

TOSHIBA Photocoupler Photo Relay

TLP599G

Telecommunication

Data Acquisition

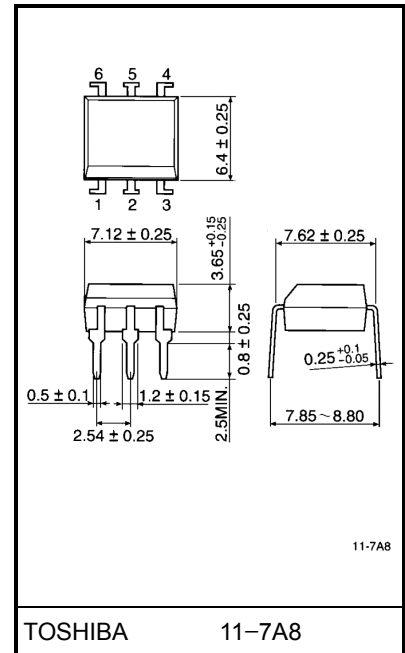
Measurement Instrumentation

The TOSHIBA TLP599G consists of a gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a six lead plastic DIP package (DIP6).

The TLP599G is a bi-directional switch which can replace mechanical relays in many applications.

- Peak off-state voltage: 400V (min.)
- On-state current: 120mA (max.) (A connection)
- On-state resistance: 30Ω (max.) (A connection)
- Insulation thickness: 0.4mm (max.)
- Isolation voltage: 2500Vrms (min.)
- UL recognized: UL1577, file no. E67349
- Trigger LED current ($T_a = 25^\circ\text{C}$)

Unit in mm

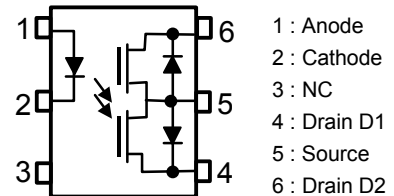


Classification (Note 1)	Trigger LED Current (mA)		Marking Of Classification
	@ $I_{ON} = 120\text{mA}$		
	Min.	Max.	
(IFT2)	—	2	T2
Standard	—	5	T2, blank

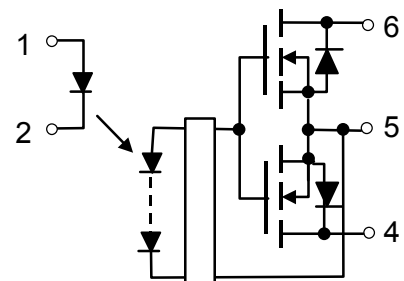
(Note 1): Application type name for certification test, please use standard product type name, i.e.

TLP599G (IFT2) : TLP599G

Pin Configuration (top view)



Schematic



Maximum Ratings (Ta = 25°C)

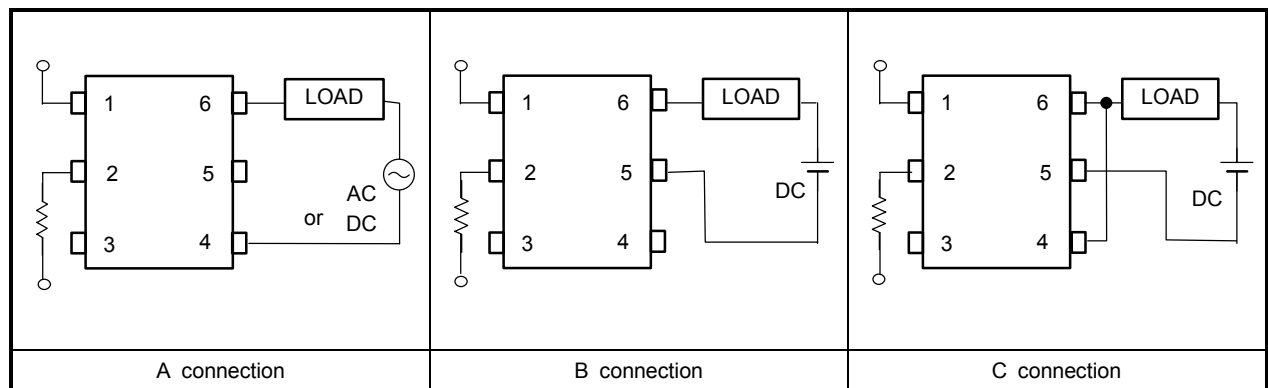
Characteristic		Symbol	Rating	Unit	
LED	Forward current	I_F	50	mA	
	Forward current derating (Ta ≥ 25°C)	$\Delta I_F / ^\circ\text{C}$	-0.5	mA / °C	
	Peak forward current (100 μs pulse, 100 pps)	I_{FP}	1	A	
	Reverse voltage	V_R	5	V	
	Junction temperature	T_j	125	°C	
Detector	Off-state output terminal voltage	V_{OFF}	400	V	
	On-state RMS current	A connection	I_{ON}	120	mA
		B connection		150	
		C connection		200	
	On-state current derating (Ta ≥ 25°C)	A connection	$\Delta I_{ON} / ^\circ\text{C}$	-1.2	mA / °C
		B connection		-1.5	
		C connection		-2.0	
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 2) BV_S	2500	Vrms		

