

TOSHIBA Photocoupler Photo Relay

TLP227G, TLP227G-2

Cordless Telephone

PBX

Modem

Unit: mm

The TOSHIBA TLP227G series consist of a gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a plastic DIP package.

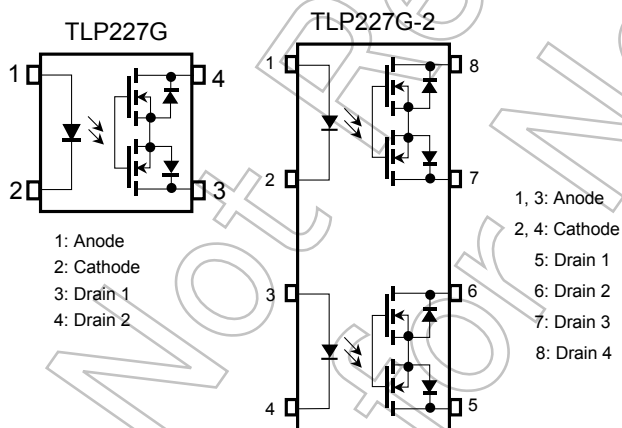
The TLP227G series are a bi-directional switch which can replace mechanical relays in many applications.

- TLP227G: 4 pin DIP(DIP4), 1 channel type(1 form A)
- TLP227G-2: 8 pin DIP(DIP8), 2 channel type(2 form A)
- Peak off-state voltage: 350 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)
- Isolation thickness: 0.4mm(min)
- UL approved: UL1577, File No.E67349 Under application
- cUL approved :CSA Component Acceptance Service
No. 5A, File No.E67349

Option (V4) VDE approved : DIN EN60747-5-5 (Note 1)

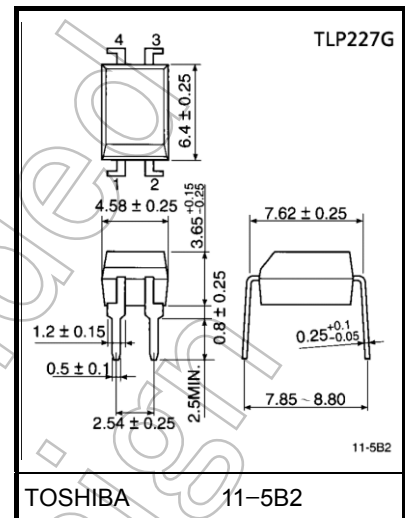
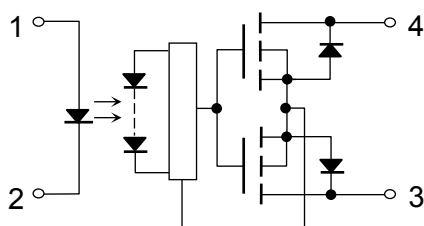
(Note 1) : When a EN60747-5-5 approved type is needed,
please designate "Option(V4)"

Pin Configuration (top view)



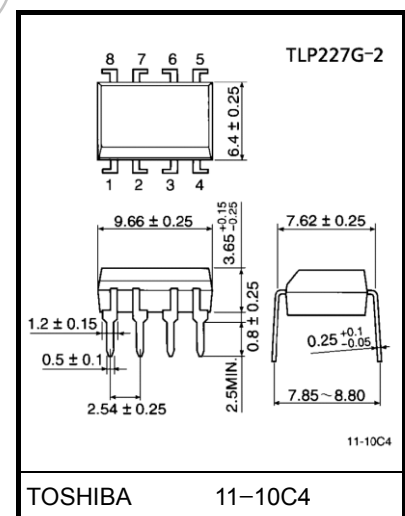
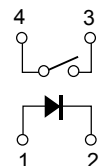
Internal Circuit

(TLP227G)



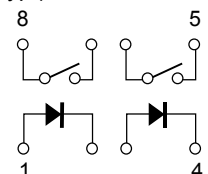
Weight: 0.26g (typ.)

1 Form A



Weight: 0.54g (typ.)

