

TOSHIBA Photocoupler Photorelay

TLP4227G, TLP4227G-2

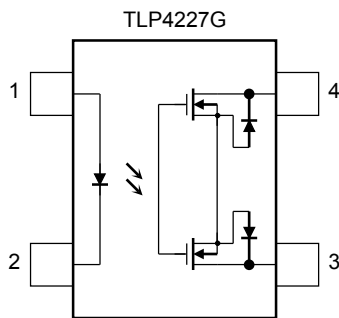
PBX
 Telecommunication
 Modem · FAX Cards, Modems In PC
 Measurement Instrumentation

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

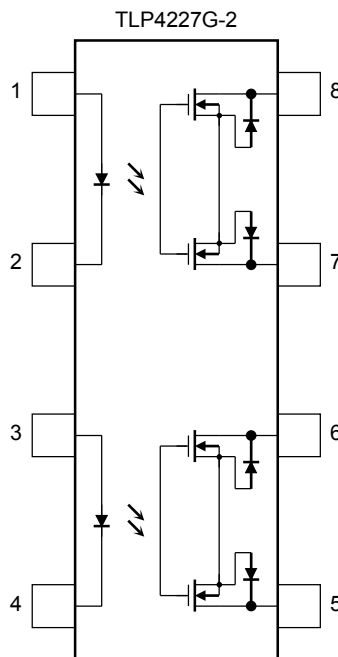
The TLP4227G series are a bi-directional switch, which can replace mechanical relays in many applications.

- 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: UL1577 File No. E67349

Pin Configuration (top view)

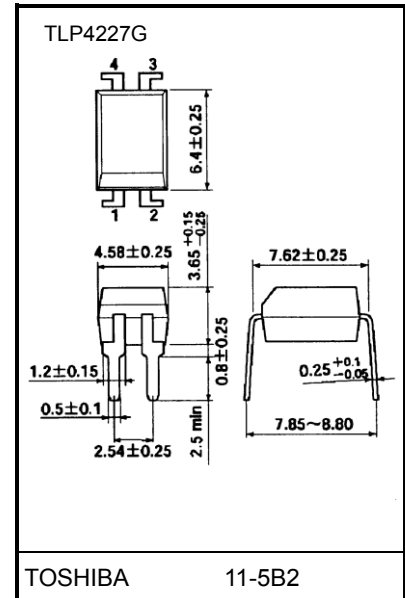


1: ANODE
 2: CATHODE
 3: DRAIN
 4: DRAIN



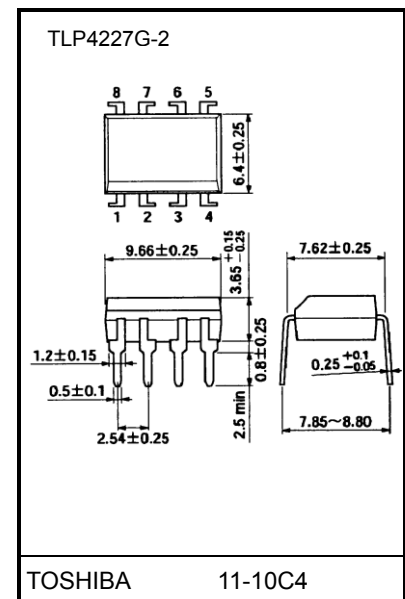
1, 3: ANODE
 2, 4: CATHODE
 5 : DRAIN D1
 6 : DRAIN D2
 7 : DRAIN D3
 8 : DRAIN D4

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			
	On-state current derating (Ta ≥ 25°C)	TLP4227G	$\Delta I_{ON} / ^\circ\text{C}$	-1.5	mA/°C
		TLP4227G-2			
	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, 1 minute, 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 (Ta = 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	IFC	I _{OFF} = 10 μA	—	1	3	mA
Return LED current	IFT	I _{ON} = 150 mA	0.1	—	—	mA
On-state resistance	R _{ON}	I _{ON} = 150 mA	—	15	25	Ω

