TOSHIBA PHOTOCOUPLER GaAℓAs IRED & PHOTO-IC

TLP112

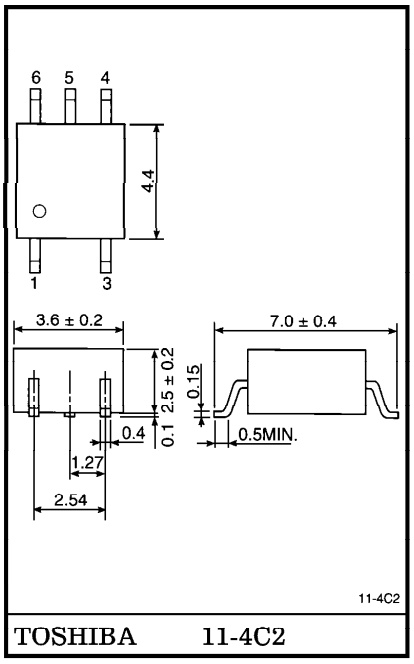
DIGITAL LOGIC ISOLATION

LINE RECEIVER

SWITCHING POWER SUPPLY FEEDBACK CONTROL

TRANSISTOR INVERTOR

Unit in mm



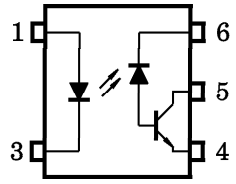
TOSHIBA 11-4C2

Weight : 0.09g

The TOSHIBA MINI FLAT COUPLER TLP112 is a small outline coupler, suitable for surface mount assembly.
TLP112 consists of a GaAℓAs light emitting diode, optically coupled to a high speed detector of one chip photodiode-transistor.

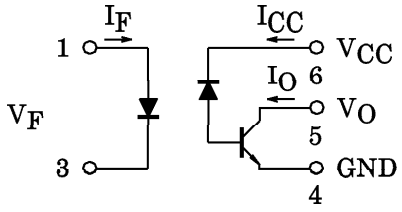
- Isolation Voltage : 2500Vrms (Min.)
- Switching Speed : $t_{pHL}=0.8\mu s$, $t_{pLH}=2\mu s$ (Max.)
  ($R_L=4.1k\Omega$)
- TTL Compatible
- UL Recognized : UL1577, File No. E67349

PIN CONFIGURATION (TOP VIEW)



1 : ANODE
3 : CATHODE
4 : EMITTER (GND)
5 : COLLECTOR (OUTPUT)
6 : V_{CC}

SCHEMATIC



961001EBC2

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)	Po	100	mW
Operating Temperature Range		T_{opr}	−55~100	°C
Storage Temperature Range		T_{stg}	−55~125	°C
Lead Soldering Temperature (10s)		T_{sol}	260	°C
Isolation Voltage (AC, 1 min., R.H≦60%, Note 6)		BV_S	2500	Vrms

(Note 1) Derate 0.8mA / °C 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	—	1.65	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	—	45	—	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	
	High Level Supply Current	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	10	—	—	%
	Low Level Output Voltage	V_{OL}	I_F = 16mA, V_{CC} = 4.5V I_O = 1.1mA	—	—	0.4	V
	Isolation Resistance	R_S	R.H. ≦ 60% V_S = 500V DC (Note 6)	5×10^{10}	10^{14}	—	Ω
	Stray Capacitance Between Input to Output	C_S	V_S = 0, f = 1MHz (Note 6)	—	0.8	—	pF

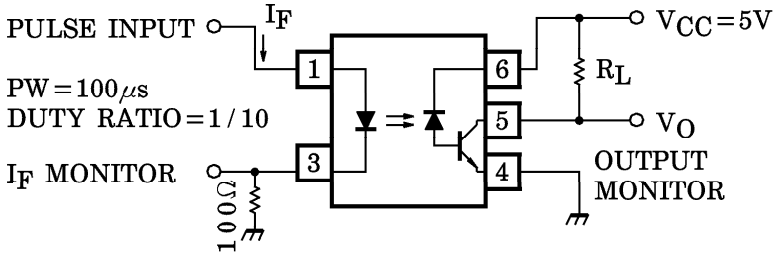
SWITCHING CHARACTERISTICS (Ta = 25°C)

