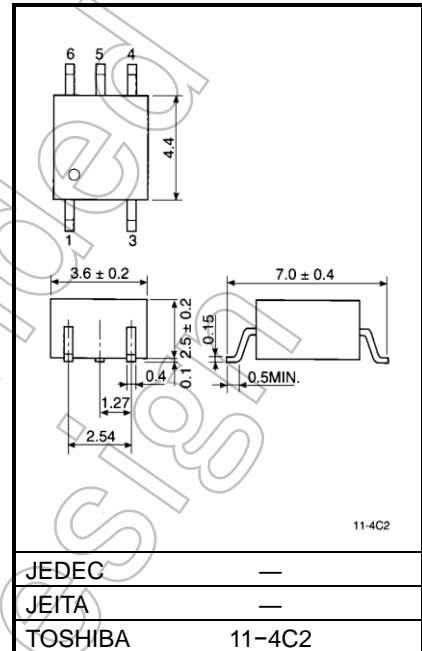


TLP114A

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

Unit : mm



Weight: 0.09g (Typ.)

The TOSHIBA mini flat coupler TLP114A is a small outline coupler, suitable for surface mount assembly.

TLP114A consists of a high output power infrared emitting diode, optically coupled to a high speed detector of one chip photodiode-transistor.

The TLP114A has an internal shield at receive area, which provides a high common-mode transient immunity, and have high noise immunity between input and output.

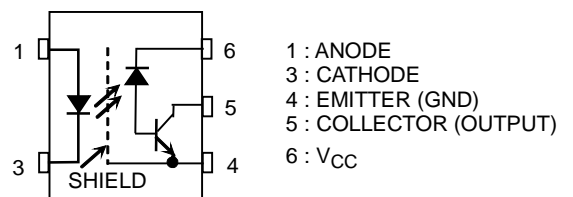
It is suitable for transistor inverter drive circuit applications such as variable speed motor control.

TLP114A : Mini Flat Package, 5Pin, one circuit.

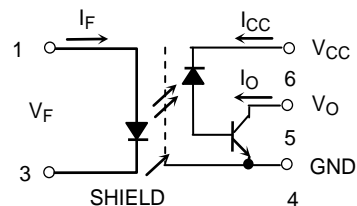
- Isolation voltage: 3750 Vrms (min)
- Switching speed: $t_{pHL} = 0.8\mu s$, $t_{pLH} = 0.8\mu s$ (max)
 (@ $R_L = 1.9 k\Omega$)
- TTL compatible by connecting external resistance.
- UL-recognized: UL 1577, File No.E67349
- cUL-recognized: CSA Component Acceptance Service No.5A
 File No.E67349
- VDE-approved: EN 60747-5-5 (Note 1)

Note 1 : When a VDE approved type is needed,
 please designate the **Option(V4)**.

Pin Configuration (top view)



Schematic



Start of commercial production
 1993-04

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	I _F	20	mA
	Forward current derating (Ta ≥ 70 °C)	ΔIF/°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
	Input power dissipation	P _D	45	mW
	Input power dissipation derating (Ta ≥ 70 °C)	ΔPD/°C	-0.82	mW/°C
Detector	Output current	I _O	8	mA
	Output current derating (Ta ≥ 70 °C)	ΔIO/°C	-0.3	mA/°C
	Peak output current	I _{OP}	16	mA
	Supply voltage	V _{CC}	-0.5 to 30	V
	Output voltage	V _O	-0.5 to 20	V
	Output power dissipation	P _O	100	mW
	Output power dissipation derating (Ta ≥ 70 °C)	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 solder temperature(10 s)		T _{sol}	260	°C
Isolation Voltage (AC,60 s., R.H.≤ 60%) (Note 3)		BVs	3750	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, 1 ms pulse width. Derate 0.72mA / °C above 70 °C.

(Note 2): Pulse width ≤ 1 μs, 300 pps.

