SEMICONDUCTOR

TOSHIBA

TECHNICAL DATA

TOSHIBA PHOTO COUPLER

TLP550

INFRARED LED + PHOTO IC

(TLP550)

DEGITAL LOGIC ISOLATION

LINE RECEIVER FEEDBACK CONTROL

POWER SUPPLY CONTROL

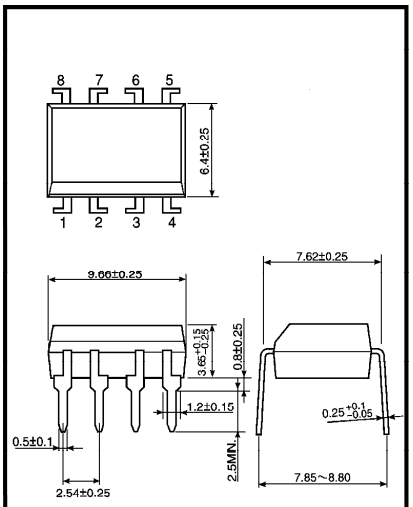
SWITCHING POWER SUPPLY

TRANSISTOR INVERTOR

TLP550 constructs a high emitting diode and a one chip photo diode-transistor.
TLP550 has no base connection, and is suitable for application at noisy environmental condition.
This unit is 8-lead DIP package.

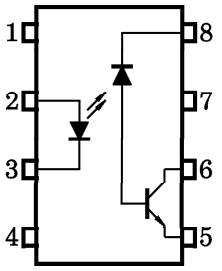
- Isolation Voltage : 2500Vrms (MIN.)
- Switching Speed : t_{pHL}, t_{pLH} = 0.5μs (TYP.) (R_L = 1.9kΩ)
- TTL Compatible
- UL Recognized : File No. E67349

Unit in mm



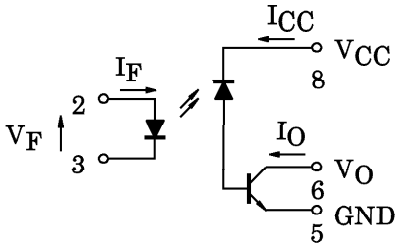
JEDEC	—
EIAJ	—
TOSHIBA	11-10C4

PIN CONFIGURATION (TOP VIEW)



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

SCHEMATIC



(TLP550)

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
	Supply Voltage	V_{CC}	−0.5~15	V
	Output Voltage	V_O	−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)		T_{sol}	260	°C
Isolation Voltage (AC, 1min., R.H = 40~60%) (Note 6)		BV_S	2500	Vrms

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.

(TLP550)

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	$\Delta V_F / \Delta Ta$	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		—	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	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.=40~60%, V=1kV DC (Note 6)		—	10^{12}	—	Ω
	Stray Capacitance Between Input to Output	C_S	V=0, f=1MHz		—	0.8	—	pF

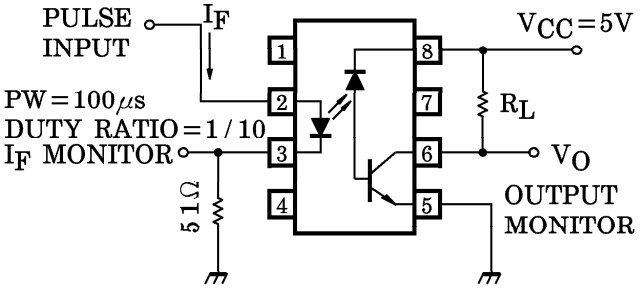
SWITCHING CHARACTERISTICS (Ta = 25°C)

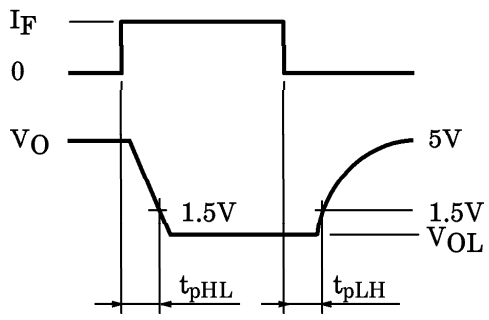
CHARACTERISTIC	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Propagation Delay Time (H→L)	t_{pHL}	I_F=0→16mA, V_{CC}=5V, R_L=4.1kΩ		—	0.3	0.8	μs
		(Note 7)	Rank 0 : R_L=1.9kΩ	—	0.5	0.8	
Propagation Delay Time (L→H)	t_{pLH}	I_F=16→0mA, V_{CC}=5V, R_L=4.1kΩ		—	1.0	2.0	μs
		(Note 7)	Rank 0 : R_L=1.9kΩ	—	0.6	1.2	
Common Mode Transient Immunity at High Output Level	C_{MH}	I_F=0mA, V_{CM}=200Vp-p R_L=4.1kΩ (Rank 0 : R_L=1.9kΩ) (Note 8)		—	1500	—	V / μs
Common Mode Transient Immunity at Low Output Level	C_{ML}	I_F=16mA, V_{CM}=200Vp-p R_L=4.1kΩ (Rank 0 : R_L=1.9kΩ) (Note 8)		—	−1500	—	V / μs