2 Form A



Start of commercial production
1995-11

Absolute 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 (100μs pulse, 100pps)			I _{FP}	1	A
	Reverse voltage			V _R	5	V
	Diode power dissipation			P _D	50	mW
	Diode power dissipation derating (Ta ≥ 25°C)			ΔP _D / °C	-0.5	mW/°C
	Junction temperature			T _J	125	°C
Detector	Off-state output terminal voltage			V _{OFF}	350	V
	On-state current	TLP227G		I _{ON}	120	mA
		TLP227G-2	One channel		120	
			Both channel (Note 1)		100	
	On-state current derating (Ta ≥ 25°C)	TLP227G		ΔI _{ON} / °C	-1.2	mA / °C
		TLP227G-2	One channel		-1.2	
			Both channel (Note 1)		-1.0	
	Output power dissipation	TLP227G		P _O	432	mW
		TLP227G-2			600	
	Output power dissipation derating (Ta ≥ 25°C)	TLP227G		ΔP _O / °C	-4.32	mW / °C
		TLP227G-2			-6.0	
	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	V _{rms}

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 1): Two channels operating simultaneously.

(Note 2): Device considered a two-terminal device: LED side pins shorted together, and detector side pins shorted together.

Recommended Operating Conditions

Characteristic	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}	—	—	100	mA
Operating temperature	T _{opr}	-20	—	65	°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.

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	$V_F = 0 \text{ V}, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Off-state current	I_{OFF}	$V_{OFF} = 350 \text{ V}$	—	—	1	μA
	Capacitance	C_{OFF}	$V = 0 \text{ V}, f = 1 \text{ MHz}$	—	40	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}	$I_{ON} = 120 \text{ mA}$	—	2	3	mA
On-state resistance	R_{ON}	$I_{ON} = 120 \text{ mA}, I_F = 5 \text{ mA}$	—	22	35	Ω
		$I_{ON} = 20 \text{ to } 120 \text{ mA}, I_F = 5 \text{ mA}$	—	26	40	
Return LED current	I_{FC}	$I_{OFF} = 100 \mu\text{A}$	0.1	—	—	mA

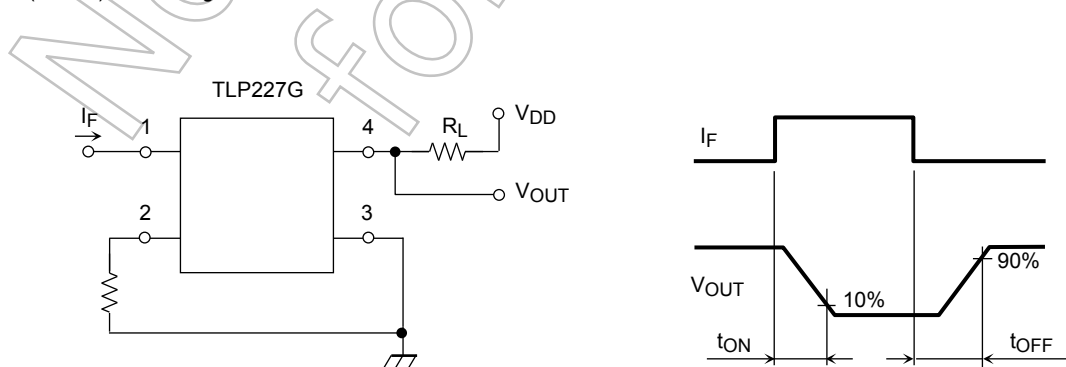
Isolation Characteristics (Ta = 25°C)