(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	7.5	15	25	mA
On-state current	I_{ON}	—	—	120	mA
Operating temperature	T_{opr}	-20	—	80	°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	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}	$I_{ON} = 120 \text{ mA}$	—	1	5	mA
On-state Resistance	A connection	R_{ON}	$I_{ON} = 120 \text{ mA}, I_F = 10 \text{ mA}$	—	20	30	Ω
	B connection		$I_{ON} = 150 \text{ mA}, I_F = 10 \text{ mA}$	—	12	20	
	C connection		$I_{ON} = 200 \text{ mA}, I_F = 10 \text{ mA}$	—	6	10	

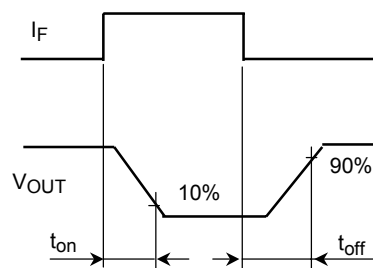
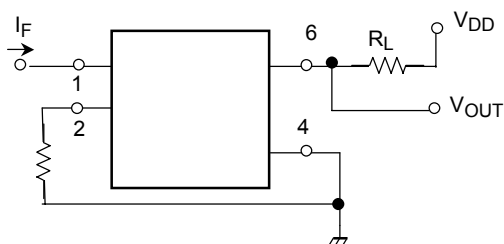
Isolation Characteristics (Ta = 25°C)

