

TOSHIBA PHOTOCOUPLER GaAlAs IRED + PHOTO IC

TLP551

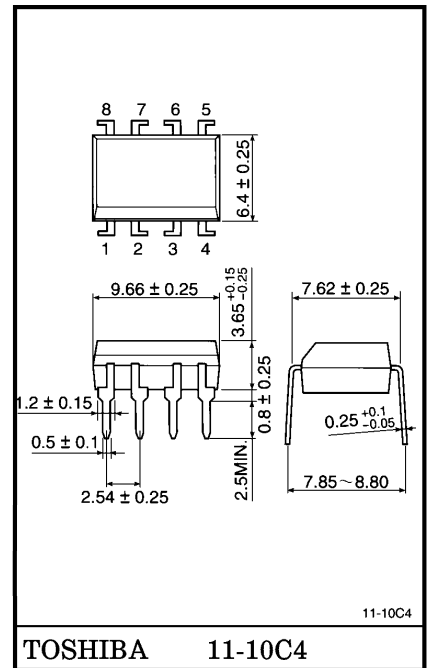
DIGITAL LOGIC GROUND ISOLATION
 LINE RECEIVER
 MICROPROCESSOR SYSTEM INTERFACES
 SWITCHING POWER SUPPLY FEEDBACK CONTROL
 ANALOG SIGNAL ISOLATION

The TOSHIBA TLP551 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.

TLP551 has internal base connection. This base pin should be used for analog application or enable operation.

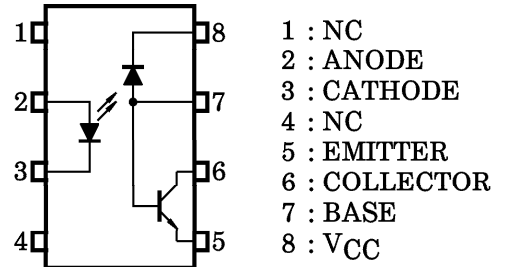
- Isolation Voltage : 2500Vrms (Min.)
- Switching Speed : $t_{pHL} = 0.5\mu s$ (Typ.)
 $t_{pLH} = 0.6\mu s$ (Typ.)
 $(R_L = 1.9k\Omega)$
- TTL Compatible
- If base pin is open, output signal will be noisy by environmental condition. For this case, TLP550 is suitable.
- UL Recognized : UL1577, File No. E67349

Unit in mm

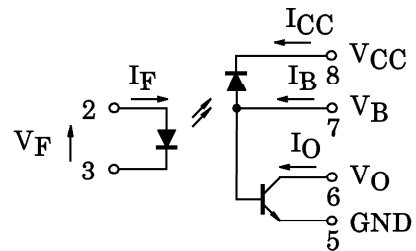


Weight : 0.54g

PIN CONFIGURATION (TOP VIEW)



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	-0.5~15	V
	Supply Voltage	V _{CC}	-0.5~15	V
	Base Current	I _B	5	mA
	Emitter-Base Reverse Voltage	V _{EB}	5	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	2500	V _{rms}

Note 1 : Derate 0.8mA 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 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	1.45	1.65	1.85	V
	Forward Voltage Temperature Coefficient	ΔV _F / ΔTa	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	—	60	—	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	
		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 ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I _O / I _F	I _F = 16mA, V _{CC} = 4.5V V _O = 0.4V	10	30	—	%
		Rank : 0	19	30	—	
		I _F = 16mA, V _{CC} = 4.5V V _O = 0.4V, 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 CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance (Input-Output)	C _S	V _S = 0, f = 1MHz (Note 7)	—	0.8	—	pF
Resistance (Input-Output)	R _S	R.H. ≤ 60%, V _S = 500VDC (Note 7)	5 × 10 ¹⁰	10 ¹⁴	—	Ω
Isolation Voltage	BV _S	AC, 1 minute	2500	—	—	V _{rms}
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000	—	V _{dc}