(TLP550)

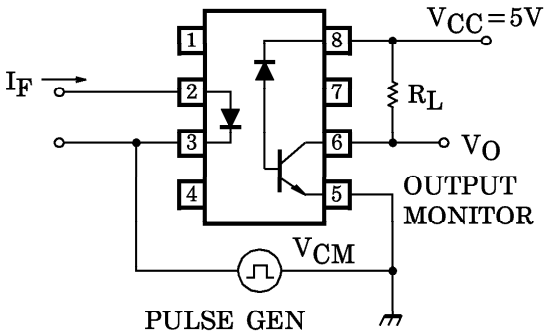
Note 6 : Device considered a two-terminal device : Pins 1, 2, 3 and 4 shorted together and Pin 5, 6, 7 and 8 shorted together.

Note 7. : Switching time test circuit.



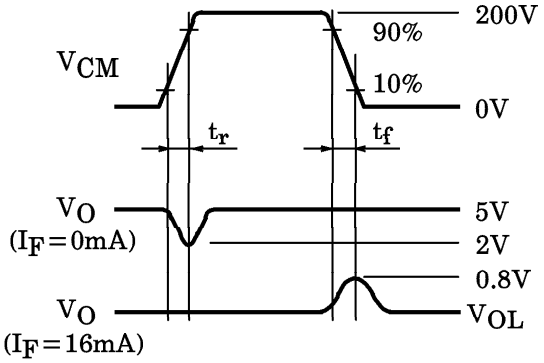


Note 8 : Common mode transient immunity test circuit.



$Z_O = 50\Omega$

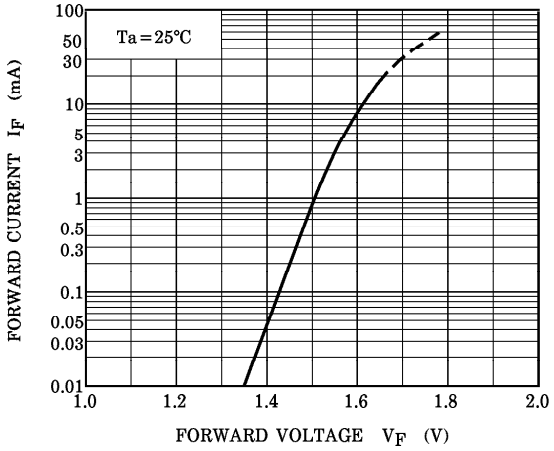
$$CM_H = \frac{160\,(V)}{t_r\,(\mu s)},\ CM_L = \frac{160\,(V)}{t_f\,(\mu s)}$$



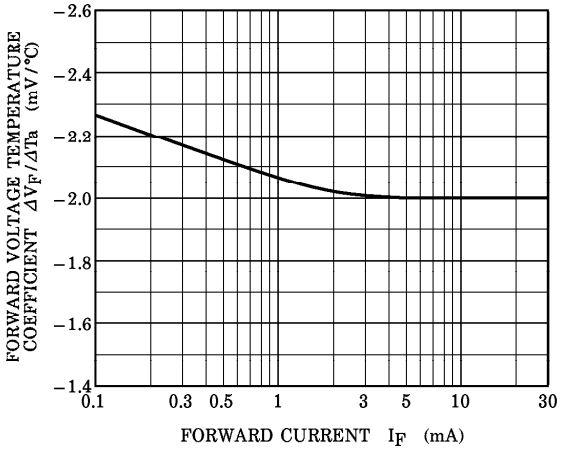
Note 9 : Maximum electrostatic discharge voltage for any pins : 100V (C = 200pF, R = 0)

(TLP550)

