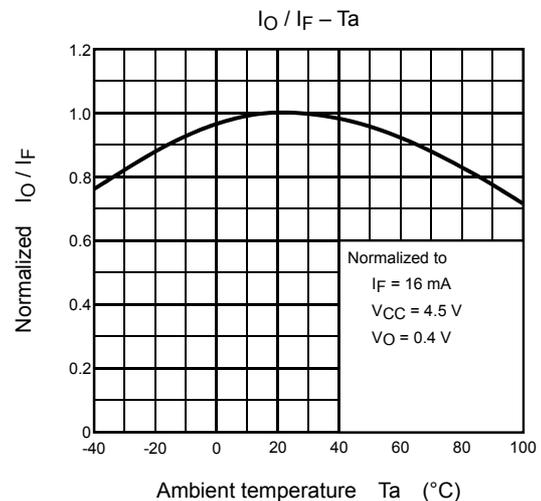
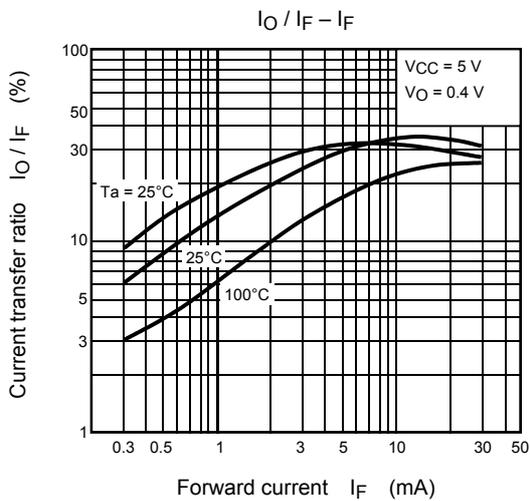
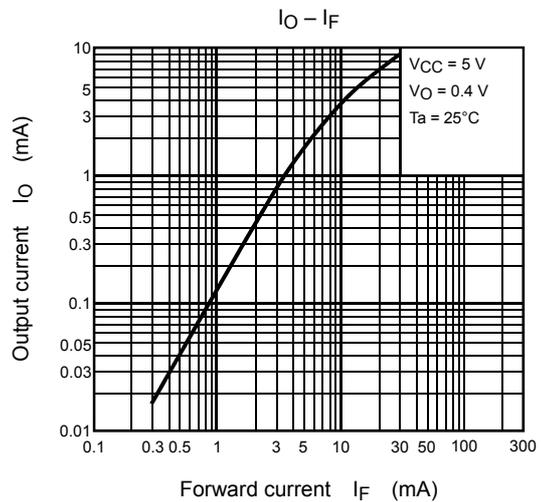
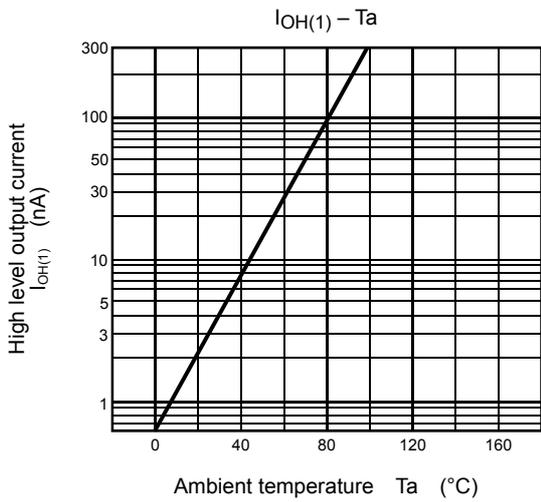
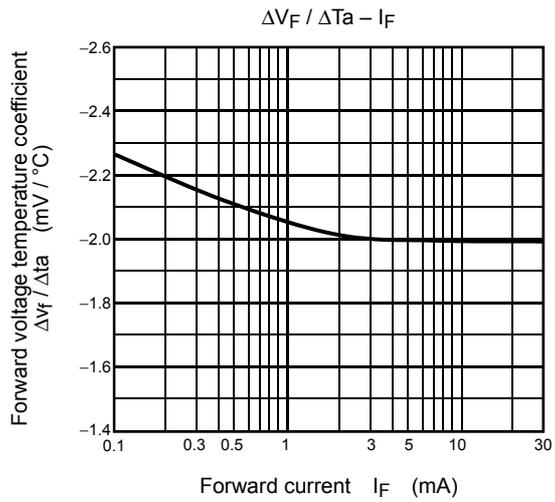
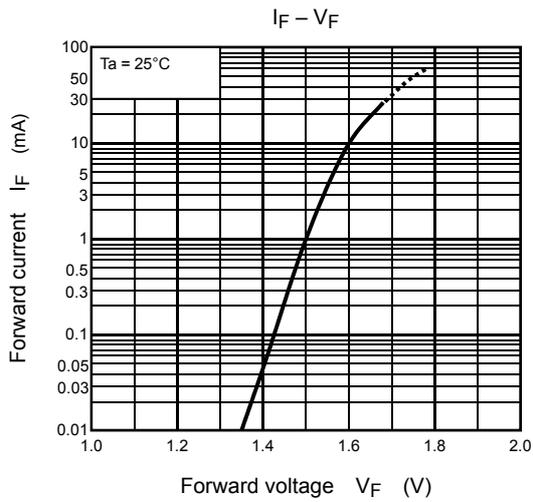
Test Circuit 1: Switching Time Test Circuit

