

TOSHIBA Photocoupler Photo Relay

# TLP296G

Telecommunication

Data Acquisition

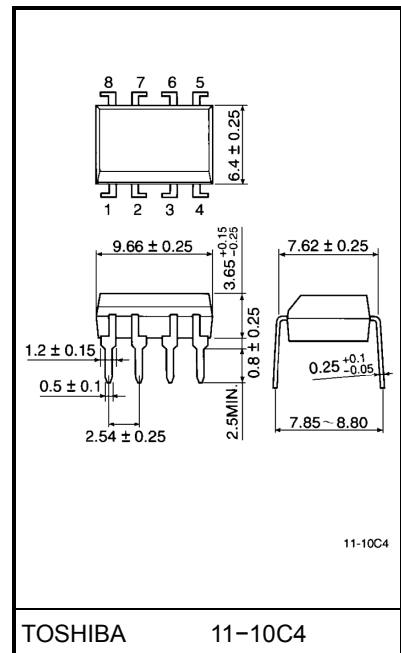
Measurement Instrumentation

The TOSHIBA TLP296G consists of gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a 8 lead DIP package (DIP8).

The TLP296G is a bi-directional switch which can replace mechanical relay in many applications.

- 8 pin DIP (DIP8), 2 channel type (2-form-A)
- Peak off-state voltage: 400 V (min.)
- Trigger LED current: 5 mA (max.)
- On-state current: 100 mA (max.)
- On-state resistance: 30 Ω (max.)
- Isolation voltage: 2500 V<sub>rms</sub> (min.)
- Trigger LED current (T<sub>a</sub> = 25°C)

Unit in mm

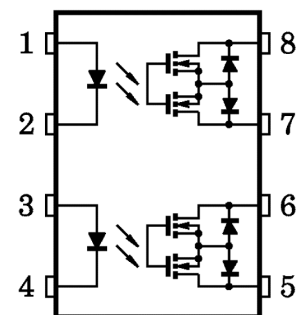


Weight: 0.54 g

Classification	Trigger LED Current (mA)		Marking Of Classification
	@I <sub>ON</sub> = 100 mA		
	Min.	Max.	
(IFT2)	—	2	T2
Standard	—	5	T2, blank

(\*): Ex. Rank IFT2: TLP296G (IFT2)

### Pin Configuration (top view)



- 1, 3 : ANODE
- 2, 4 : CATHODE
- 5 : DRAIN D1
- 6 : DRAIN D2
- 7 : DRAIN D3
- 8 : DRAIN D4

**Maximum Ratings (Ta = 25°C)**

Characteristic		Symbol	Rating	Unit	
LED	Forward current	$I_F$	50	mA	
	Forward current derating (Ta ≥ 25°C)	$\Delta I_F / ^\circ\text{C}$	-0.5	mA / °C	
	Peak forward current (100 μs pulse, 100 pps)	$I_{FP}$	1	A	
	Reverse voltage	$V_R$	5	V	
	Junction temperature	$T_j$	125	°C	
Detector	Off-state output terminal voltage	$V_{OFF}$	400	V	
	On-state current	Both channel Note 1	$I_{ON}$	100	mA
		One channel		120	
	On-state current derating (Ta ≥ 25°C)	Both channel Note 1	$\Delta I_{ON} / ^\circ\text{C}$	-1.0	mA / °C
		One channel		-1.2	
Junction temperature	$T_j$	125	°C		
Storage temperature range		$T_{stg}$	-55~125	°C	
Operating temperature range		$T_{opr}$	-20~85	°C	
Lead soldering temperature (10 s)		$T_{sol}$	260	°C	
Isolation voltage (AC, 1 min., R.H. ≤ 60%)		$BV_S$	2500	$V_{rms}$	

(Note 1): Two channels operating simultaneously.

