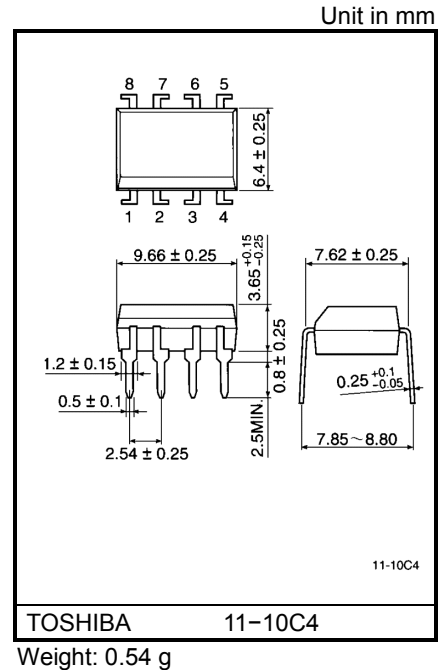


# TLP2630

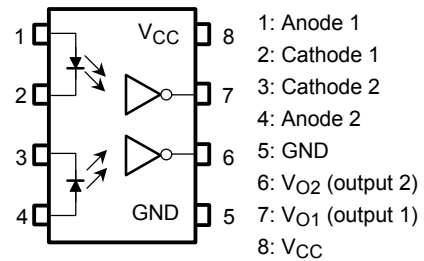
Digital Logic Isolation  
 Tele-Communication  
 Analog Data Equipment Control  
 Microprocessor System Interface

The TOSHIBA TLP2630 dual photocoupler consists of a pair of GaAlAs light emitting diode and integrated high gain, high speed photodetector.  
 The output of the detector circuit is an open collector, schottky clamped transistor. This unit is 8-lead DIP.

- Input current threshold:  $I_F = 5\text{mA}(\text{max.})$
- LSTTL/TTL compatible: 5V supply
- Switching speed: 10MBd(typ.)
- Guaranteed performance over temperature: 0~70°C
- Isolation voltage: 2500V<sub>rms</sub>(min.)
- UL recognized: UL1577, file no. E67349



### Pin Configuration (top view)

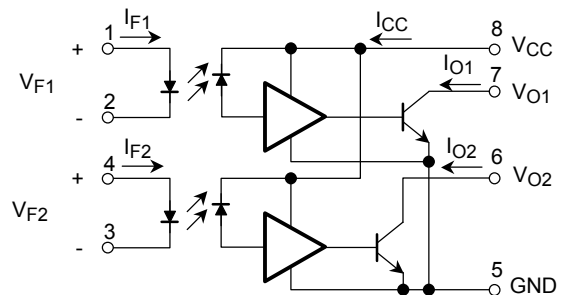


### Truth Table (positive logic)

Input	Output
H	L
L	H

A 0.01 to 0.1μF bypass capacitor must be connected between pins 8 and 5 (see Note 1).

### Schematic



## Maximum Ratings (no derating required up to 70°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current(each channel)	$I_F$	20	mA
	Pulse forward current (each channel)*	$I_{FP}$	30	mA
	Reverse voltage(each channel)	$V_R$	5	V
Detector	Output current(each channel)	$I_O$	16	mA
	Output voltage(each channel)	$V_O$	-0.5~7	V
	Supply voltage (1 minute maximum)	$V_{CC}$	7	V
	Output collector power dissipation(each channel)	$P_O$	40	mW
Operating temperature range		$T_{stg}$	-55~125	°C
Storage temperature range		$T_{opr}$	-40~85	°C
Lead soldering temperature (10 s) (Note 1)		$T_{sol}$	260	°C
Isolation voltage (AC, 1 min., R.H.≤ 60%, Note 3)		$BV_S$	2500	Vrms

\*  $t \leq 1$  msec duration.

## Recommended Operating Conditions

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Input current, low level, each channel	$I_{FL}$	0	—	250	$\mu A$
Input current, high level, each channel	$I_{FH}$	6.3*	—	15	mA
Supply voltage, output	$V_{CC}$	4.5	5	5.5	V
Fan out(TTL load, each channel)	N	—	—	8	
Operating temperature	$T_{opr}$	0	—	70	°C

\* 6.3mA is a guard banded value which allows for at least 20% CTR degradation.  
Initial input current threshold value is 5.0mA or less.

