

TOSHIBA Photocoupler Photo Relay

# TLP597GA

Cordless Telephone

PBX

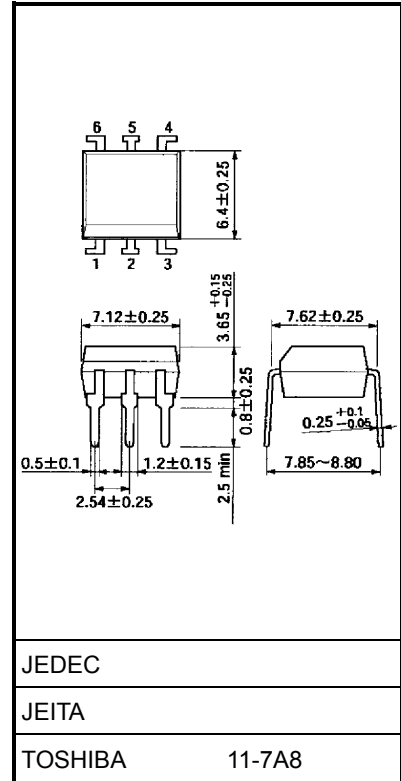
Modem

The TOSHIBA TLP597GA 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 TLP597GA is a bi-directional switch can replace mechanical relays in many applications.

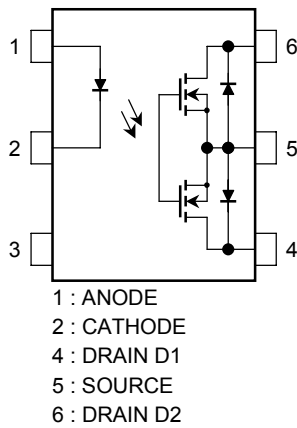
- 6 pin DIP (DIP6)
- 1-form-A
- Peak off-state voltage: 400 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 120 mA (max)
- On-state resistance: 35 Ω (max)
- Isolation voltage: 2500 Vrms (min)

Unit: mm

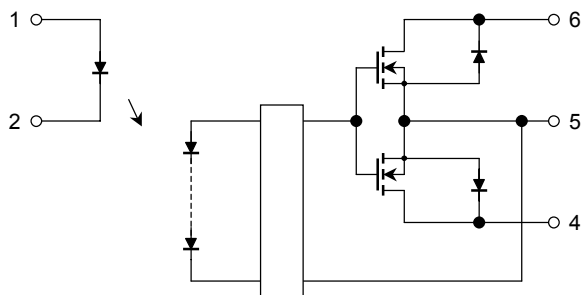


Weight: 0.4 g (typ.)

