Unit in mm

TOSHIBA Photocoupler GaAs Ired & Photo-Triac

# **TLP160G**

Triac Drive **Programmable Controllers** AC-Output Module Solid State Relay

The TOSHIBA mini flat coupler TLP160G is a small outline coupler, suitable for surface mount assembly.

The TLP160G consists of a photo triac, optically coupled to a gallium arsenide infrared emitting diode.

Peak off-state voltage: 400 V (min.)

Trigger LED current: 10 mA (max.)

On-state current: 70 mA (max.)

Isolation voltage: 2500 Vrms (min.)

UL recognized: UL1577, file No. E67349

### **Trigger LED Current**

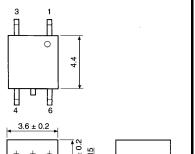
Classi– fication*	Trigger LED V <sub>T</sub> =3V,	Marking of Classification	
lication	Min.	Max.	Classification
(IFT5)	_	5	T5
(IFT7)	_	7	T5, T7
Standard	_	10	T5, T7, blank

(IFT5); TLP160G (IFT5)

(Note) Application type name for certification test, please

use standard product type name, i.e.

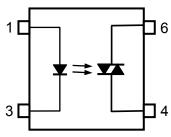
TLP160G(IFT5): TLP160G



0.5MIN 7.0 ± 0.4 11-4C3 **TOSHIBA** 11-4C3

Weight: 0.09 g (typ.)

## **Pin Configurations**



- 1. Anode
- 3. Cathode
- 4. Terminal 1
- 6. Terminal 2

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#### Absolute Maximum Ratings (Ta = 25°C)

Characteristics			Symbol	Rating	Unit
	Forward current	lF	50	mA	
	Forward current derating (Ta ≥ 5	ΔI <sub>F</sub> / °C	-0.7	mA / °C	
LED	Peak forward current (100µs pul	se, 100 pps)	IFP	1	Α
	Reverse voltage	V <sub>R</sub>	5	V	
	Junction temperature	Tj	125	°C	
	Off– state output terminal voltag	$V_{DRM}$	400	V	
	On-state RMS current	Ta=25°C	l=(p, (o)	70	mA
Detector		Ta=70°C	IT(RMS)	40	IIIA
	On–state current derating (Ta ≥	ΔI <sub>T</sub> / °C	-0.67	mA / °C	
	Peak on-state current (100µs pu	I <sub>TP</sub>	2	Α	
	Peak nonrepetitive surge current (PW=10ms)	I <sub>TSM</sub>	1.2	А	
	Junction temperature	Tj	115	°C	
Storag	Storage temperature range			-55 to 125	°C
Operating temperature range			T <sub>opr</sub>	-40 to 100	°C
Lead soldering temperature (10s)			T <sub>sol</sub>	260	°C
Isolatio	Isolation voltage (AC, 1 min., R.H. ≤ 60%) (Note)			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) Device considered a two terminal device: Pins 1 and 3 shorted together and pins 4 and 6 shorted together.

#### **Recommended Operating Conditions**

Characteristics	Symbol	Min.	Тур.	Max.	Unit
Supply voltage	V <sub>AC</sub>	-	-	120	Vac
Forward current	lF	15	20	25	mA
Peak on-state current	I <sub>TP</sub>	_	_	1	Α
Operating temperature	T <sub>opr</sub>	-25	_	85	°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.

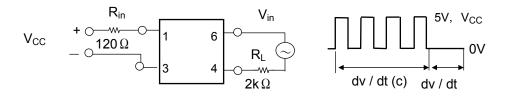
## Individual Electrical Characteristics (Ta = 25°C)

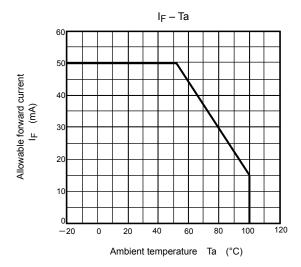
	Characteristics	Symbol	Test Condition		Min.	Тур.	Max.	Unit
LED	Forward voltage	V <sub>F</sub>	I <sub>F</sub> =10mA		1.0	1.15	1.3	V
	Reverse current	I <sub>R</sub>	V <sub>R</sub> =5V		_	_	10	μΑ
	Capacitance	C <sub>T</sub>	V=0, f=1MHz		_	30	_	pF
Detector	Peak off-state current	I <sub>DRM</sub>	V <sub>DRM</sub> =400V		-	10	1000	nA
	Peak on-state voltage	V <sub>TM</sub>	I <sub>TM</sub> =70mA		-	1.7	2.8	V
	Holding current	lΗ	_		-	0.6	_	mA
	Critical rate of rise of off–state voltage	dv / dt	V <sub>in</sub> =120Vrms, Ta=85°C (Fig	g.1)	200	500	1	V / µs
	Critical rate of rise of commutating voltage	dv / dt(c)	I <sub>T</sub> =15mA, V <sub>in</sub> =30Vrms (Fi	g.1)	_	0.2		V / µs

