TOSHIBA Photocoupler Photo Relay

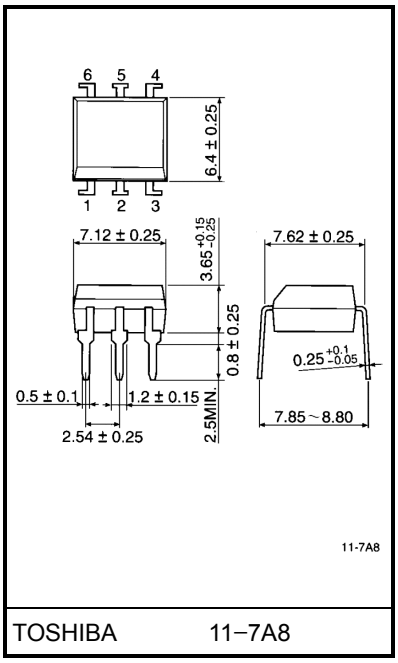
TLP599G

Telecommunication

Data Acquisition

Measurement Instrumentation

Unit in mm



TOSHIBA 11−7A8

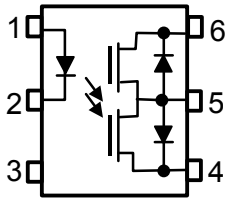
The TOSHIBA TLP599G consists of a gallium arsenide infrared emitting diode optically coupled to a photo−MOS FET in a six lead plastic DIP package (DIP6).
The TLP599G is a bi-directional switch which can replace mechanical relays in many applications.

- 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 (Ta = 25°C)

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

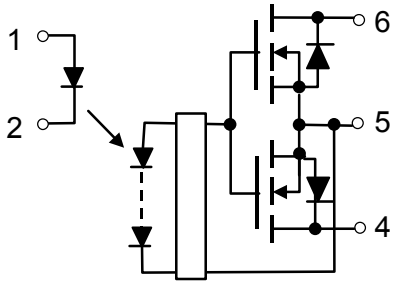
(Note 1): Application type name for certification test, please use standard product type name, i.e.
TLP599G (IFT2) :TLP599G

Pin Configuration (top view)



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

Schematic



Maximum Ratings (Ta = 25°C)

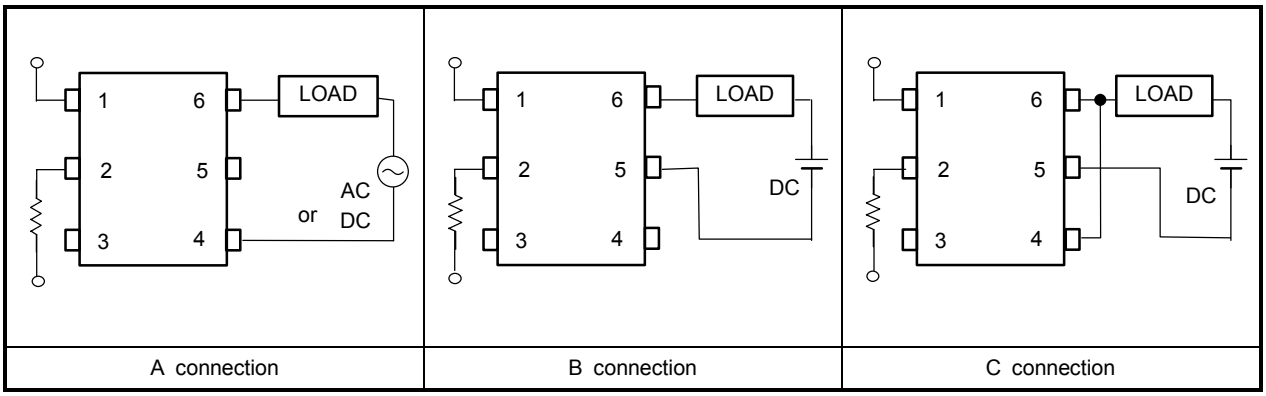
Characteristic			Symbol	Rating	Unit
LED	Forward current		I_F	50	mA
	Forward current derating (Ta ≥ 25°C)		ΔI_F / °C	−0.5	mA / °C
	Peak forward current (100 μs pulse, 100 pps)		I_{FP}	1	A
	Reverse voltage		V_R	5	V
	Junction temperature		T_j	125	°C
Detector	Off−state output terminal voltage		V_{OFF}	400	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	ΔI_{ON} / °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



