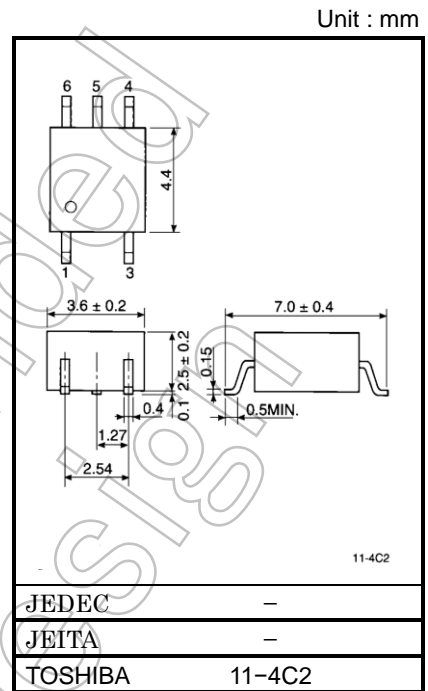


TLP112A

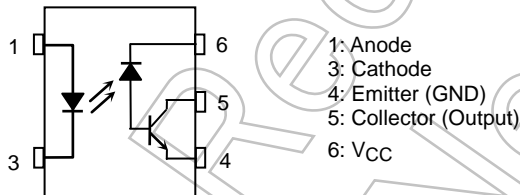
Interfaces of measuring and control instruments
 Digital Logic Isolation
 Line Receiver
 Switching Power Supply Feedback Control
 Industrial Inverter

The TOSHIBA mini flat coupler TLP112A is a small outline coupler, suitable for surface mount assembly. TLP112A consists of a high output power infrared emitting diode, optically coupled to a high speed detector of one chip photodiode-transistor.

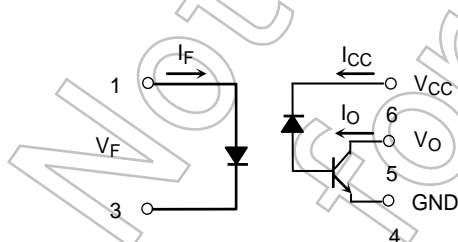
- Isolation voltage: 2500Vrms (min)
- Switching speed: $t_{pHL}=0.8\mu s$, $t_{pLH}=0.8\mu s(\max)$ (@ $R_L=1.9k\Omega$)
- TTL compatible by connecting external resistance
- UL-recognized: UL 1577, File No.E67349
- cUL-recognized: CSA Component Acceptance Service No.5A
 File No.E67349



Pin Configuration(top view)



Schematic



Start of commercial products
 1989-05

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
LED	Forward current	I _F	20	mA
	Forward Current Derating (Ta ≥ 70 °C)	Δ I _F /°C	-0.36	mA/°C
	Pulse forward current (Note 1)	I _{FP}	40	mA
	Peak transient forward current (Note 2)	I _{FPT}	1	A
	Reverse voltage	V _R	5	V
	Diode power dissipation (Note 3)	P _D	45	mW
Detector	Output current	I _O	8	mA
	Peak output current	I _{OP}	16	mA
	Supply voltage	V _{CC}	-0.5 to 15	V
	Output voltage	V _O	-0.5 to 15	V
	Output power dissipation	P _O	100	mW
	Output Power Dissipation Derating (Ta ≥ 70°C)	Δ P _O /°C	-1.8	mW/°C
Operating temperature range		T _{opr}	-55 to 100	°C
Storage temperature range		T _{stg}	-55 to 125	°C
Lead soldering temperature(10 s)		T _{sol}	260	°C
Isolation voltage (AC, 60 s, R.H ≤ 60 %)		BV _S	2500	V _{rms}

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

(Note 1) 50 % duty cycle, 1ms pulse width. Derate 1.6 mA / °C above 70 °C

(Note 2) Pulse width ≤ 1 μs, 300 pps.

(Note 3) Derate 0.9 mW / °C above 70 °C

(Note 4) This device is regarded as a two terminal device: pins 1 and 3 are shorted together, as are pins 4, 5 and 6.