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

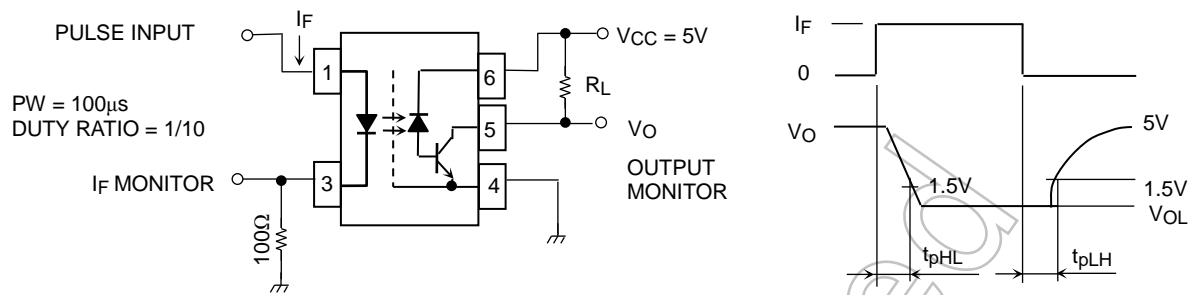
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	V_F	$I_F = 16 \text{ mA}$	1.22	1.42	1.72	V
	Forward voltage temperature coefficient	$\Delta V_F / \Delta T_a$	$I_F = 16 \text{ mA}$	—	-2	—	mV/°C
	Reverse current	I_R	$V_R = 3 \text{ V}$	—	—	10	μA
	Capacitance between terminals	C_T	$V_F = 0 \text{ V}, f = 1 \text{ MHz}$	—	30	—	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
		$I_{OH(2)}$	$I_F = 0 \text{ mA}, V_{CC} = 30 \text{ V}$ $V_O = 20 \text{ V}$	—	—	5	μA
		I_{OH}	$I_F = 0 \text{ mA}, V_{CC} = 30 \text{ V}$ $V_O = 20 \text{ V}, T_a = 70 \text{ }^\circ\text{C}$	—	—	50	
	High level supply current	I_{CCH}	$I_F = 0 \text{ mA}, V_{CC} = 30 \text{ V}$	—	0.01	1	μA
Current transfer ratio		I_O / I_F	$I_F = 16 \text{ mA}, V_{CC} = 4.5 \text{ V}$ $V_O = 0.4 \text{ V}$	20	—	—	%
Low level output voltage		V_{OL}	$I_F = 16 \text{ mA}, V_{CC} = 4.5 \text{ V}$ $I_O = 2.4 \text{ mA}$	—	—	0.4	V
Isolation resistance		R_S	$R.H. \leq 60 \%, V_S = 500 \text{ V}$	5×10^{10}	10^{14}	—	Ω
Stray capacitance between input to output		C_S	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation		BVS	AC, 60 s	3750	—	—	Vrms

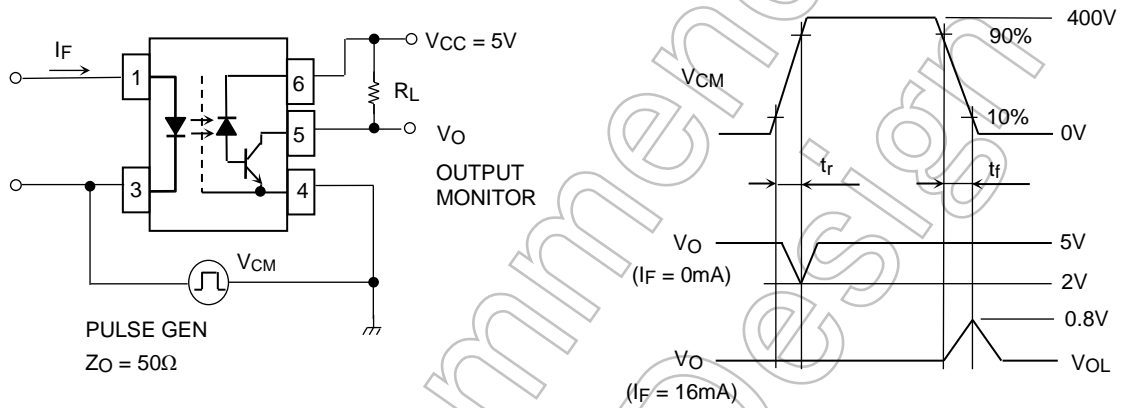
Switching Characteristics (Ta = 25°C, VCC = 5V)

Characteristic	Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit
Propagation delay time (H → L)	t_{pHL}	1	$I_F = 0 \rightarrow 16 \text{ mA}$ $V_{CC} = 5 \text{ V}, R_L = 1.9 \text{ k}\Omega$	—	—	0.8	μs
Propagation delay time (L → H)	t_{pLH}		$I_F = 16 \rightarrow 0 \text{ mA}$ $V_{CC} = 5 \text{ V}, R_L = 1.9 \text{ k}\Omega$	—	—	0.8	μs
Common mode transient immunity at high output level	CMH	2	$I_F = 0 \text{ mA},$ $V_{CM} = 400 \text{ V}_{p-p}$ $R_L = 4.1 \text{ k}\Omega$	5000	10000	—	V / μs
Common mode transient immunity at low output level	CML		$I_F = 16 \text{ mA},$ $V_{CM} = 400 \text{ V}_{p-p}$ $R_L = 4.1 \text{ k}\Omega$	-5000	-10000	—	V / μs

