

TOSHIBA Photocoupler Infrared LED + Photo IC

TLP550

Digital Logic Isolation

Line Receiver Feedback Control

Power Supply Control

Switching Power Supply

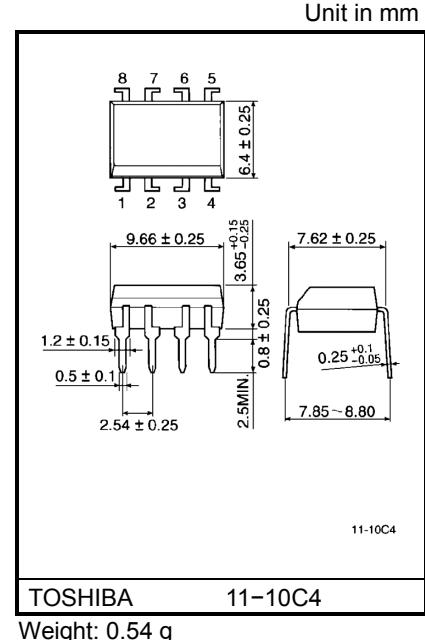
Transistor Invertor

TLP550 constructs a high emitting diode and a one chip photo diode-transistor.

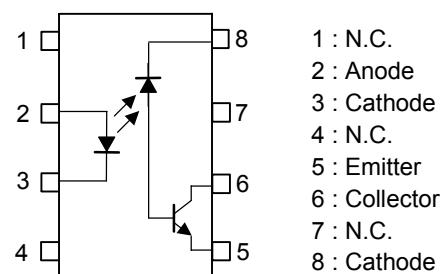
TLP550 has no base connection, and is suitable for application at noisy environmental condition.

This unit is 8-lead DIP package.

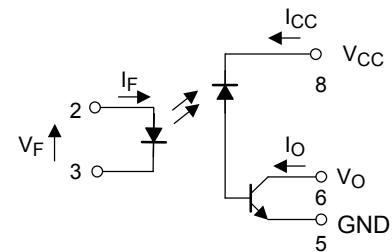
- Isolation voltage: 2500 Vrms (min.)
- Switching speed: $t_{pHL}, t_{pLH} = 0.5\mu s$ (typ.) ($R_L = 1.9\text{ k}\Omega$)
- TTL compatible
- UL recognized: UL1577, file No. E67349



Pin Configuration (top view)



Schematic



Maximum Ratings ($T_a = 25^\circ\text{C}$)

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	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55~125	$^\circ\text{C}$
Lead solder temperature (10s)		T_{sol}	260	$^\circ\text{C}$
Isolation voltage (AC, 1min., R.H. = 40~60%)		BV_S	2500	Vrms

(Note 1) Derate 0.8mA above 70°C .

(Note 2) 50% duty cycle, 1ms pulse width.

Derate 1.6mA / $^\circ\text{C}$ above 70°C .(Note 3) Pulse width 1 μs , 300pps.(Note 4) Derate 0.9mW / $^\circ\text{C}$ above 70°C .(Note 5) Derate 2mW / $^\circ\text{C}$ above 70°C .