Electrical Characteristics(Ta = 25°C)

Characteristics		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	V _F	I _F = 16 mA	1.22	1.42	1.72	V
	Forward voltage temperature coefficient	ΔV _F / ΔT _a	I _F = 16 mA	—	-2	—	mV / °C
	Reverse current	I _R	V _R = 3 V	—	—	10	μA
	Capacitance between terminals	C _T	V _F = 0 V, f = 1 MHz	—	30	—	pF
Detector	High level output current	I _{OH} (1)	I _F = 0 mA, V _{CC} = V _O = 5.5 V	—	3	500	nA
		I _{OH} (2)	I _F = 0 mA, V _{CC} = V _O = 15 V	—	—	5	μA
		I _{OH}	I _F = 0 mA, V _{CC} = V _O = 15 V T _a = 70 °C	—	—	50	
	High level supply current	I _{CCH}	I _F = 0 mA, V _{CC} = 15 V	—	0.01	1	μA
Coupled	Current transfer ratio	I _O / I _F	I _F = 16 mA, V _{CC} = 4.5 V V _O = 0.4 V	20	—	—	%
	Low level output voltage	V _{OL}	I _F = 16 mA, V _{CC} = 4.5 V I _O = 2.4 mA	—	—	0.4	V
	Isolation resistance	R _S	R.H. ≤ 60 % V _S = 500 VDC (Note 1)	5×10 ¹⁰	10 ¹⁴	—	Ω
	Stray capacitance between input to output	C _S	V _S = 0 V, f = 1 MHz (Note 1)	—	0.8	—	pF

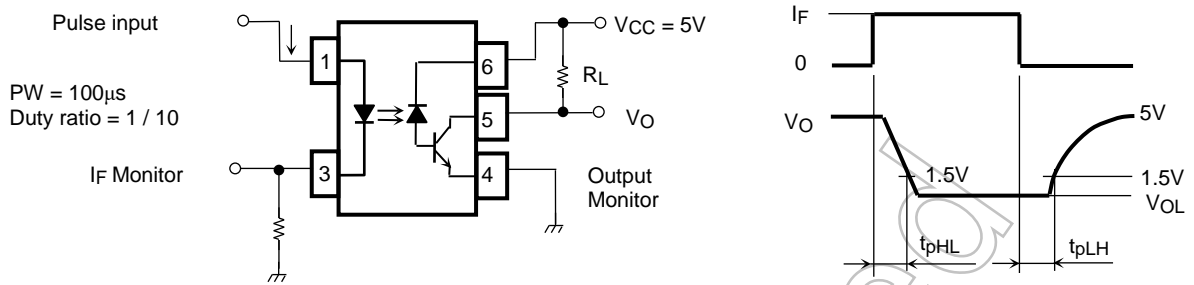
(Note 1) Device considered a two-terminal device: Pins 1 and 3 shorted together and pin 4, 5 and 6 shorted together.

Switching Characteristics(Ta = 25°C, V_{CC}=5V)

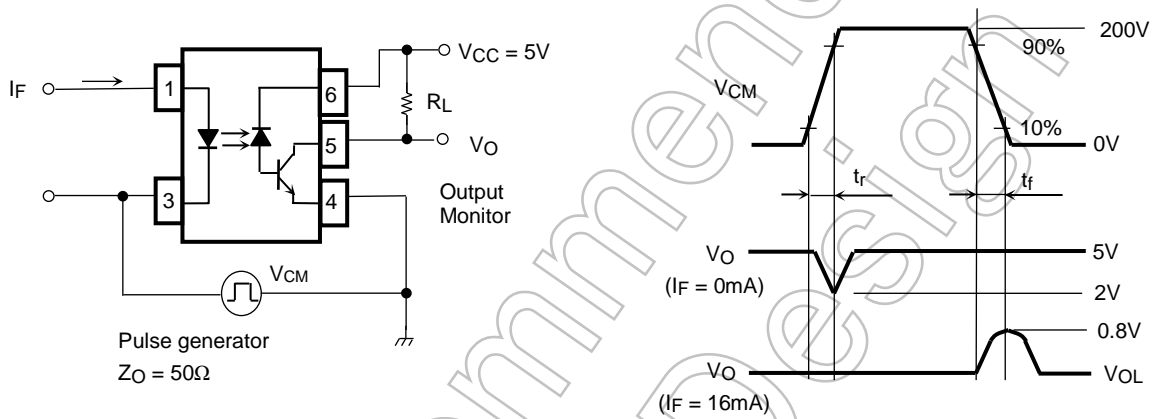
Characteristics	Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit
Propagation delay time (H→L)	t _{pHL}	1	I _F = 0→16 mA V _{CC} = 5 V, R _L = 1.9 kΩ	—	—	0.8	μs
Propagation delay time (L→H)	t _{pLH}	1	I _F = 16→0 mA V _{CC} = 5 V, R _L = 1.9 kΩ	—	—	0.8	μs
Common mode transient immunity at high output level	CM _H (Note 2)	2	I _F = 0 mA, V _{CM} = 200 V _{p-p} R _L = 4.1 kΩ	—	1500	—	V / μs
Common mode transient immunity at low output level	CM _L (Note 2)	2	I _F = 16 mA, V _{CM} = 200 V _{p-p} R _L = 4.1 kΩ	—	-1500	—	V / μs

(Note 2) : CM_L is the maximum falling common mode voltage waveform (voltage/time) that can keep low level (V_O < 0.8 V).
CM_H is the maximum rising common mode voltage waveform (voltage/time) that can keep high level (V_O > 2.0 V).

