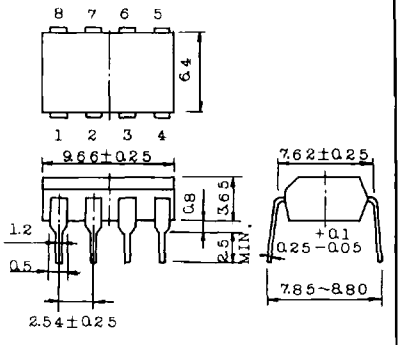
TLP550

GaAℓAs IRED & PHOTO-IC

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.

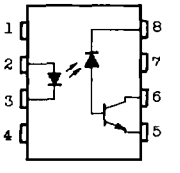
. Isolation Voltage : 2500Vrms Min.
. Switching Speed : t_{pHL}, t_{pLH}=0.5μs(Typ.)
(R_L=1.9kΩ)
. TTL Compatible
. UL Recognized : File No. E67349



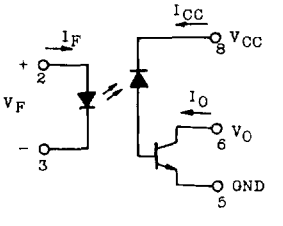
1. N.C
2. ANODE
3. CATHODE
4. N.C
5. EMITTER
6. COLLECTOR
7. N.C
8. CATHODE

JEDEC	—
EIAJ	—
TOSHIBA	11-10C1E

PIN CONFIGURATIONS (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	
	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	
	Supply Voltage		V_{CC}	-0.5 ∿ 15	V
	Output Voltage		V_O	-0.5 ∿ 15	
	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 (10 sec.)			T_{sold}	260	°C
Isolation Voltage (AC, 1 min., R.H=40 ∿ 60%, Note 6)			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.

ELECTRICAL CHARACTERISTICS (Ta=25°C)

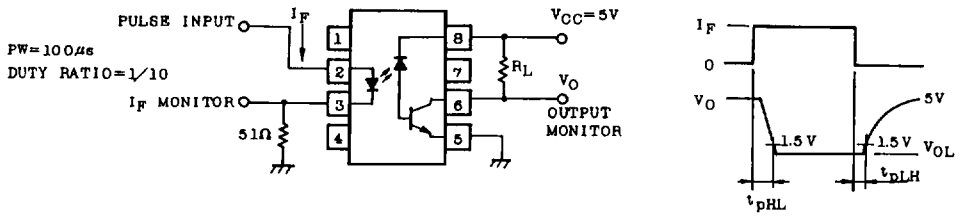
	CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	I_F=16mA	1.45	1.65	1.85	V
	Forward Voltage Temperature Coefficient	$\Delta V_F/\Delta Ta$	I_F=16mA	-	-2	-	mV/°C
	Reverse Current	I_R	V_R=5V	-	-	10	μA
	Capacitance Between Terminals	C_T	V_F=0, f=1MHz	-	60	-	pF
DETECTOR	High 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=16mA, V_{CC}=4.5V, V_O=0.4V, Ta=25°C	10	30	-	%
			I_F=16mA, V_{CC}=4.5V, V_O=0.4V, Ta=25°C, rank:0	19	30	-	%
			I_F=16mA, V_{CC}=4.5V, V_O=0.4V, Ta=0 ~ 70°C	5	-	-	%
			I_F=16mA, V_{CC}=4.5V, V_O=0.4V, Ta=0 ~ 70°C, 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)

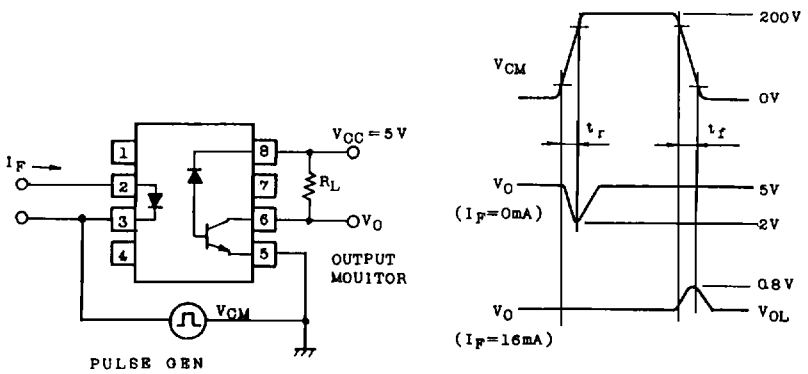
	CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
	Propagation Delay Time (H → L)	t_{pHL}	I_F=0 → 16mA, V_{CC}=5V, R_L=4.1kΩ	-	0.3	0.8	μs
			(Note 7) rank 0: R_L=1.9kΩ	-	0.5	0.8	μs
	Propagation Delay Time (L → H)	t_{pLH}	I_F=16 → 0mA, V_{CC}=5V, R_L=4.1kΩ	-	1.0	2.0	μs
			(Note 7) rank 0: R_L=1.9kΩ	-	0.6	1.2	μs
	Common Mode Transient Imunity 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 Imunity 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

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=50Ω

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

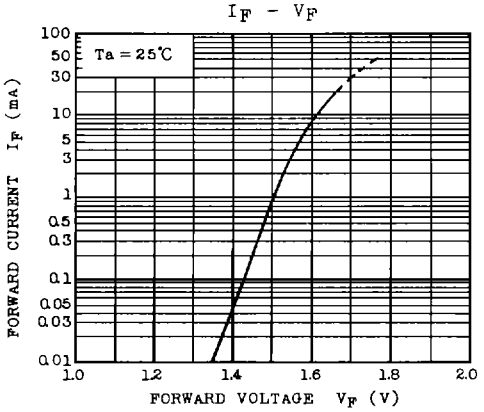
Note 9. Maximum electrostatic discharge voltage for any pins: 100V(C=200pF, R=0)