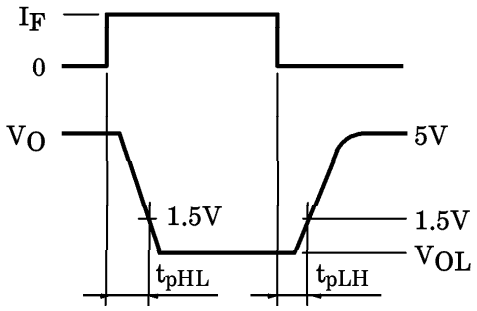
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Propagation Delay Time (H→L)	t_{pHL}	1	I_F = 0→16mA V_{CC} = 5V, R_L = 4.1kΩ	—	—	0.8	μs
Propagation Delay Time (L→H)	t_{pLH}	1	I_F = 16→0mA V_{CC} = 5V, R_L = 4.1kΩ	—	—	2.0	μs
Common Mode Transient Immunity at High Output Level	CM_H	2	I_F = 0mA, V_{CM} = 200V_{p-p} R_L = 4.1kΩ	—	1500	—	V / μs
Common Mode Transient Immunity at Low Output Level	CM_L	2	I_F = 16mA, V_{CM} = 200V_{p-p} R_L = 4.1kΩ	—	−1500	—	V / μs

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

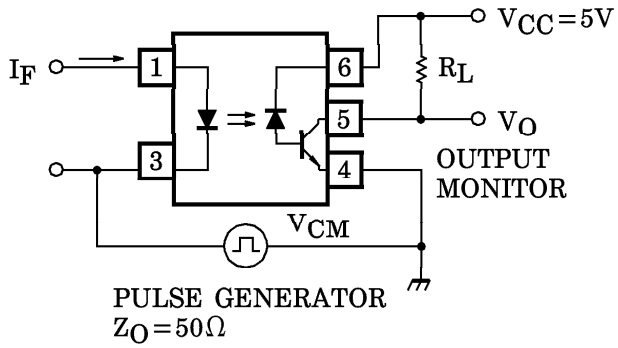
(Note 7) Maximum electrostatic discharge voltage for any pins : 100V (C = 200pF, R = 0)

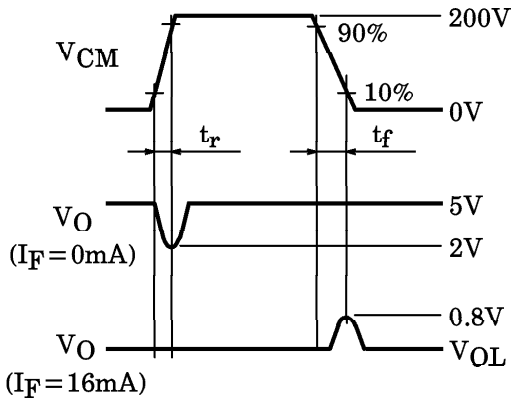
TEST CIRCUIT 1 : Switching Time Test Circuit





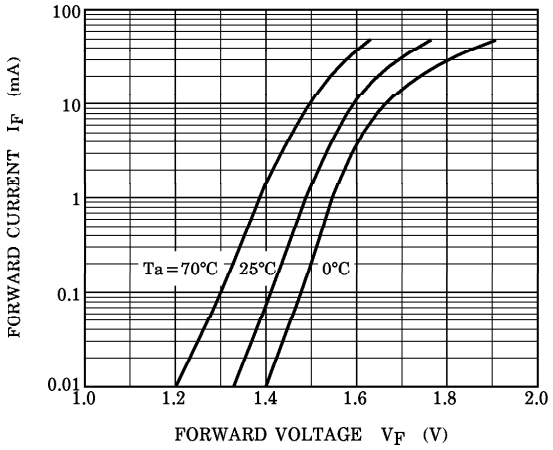
TEST CIRCUIT 2 : Common Mode Transient Immunity Test Circuit



