

TOSHIBA Photocoupler Photorelay

TLP4227G, TLP4227G-2

PBX

Telecommunication

Modem · FAX Cards, Modems In PC

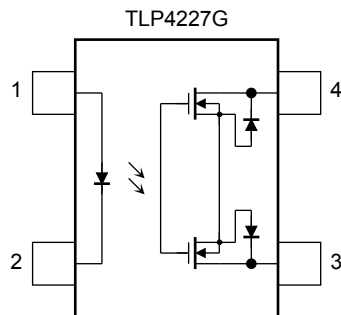
Measurement Instrumentation

The TOSHIBA TLP4227G series consist of an infrared emitting diode optically coupled to a photo-MOSFET in a plastic DIP package.

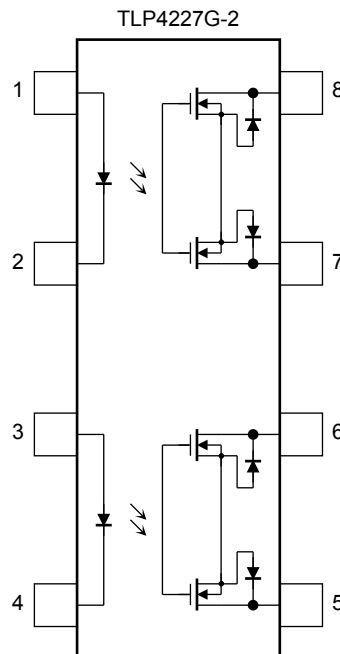
The TLP4227G series are a bi-directional switch, which can replace mechanical relays in many applications.

- Peak off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 150 mA (max)
- On-state resistance: 25 Ω (max)
- Isolation voltage: 2500 Vrms (min)
- UL-recognized: UL 1577, File No. E67349

Pin Configuration (top view)

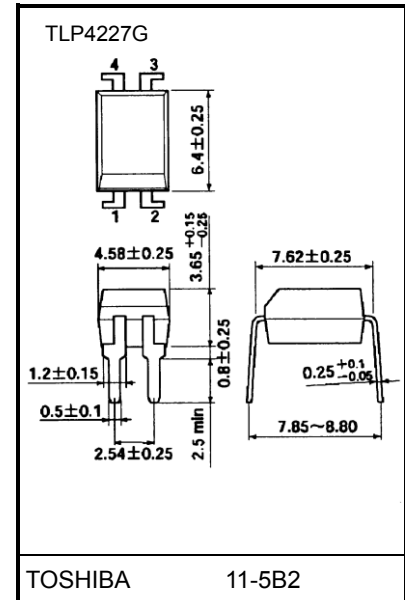


- 1: ANODE
- 2: CATHODE
- 3: DRAIN
- 4: DRAIN



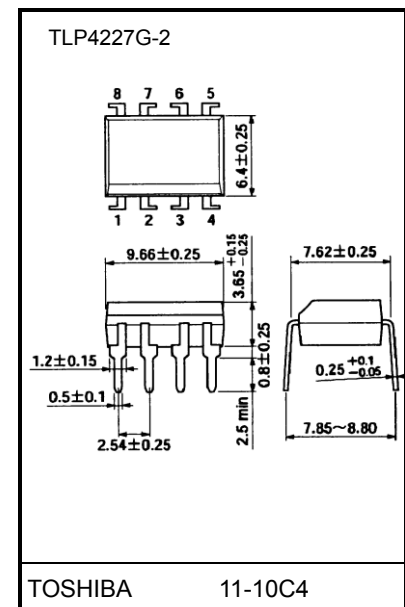
- 1, 3: ANODE
- 2, 4: CATHODE
- 5 : DRAIN D1
- 6 : DRAIN D2
- 7 : DRAIN D3
- 8 : DRAIN D4

Unit: mm



Weight: 0.26 g (typ.)

Unit: mm



Weight: 0.54 g (typ.)

