

TOSHIBA Photocoupler Photo Relay

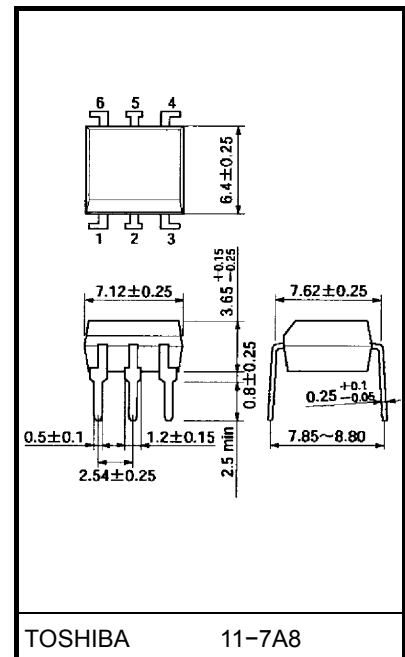
TLP598GA

Telecommunication
 Data Acquisition
 Measurement Instrumentation

The TOSHIBA TLP598GA 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 TLP598GA is a bi-directional switch which can replace mechanical relays in many applications.

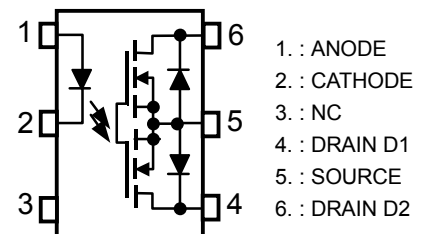
- Peak off-state voltage: 400 V (min)
- On-state current: 150 mA (max) (A connection)
- On-state resistance: 12 Ω (max) (A connection)
- Isolation voltage: 2500 Vrms (min) (A connection)

Unit: mm

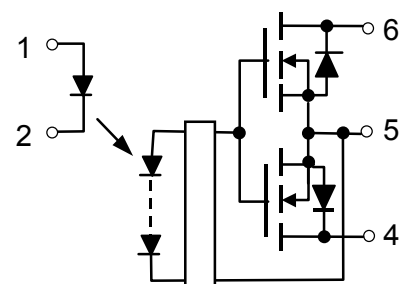


Weight: 0.4 g (typ.)

Pin Configuration (top view)



Schematic



Start of commercial production
 2004/08

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit	
LED	Forward current	I_F	30	mA	
	Forward current derating (Ta ≥ 25°C)	$\Delta I_F / ^\circ\text{C}$	-0.3	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 RMS current	A connection	I_{ON}	150	mA
		B connection		200	
		C connection		300	
	On-state current derating (Ta ≥ 25°C)	A connection	$\Delta I_{ON} / ^\circ\text{C}$	-1.5	mA / °C
		B connection		-2.0	
		C connection		-3.0	
Junction temperature	T_j	125	°C		
Storage temperature range	T_{stg}	-55 to 125	°C		
Operating temperature range	T_{opr}	-40 to 85	°C		
Lead soldering temperature (10 s)	T_{sol}	260	°C		
Isolation voltage (AC, 1 minute, R.H. ≤ 60%)	(Note 2) BV_S	2500	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).

