TOSHIBA Photocoupler Photo Relay

TLP227GA, TLP227GA-2

Modem

Telecommunications

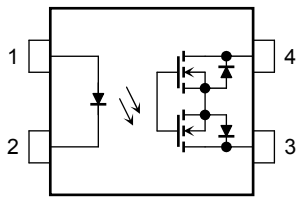
PBXs

The Toshiba TLP227GA series consist of a gallium arsenide infrared-emitting diode optically coupled to a photo-MOSFET in a 4-pin DIP or a 8-pin DIP package, and has a peak off-State voltage of 400 V.

- Normally off function
- TLP227GA : DIP4 (1 form A)
  TLP227GA-2 : DIP8 (2 form A)
- Peak off-state voltage : 400 V (min)
- Trigger LED current : 3 mA (max)
- On-state current : 120 mA (max)
- On-state resistance : 35Ω (max)
- Isolation voltage : 2500 Vrms (min)

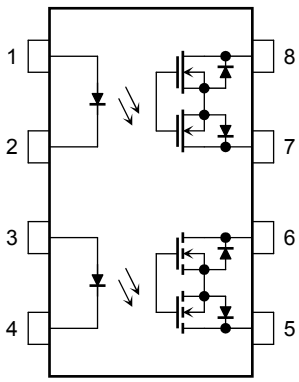
Pin Configuration (top view)

TLP227GA



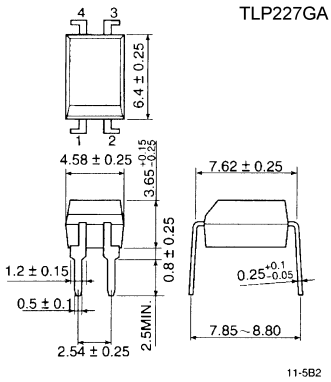
1: Anode
2: Cathode
3: Drain
4: Drain

TLP227GA-2



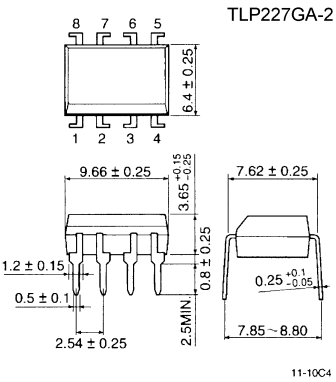
1, 3: Anode
2, 4: Cathode
5 : Drain D1
6 : Drain D2
7 : Drain D3
8 : Drain D4

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	11-5B2

Weight: 0.26 g (typ.)



JEDEC	—
JEITA	—
TOSHIBA	11-10C4

Weight: 0.54 g (typ.)

Absolute Maximum Rating (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 current	TLP227GA		I_{ON}	120	Ma
		TLP227GA-2	One channel			
			Both channel			
	On-state current rating (Ta ≧ 25°C)	TLP227GA		ΔI_{ON}/°C	−1.2	mA/°C
		TLP227GA-2	One channel			
			Both channel			
	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 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: LED pins are shorted together. Detector pins are also shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{DD}	—	—	320	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 mA	1.0	1.15	1.3	V
	Reverse current	I_R	V_R = 5 V	—	—	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	3	mA
On-state resistance	R_{ON}	I_{ON} = 120 mA, I_F = 5 mA	—	18	35	Ω

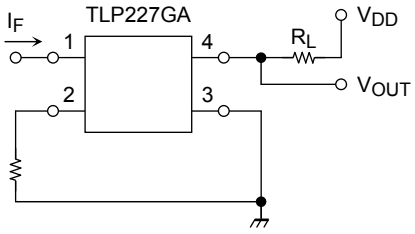
Isolation Characteristics (Ta = 25°C)

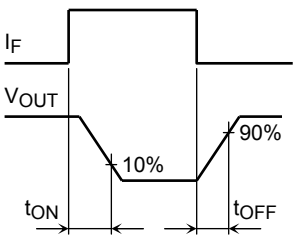
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	V_S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R_S	V_S = 500 V, R.H. ≦ 60%	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 min	2500	—	—	Vrms
		AC, 1 s (in oil)	—	5000	—	
		DC, 1 min (in oil)	—	5000	—	Vdc