Start of commercial production
2000-09

Absolute Maximum Ratings (Ta = 25°C)

Characteristics			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	
	Diode power dissipation		P_D	50	mW	
	Diode power dissipation derating (Ta ≥ 25°C)		$\Delta P_D / ^\circ\text{C}$	-0.5	mW/°C	
	Junction temperature		T_j	125	°C	
Detector	Off-state output terminal voltage		V_{OFF}	350	V	
	On-state current	TLP4227G	I_{ON}	150	mA	
		TLP4227G-2				One channel
	On-state current derating (Ta ≥ 25°C)	TLP4227G	$\Delta I_{ON} / ^\circ\text{C}$	-1.5	mA/°C	
		TLP4227G-2				One channel
Output power dissipation		P_O	506	mW		
Output power dissipation derating (Ta ≥ 25°C)		$\Delta P_O / ^\circ\text{C}$	-5.06	mW / °C		
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, 60 s, R.H. ≤ 60 %) (Note 1)		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 1: Device considered a two-terminal device: LED side pins shorted together, and DETECTOR side pins shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	V _{DD}	—	—	280	V
Forward current	I _F	5	—	25	mA
On-state current	I _{ON}	—	—	150	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.

Electrical Characteristics (T_a = 25°C)

Characteristics		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 = 5 V	—	—	10	μA
	Capacitance	C _T	V _F = 0 V, f = 1 MHz	—	30	—	pF
Detector	Off-state current	I _{OFF}	V _{OFF} = 350 V	—	—	1	μA
	Capacitance	C _{OFF}	V = 0 V, f = 1 MHz, I _F = 5 mA	—	65	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I _{FC}	I _{OFF} = 10 μA	—	1	3	mA
Return LED current	I _{FT}	I _{ON} = 150 mA	0.1	—	—	mA
On-state resistance	R _{ON}	I _{ON} = 150 mA	—	15	25	Ω

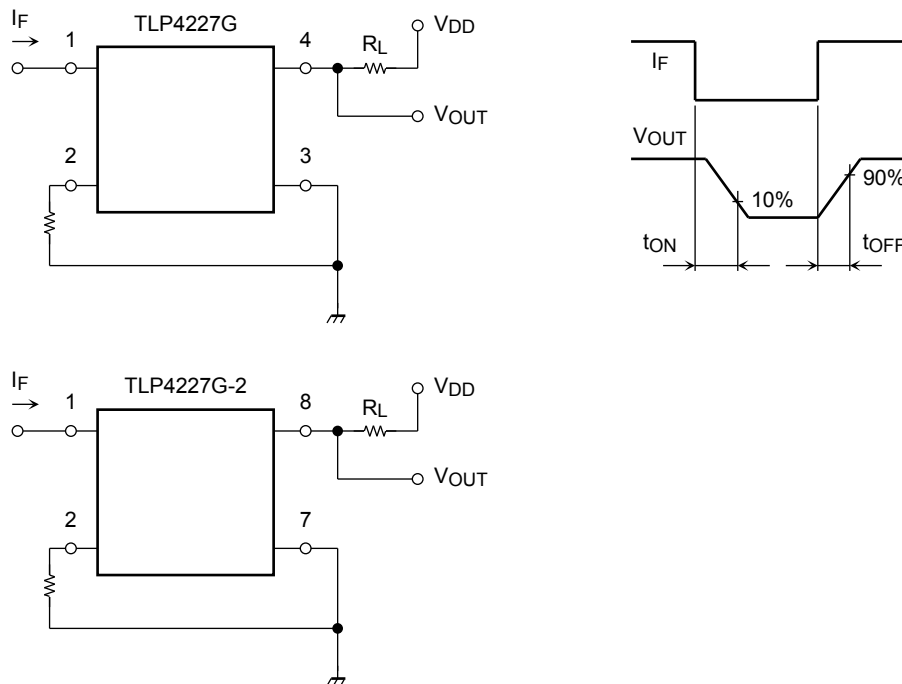
Isolation Characteristics (Ta = 25°C)