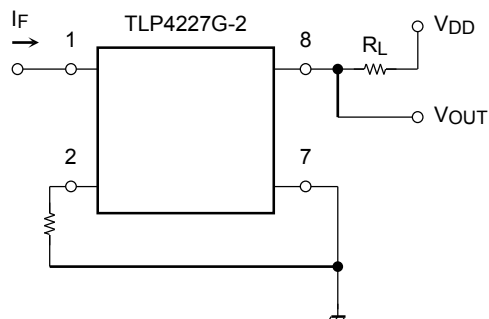
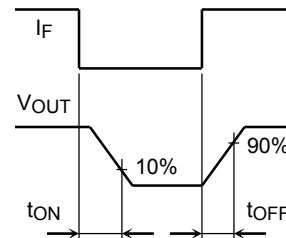
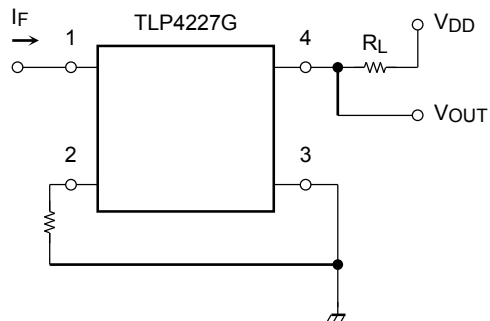
Isolation Characteristics (Ta = 25°C)

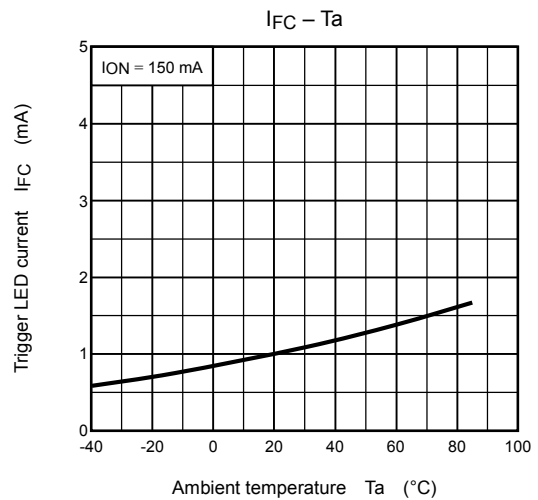
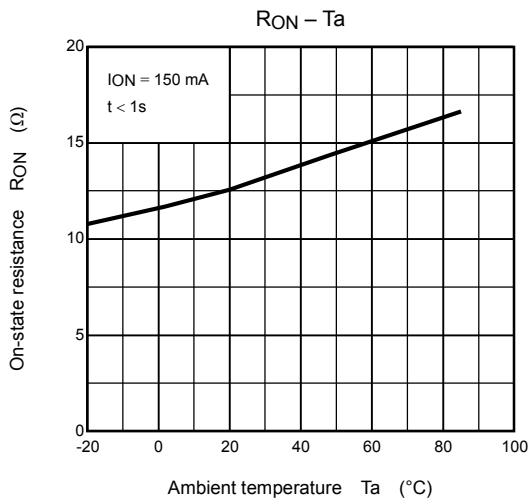
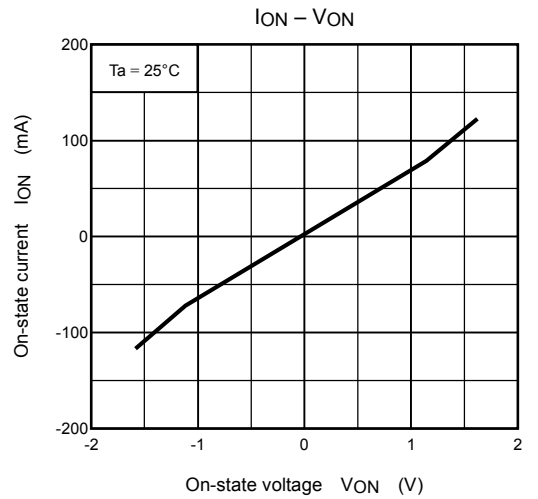
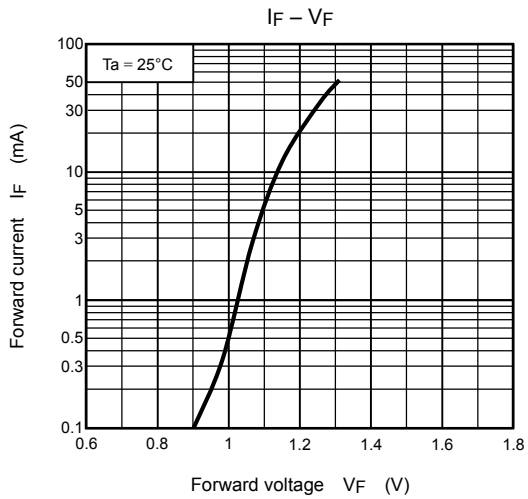
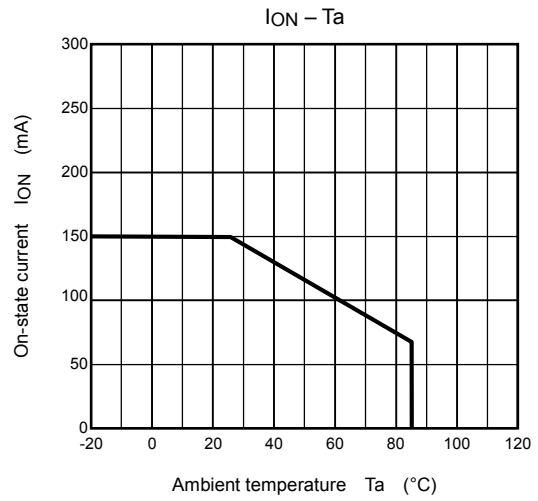
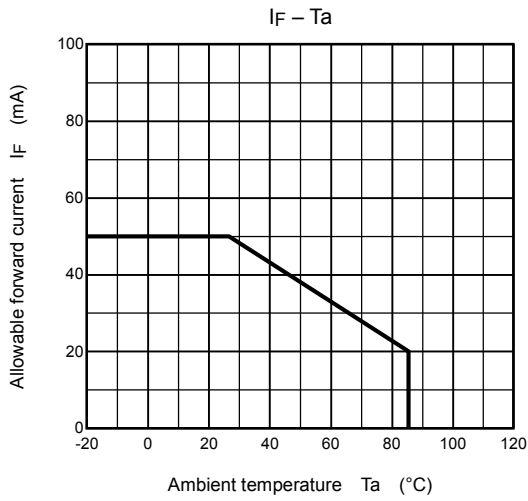
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C _S	V _S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R _S	V _S = 500 V, R.H. ≤ 60%	5 × 10 ¹⁰	10 ¹⁴	—	Ω
Isolation voltage	BV _S	AC, 1 minute	2500	—	—	V _{rms}
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000	—	V _{dc}