PRECAUTION

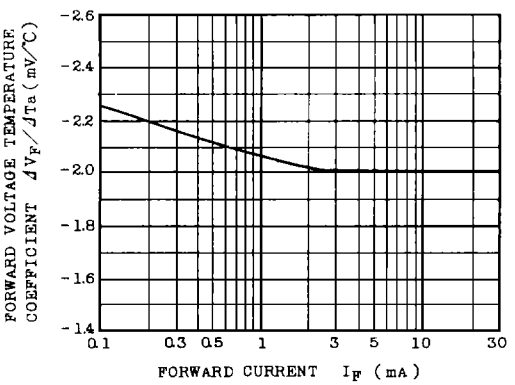
Please be careful of the followings.

1. Soldering temperature: 260°C MAX. Soldering time: 10 sec MAX.
   (Soldering portion of lead: up to 2mm from the body of the device)
2. Avoid using the Solvents except for the follows, when washing off flux and wiping off stain on the device.
   Washing time: 30 sec MAX. Solvents temperature: 45°C MAX.

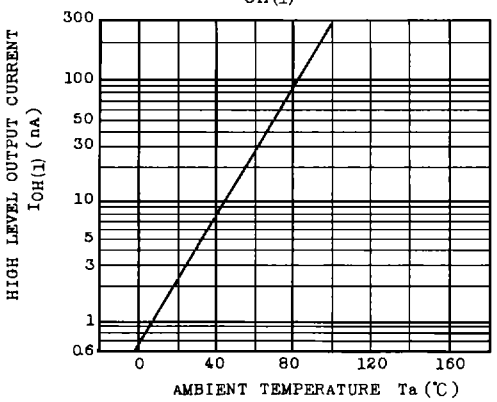
$I_F - V_F$



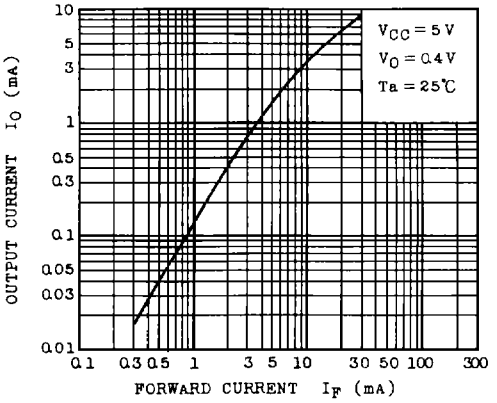
$\Delta V_F / \Delta Ta - I_F$



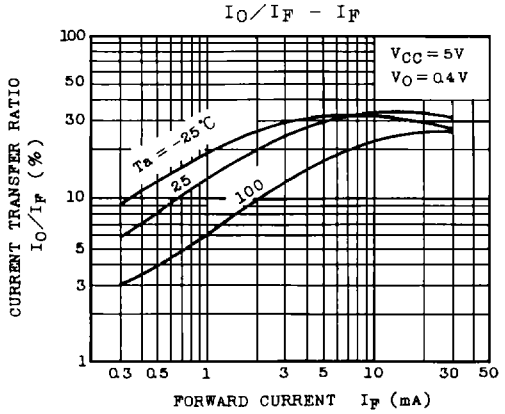
$I_{OH(1)} - Ta$



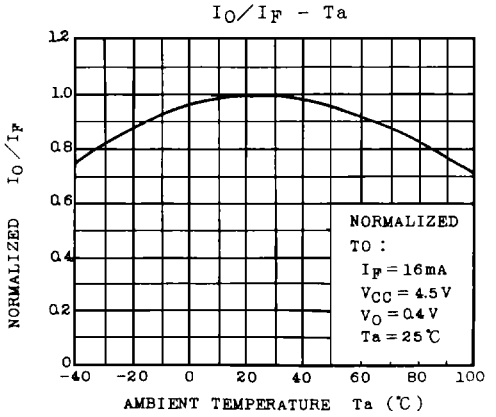
$I_O - I_F$



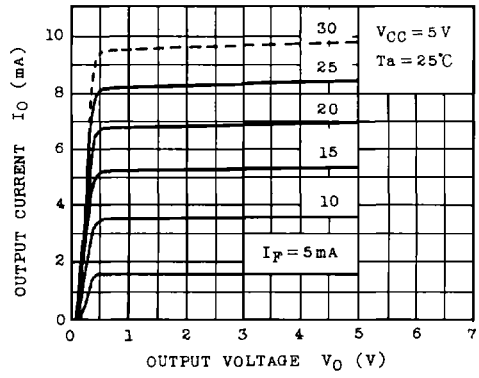
$I_O / I_F - I_F$



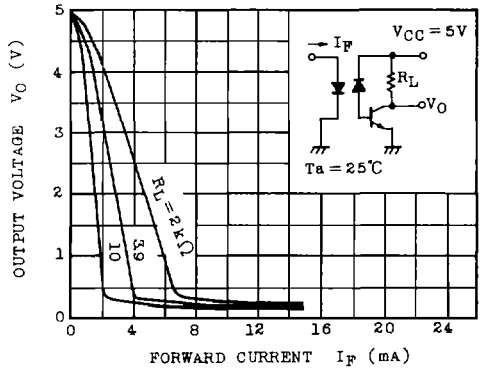
$I_O / I_F - Ta$



$I_O - V_O$



$V_O - I_F$



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