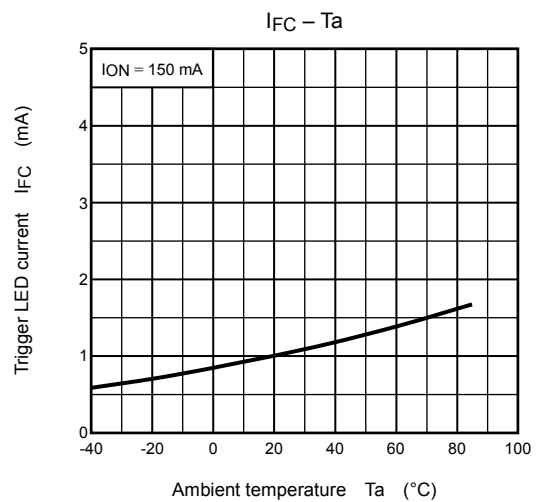
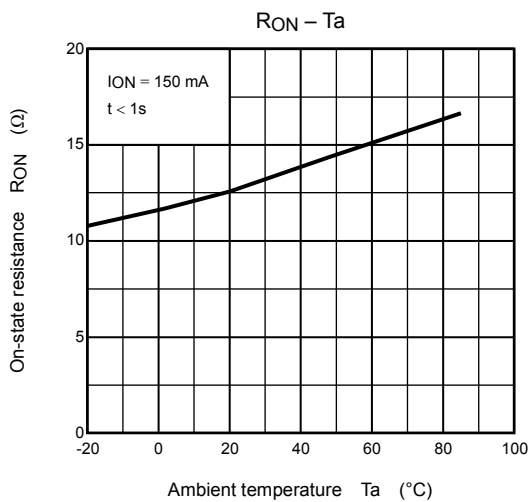
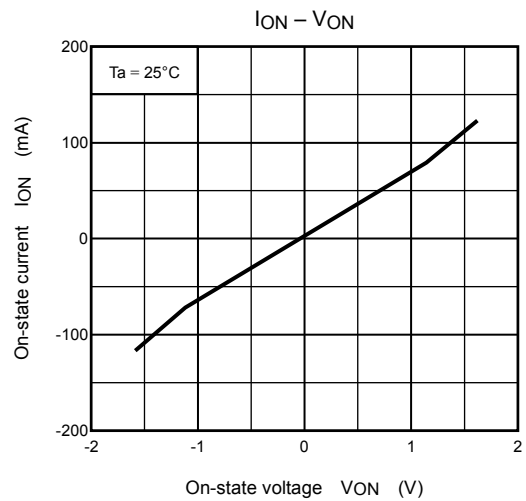
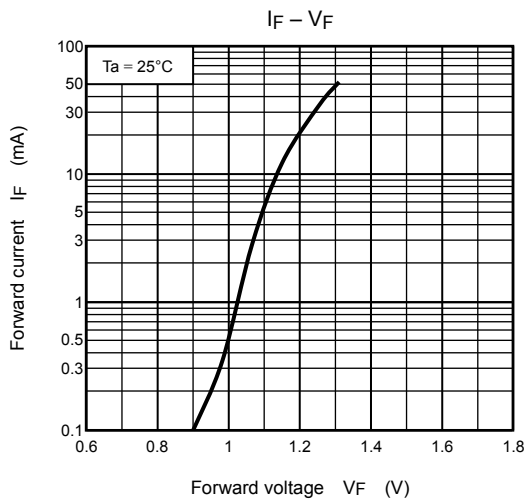
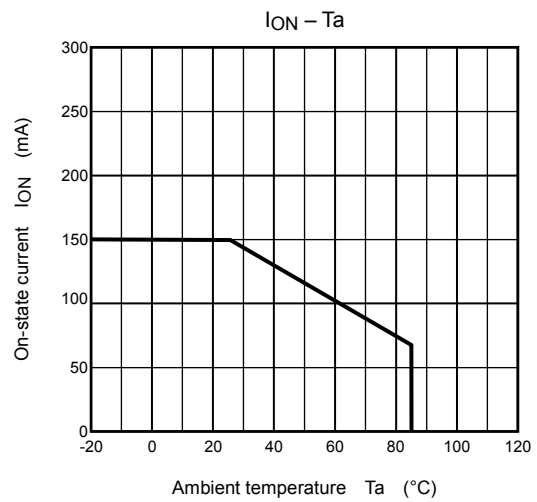
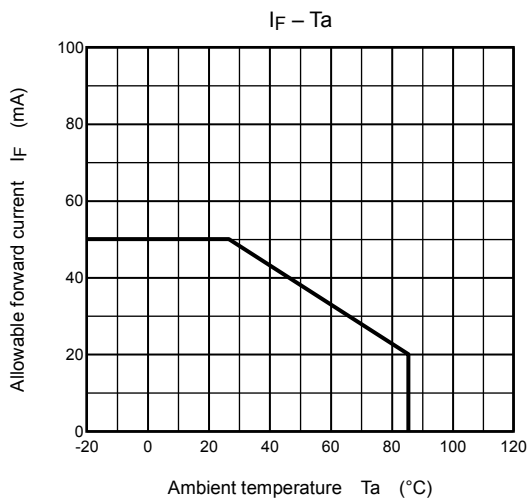
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C _S	V _S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R _S	V _S = 500 V, R.H. ≤ 60 %	5 × 10 ¹⁰	10 ¹⁴	—	Ω
Isolation voltage	B _V S	AC, 60 s	2500	—	—	V _{rms}