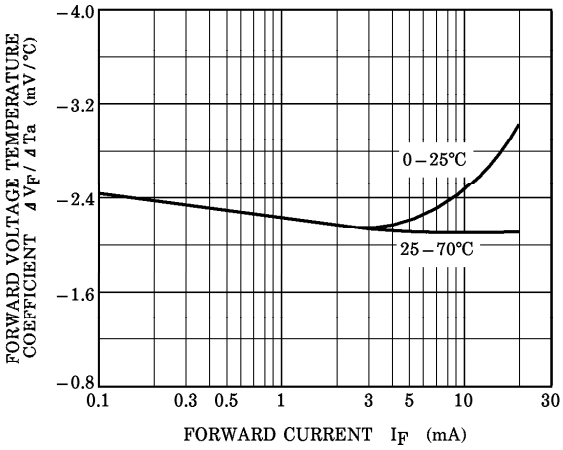


$$CM_H = \frac{160\ (V)}{t_r\ (\mu s)},\ CM_L = \frac{160\ (V)}{t_f\ (\mu s)}$$

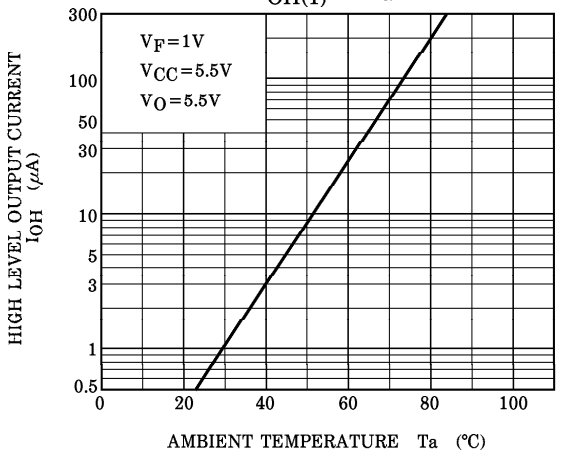
$I_F - V_F$



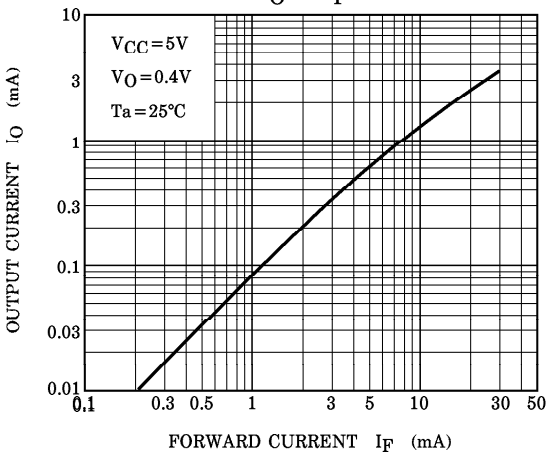
$\Delta V_F / \Delta Ta - I_F$



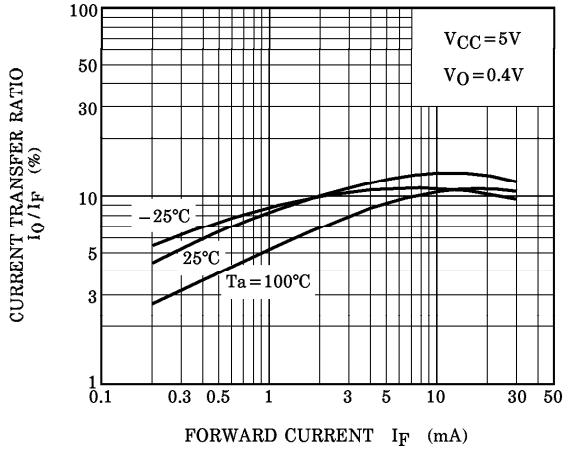
$I_{OH(1)} - Ta$



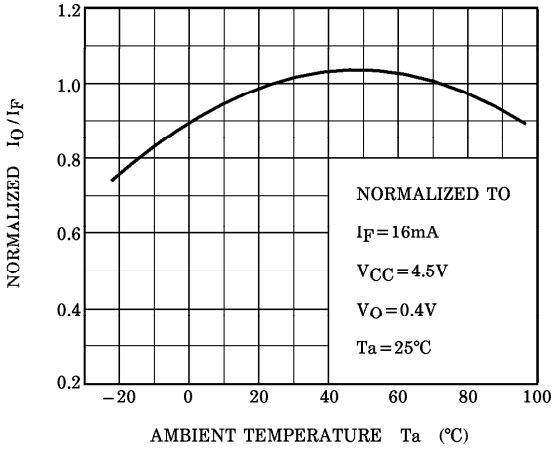
