

TOSHIBA Photocoupler Photorelay

# TLP797GA

Cordless Telephone

PBX

MODEM

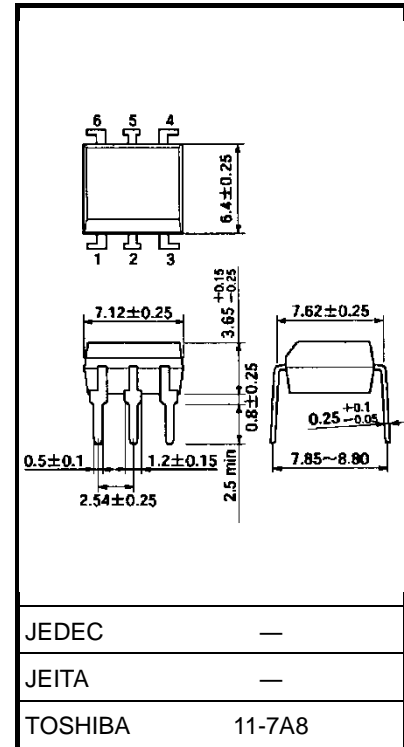
The TOSHIBA TLP797GA consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a six lead plastic DIP package (DIP6).

The TLP797GA is a bi-directional switch which can replace mechanical relays in many applications.

- 6 pin DIP (DIP6)
- 1-form-A
- Peak off-state voltage: 400 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 120 mA (max)
- On-state resistance: 35  $\Omega$  (max)
- Isolation voltage: 5000 Vrms (min)
- UL approved: UL1577, File No.E67349
- cUL approved :CSA Component Acceptance Service  
No. 5A, File No.E67349
- Option (D4) VDE approved : DIN EN60747-5-5 (Note1)

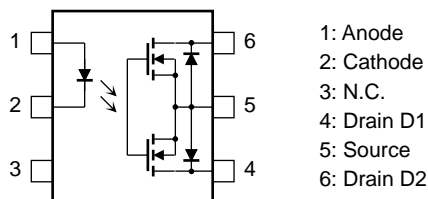
(Note 1) : When a EN60747-5-5 approved type is needed, please designate "Option(D4)"

Unit: mm

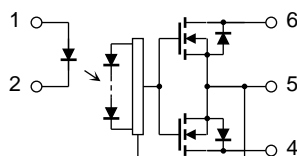


Weight: 0.4 g (typ.)

## Pin Configuration (top view)



## Internal Circuit



Start of commercial production  
2001/01

## Absolute Maximum Ratings (Ta = 25°C)

Characteristics			Symbol	Rating	Unit
LED	Forward current		I <sub>F</sub>	50	mA
	Forward current derating (Ta ≥ 25°C)		ΔI <sub>F</sub> /°C	−0.5	mA/°C
	Peak forward current(100 μs pulse, 100 pps)		I <sub>FP</sub>	1	A
	Reverse voltage		V <sub>R</sub>	5	V
	Diode power dissipation		P <sub>D</sub>	50	mW
	Diode power dissipation derating (Ta ≥ 25°C)		ΔP <sub>D</sub> /°C	-0.5	mW/°C
	Junction temperature		T <sub>j</sub>	125	°C
Detector	Off-state output terminal voltage		V <sub>OFF</sub>	400	V
	On-state current	A connection	I <sub>ON</sub>	120	mA
		B connection		120	
		C connection		240	
	On-state current derating (Ta ≥ 25°C)	A connection	ΔI <sub>ON</sub> /°C	−1.2	mA/°C
		B connection		−1.2	
		C connection		−2.4	
	Output power dissipation	A connection	P <sub>O</sub>	453	mW
		B connection		345	
		C connection		504	
	Output power dissipation derating (Ta ≥ 25°C)	A connection	ΔP <sub>O</sub> /°C	−4.53	mW /°C
		B connection		-3.45	
		C connection		-5.04	
	Junction temperature		T <sub>j</sub>	125	°C
Storage temperature range			T <sub>stg</sub>	−55 to 125	°C
Operating temperature range			T <sub>opr</sub>	−40 to 85	°C
Lead soldering temperature (10 s)			T <sub>sol</sub>	260	°C
Isolation voltage (AC, 1 minute, R.H. ≤ 60%) (Note)			BV <sub>S</sub>	5000	Vrms

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).