## Electrical Characteristics (Ta = 0~70°C, unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.*	Max.	Unit
Input forward voltage (each channel)	$V_F$	$I_F = 10\text{mA}$ , $T_a = 25^\circ\text{C}$	—	1.65	1.75	V
Input diode temperature coefficient(each channel)	$\Delta V_F / \Delta T_a$	$I_F = 10\text{mA}$	—	-2.0	—	mV / °C
Input reverse breakdown voltage(each channel)	$BV_R$	$I_R = 10\mu\text{A}$ , $T_a = 25^\circ\text{C}$	5	—	—	V
Input capacitance (each channel)	$C_T$	$V_F = 0$ , $f = 1\text{MHz}$	—	45	—	pF
High level output current (each channel)	$I_{OH}$	$V_{CC} = 5.5\text{V}$ , $V_O = 5.5\text{V}$ $I_F = 250\mu\text{A}$	—	1	250	$\mu\text{A}$
Low level output voltage (each channel)	$V_{OL}$	$V_{CC} = 5.5\text{V}$ , $I_F = 5\text{mA}$ $I_{OL}(\text{sinking}) = 13\text{mA}$	—	0.4	0.6	V
High level supply current (both channels)	$I_{CCH}$	$V_{CC} = 5.5\text{V}$ , $I_F = 0$	—	14	30	mA
Low level supply current (both channels)	$I_{CCL}$	$V_{CC} = 5.5\text{V}$ , $I_F = 10\text{mA}$	—	24	36	mA
Isolation voltage	$R_S$	$V_S = 500\text{V}$ , R.H. $\leq 60\%$ (Note 3)	—	$10^{14}$	—	$\Omega$
Capacitance(input-output)	$C_S$	$f = 1\text{MHz}$ (Note 3)	—	0.6	—	pF
Input-input leakage current	$I_{I-I}$	R.H. $\leq 60\%$ , $t = 5\text{s}$ $V_{I-I} = 500\text{V}$ (Note 6)	—	0.005	—	$\mu\text{A}$
Resistance(input-input)	$R_{I-I}$	$V_{I-I} = 500\text{V}$ (Note 6)	—	$10^{11}$	—	$\Omega$
Capacitance(input-input)	$C_{I-I}$	$f = 1\text{MHz}$ (Note 6)	—	0.25	—	pF

\* All typical values are at  $V_{CC} = 5\text{V}$ ,  $T_a = 25^\circ\text{C}$ .

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

Characteristic	Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit
Propagation delay time to low output level	$t_{pHL}$	1	$I_F = 0 \rightarrow 7.5\text{mA}$ , $R_L = 350\Omega$ $C_L = 15\text{pF}$ (each channel)	—	60	75	ns
Propagation delay time to high output level	$t_{pLH}$	1	$I_F = 7.5\text{mA} \rightarrow 0$ , $R_L = 350\Omega$ $C_L = 15\text{pF}$ (each channel)	—	60	75	ns
Output rise a time,output fall time(10~90%)	$t_r, t_f$	1	$I_F = 0 \rightleftharpoons 7.5\text{mA}$ , $R_L = 350\Omega$ $C_L = 15\text{pF}$ (each channel)	—	30	—	ns
Common mode transient immunity at high output level	$CM_H$	2	$I_F = 0$ , $R_L = 350\Omega$ $V_{CM} = 200\text{V}$ $V_{O(\text{min.})} = 2\text{V}$ (each channel, Note 4)	—	200	—	V / $\mu\text{s}$
Common mode transient immunity at low output level	$CM_L$	2	$I_F = 7.5\text{mA}$ , $R_L = 350\Omega$ $V_{CM} = 200\text{V}$ $V_{O(\text{max.})} = 0.8\text{V}$ (each channel, Note 5)	—	-500	—	V / $\mu\text{s}$

(Note 1) 2mm below seating plane.

(Note 2) The  $V_{CC}$  supply voltage to each TLP2630 isolator must be bypassed by a  $0.01\mu\text{F}$  capacitor or larger. This can be either a ceramic or solid tantalum capacitor with good high frequency characteristic and should be connected as close as possible to the package  $V_{CC}$  and GND pins each device.