Test Circuit 1: Switching Time Test Circuit

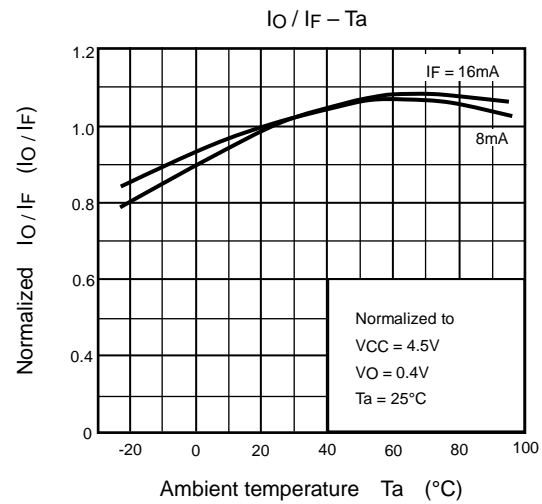
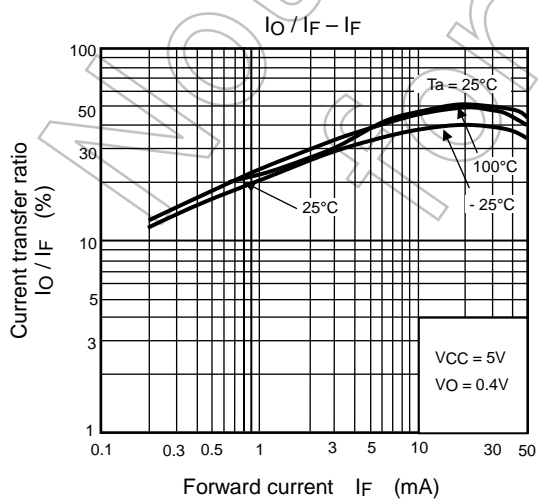
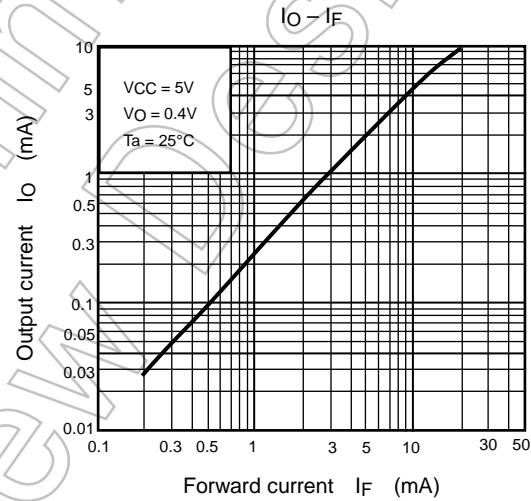
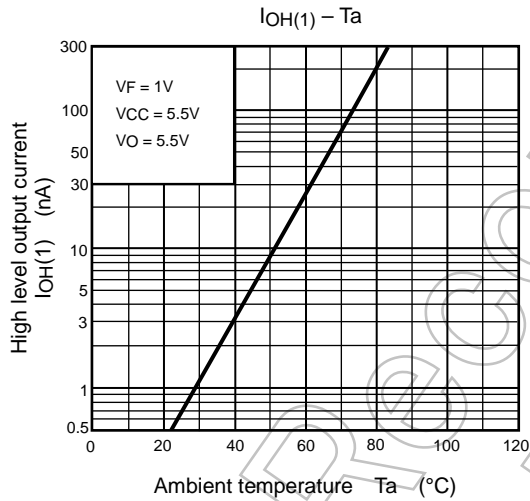
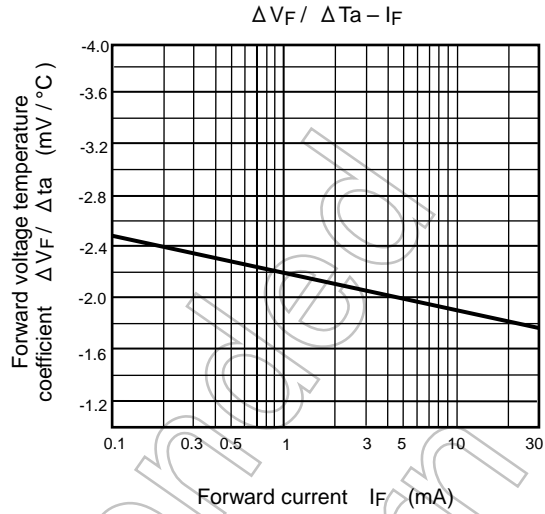
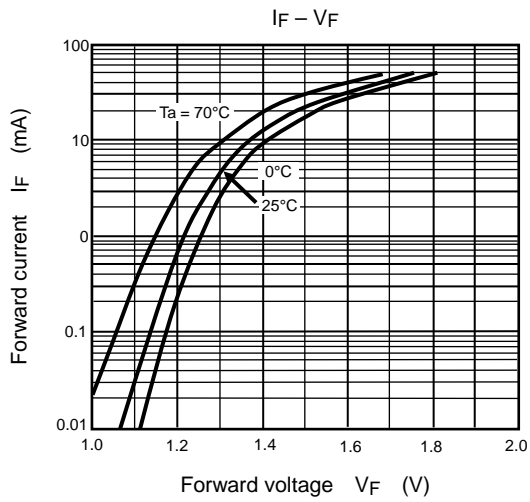