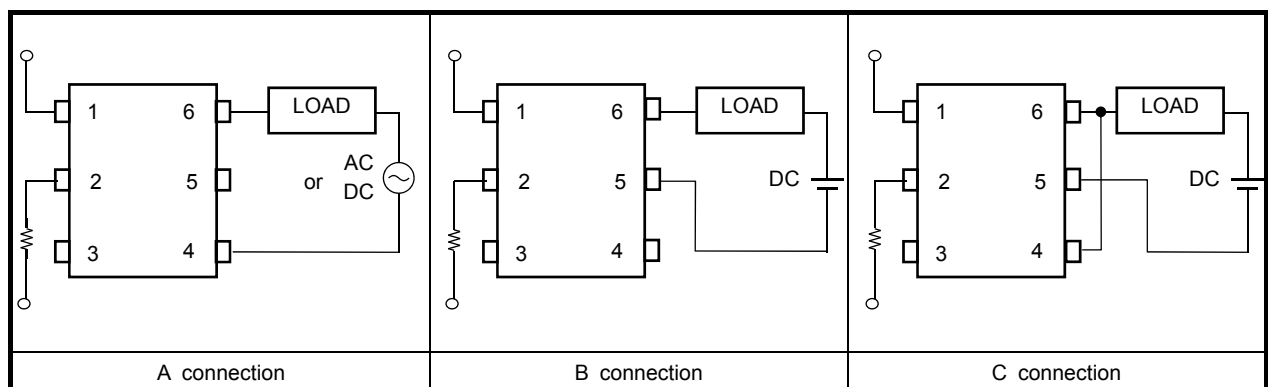
(Note 2): Device considered a two-terminal device: Pins 1, 2 and 3 shorted together, and pins 4, 5 and 6 shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{DD}	—	—	320	V
Forward current	I_F	5	7.5	20	mA
On-state current (A connection)	I_{ON}	—	—	150	mA
Operating temperature	T_{opr}	-20	—	80	°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)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V_F	$I_F = 10 \text{ mA}$	1.18	1.33	1.48	V
	Reverse current	I_R	$V_R = 5 \text{ V}$	—	—	10	μA
	Capacitance	C_T	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Off-state current	I_{OFF}	$V_{OFF} = 400 \text{ V}$	—	—	1	μA
	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}	$I_{ON} = 150 \text{ mA}$	—	1	3	mA
On-state resistance	A connection	R_{ON}	$I_{ON} = 150 \text{ mA}, I_F = 5 \text{ mA}$	—	8	12	Ω
	B connection		$I_{ON} = 200 \text{ mA}, I_F = 5 \text{ mA}$	—	4	6	
	C connection		$I_{ON} = 300 \text{ mA}, I_F = 5 \text{ mA}$	—	2	3	

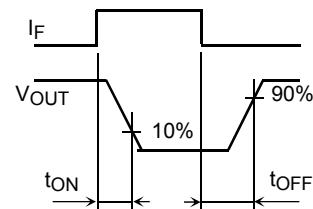
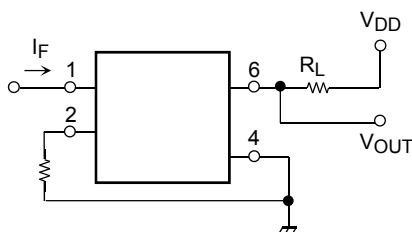
Isolation Characteristics (Ta = 25°C)