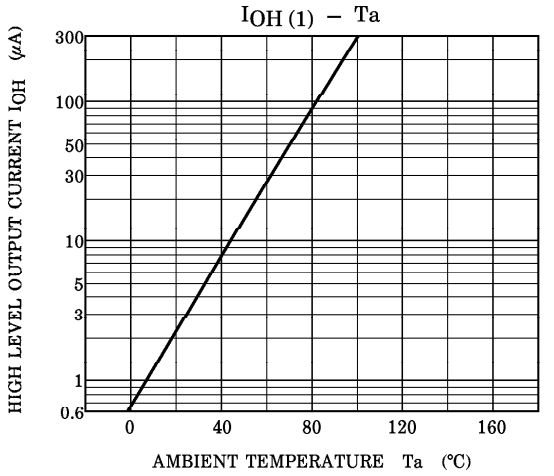
$I_F - V_F$



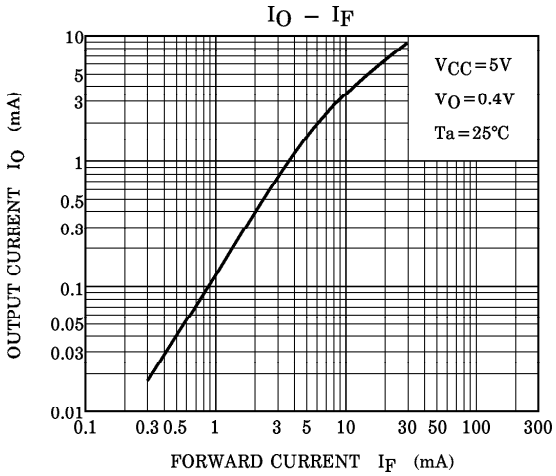
$\Delta V_F / \Delta Ta - I_F$



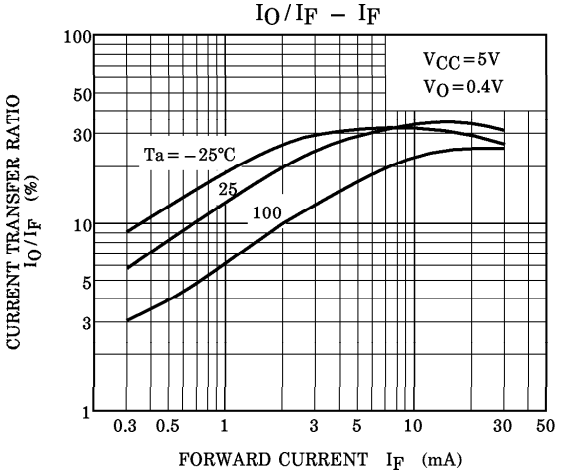
$I_{OH\,(1)} - Ta$



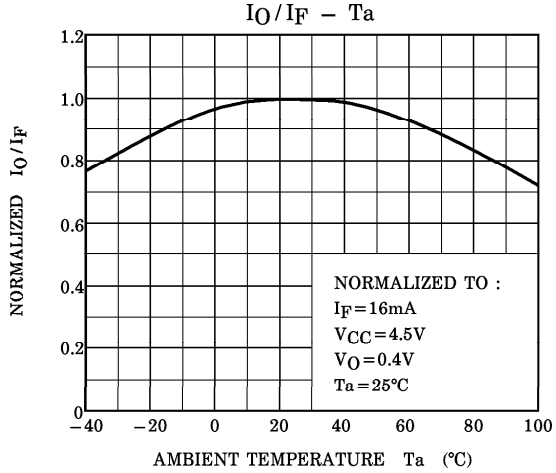
$I_O - I_F$



$I_O / I_F - I_F$

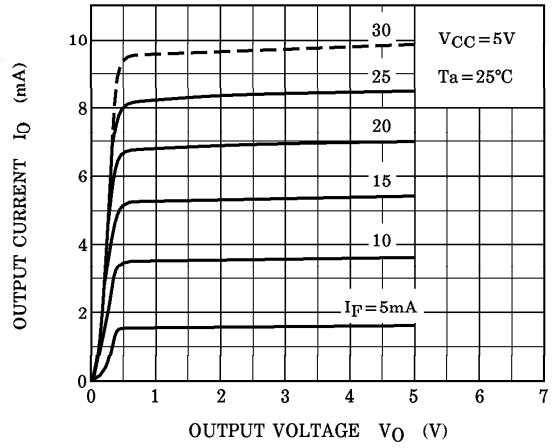


$I_O / I_F - Ta$

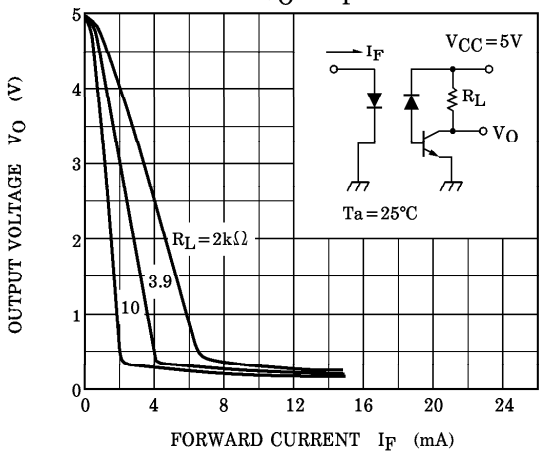


(TLP550)

$I_O - V_O$



$V_O - I_F$



$t_{pHL}, t_{pLH} - R_L$