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

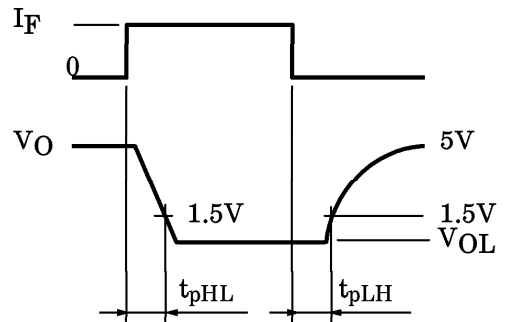
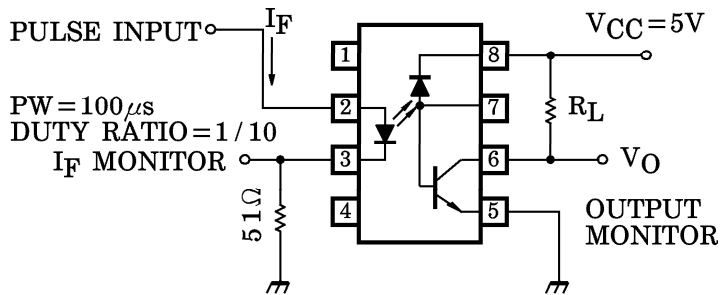
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Propagation Delay Time (H→L)	t _{pHL}	I _F = 16mA, R _L = 4.1kΩ	—	0.3	0.8	μs
		I _F = 16mA, R _L = 1.9kΩ (Rank O)	—	0.5	0.8	
Propagation Delay Time (L→H)	t _{pLH}	I _F = 16mA, R _L = 4.1kΩ	—	1	2	μs
		I _F = 16mA, R _L = 1.9kΩ (Rank O)	—	0.6	1.2	
Common Mode Transient Immunity at Logic High Output	CM _H	I _F = 0mA, V _{CM} = 200V _{p-p} R _L = 4.1kΩ (Rank O : R _L = 1.9kΩ) (Note 8)	—	400	—	V / μs
Common Mode Transient Immunity at Logic Low Output	CM _L	I _F = 16mA, V _{CM} = 200V _{p-p} R _L = 4.1kΩ (Rank O : R _L = 1.9kΩ) (Note 8)	—	-1000	—	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).

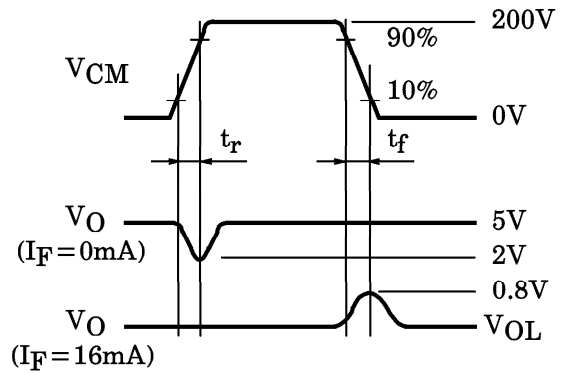
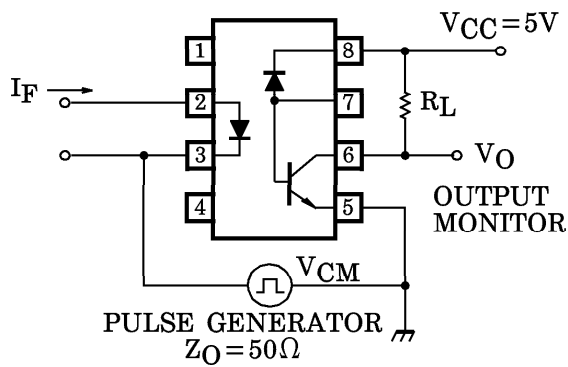
CM_H is the maximum rate of rise of the common mode voltage that can be sustained with the output voltage in the logic high state (V_O > 2.0V).