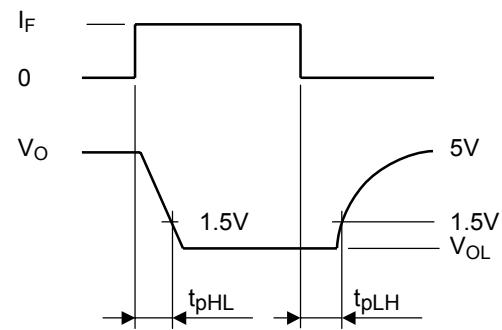
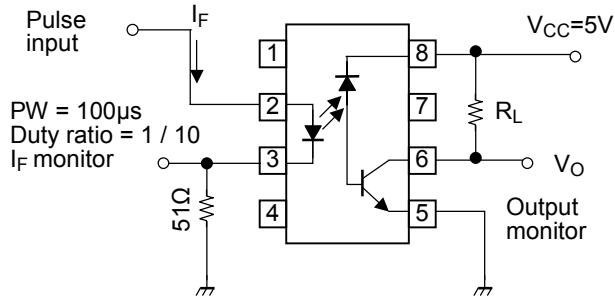
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristic		Symbol	Test condition		Min.	Typ.	Max.	Unit
LED	Forward voltage	V_F	$I_F = 16 \text{ mA}$		1.45	1.65	1.85	V
	Forward voltage temperature coefficient	$\Delta V_F / \Delta T_a$	$I_F = 16 \text{ mA}$		—	-2	—	$\text{mV} / ^\circ\text{C}$
	Reverse current	I_R	$V_R = 5 \text{ V}$		—	—	10	μA
	Capacitance between terminal	C_T	$V_F = 0, f = 1\text{MHz}$		—	60	—	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
		$I_{OH}(2)$	$I_F = 0 \text{ mA}, V_{CC} = V_O = 15 \text{ V}$		—	—	5	μA
		I_{OH}	$I_F = 0 \text{ mA}, V_{CC} = V_O = 15 \text{ V}$ $T_a = 70^\circ\text{C}$		—	—	50	μA
	High level supply voltage	I_{CCH}	$I_F = 0 \text{ mA}, V_{CC} = 15 \text{ V}$		—	0.01	1	μA
Coupled	Current transfer ratio	I_O / I_F	$I_F = 16 \text{ mA}$ $V_{CC} = 4.5 \text{ V}$ $V_O = 0.4 \text{ V}$	$T_a = 25^\circ\text{C}$	10	30	—	%
				Rank : 0	19	30	—	
				$T_a = 0\text{~}70^\circ\text{C}$	5	—	—	
				Rank : 0	15	—	—	
	Low level output voltage	V_{OL}	$I_F = 16 \text{ mA}, V_{CC} = 4.5 \text{ V}$ $I_O = 1.1 \text{ mA}$ (rank 0: $I_O = 2.4 \text{ mA}$)		—	—	0.4	V
	Isolation resistance	R_S	R.H. = 40~60%, $V = 1\text{kV DC}$ (Note 6)		—	10^{12}	—	Ω
	Capacitance between input to output	C_S	$V = 0, f = 1\text{MHz}$		—	0.8	—	pF

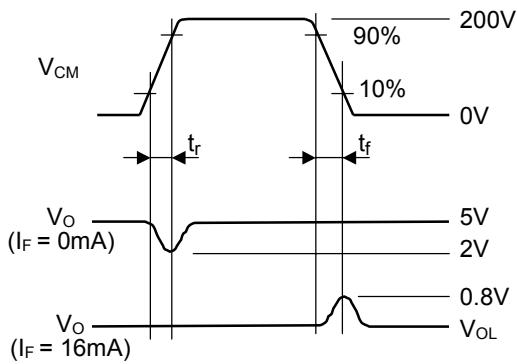
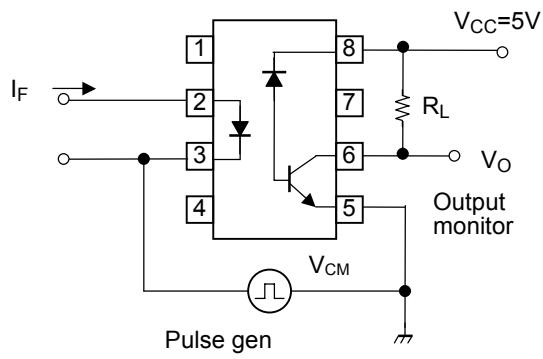
Switching Characteristics ($T_a = 25^\circ\text{C}$)

Characteristic	Symbol	Test Condition		Min.	Typ.	Max.	Unit
Propagation delay time ($H \rightarrow L$)	t_{pHL}	$I_F = 0 \rightarrow 16 \text{ mA}, V_{CC} = 5\text{V}, R_L = 4.1 \text{ k}\Omega$		—	0.3	0.8	μs
		(Note 7)	Rank 0: $R_L = 1.9 \text{ k}\Omega$	—	0.5	0.8	
Propagation delay time ($L \rightarrow H$)	t_{pLH}	$I_F = 16 \rightarrow 0 \text{ mA}, V_{CC} = 5\text{V}, R_L = 4.1 \text{ k}\Omega$		—	1.0	2.0	μs
		(Note 7)	Rank 0: $R_L = 1.9 \text{ k}\Omega$	—	0.6	1.2	
Common mode transient immunity at high output level	C_{MH}	$I_F = 0 \text{ mA}, V_{CM} = 200 \text{ V}_{\text{p-p}}$ $R_L = 4.1 \text{ k}\Omega$ (rank 0: $R_L = 1.9 \text{ k}\Omega$)		—	1500	—	$\text{V} / \mu\text{s}$
Common mode transient immunity at low output level	C_{ML}	$I_F = 16 \text{ mA}, V_{CM} = 200 \text{ V}_{\text{p-p}}$ $R_L = 4.1 \text{ k}\Omega$ (rank 0: $R_L = 1.9 \text{ k}\Omega$)		—	-1500	—	$\text{V} / \mu\text{s}$
		(Note 8)					