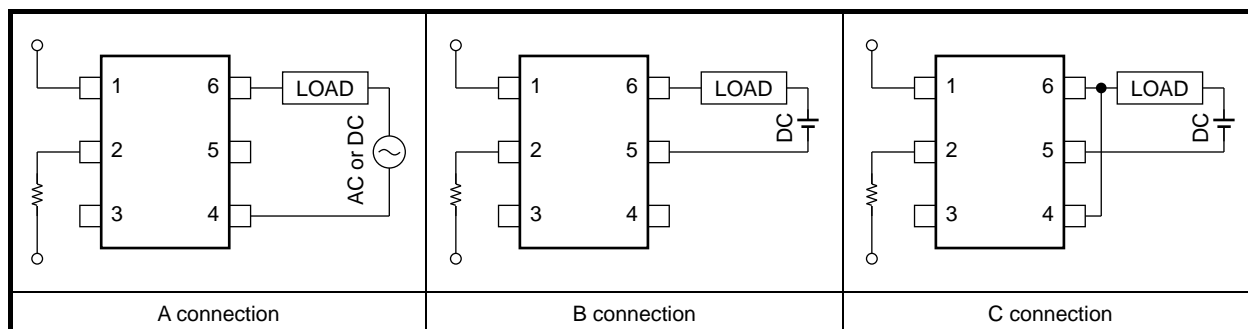
Note: Device considered a two-terminal device: Pins1, 2 and 3 shorted together, and pins 4, 5 and 6 shorted together.

## Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	V <sub>DD</sub>	—	—	320	V
Forward current	I <sub>F</sub>	5	7.5	25	mA
On-state current	I <sub>ON</sub>	—	—	120	mA
Operating temperature	T <sub>opr</sub>	-20	—	65	°C

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

## Circuit Connections



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

Characteristics		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	$C_T$	$V = 0 \text{ V}, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Off-state current	$I_{OFF}$	$V_{OFF} = 400 \text{ V}$	—	—	1	$\mu\text{A}$
	Capacitance	$C_{OFF}$	$V = 0 \text{ V}, f = 1 \text{ MHz}$	—	70	—	pF

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current		$I_{FT}$	$I_{ON} = 120 \text{ mA}$	—	1	3	mA
Load current limiting		$I_{FC}$	$I_{OFF} = 100 \mu\text{A}$	0.1	—	—	mA
On-state resistance	A connection	$R_{ON}$	$I_{ON} = 120 \text{ mA}, I_F = 5 \text{ mA}$	—	17	35	$\Omega$
	B connection		$I_{ON} = 20 \text{ to } 120 \text{ mA}, I_F = 5 \text{ mA}$	—	20	40	
	C connection		$I_{ON} = 120 \text{ mA}, I_F = 5 \text{ mA}$	—	11	20	
	C connection		$I_{ON} = 240 \text{ mA}, I_F = 5 \text{ mA}$	—	6	—	

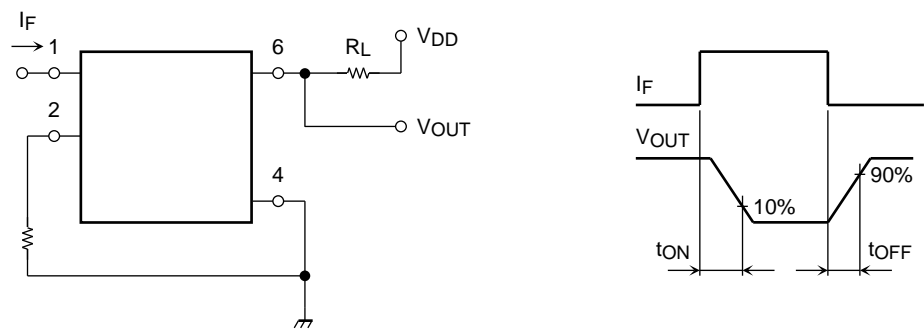
## Isolation Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	$C_S$	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	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	5000	—	—	Vrms
		AC, 1 second (in oil)	—	10000	—	
		DC, 1 minute (in oil)	—	10000	—	Vdc

Switching Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	tON	RL = 200 Ω VDD = 20 V, IF = 5 mA (Note)	—	0.3	1	ms
Turn-off time	tOFF	RL = 200 Ω VDD = 20 V, IF = 5 mA (Note)	—	0.1	1	ms

Note: Switching time test circuit



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