TOSHIBA PHOTOCOUPLER GaAℓAs IRED & PHOTO IC

TLP2630

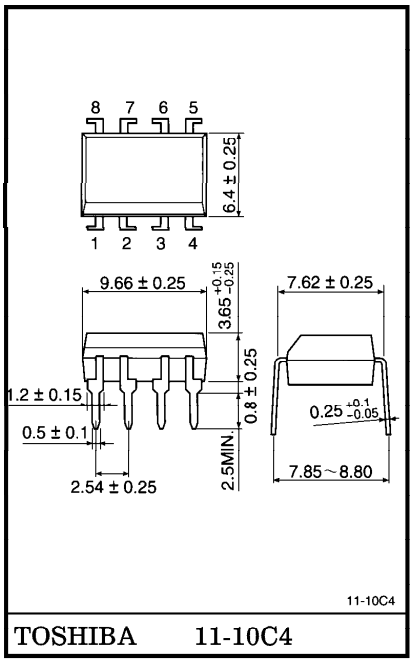
DEGITAL LOGIC ISOLATION

TELE-COMMUNICATION

ANALOG DATA EQUIPMENT CONTROL

MICROPROCESSOR SYSTEM INTERFACE

Unit in mm



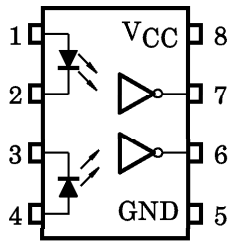
TOSHIBA 11-10C4

Weight : 0.54g

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.

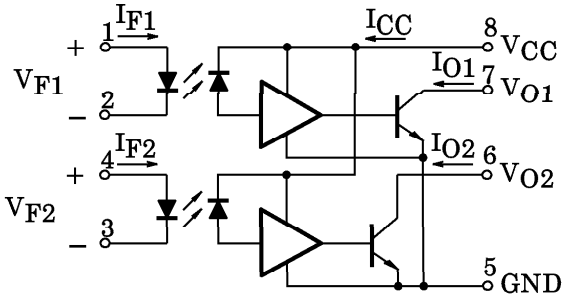
- Input Current Threshold : I_F = 5mA (MAX.)
- LSTTL / TTL Compatible : 5V Supply
- Switching Speed : 10MBd (TYP.)
- Guaranteed Performance Over Temperature : 0~70°C
- Isolation Voltage : 2500V_{rms} (MIN.)
- UL Recognized : UL1577, File No. E67349

PIN CONFIGURATION (TOP VIEW)



1 : ANODE 1
2 : CATHODE 1
3 : CATHODE 2
4 : ANODE 2
5 : GND
6 : V_{O2} (OUTPUT 2)
7 : V_{O1} (OUTPUT 1)
8 : V_{CC}

SCHEMATIC



TRUTH TABLE
(Positive Logic)

INPUT	OUTPUT
H	L
L	H

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

961001EBC2

MAXIMUM RATINGS (No derating required up to 70°C)

	CHARACTERISTIC	SYMBOL	RATING	UNIT
LED	Foward Current (Each Channel)	I_F	15	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 (10s) (Note 1)		T_{sol}	260	°C
Isolation Voltage (AC, 1min., R.H.≦60%, Note 3)		BV_S	2500	V_{rms}

* t≦1 msec Duration.

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Input Current, Low Level, Each Channel	I_{FL}	0	—	250	μA
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 = 10mA, Ta = 25°C	—	1.65	1.75	V
Input Diode Temperature Coefficient (Each Channel)	$\Delta V_F / \Delta Ta$	I_F = 10mA	—	−2.0	—	mV / °C
Input Reverse Breakdown Voltage (Each Channel)	BV_R	I_R = 10μA, Ta = 25°C	5	—	—	V
Input Capacitance (Each Channel)	C_T	V_F = 0, f = 1MHz	—	45	—	pF
High Level Output Current (Each Channel)	I_{OH}	V_{CC} = 5.5V, V_O = 5.5V I_F = 250μA	—	1	250	μA
Low Level Output Voltage (Each Channel)	V_{OL}	V_{CC} = 5.5V, I_F = 5mA I_{OL} (Sinking) = 13mA	—	0.4	0.6	V
High Level Supply Current (Both Channels)	I_{CCH}	V_{CC} = 5.5V, I_F = 0	—	14	30	mA
Low Level Supply Current (Both Channels)	I_{CCL}	V_{CC} = 5.5V, I_F = 10mA	—	24	36	mA
Isolation Voltage	R_S	V_S = 500V, R.H. ≦ 60% (Note 3)	—	10^{14}	—	Ω
Capacitance (Input-Output)	C_S	f = 1MHz (Note 3)	—	0.6	—	pF
Input-Input Leakage Current	I_{I-I}	R.H. ≦ 60%, t = 5s V_{I-I} = 500V (Note 6)	—	0.005	—	μA
Resistance (Input-Input)	R_{I-I}	V_{I-I} = 500V (Note 6)	—	10^{11}	—	Ω
Capacitance (Input-Input)	C_{I-I}	f = 1MHz (Note 6)	—	0.25	—	pF