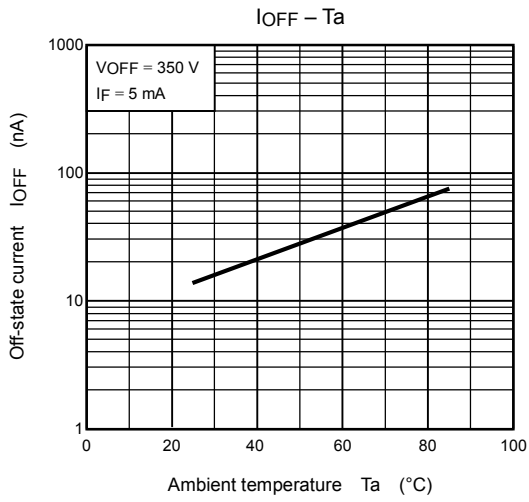
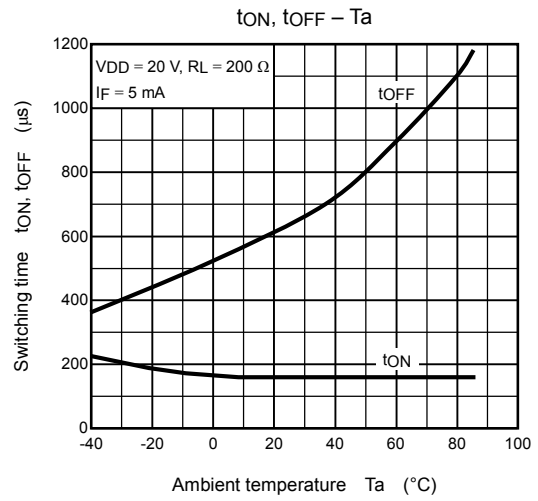
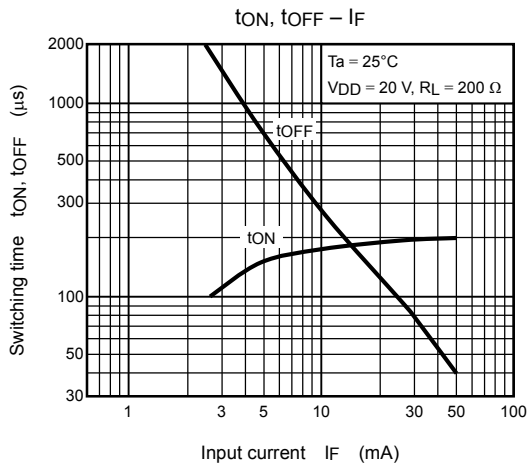
Switching Characteristics (Ta = 25°C)

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







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