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

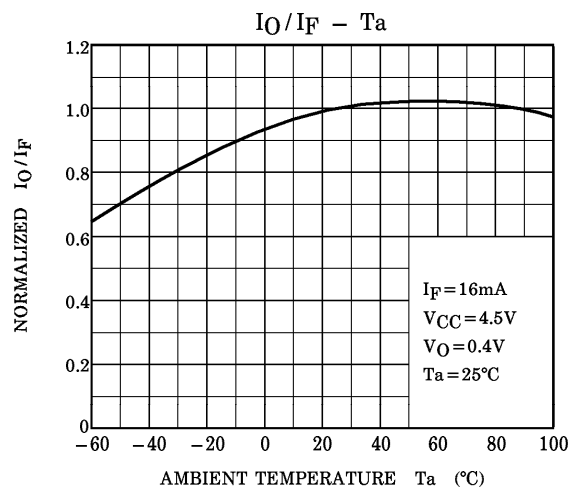
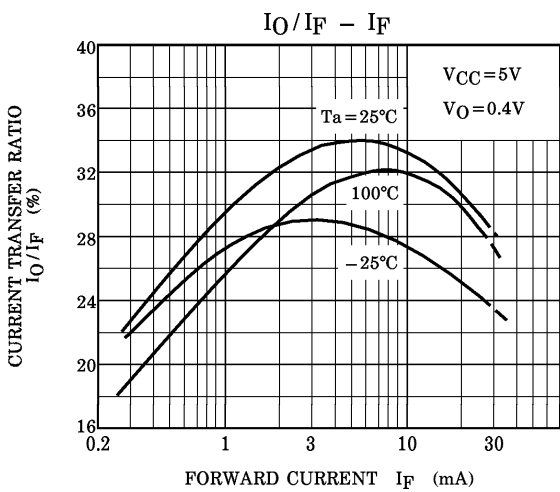
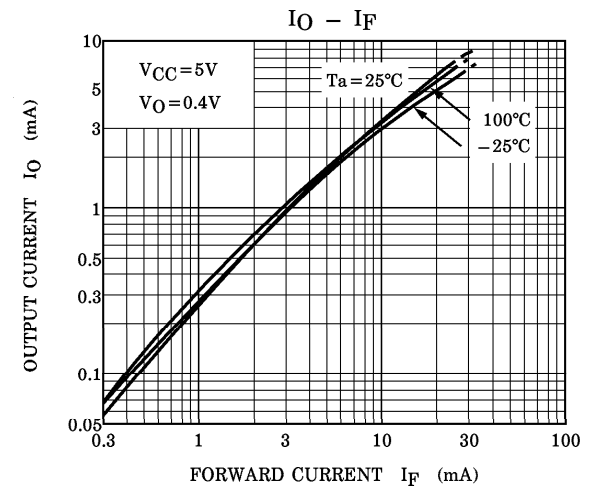
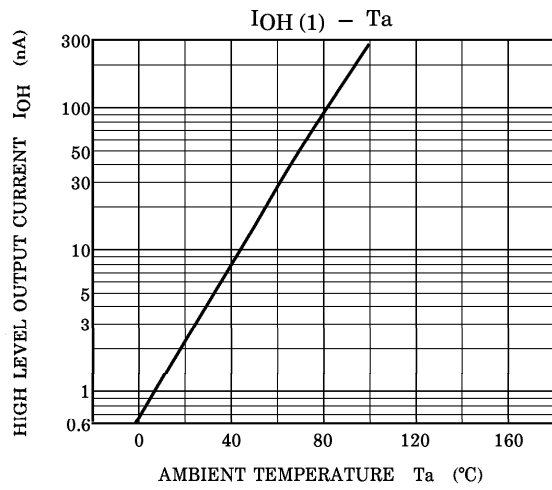
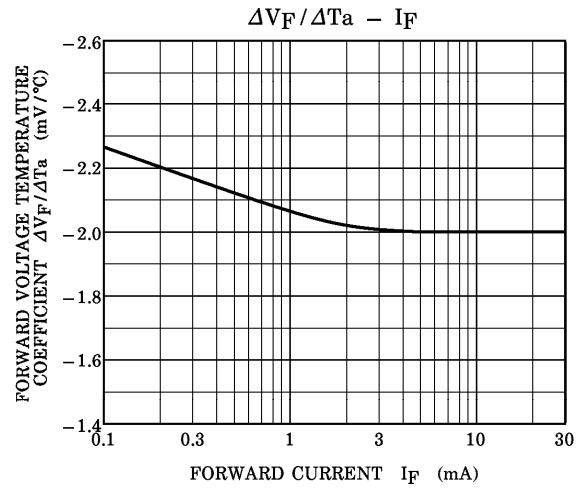
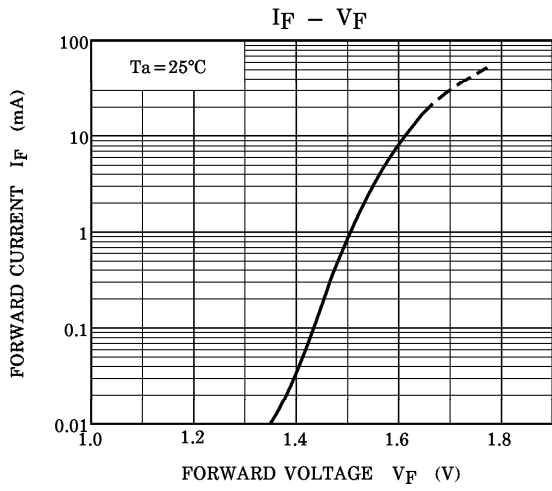
TEST CIRCUIT 1 : Switching Time Test Circuit