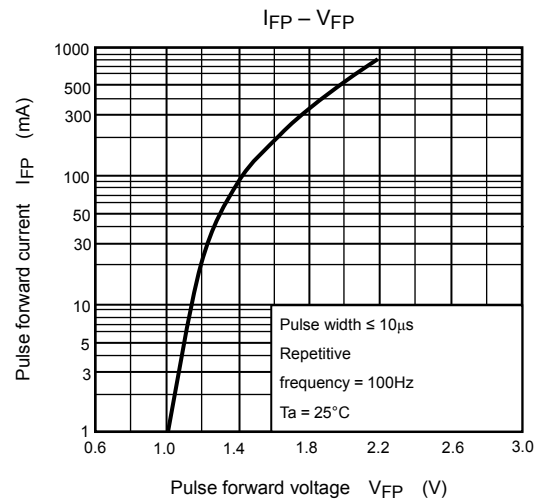
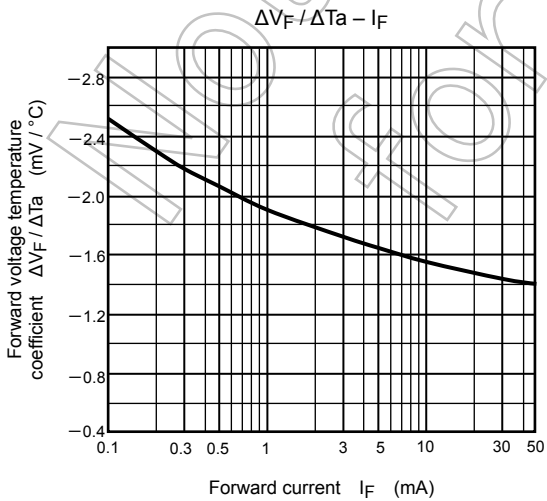
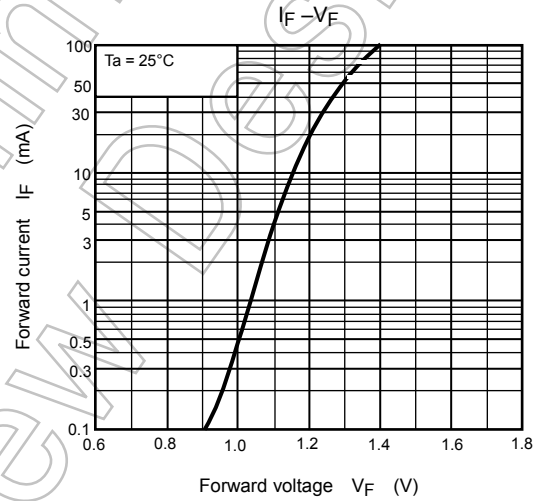
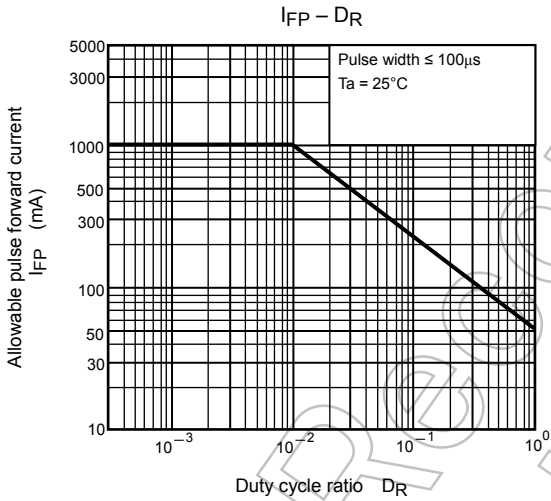
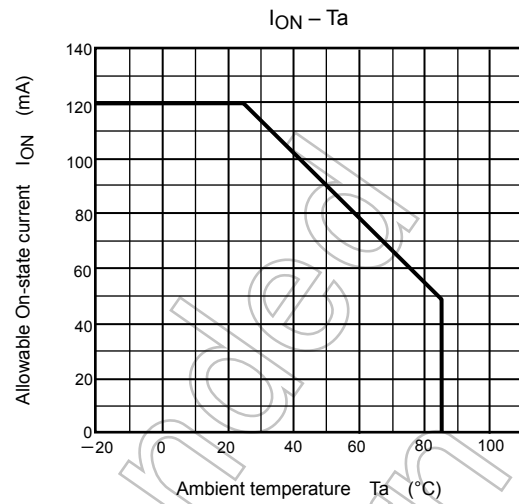
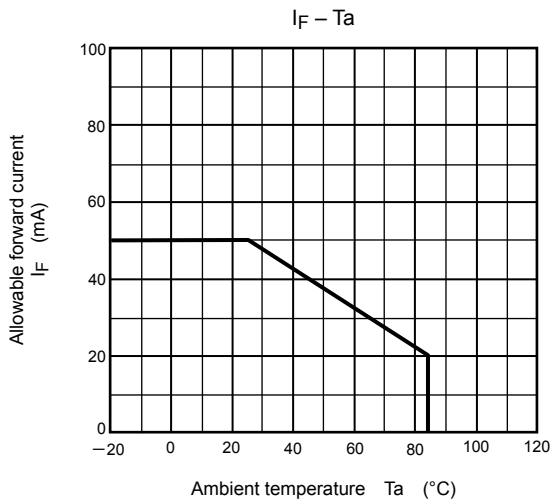
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	2500	—	—	V_{rms}
		AC, 1 second (in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