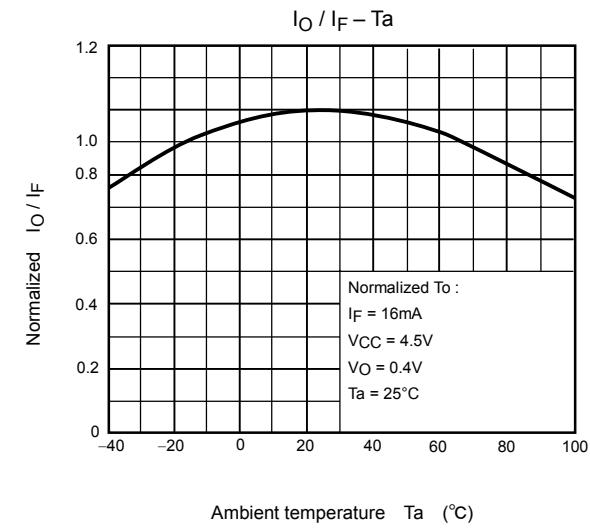
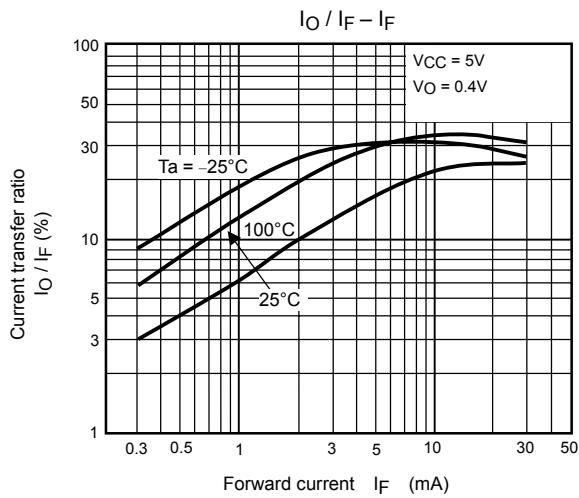
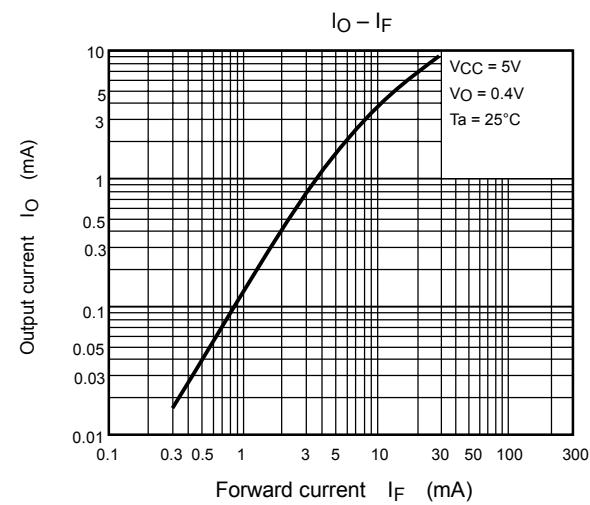
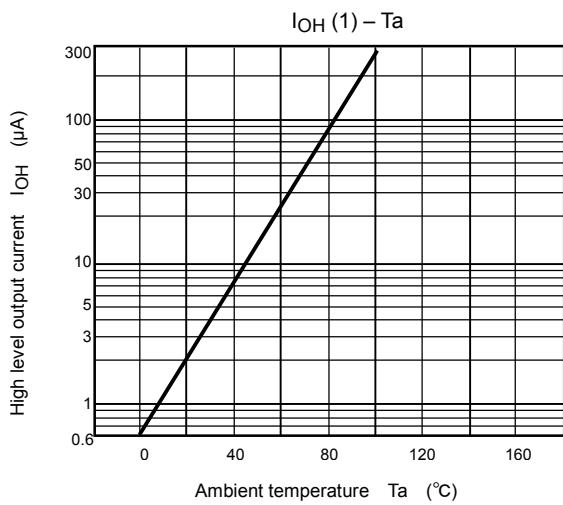
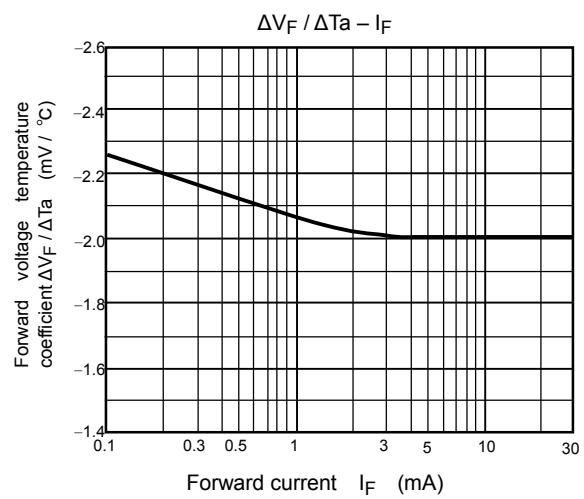
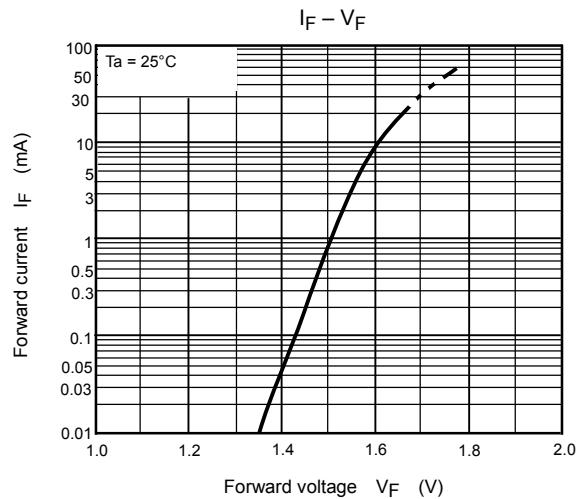
(Note 6) Device considered two-terminal device: Pins 1, 2, 3 and 4 shorted together and pin 5, 6, 7 and 8 shorted together.
 (Note 7) Switching time test circuit.