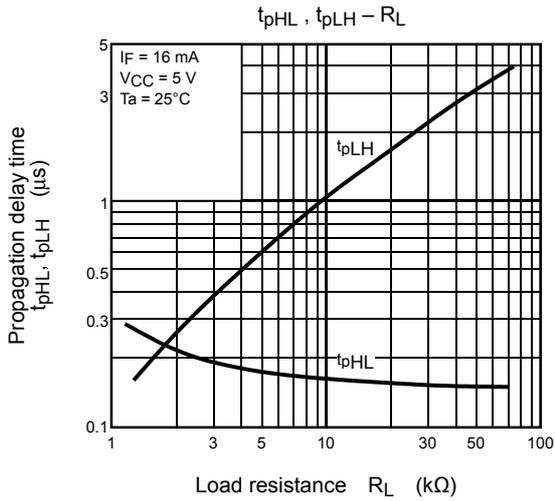
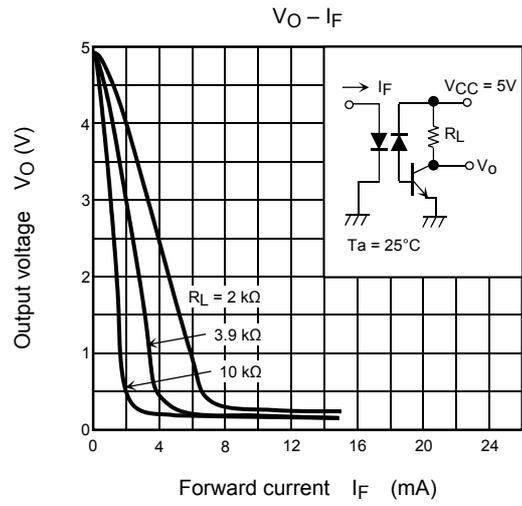
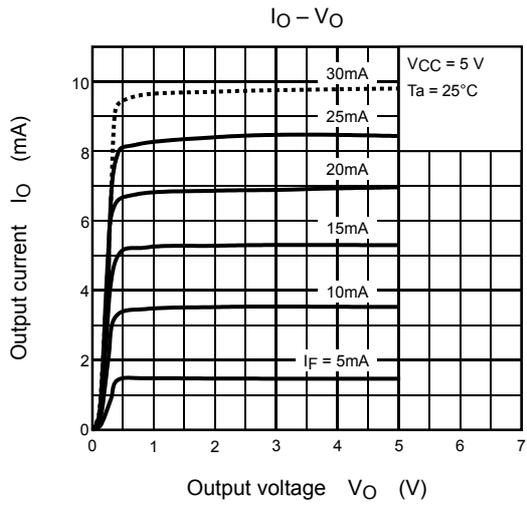


Test Circuit 2: Common Mode Noise Immunity Test Circuit



$$CM_{IH} = \frac{320 \text{ (V)}}{t_r \text{ (\mu s)}}, CM_{IL} = \frac{320 \text{ (V)}}{t_f \text{ (\mu s)}}$$





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