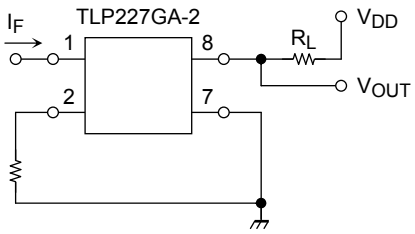
Switching Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t_{ON}	R_L = 200 Ω V_{DD} = 20 V, I_F = 5 mA (Note 2)	—	—	1	ms
Turn-off time	t_{OFF}		—	—	1	

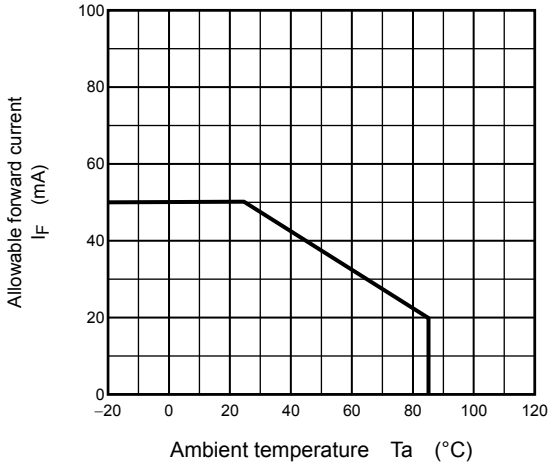
Note 2: Switching time test circuit



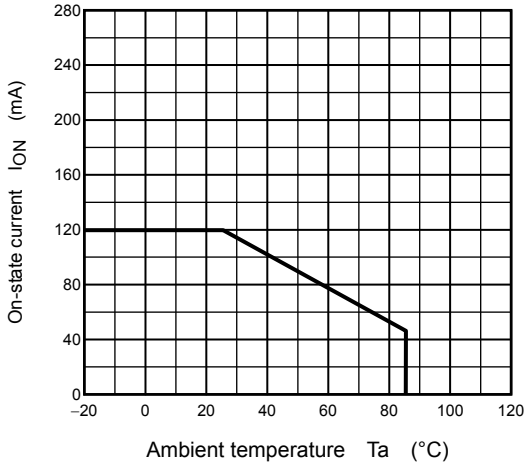




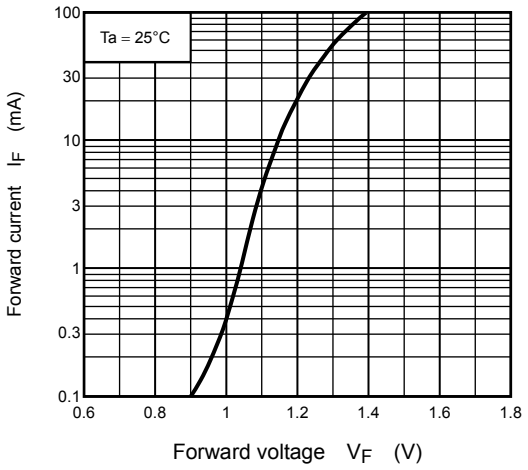
I_F – Ta



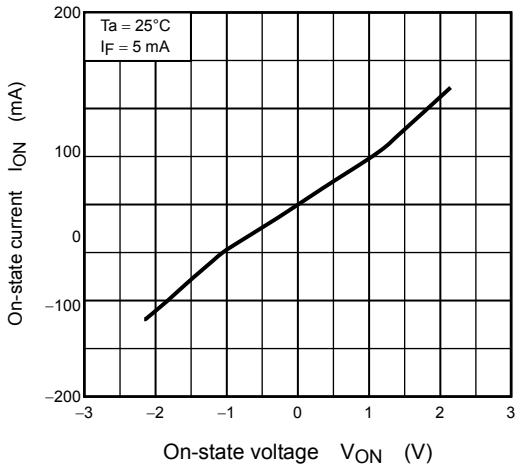
I_{ON} – Ta