Test Circuit 1: Switching Time Test Circuit

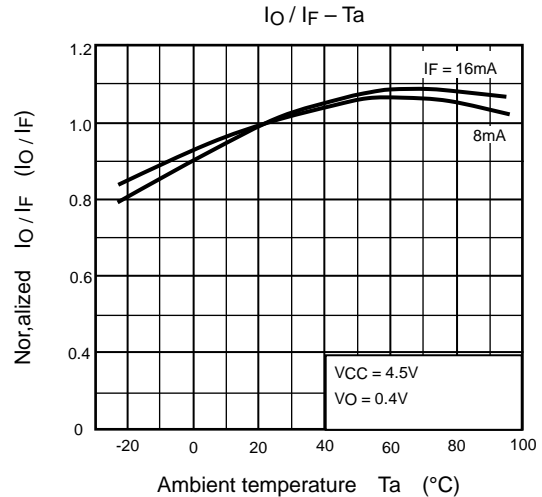
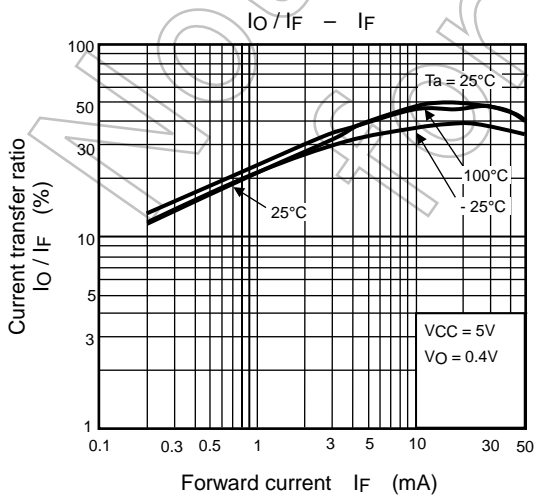
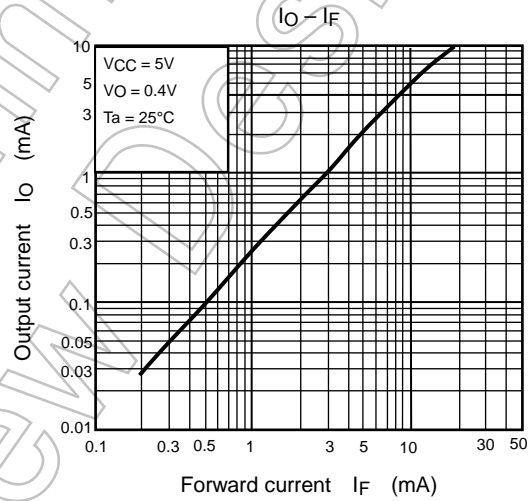
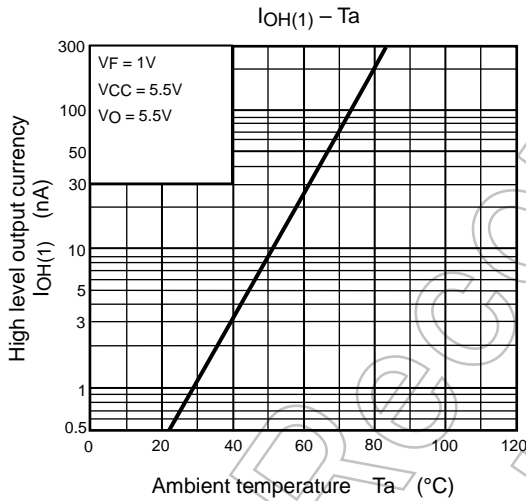
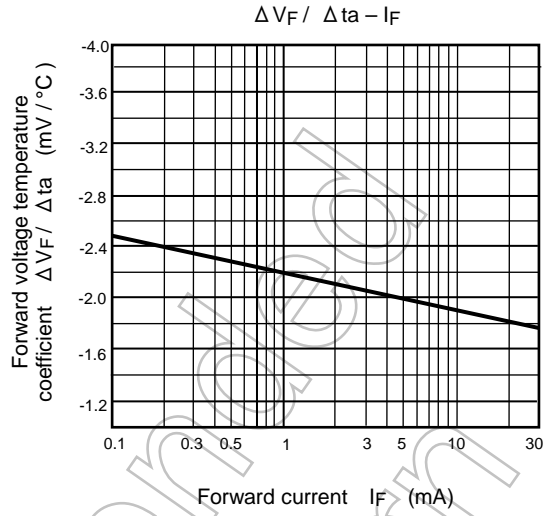
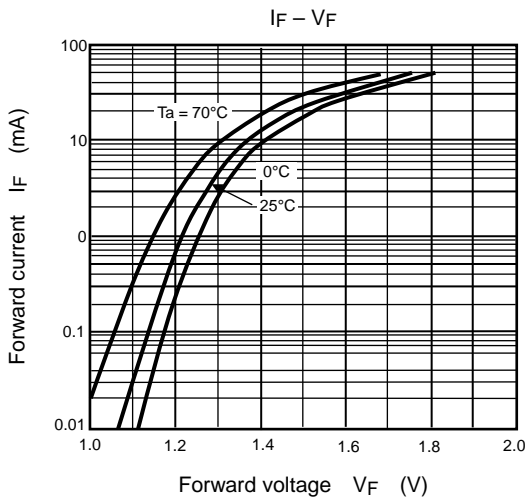