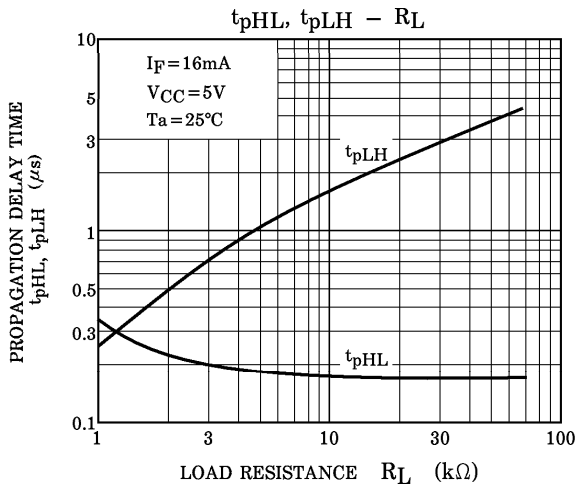
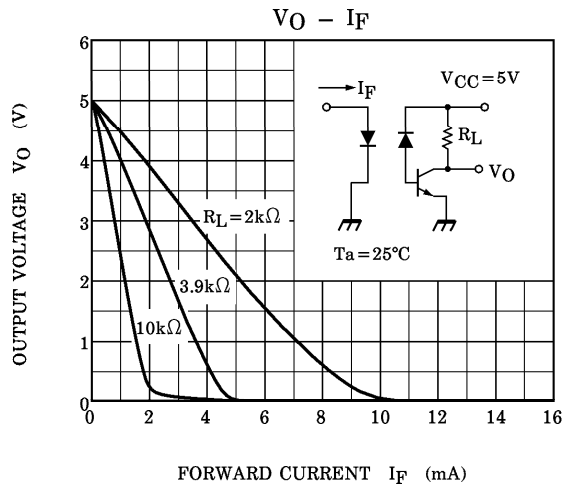
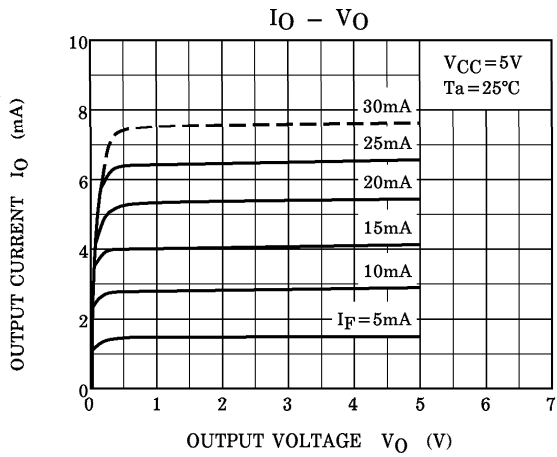


TEST CIRCUIT 2 : Common Mode Noise Immunity Test Circuit



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





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