Test Circuit 2: Common Mode Transient Immunity Test Circuit

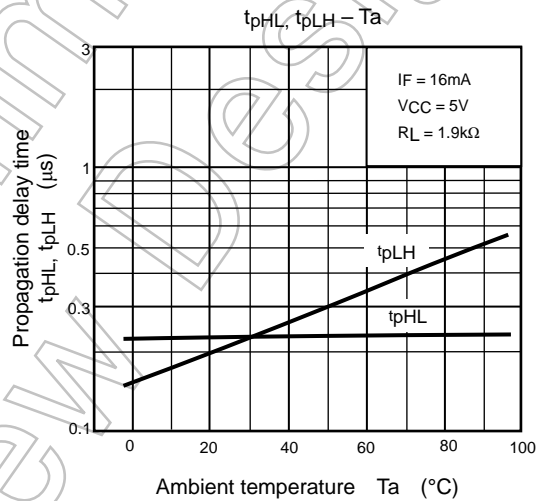
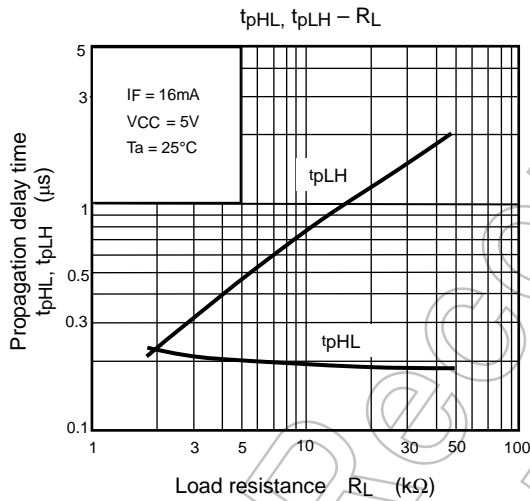
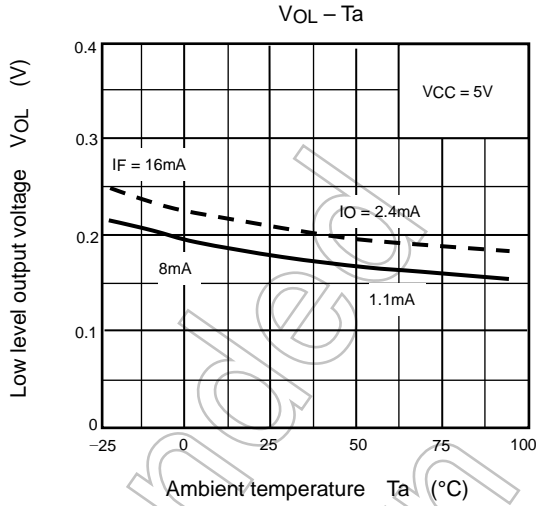
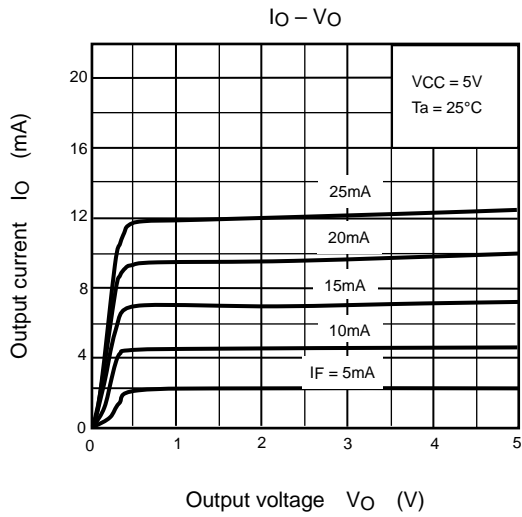


$$CM_H = \frac{160(V)}{t_r(\mu s)}, CM_L = \frac{160(V)}{t_f(\mu s)}$$

Not Recommended for New



NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



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