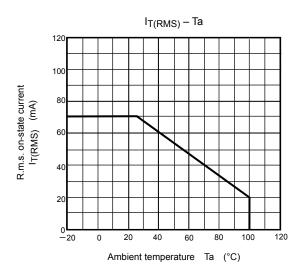
## **Coupled Electrical Characteristics (Ta = 25°C)**

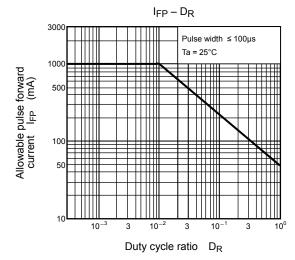
Characteristics	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Trigger LED current	I <sub>FT</sub>	V <sub>T</sub> =3V	_	5	10	mA
Capacitance input to output	Cs	V <sub>S</sub> =0, f=1MHz	_	0.8	_	pF
Isolation resistance	R <sub>S</sub>	V <sub>S</sub> =500V, R.H. ≤ 60%	1×10 <sup>12</sup>	10 <sup>14</sup>	_	Ω
		AC, 1 minute	2500	_	_	- Vrms
Isolation voltage	$BV_S$	AC, 1 second, in oil	_	5000	_	
		DC, 1 minute, in oil	_	5000	_	Vdc
Turn-on time	t <sub>ON</sub>	$V_D$ =6→4V, R <sub>L</sub> = 100Ω I <sub>F</sub> =rated I <sub>F</sub> T×1.5	_	30	100	μs

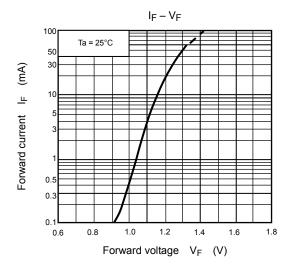
Fig.1 dv / dt Test Circuit

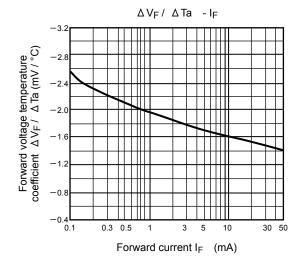


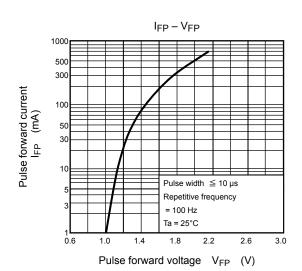




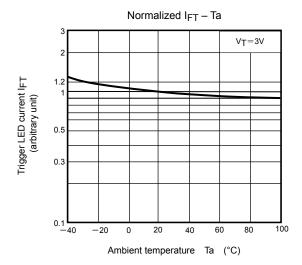


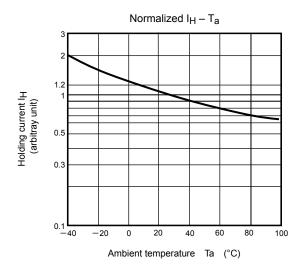


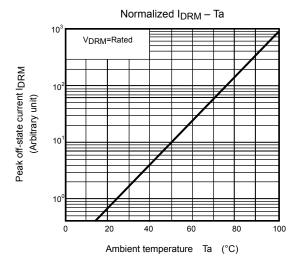


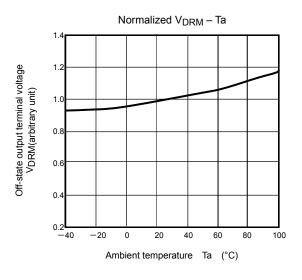


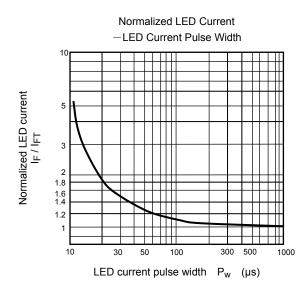
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