Test Circuit 2: Common Mode Transient Immunity Test Circuit

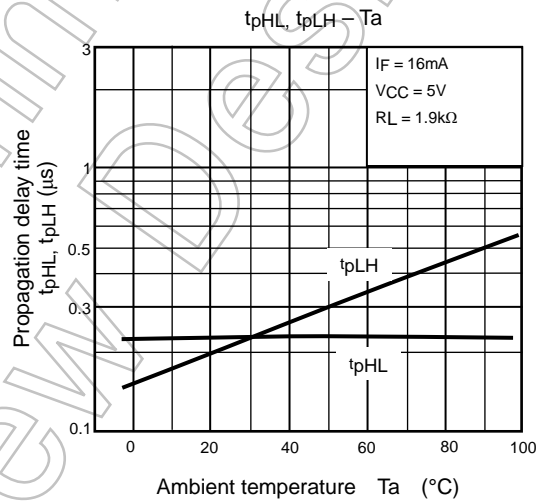
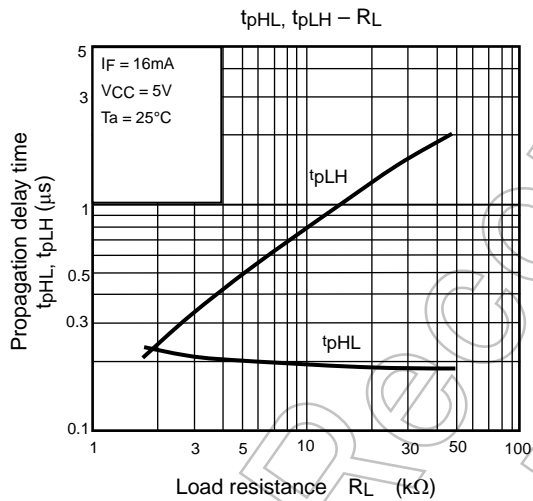
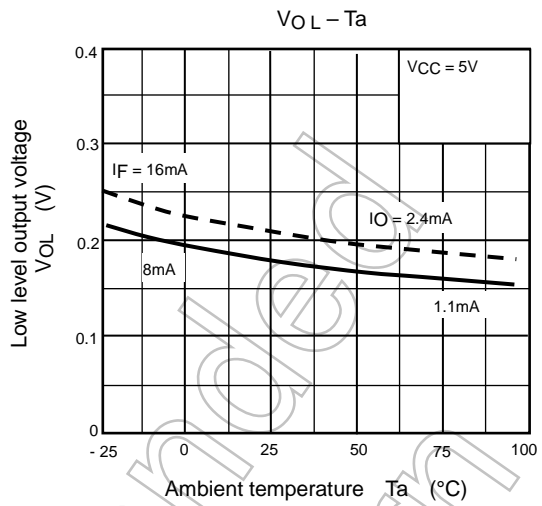
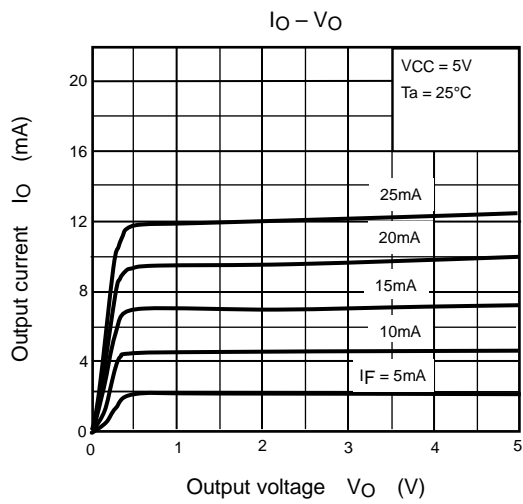


$$CM_H = \frac{320(V)}{t_r(\mu s)}, \quad CM_L = \frac{320(V)}{t_r(\mu s)}$$

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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