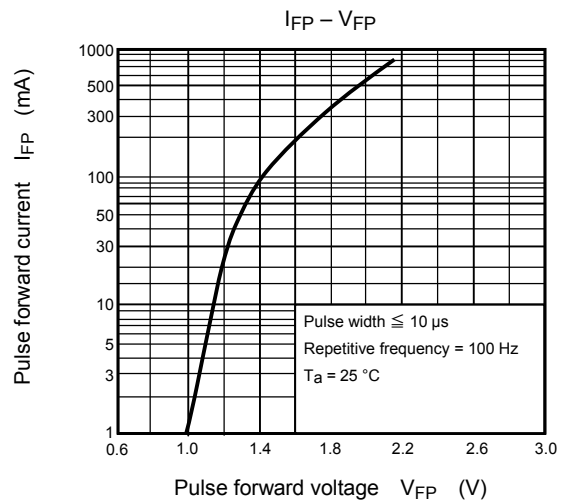
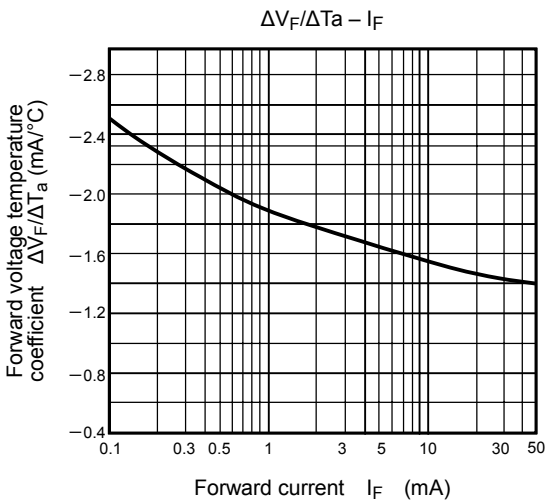
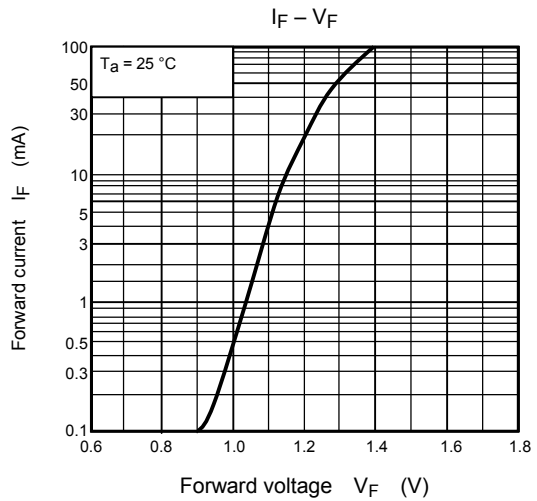
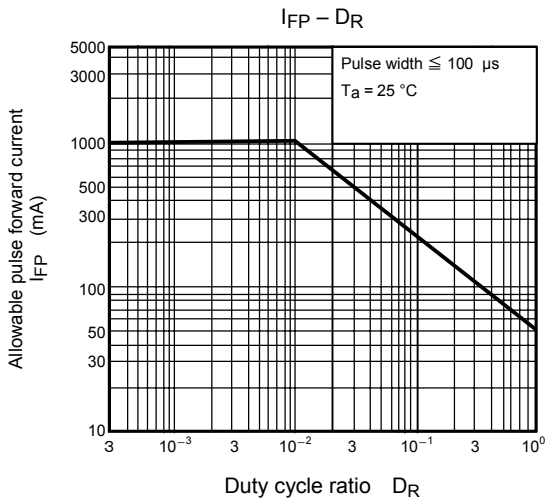
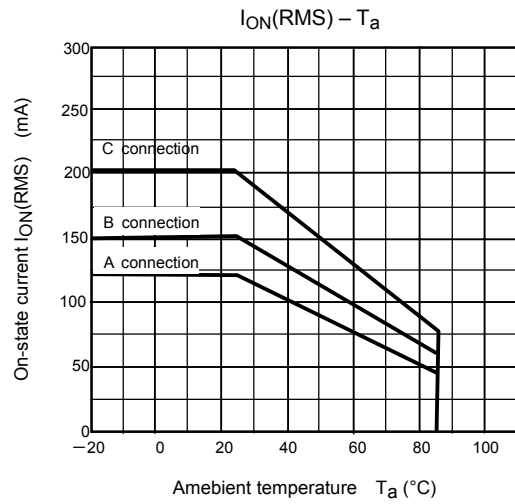
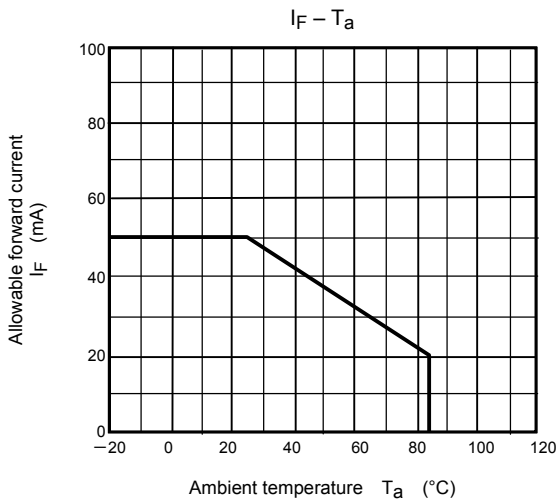
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance input to output	C_S	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	2500	—	—	Vrms
		AC, 1 second (in oil)	—	5000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