A connection	B connection	C connection

Individual Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	V_F	I_F = 10 mA	1.0	1.15	1.3	V
	Reverse current	I_R	V_R = 5V	—	—	10	μA
	Capacitance	C_T	V = 0, f = 1 MHz	—	30	—	pF
Detector	Off−state current	I_{OFF}	V_{OFF} = 400 V	—	—	1	μA
	Capacitance	C_{OFF}	V = 0, f = 1 MHz	—	—	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ/	Max.	Unit
Trigger LED current		I_{FT}	I_{ON} = 120 mA	—	1	5	mA
On−state Resistance	A connection	R_{ON}	I_{ON} = 120 mA, I_F = 10 mA	—	20	30	Ω
	B connection		I_{ON} = 150 mA, I_F = 10 mA	—	12	20	
	C connection		I_{ON} = 200 mA, I_F = 10 mA	—	6	10	

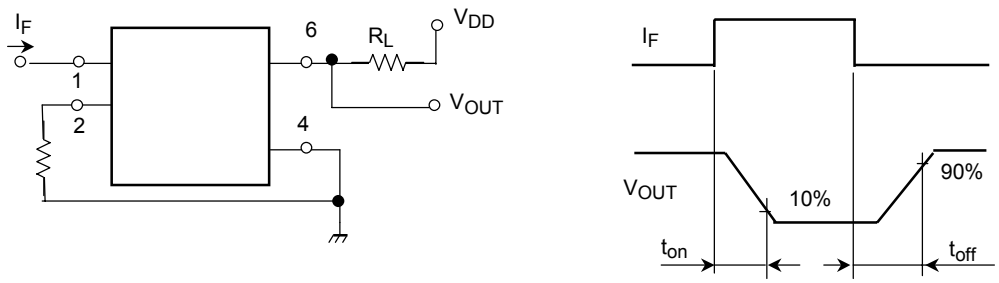
Isolation Characteristics (Ta = 25°C)

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

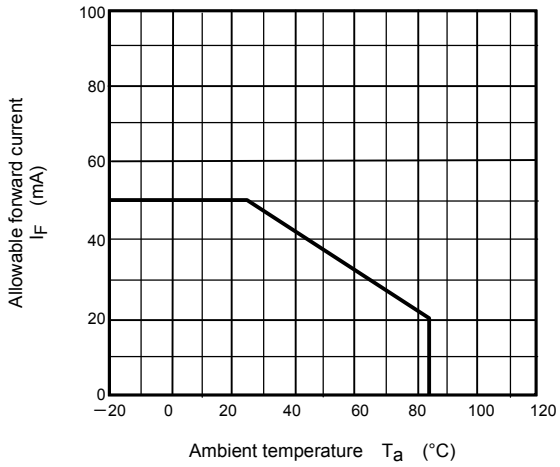
Switching Characteristics (Ta = 25°C)

