

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-IC

TLP112

DIGITAL LOGIC ISOLATION

LINE RECEIVER

SWITCHING POWER SUPPLY FEEDBACK CONTROL

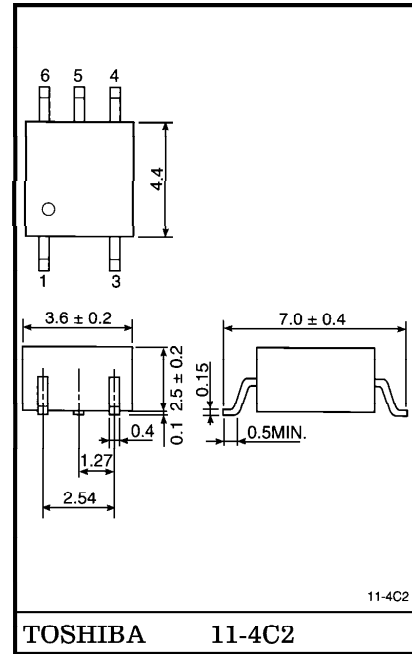
TRANSISTOR INVERTOR

The TOSHIBA MINI FLAT COUPLER TLP112 is a small outline coupler, suitable for surface mount assembly.

TLP112 consists of a GaAs light emitting diode, optically coupled to a high speed detector of one chip photodiode-transistor.

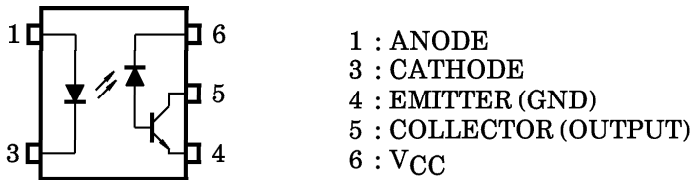
- Isolation Voltage : 2500Vrms (Min.)
- Switching Speed : $t_{pHL} = 0.8\mu s$, $t_{pLH} = 2\mu s$ (Max.)
($R_L = 4.1k\Omega$)
- TTL Compatible
- UL Recognized : UL1577, File No. E67349

Unit in mm

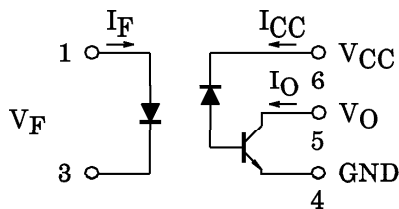


Weight : 0.09g

PIN CONFIGURATION (TOP VIEW)



SCHEMATIC



961001EBC2

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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 Soldering Temperature (10s)		T _{sol}	260	°C
Isolation Voltage (AC, 1 min., R.H ≤ 60%, Note 6)		BVS	2500	V _{rms}

(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	ΔV _F /ΔTa	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 _{CC} H	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

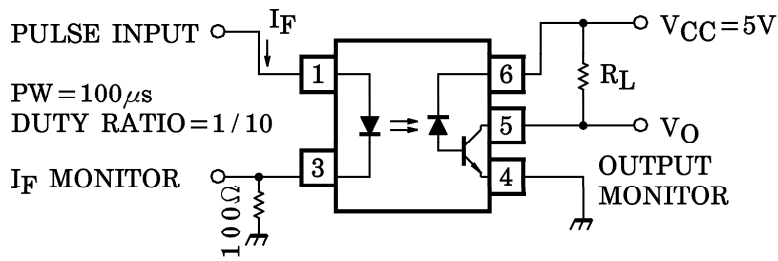
SWITCHING CHARACTERISTICS (Ta = 25°C)

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

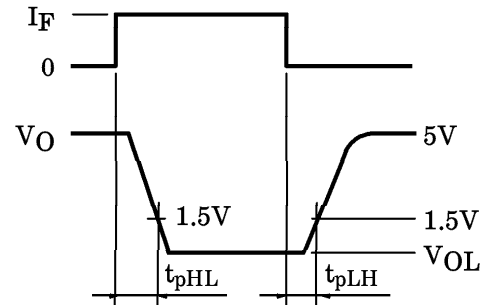
(Note 6) Device considered a two-terminal device : Pins 1 and 3 shorted together and Pin 4, 5 and 6 shorted together.

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

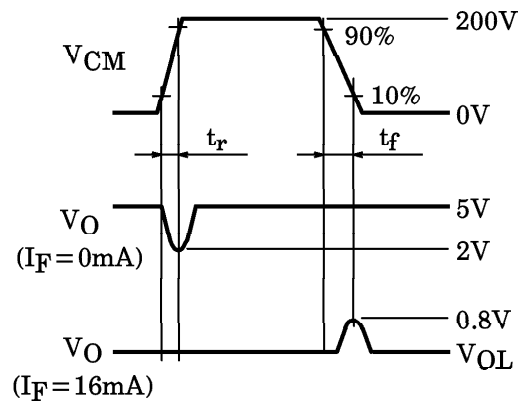
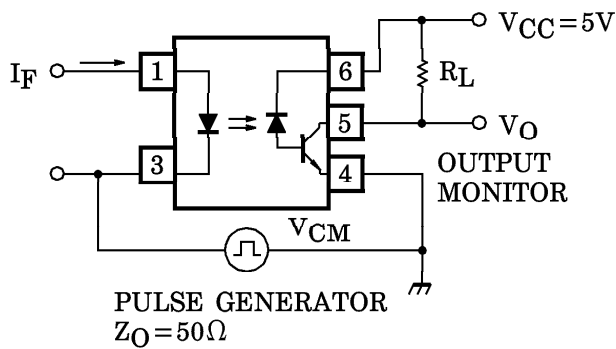
TEST CIRCUIT 1 : Switching Time Test Circuit



PW = 100 μs
DUTY RATIO = 1 / 10



TEST CIRCUIT 2 : Common Mode Transient Immunity Test Circuit



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