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

**Recommended Operating Conditions**

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	$V_{DD}$	—	—	320	V
Forward current	$I_F$	7.5	15	25	mA
On-state current	$I_{ON}$	—	—	100	mA
Operating temperature	$T_{opr}$	-20	—	80	°C

## Individual Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	$V_F$	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse current	$I_R$	$V_R = 5 \text{ V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Off-state current	$I_{OFF}$	$V_{OFF} = 400 \text{ V}$	—	—	1	$\mu\text{A}$
	Capacitance	$C_{OFF}$	$V = 0, f = 1 \text{ MHz}$	—	—	—	pF

## Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Trigger LED current	$I_{FT}$	$I_{ON} = 100 \text{ mA}$	—	2	5	mA
On-state resistance	$R_{ON}$	$I_{ON} = 100 \text{ mA}, I_F = 10 \text{ mA}$	—	20	30	$\Omega$

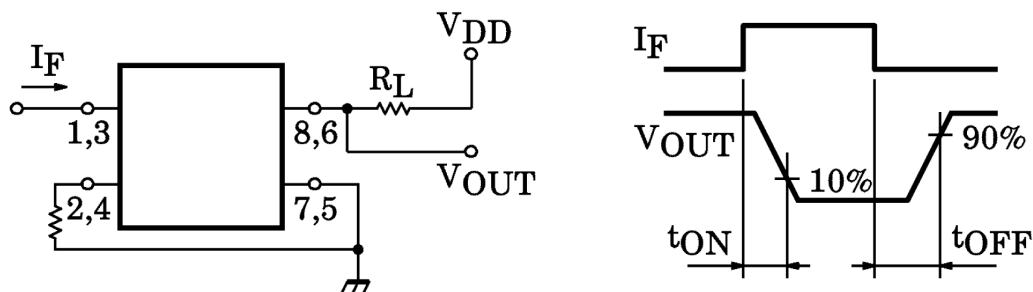
## Isolation Characteristics (Ta = 25°C)