* All typical values are at V_{CC} = 5V, Ta = 25°C.

SWITCHING CHARACTERISTICS (Ta = 25°C, V_{CC} = 5V)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Propagation Delay Time to Low Output Level	t_{pHL}	1	I_F = 0→7.5mA, R_L = 350Ω C_L = 15pF (Each Channel)	—	60	75	ns
Propagation Delay Time to High Output Level	t_{pLH}	1	I_F = 7.5mA→0, R_L = 350Ω C_L = 15pF (Each Channel)	—	60	75	ns
Output Rise a Time, Output Fall Time (10~90%)	t_r, t_f	1	I_F = 0⇌7.5mA, R_L = 350Ω C_L = 15pF (Each Channel)	—	30	—	ns
Common Mode Transient Immunity at High Output Level	CM_H	2	I_F = 0, R_L = 350Ω V_{CM} = 200V V_O (MIN.) = 2V (Each Channel, Note 4)	—	200	—	V / μs
Common Mode Transient Immunity at Low Output Level	CM_L	2	I_F = 7.5mA, R_L = 350Ω V_{CM} = 200V V_O (MAX.) = 0.8V (Each Channel, Note 5)	—	−500	—	V / μs

(Note 1) 2mm below seating plane.

(Note 2) The V_{CC} supply voltage to each TLP2630 isolator must be bypassed by a 0.01μF 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.

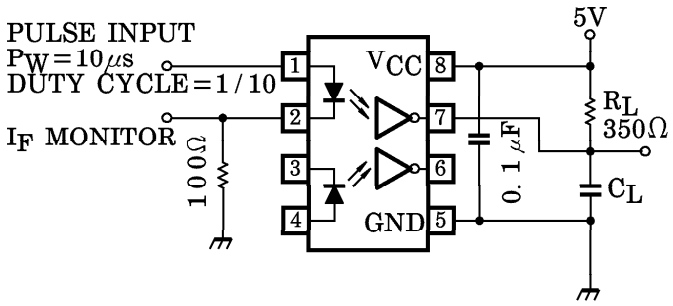
(Note 3) Device considered a two-terminal device : Pins 1, 2, 3 and 4 shorted together, and Pins 5, 6, 7 and 8 shorted together.

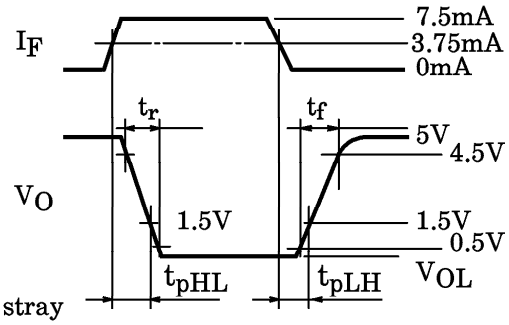
(Note 4) CM_H · The maximum tolerable rate of rise of the common mode voltage to ensure the output will remain in the high state (i.e., V_{OUT} > 2.0V)

(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} > 0.8V)
Measured in volts per microsecond (V / μs).