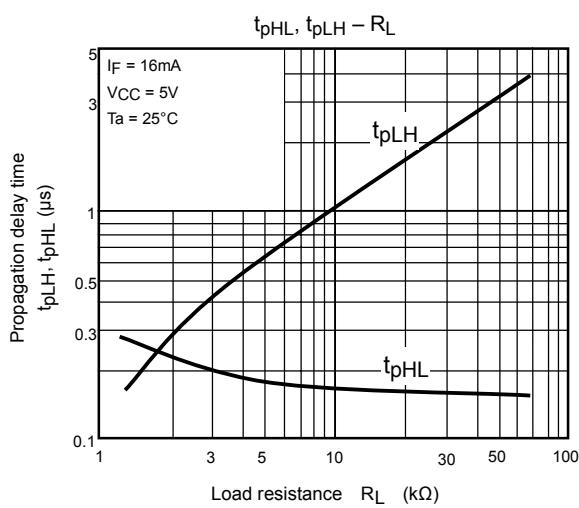
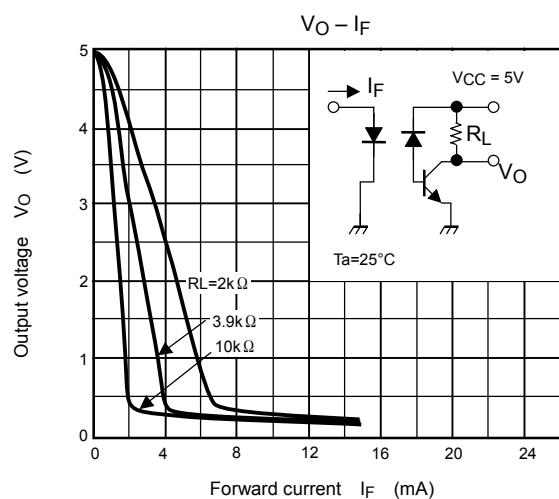
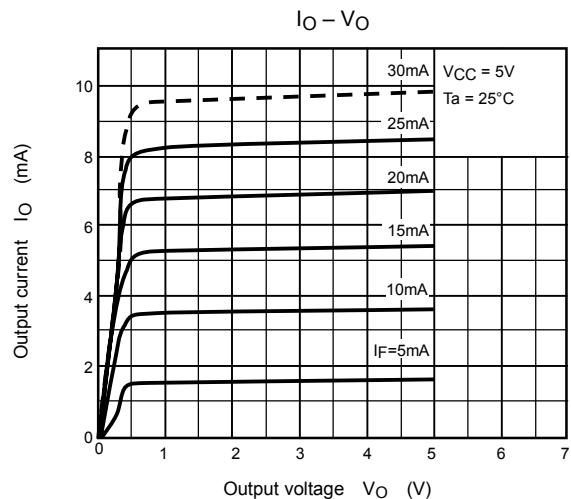


(Note 8) Common mode transient immunity test circuit.



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





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