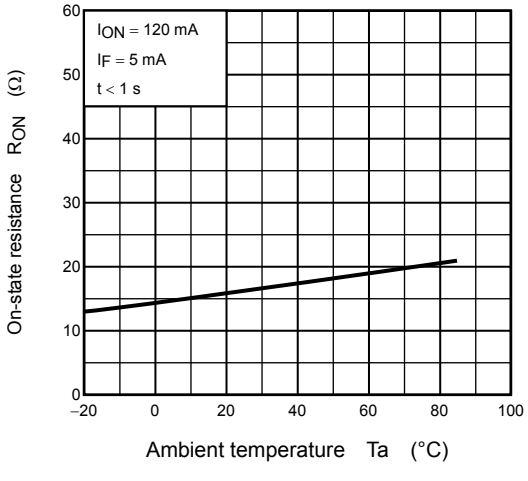
I_F – V_F



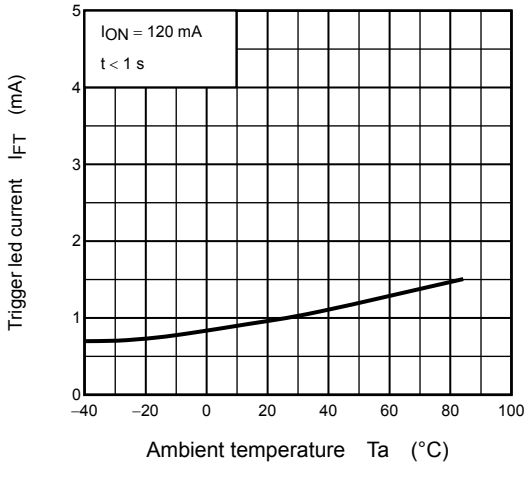
I_{ON} – V_{ON}



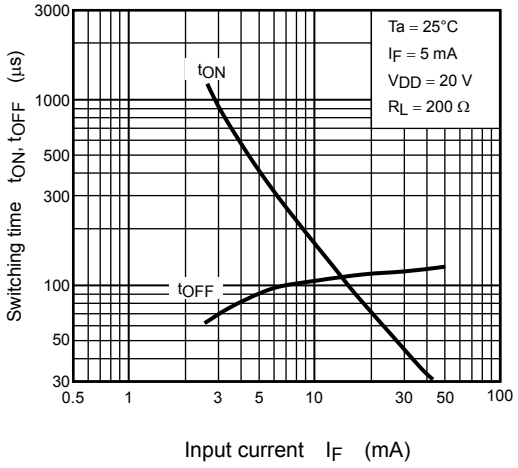
R_{ON} – Ta



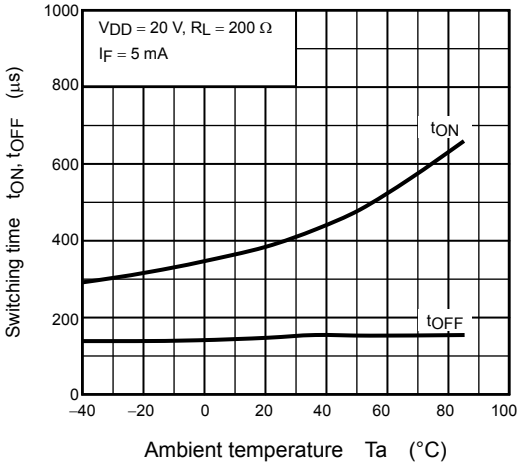
I_{FT} – Ta



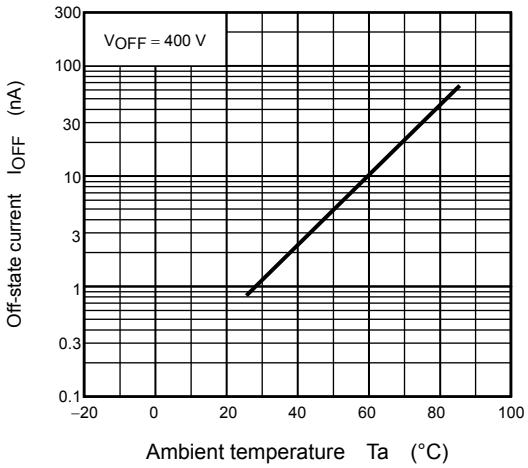
t_{ON}, t_{OFF} – I_F



t_{ON}, t_{OFF} – Ta



I_{OFF} – Ta



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20070701-EN

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