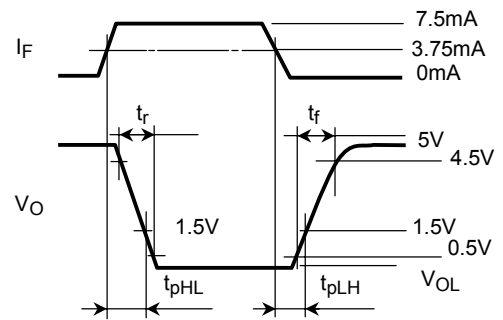
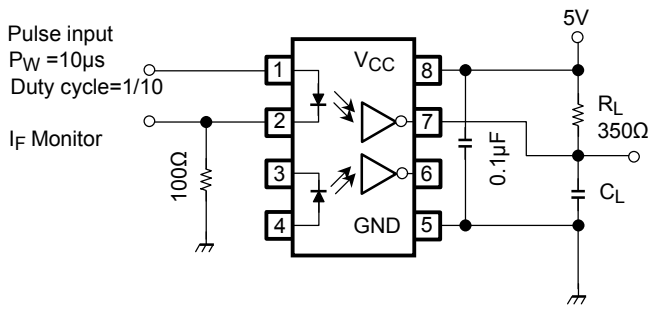
(Note 3) Device considered a two-terminal device: Pins 1, 2, 3 and 4 shorted together, and pins 5, 6, 7 and 8 shorted together.

(Note 4)  $CM_H$ ·the maximum tolerable rate of rise of the common mode voltage to ensure the output will remain in the high state(i.e.,  $V_{OUT} > 2.0\text{V}$ )

(Note 5)  $CM_L$ ·the maximum tolerable rate of fall of the common mode voltage to ensure the output will remain in the low output state(i.e.,  $V_{OUT} > 0.8\text{V}$ )  
Measured in volts per microsecond(V /  $\mu\text{s}$ ).

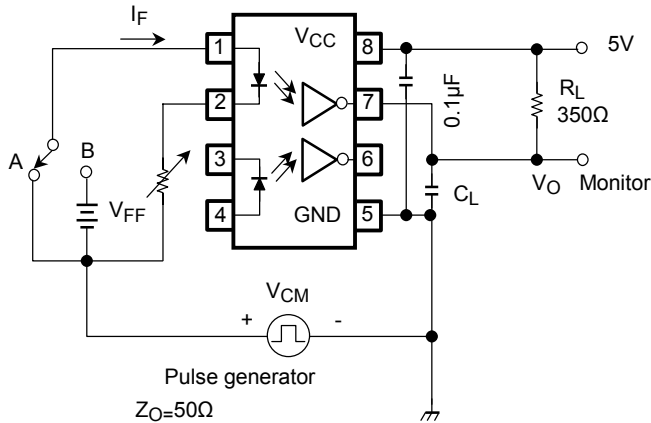
(Note 6) Measured between pins 1 and 2 shorted together, and pins 3 and 4 shorted together.

## Test Circuit 1. $t_{pHL}$ And $t_{pLH}$

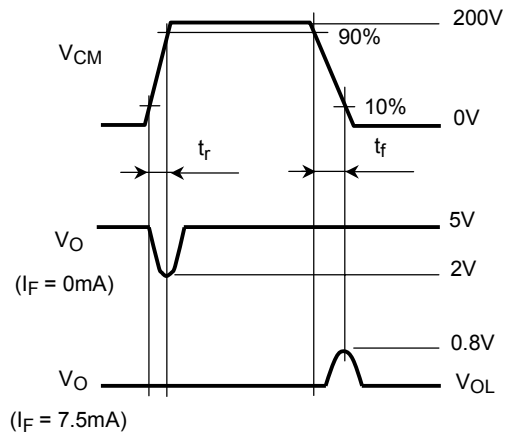


\*  $C_L$  is approximately 15pF which includes probe and stray wiring capacitance.