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

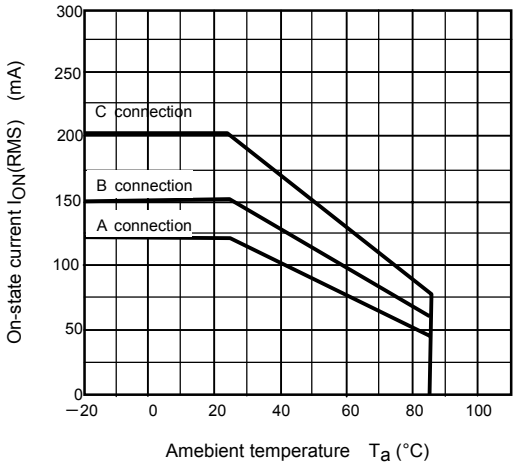
Switching Time Test Circuit



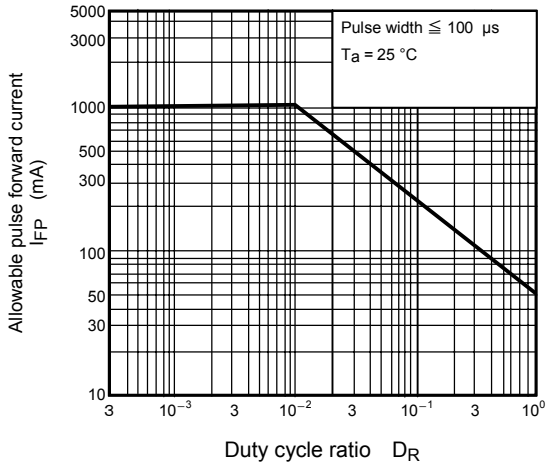
$I_F - T_a$



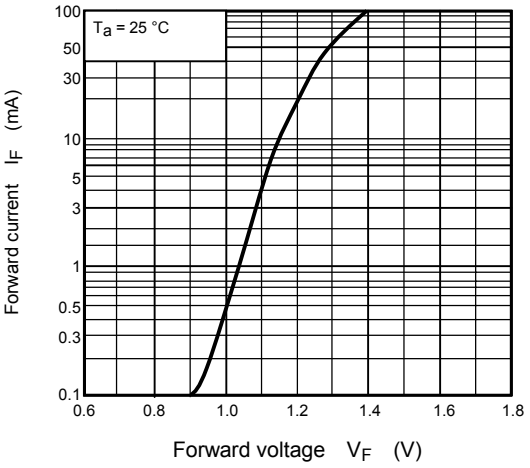
$I_{ON}(RMS) - T_a$



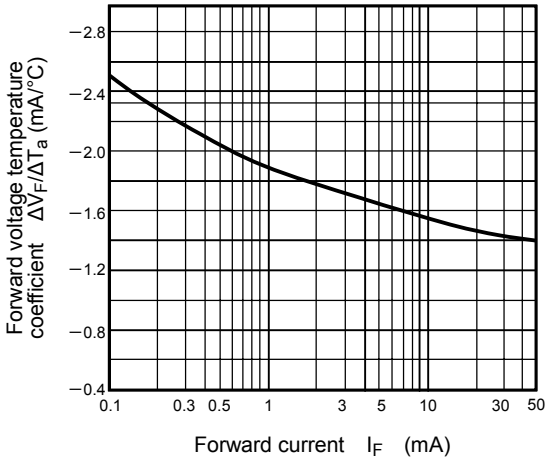
$I_{FP} - D_R$



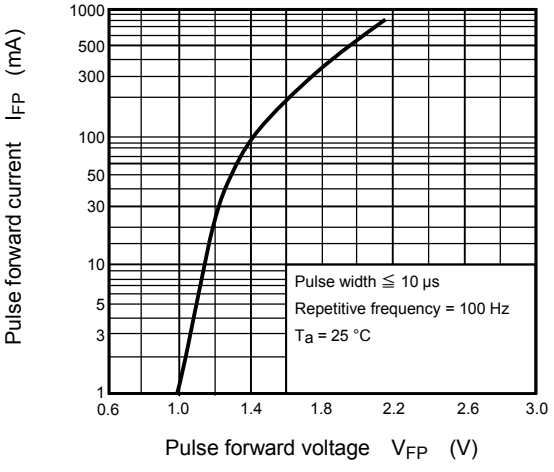
$I_F - V_F$



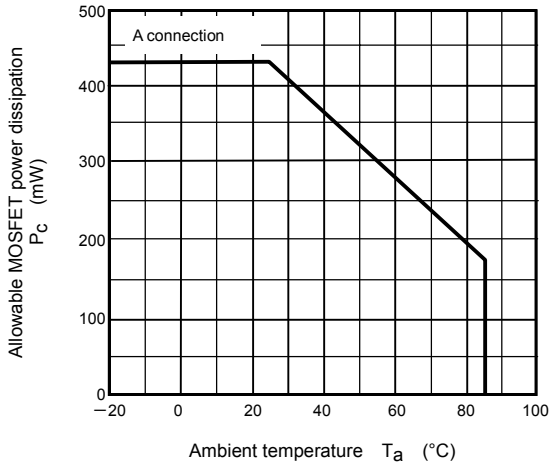
$\Delta V_F/\Delta Ta - I_F$