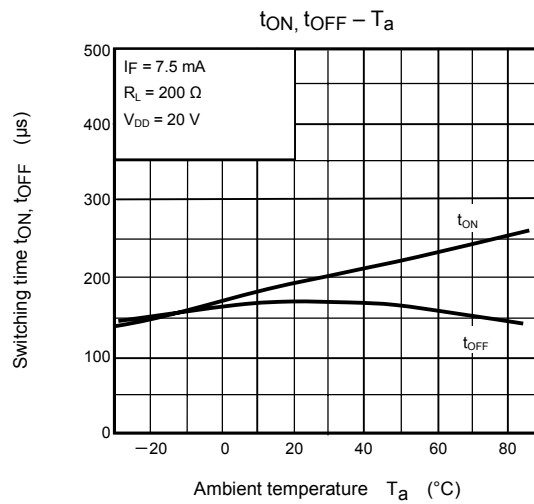
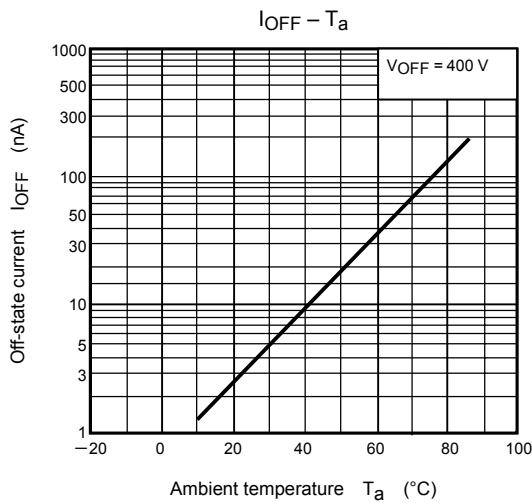
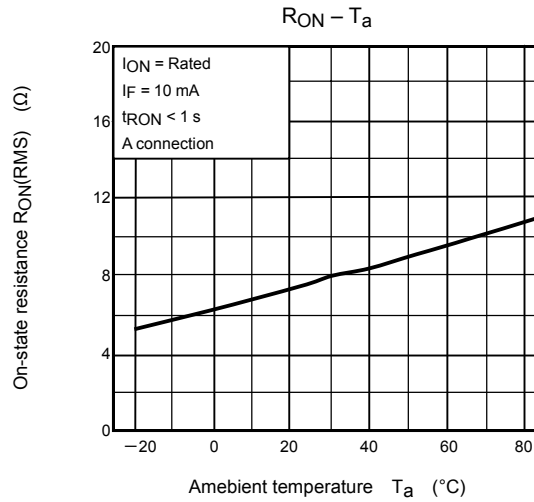
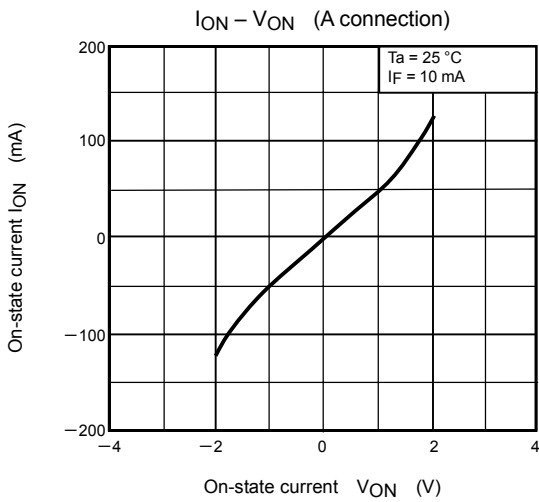
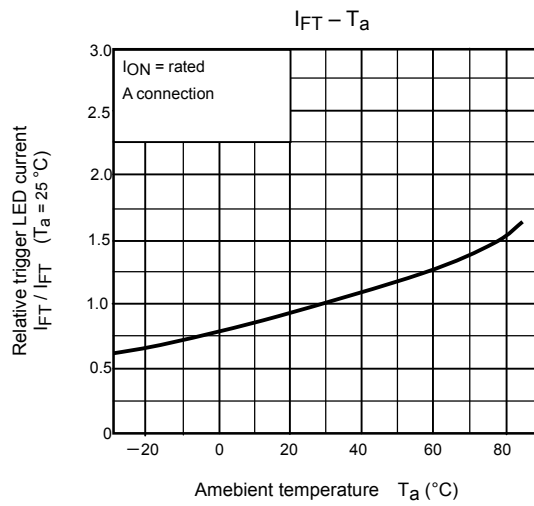
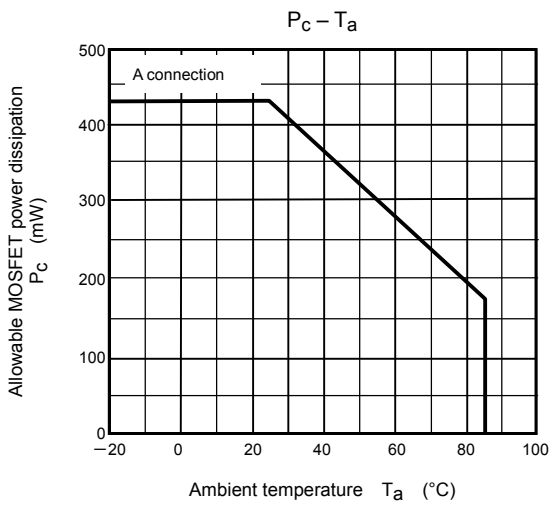
Switching Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Turn-on time	t_{on}	$R_L = 200 \Omega$ $V_{DD} = 20 \text{ V}, I_F = 10 \text{ mA}$	—	—	2	ms
Turn-off time	t_{off}		—	—	2	

Switching Time Test Circuit







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