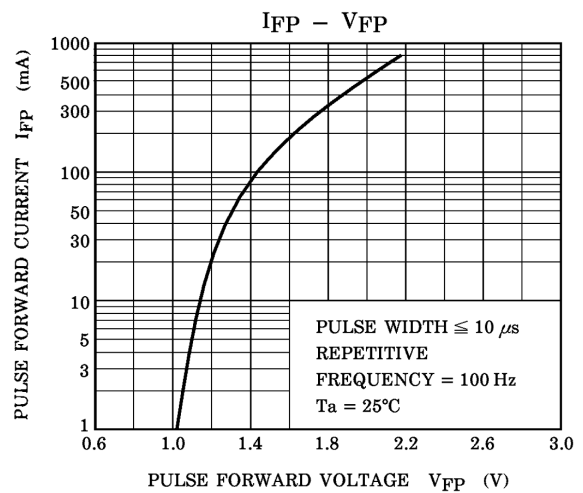
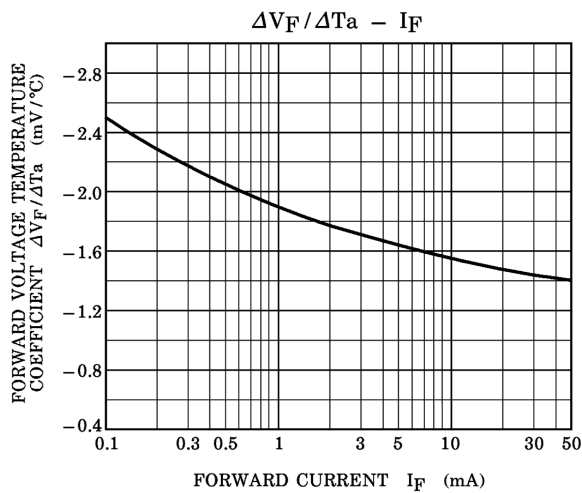
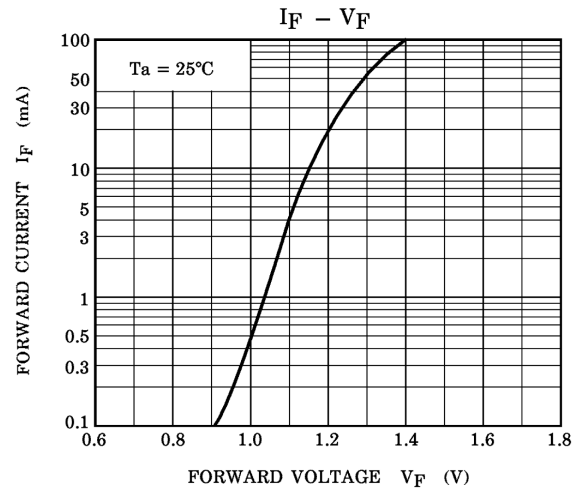
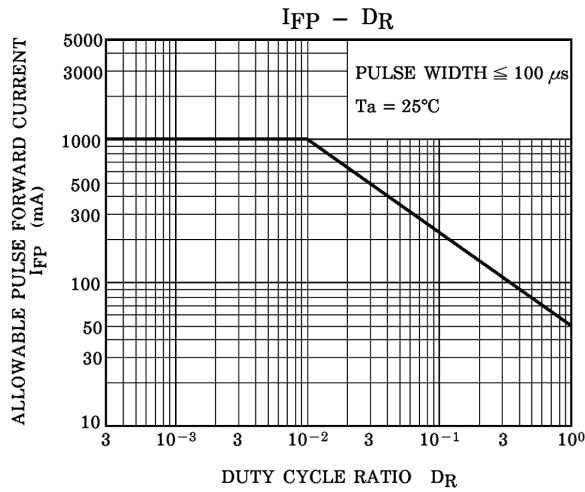
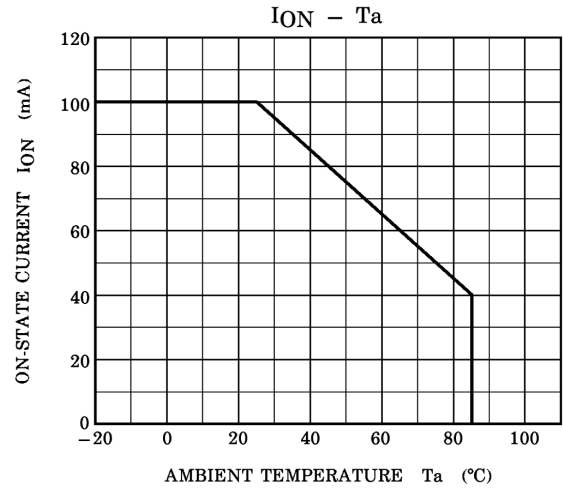
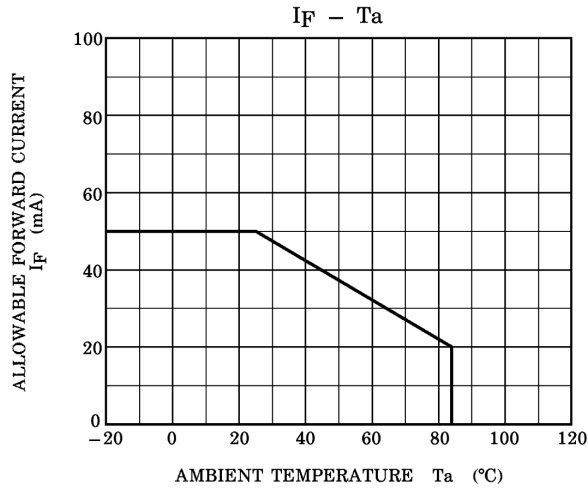
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance input to output	$C_S$	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	$R_S$	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 1 minute	2500	—	—	$V_{rms}$
		AC, 1 second (in oil)	—	5000	—	$V_{rms}$
		DC, 1 minute (in oil)	—	5000	—	Vdc