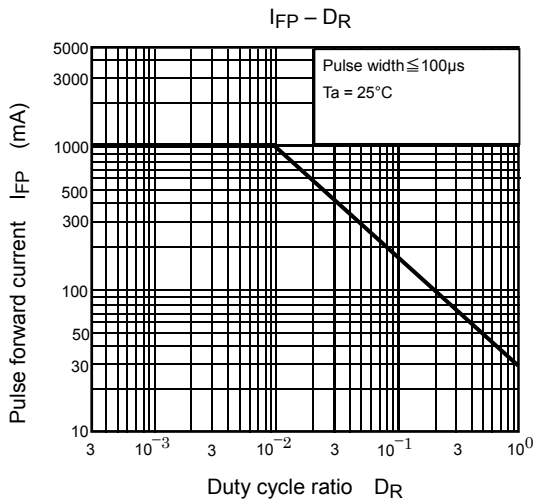
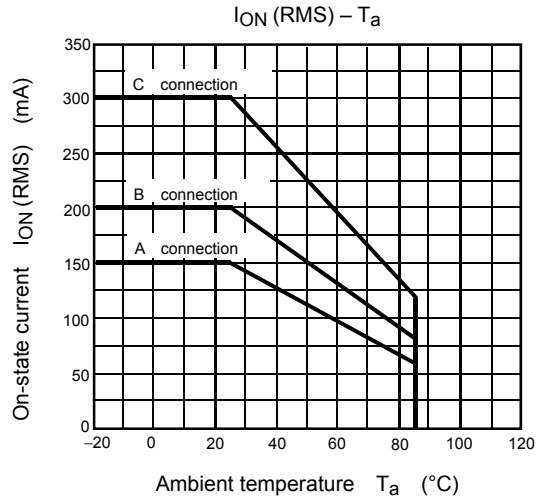
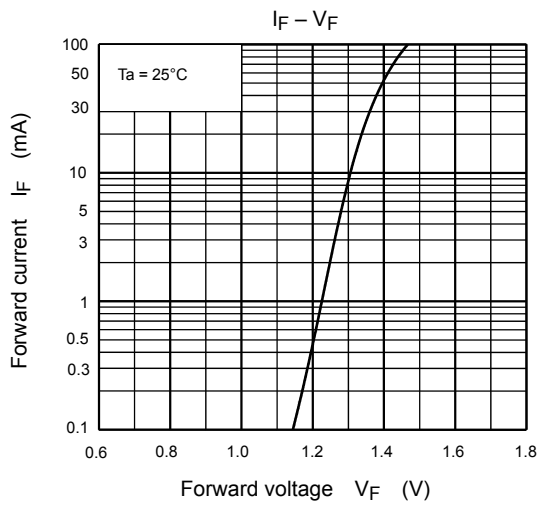
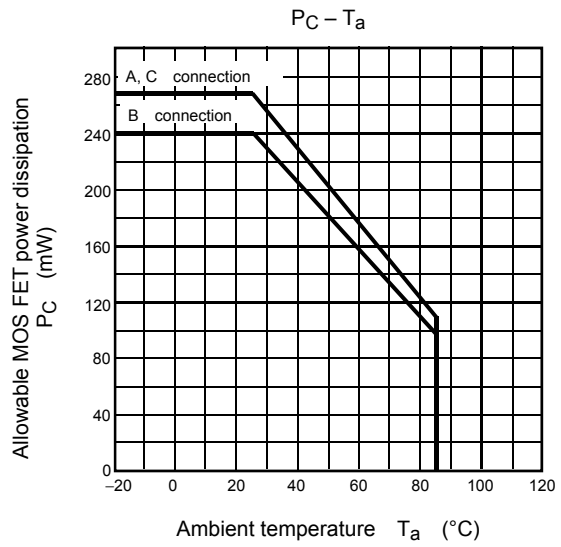
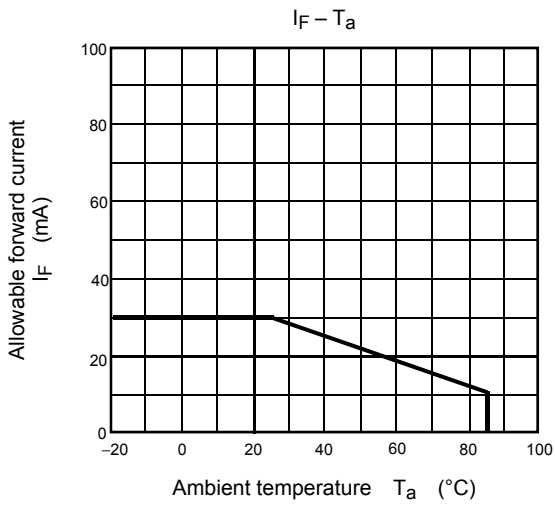
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	2500	—	—	Vrms
		AC, 1 second (in oil)	—	5000	—	VDC
		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}	$V_{DD} = 20 \text{ V}, R_L = 200 \Omega$ $I_F = 5 \text{ mA}$ (Note 3)	—	0.3	1.0	ms
Turn-off time	t_{OFF}		—	0.2	1.0	

(Note 3): Switching time test circuit





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