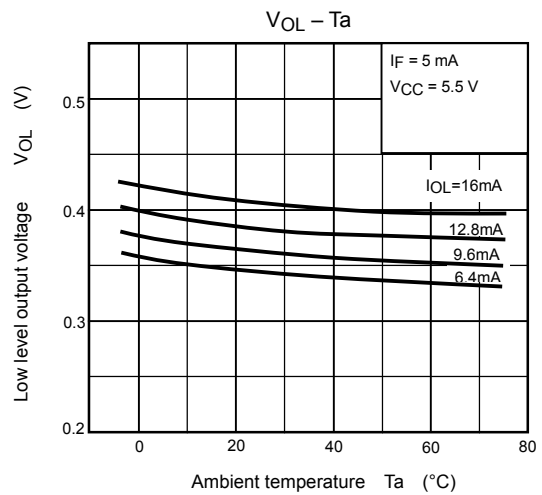
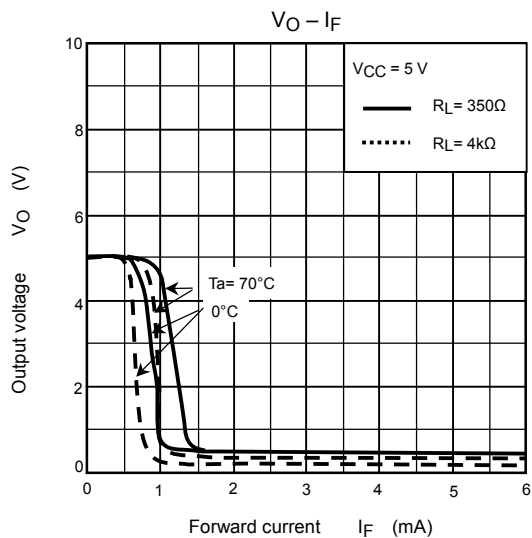
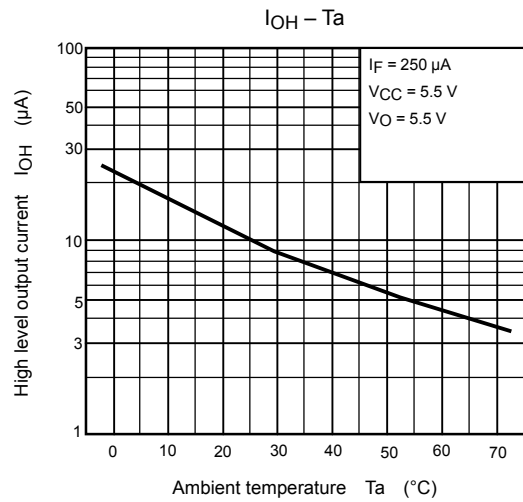
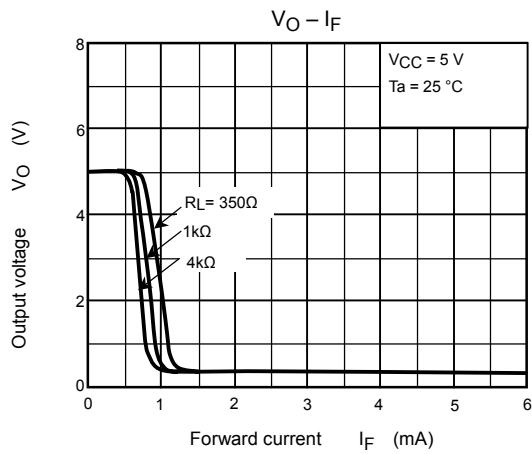
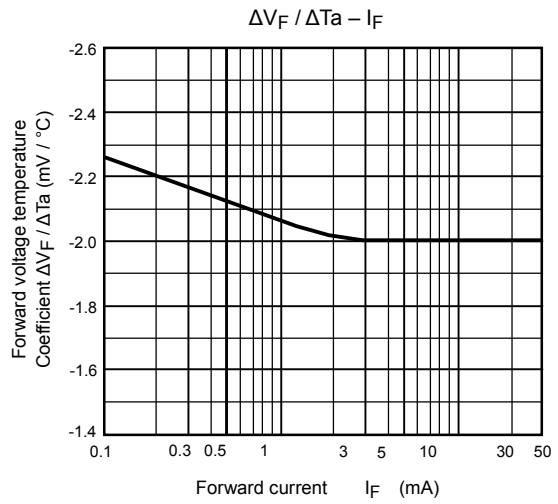
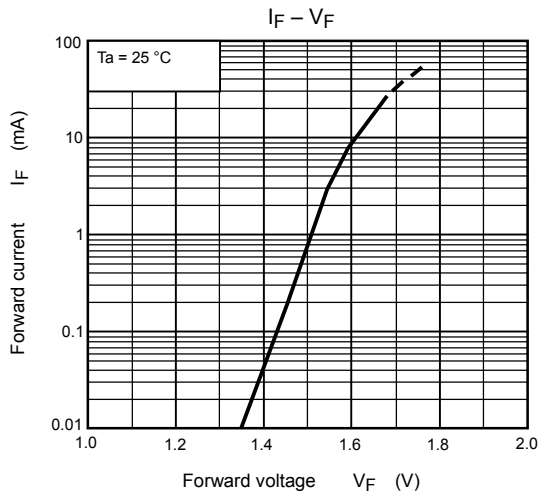
## Test Circuit 2. Transient Immunity And Typical Waveforms.