$I_O - I_F$



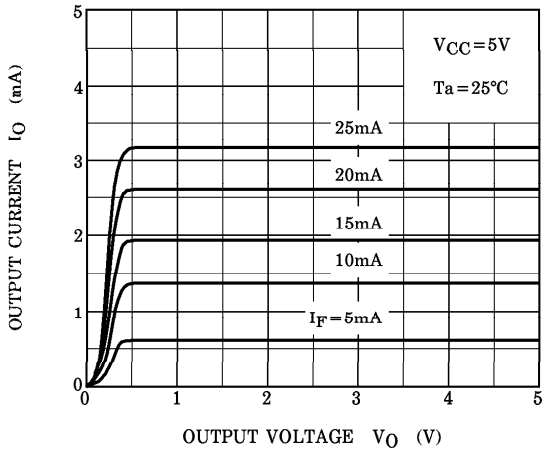
$I_O / I_F - I_F$



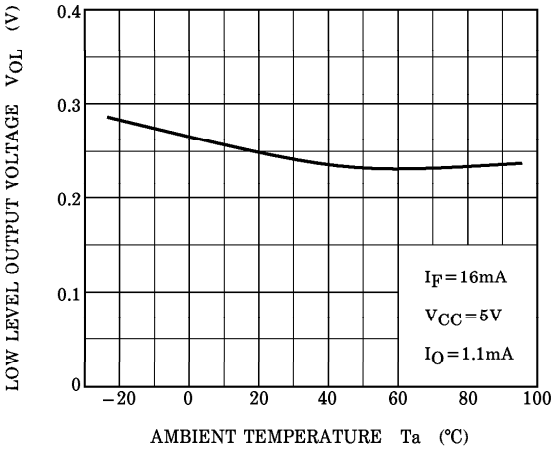
$I_O / I_F - Ta$



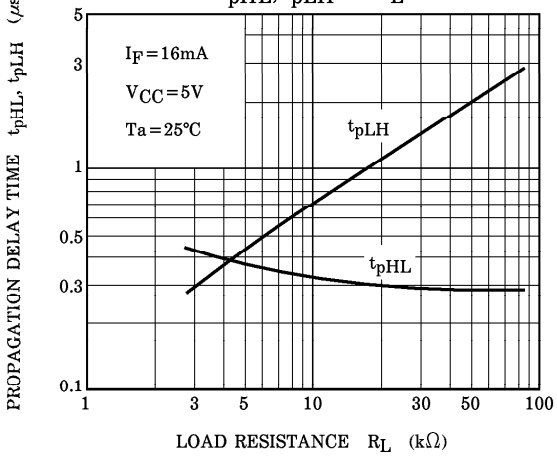
$I_O - V_O$



$V_{OL} - Ta$



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



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