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

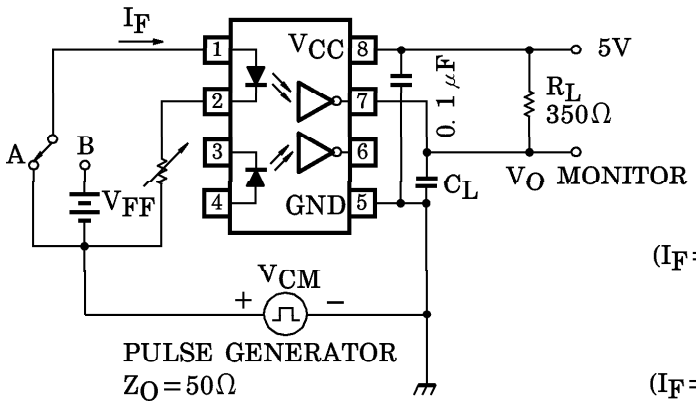
TEST CIRCUIT 1. t_{pHL} and t_{pLH}

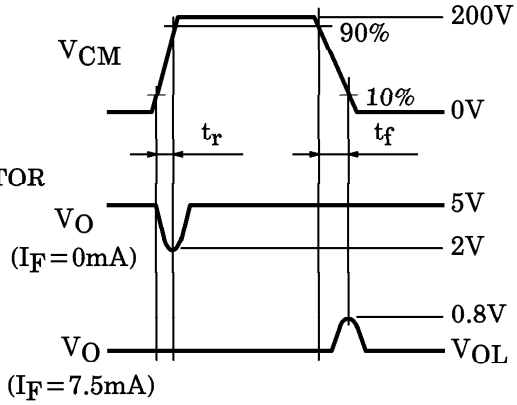




* C_L is approximately 15pF which includes probe and stray wiring capacitance.

TEST CIRCUIT 2. Ttansient Immunity and Typical Waveforms.

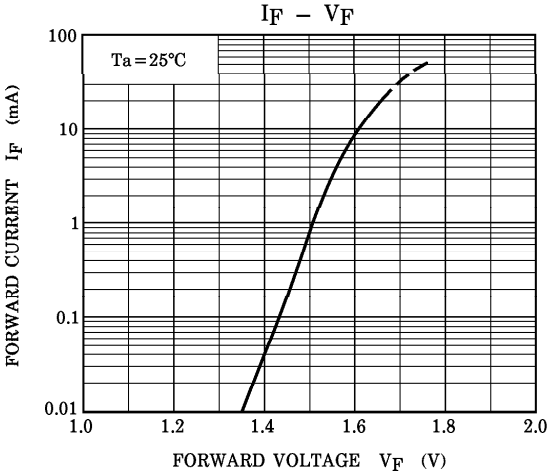




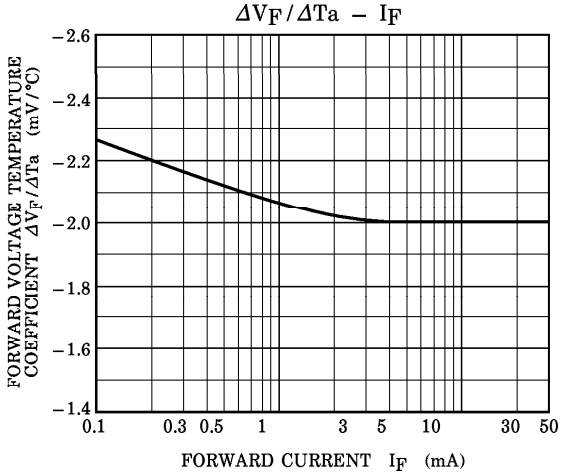
$$CM_H = \frac{160\,(V)}{t_r\,(\mu s)},\ CM_L = \frac{160\,(V)}{t_f\,(\mu s)}$$