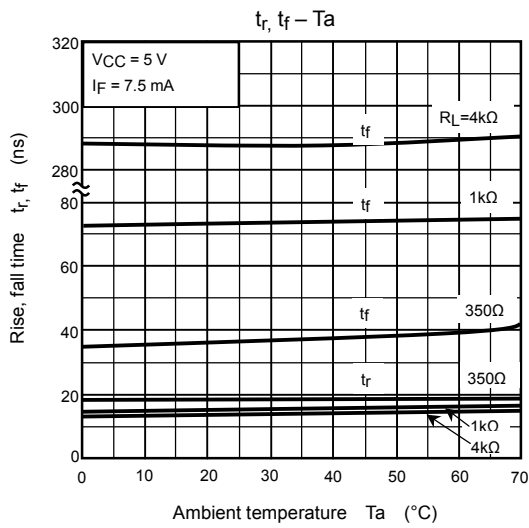
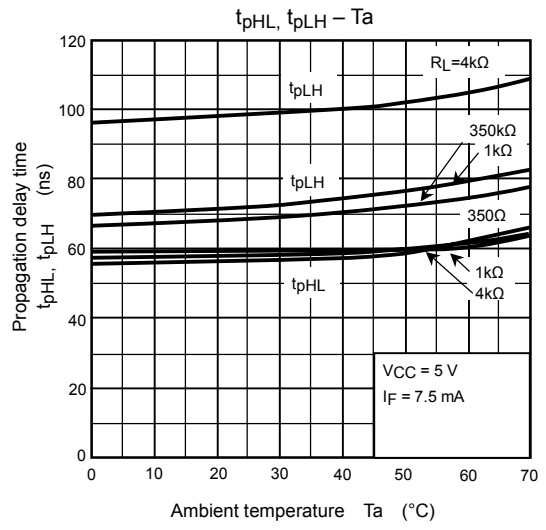
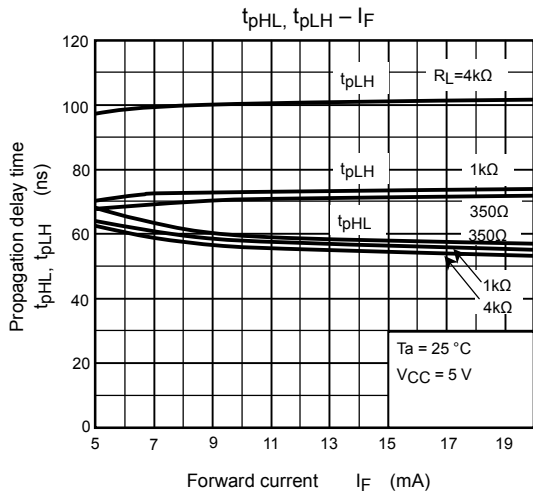


$$CM_H = \frac{160(V)}{t_r(\mu s)}, CM_L = \frac{160(V)}{t_f(\mu s)}$$



\*  $C_L$  is approximately 15pF which includes probe and stray wiring capacitance.





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