## Pin Configuration (top view)



## Schematic



## Maximum Ratings (Ta = 25°C)

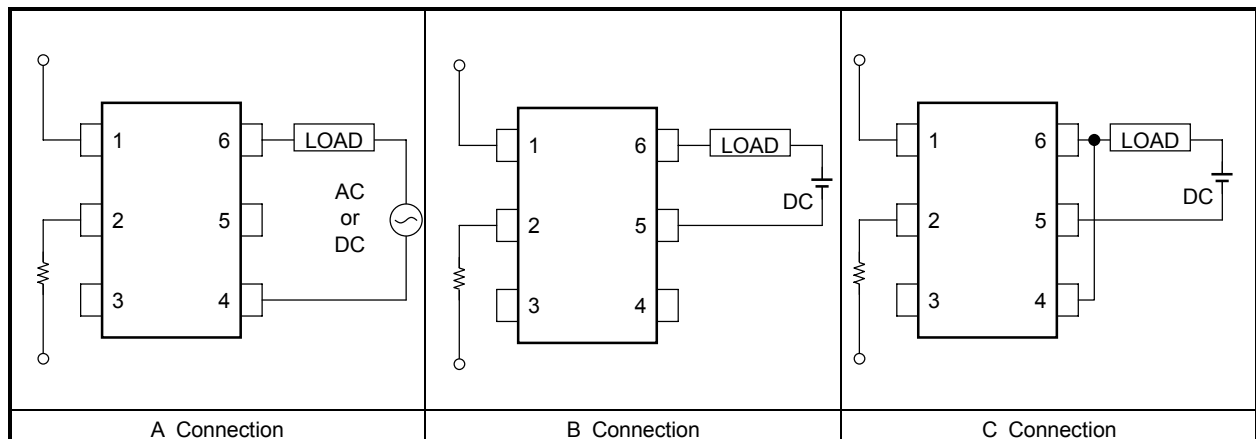
Characteristics		Symbol	Rating	Unit	
LED	Forward current	$I_F$	50	mA	
	Forward current derating (Ta ≥ 25°C)	$\Delta I_F/^\circ\text{C}$	-0.5	mA/°C	
	Peak forward current (100 μs pulse, 100 pps)	$I_{FP}$	1	A	
	Reverse voltage	$V_R$	5	V	
	Junction temperature	$T_j$	125	°C	
Detector	Off-state output terminal voltage		$V_{OFF}$	400	V
	On-state current	A connection	$I_{ON}$	120	mA
		B connection		120	
		C connection		240	
	On-state current derating (Ta ≥ 25°C)	A connection	$\Delta I_{ON}/^\circ\text{C}$	-1.2	mA/°C
		B connection		-1.2	
		C connection		-2.4	
Junction temperature		$T_j$	125	°C	
Storage temperature range		$T_{opr}$	-55 to 125	°C	
Operating temperature range		$T_{stg}$	-40 to 85	°C	
Lead soldering temperature (10 s)		$T_{sol}$	260	°C	
Isolation voltage (AC, 1 min, R.H. ≤ 60%) (Note 1)		$BV_S$	2500	Vrms	

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

## Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	$V_{DD}$	—	—	320	V
Forward current	$I_F$	5	7.5	25	mA
On-state current	$I_{ON}$	—	—	120	mA
Operating temperature	$T_{opr}$	-20	—	65	°C

## 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	$C_T$	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Off-state current	$I_{OFF}$	$V_{OFF} = 400 \text{ V}$	—	—	1	$\mu\text{A}$
	Capacitance	$C_{OFF}$	$V = 0, f = 1 \text{ MHz}$	—	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
Return LED current		$I_{FC}$	$I_{OFF} = 100 \mu\text{A}$	0.1	—	—	mA
On-state resistance	A connection	$R_{ON}$	$I_{ON} = 120 \text{ mA}, I_F = 5 \text{ mA}$	—	17	35	$\Omega$
			$I_{ON} = 20 \text{ to } 120 \text{ mA}, I_F = 5 \text{ mA}$	—	20	40	
	B 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	—	

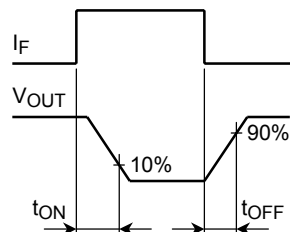
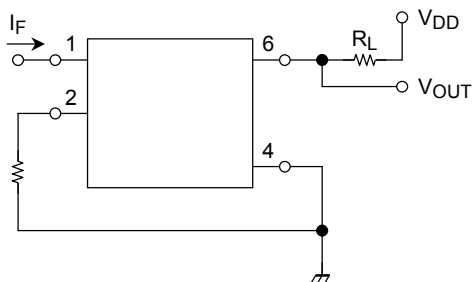
## Isolation Characteristics (Ta = 25°C)