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

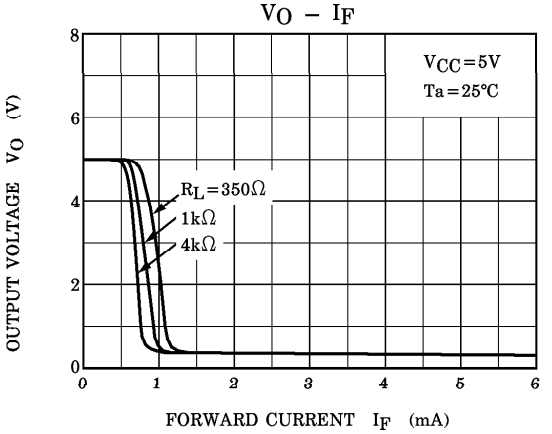
$I_F - V_F$



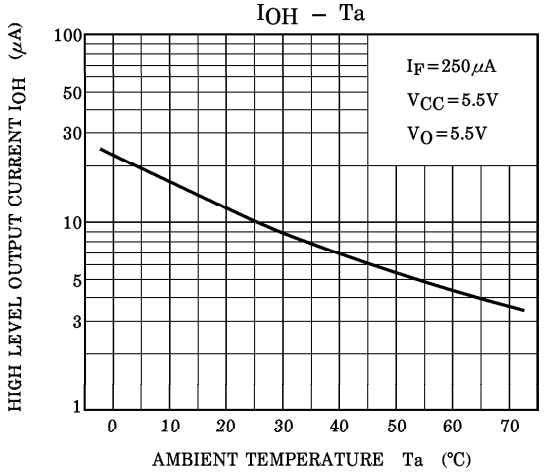
$\Delta V_F / \Delta Ta - I_F$



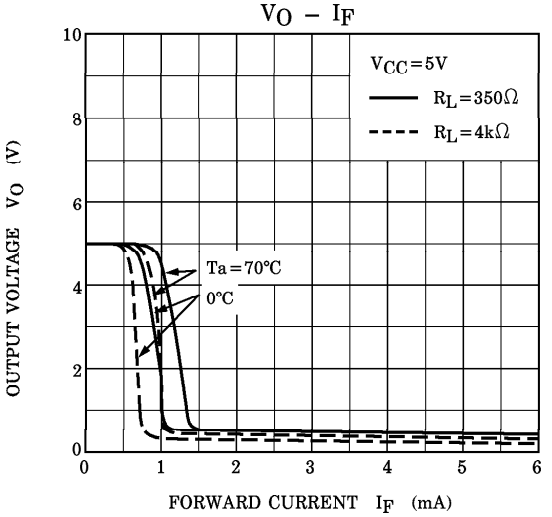
$V_O - I_F$



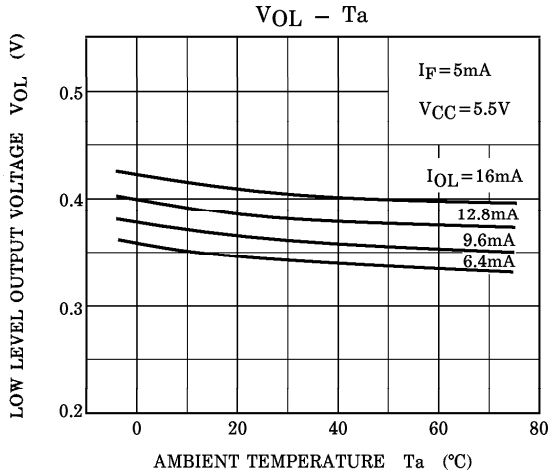
$I_{OH} - Ta$



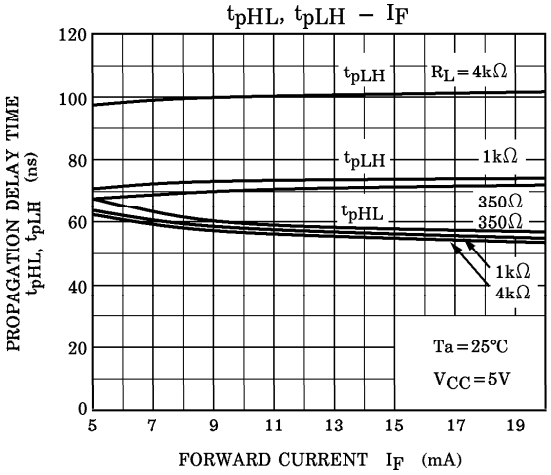
$V_O - I_F$



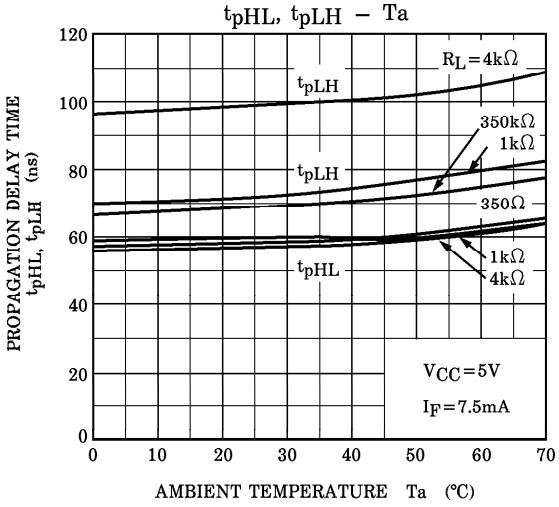
$V_{OL} - Ta$



t_{pHL}, t_{pLH} – I_F



t_{pHL}, t_{pLH} – Ta



t_r, t_f – Ta