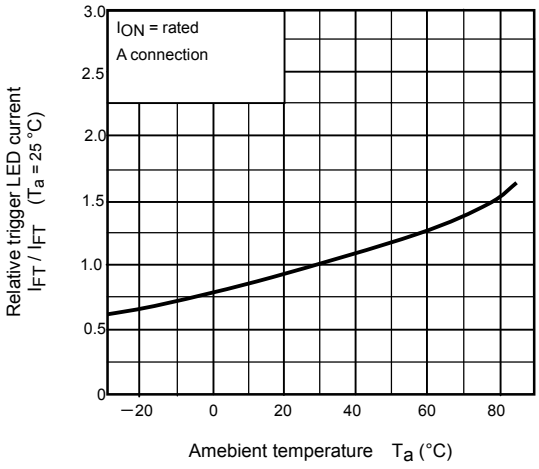
$I_{FP} - V_{FP}$



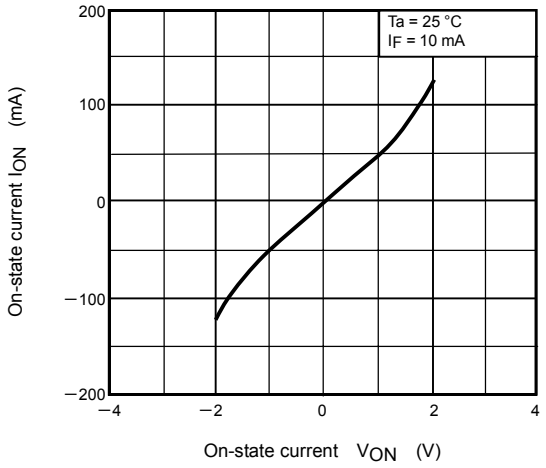
$P_C - T_a$



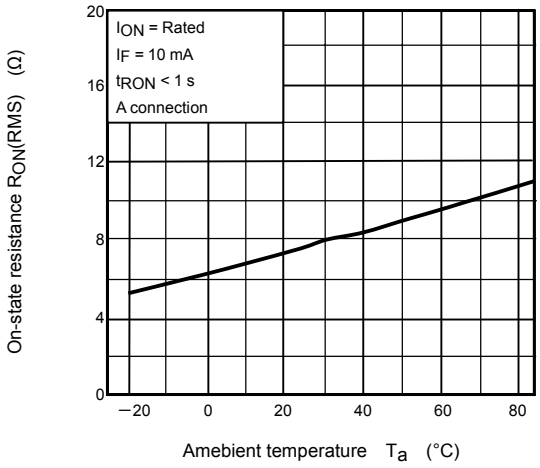
$I_{FT} - T_a$



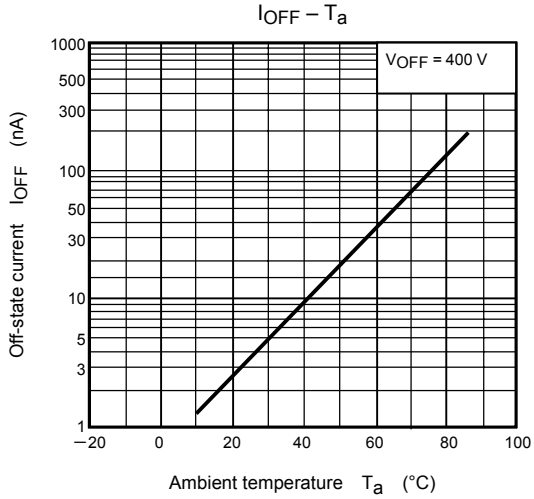
$I_{ON} - V_{ON}$ (A connection)



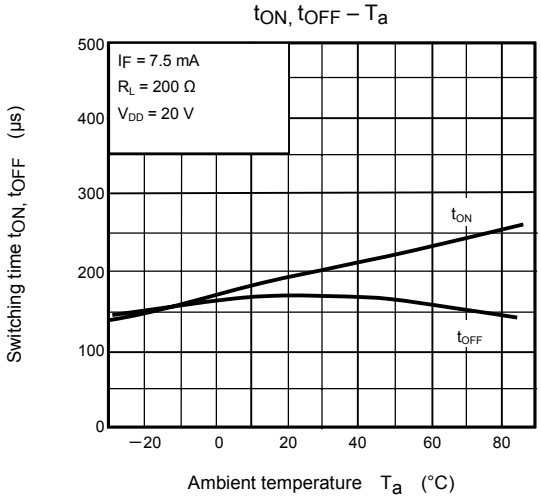
$R_{ON} - T_a$



$I_{OFF} - T_a$



t_{ON}, $t_{OFF} - T_a$



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000707EBC

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