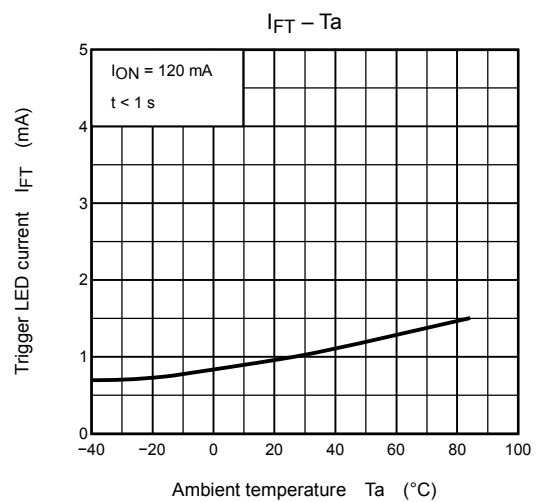
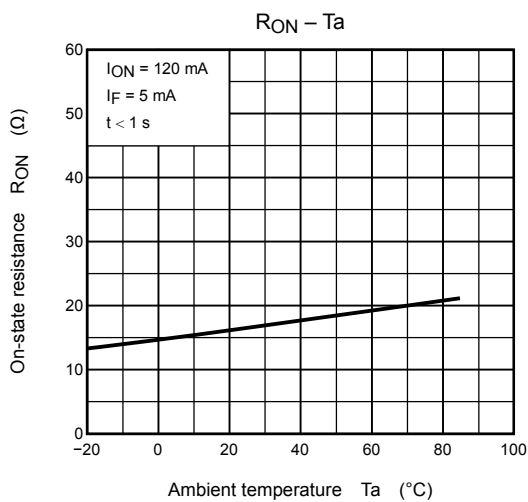
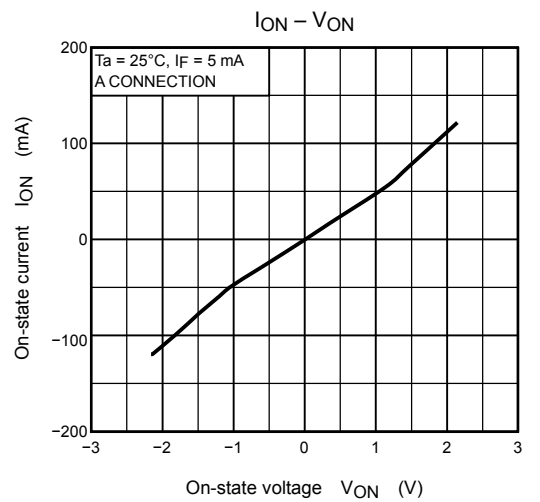
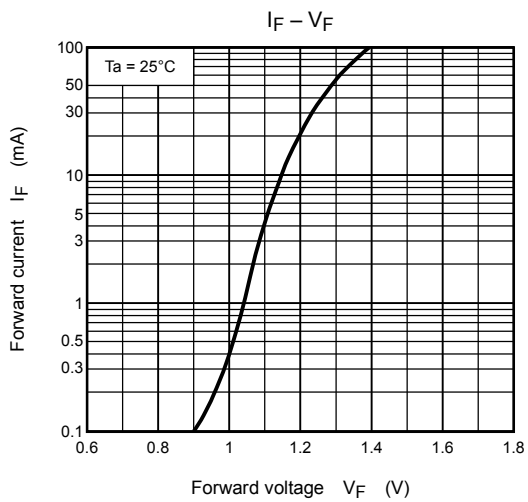
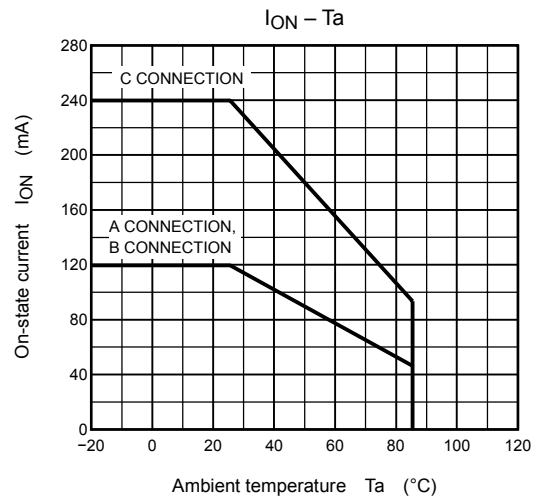
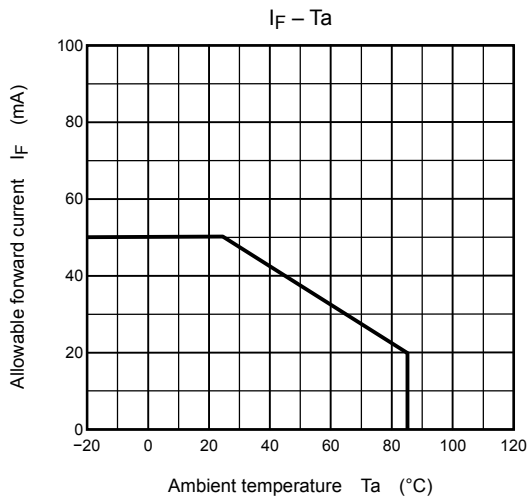
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output		$C_S$	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance		$R_S$	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 1 min	2500	—	—	Vrms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