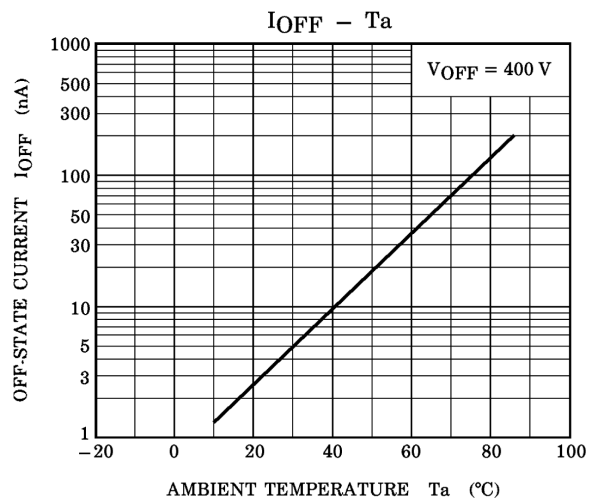
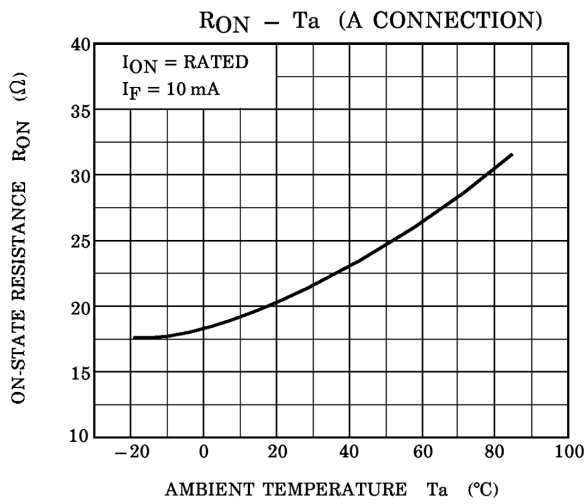
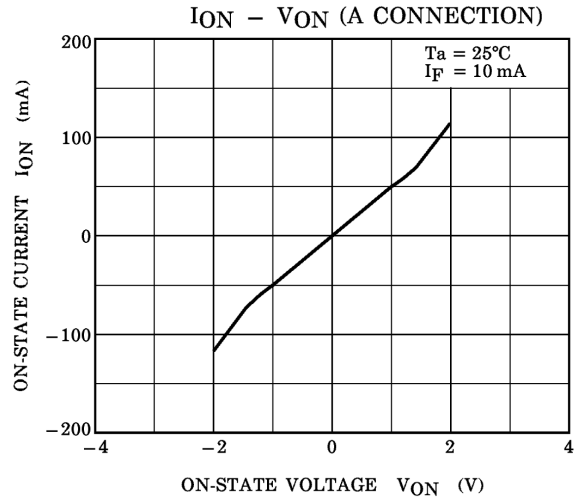
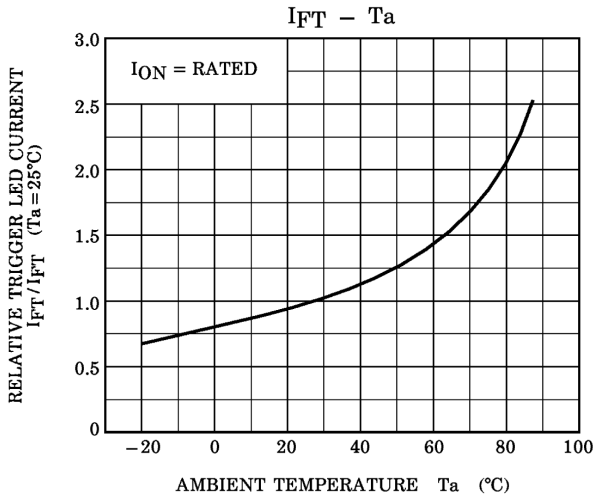
## Switching Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Turn-on time	$t_{ON}$	$R_L = 200 \Omega$ (Note 1) $V_{DD} = 20 \text{ V}, I_F = 10 \text{ mA}$	—	—	4	ms
Turn-off time	$t_{OFF}$		—	—	4	

(Note 1): Switching time test circuit







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