

TOSHIBA Photocoupler Photo Relay

# TLP594G

Modems

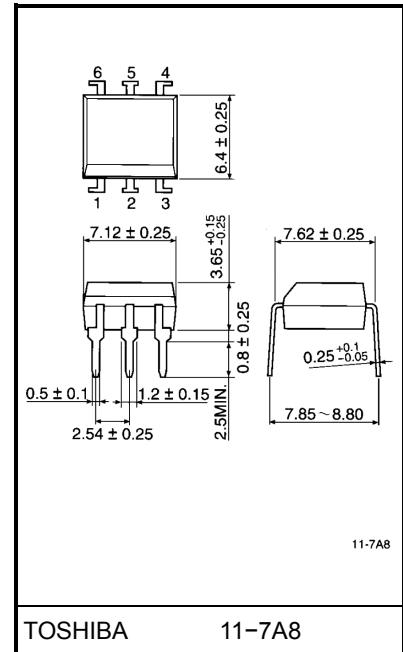
PBXes

Telecommunications

The TOSHIBA TLP594G consists of a gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a DIP (DIP6), which is suitable for equipment for high tech communications, including modems. The TLP594G complies with FCC part 68 rules with current limiting function.

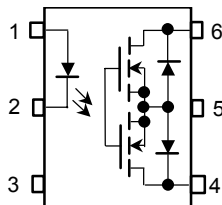
- Peak off-state voltage: 350V (min.)
- Trigger LED current: 3mA (max)
- On-state current: 120mA(max)
- Load current limiting: 150mA~300mA (t = 5ms)
- On-state resistance: 35Ω (max)
- Isolation voltage: 2500Vrms (min)
- UL recognized: UL1577, file no.E67349

Unit in mm



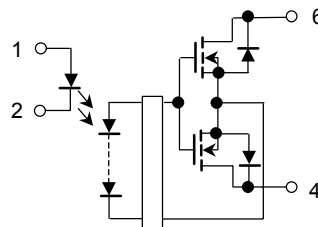
Weight: 0.4g

## Pin Configurations (top view)



- 1 : Anode
- 2 : Cathode
- 3 : NC
- 4 : Drain D1
- 6 : Drain D2

## Schematic



## Maximum Ratings (Ta = 25°C)

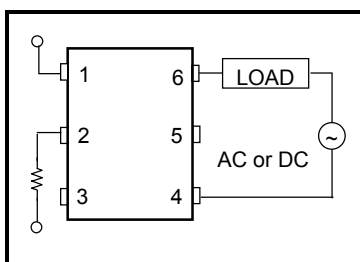
Characteristic		Symbol	Rating	Unit
LED	Forward current	$I_F$	50	mA
	Forward current derating (Ta ≥ 25°C)	$\Delta I_F / ^\circ\text{C}$	-0.5	mA / °C
	Pulse forward current (100µs pulse, 100pps)	$I_{FP}$	1	A
	Reverse voltage	$V_R$	5	V
	Junction temperature	$T_j$	125	°C
Detector	Off-state output terminal voltage	$V_{OFF}$	350	V
	On-state RMS current	$I_{ON}$	120	mA
	On-state current derating (Ta ≥ 25°C)	$\Delta I_{ON} / ^\circ\text{C}$	-1.2	mA / °C
	Junction temperature	$T_j$	125	°C
Storage temperature range		$T_{stg}$	-55~125	°C
Operating temperature range		$T_{opr}$	-40~85	°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 shorted together and pins 4, 5 and 6 shorted together.

## Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	$V_{DD}$	—	—	280	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)

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	$I_{OFF}$	$V_{OFF} = 350\text{V}$	—	—	1	$\mu\text{A}$
	Capacitance	$C_{OFF}$	$V = 0, f = 1\text{MHz}$	—	40	—	pF

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

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	$I_{FT}$	$I_{ON} = 120\text{mA}$	—	—	3	mA
On-state resistance	$R_{ON}$	$I_{ON} = 120\text{mA}, I_F = 5\text{mA}$	—	22	35	$\Omega$
		$I_{ON} = 20\sim 120\text{mA}, I_F = 5\text{mA}$	—	26	40	$\Omega$
Load current limiting	$I_{LIM}$	$I_F = 5\text{mA}, V_{DD} = 5\text{V}, t = 5\text{ms}$	150	—	300	mA

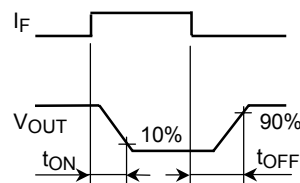
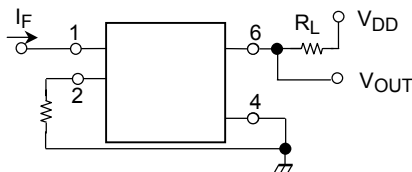
## Isolation Characteristics (Ta = 25°C)

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	—	—	Vrms
		AC, 1 second, in oil	—	5000	—	—
		DC, 1 minute, in oil	—	5000	—	Vdc

## Switching Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	$t_{ON}$	$R_L = 200\Omega$ (Note2)	—	—	1	ms
Turn-off time	$t_{OFF}$	$V_{DD} = 20\text{V}, I_F = 5\text{mA}$	—	—	1	

(Note2): Switching time test circuit



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