TOSHIBA Photocoupler Photorelay

TLP176GA

PBX

Telecommunication

Modem · FAX Cards, Modems In PC

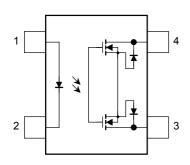
Measurement Instrumentation

The TOSHIBA TLP176GA consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a SOP, which is suitable for surface mount assembly.

The TLP176GA is suitable for the modem applications which require space savings. $\,$

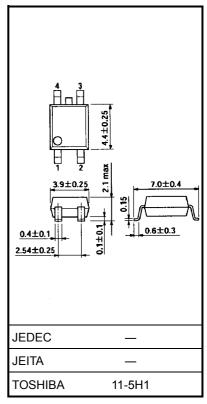
- 4 pin SOP (2.54SOP4): 2.1 mm high, 2.54 mm pitch
- 1-form-A
- Peak off-state voltage: 400 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 120 mA (max)
- On-state resistance: 35Ω (max)
- Isolation voltage: 1500 Vrms (min)

Pin Configuration (top view)



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

Unit: mm



Weight: 0.1 g (typ.)

Maximum Ratings (Ta = 25°C)

	Characteristics	Symbol	Rating	Unit
	Forward current	lF	50	mA
LED	Forward current derating (Ta ≧ 25°C)	ΔI _F /°C	-0.5	mA/°C
	Peak forward current (100 μs pulse, 100 pps)	I _{FP}	1	А
	Reverse voltage	V _R	5	V
	Junction temperature	Tj	125	°C
	Off-state output terminal voltage	V _{OFF}	400	V
tor	On-state current	I _{ON}	120	mA
Detector	On-state current derating (Ta ≥ 25°C)	Δl _{ON} /°C	-1.2	mA/°C
	Junction temperature	Tj	125	°C
Operating temperature range		T _{opr}	-40 to 85	°C
Storage temperature range		T _{stg}	-55 to 125	°C
Lead soldering temperature (10 s)		T _{sol}	260	°C
	tion voltage 1 min, R.H. ≦ 60%) (Note 1)	BVS	1500	Vrms

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	Тур.	Max	Unit
Supply voltage	V_{DD}	_	_	320	V
Forward current	lF	5	7.5	25	mA
On-state current	I _{ON}	_	_	120	mA
Operating temperature	T _{opr}	-20	_	65	°C

Individual Electrical Characteristics (Ta = 25°C)

	Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
	Forward voltage	V _F	I _F = 10 mA	1.0	1.15	1.3	V
LED	Reverse current	I _R	V _R = 5 V	_	_	10	μА
	Capacitance	C _T	V = 0, f = 1 MHz	_	30	_	pF
ec-	Off-state current	l _{OFF}	V _{OFF} = 400 V	_	_	1	μА
Detec- tor	Capacitance	C _{OFF}	V = 0, f = 1 MHz	_	70	_	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Trigger LED current	I _{FT}	I _{ON} = 120 mA	_	1	3	mA
Return LED current	I _{FC}	I _{OFF} = 100 μA	0.1	_	_	mA
On-state resistance	R _{ON}	I _{ON} = 120 mA, I _F = 5 mA	_	17	35	Ω

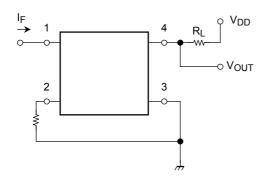
Isolation Characteristics (Ta = 25°C)

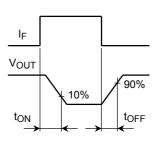
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Capacitance input to output	CS	V _S = 0, f = 1 MHz	_	0.8	_	pF
Isolation resistance	R _S	V _S = 500 V, R.H. ≦ 60%	5×10^{10}	10 ¹⁴	_	Ω
		AC, 1 min	1500	_	_	Vrms
Isolation voltage	BV_S	AC, 1 s, in oil	_	3000	_	VIIIIS
		DC, 1 min, in oil	_	3000	_	Vdc

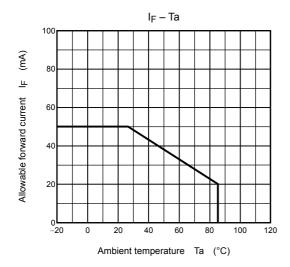
Switching Characteristics (Ta = 25°C)

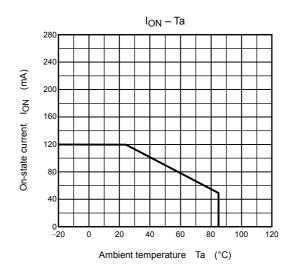
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Turn-on time	ton	$R_L = 200 \Omega$ (Note 2)	_	0.3	1	ms
Turn-off time	toff	$V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$	_	0.1	1	ms

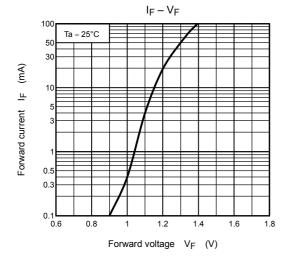
Note 2: Switching time test circuit

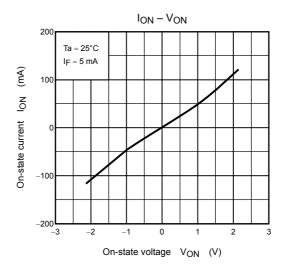


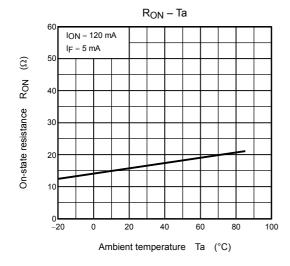


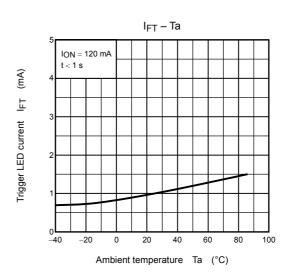






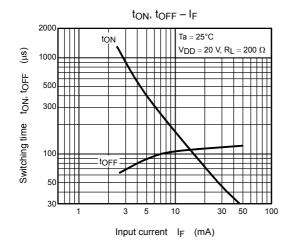


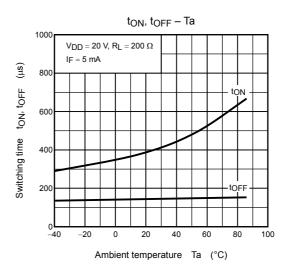


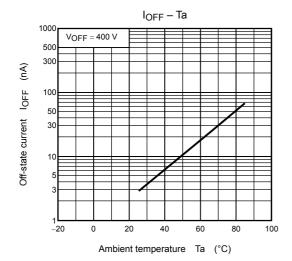


4

2002-01-08







RESTRICTIONS ON PRODUCT USE

000707EBC

- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes
 are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the
 products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with
 domestic garbage.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- The information contained herein is presented only as a guide for the applications of our products. No
 responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other
 rights of the third parties which may result from its use. No license is granted by implication or otherwise under
 any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.