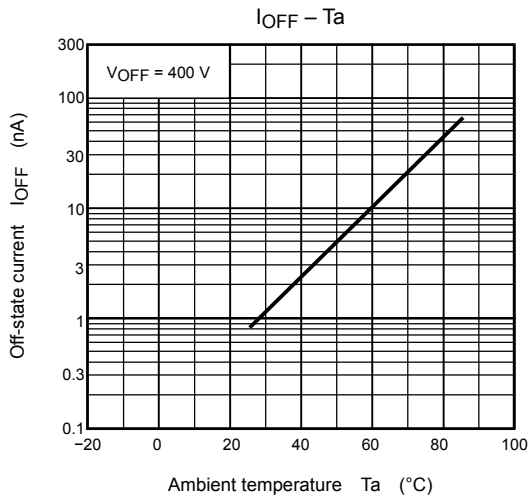
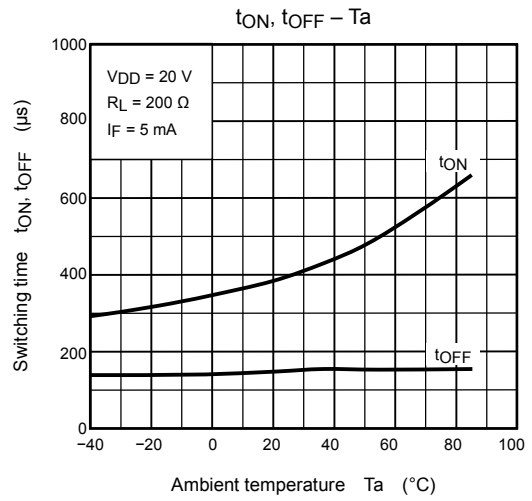
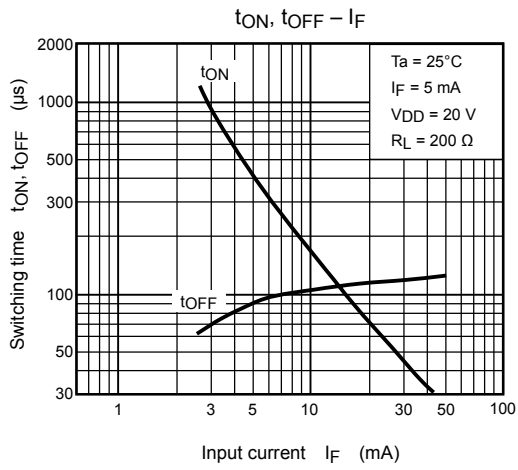
## Switching Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	$t_{ON}$	$R_L = 200 \Omega$ $V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$	(Note 2)	—	0.3	1	ms
Turn-off time	$t_{OFF}$			—	0.1	1	ms

Note 2: Switching time test circuit







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