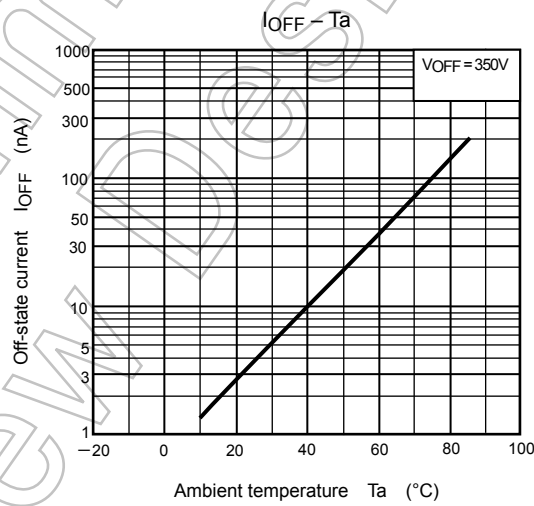
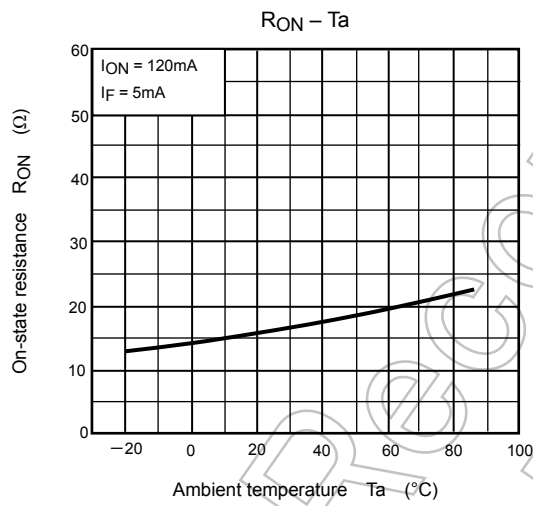
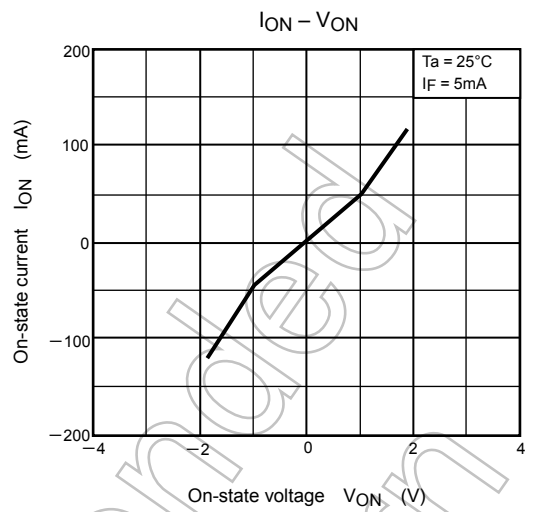
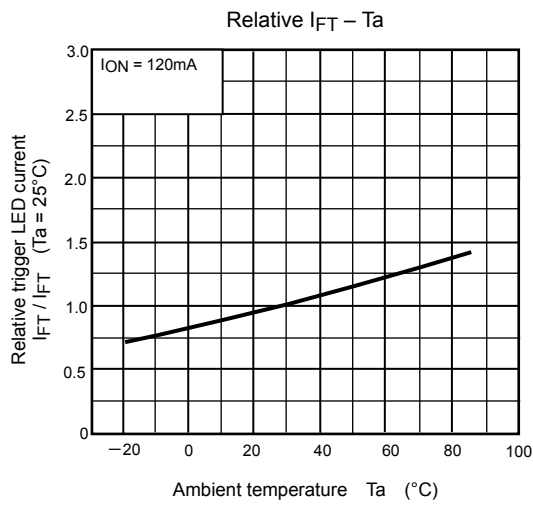
Switching Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t_{ON}	$R_L = 200 \Omega$	—	0.3	1	ms
Turn-off time	t_{OFF}	$V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA (Note 3)}$	—	0.1	1	

(Note 3) : Switching Time Test Circuit







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