Switching Characteristics (Ta = 25°C)

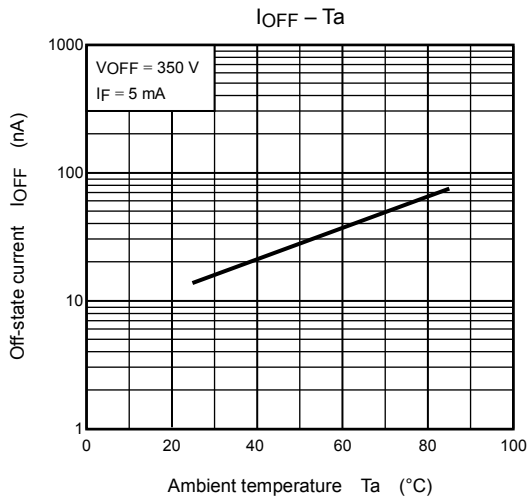
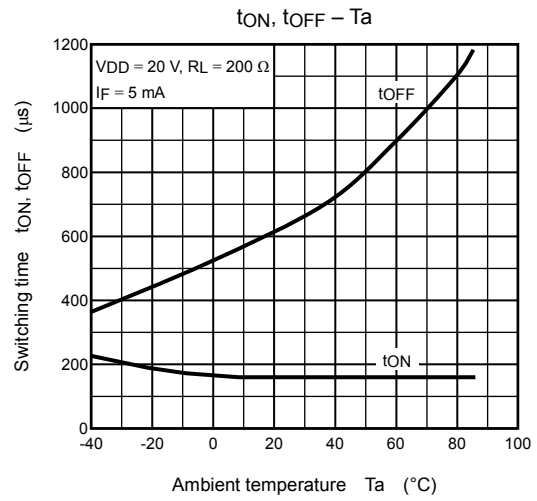
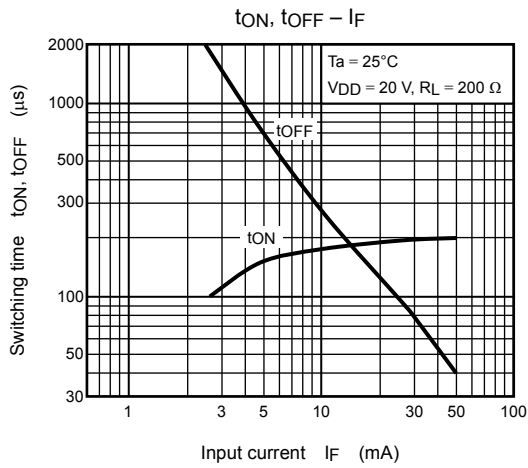
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t _{ON}	R _L = 200 Ω	—	—	1	ms
Turn-off time	t _{OFF}	V _{DD} = 20 V, I _F = 5 mA (Note 2)	—	—	3	ms

Note 2: Switching time test circuit





NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



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