

# TLP160G

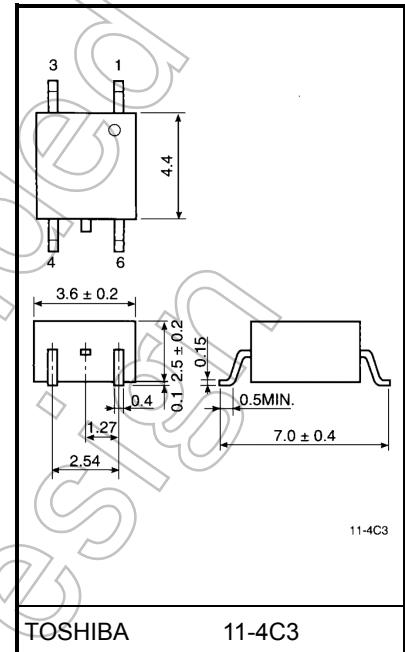
Triac Drive  
 Programmable Controllers  
 AC-Output Module  
 Solid State Relay

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 approved: UL1577, File No.E67349
- cUL approved : CSA Component Acceptance Service No. 5A, File No.E67349
- Option (V4) VDE approved : EN60747-5-5 (Note1)

Note 1: When a EN60747-5-5 approved type is needed, please designate "Option(V4)"

Unit: mm



Weight: 0.09 g (typ.)

## Trigger LED Current

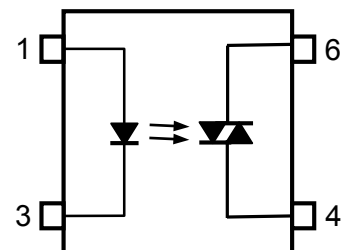
Classification (Note 1)	Trigger LED Current (mA)		Marking of Classification
	V <sub>T</sub> =3V; T <sub>a</sub> =25°C		
	Min	Max	
(IFT5)	—	5.0	T5
(IFT7)	—	7.0	T5, T7
Standard	—	10.0	T5, T7, blank

Note 1: (IFT5); TLP160G (IFT5)

Note: Application type name for certification test, please use standard product type name, i.e.

TLP160G(IFT5): TLP160G

## Pin Configurations (top view)



1. Anode
3. Cathode
4. Triac Terminal
6. Triac Terminal

Start of commercial production  
 1988-04

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

Characteristics		Symbol	Rating	Unit	
LED	Forward current	IF	50	mA	
	Forward current derating (Ta ≥ 53°C)	ΔIF / °C	-0.7	mA / °C	
	Peak forward current (100μs pulse, 100 pps)	IFP	1	A	
	Reverse voltage	VR	5	V	
	Diode power dissipation	PD	100	mW	
	Diode power dissipation derating (Ta ≥ 53°C)	ΔPD / °C	-1.4	mW/°C	
	Junction temperature	Tj	125	°C	
Detector	Off- state output terminal voltage	VDRM	400	V	
	On-state RMS current	Ta=25°C	IT(RMS)	70	mA
		Ta=70°C		40	
	On-state current derating (Ta ≥ 25°C)	ΔIT / °C	-0.67	mA / °C	
	Peak on-state current (100μs pulse, 120 pps)	ITP	2	A	
	Peak non-repetitive surge current (PW=10ms)	ITSM	1.2	A	
	Output power dissipation	PO	200	mW	
	Output power dissipation derating (Ta ≥ 25°C)	ΔPO / °C	-2.0	mW / °C	
Junction temperature	Tj	115	°C		
Storage temperature range		Tstg	-55 to 125	°C	
Operating temperature range		Topr	-40 to 100	°C	
Lead soldering temperature (10s)		Tsol	260	°C	
Isolation voltage (AC, 1 minute, R.H. ≤ 60%) (Note 1)		BVS	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: Pins 1 and 3 shorted together and pins 4 and 6 shorted together.

**Recommended Operating Conditions**

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	VAC	—	—	120	Vac
Forward current	IF	15	20	25	mA
Peak on-state current	ITP	—	—	1	A
Operating temperature	Topr	-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.

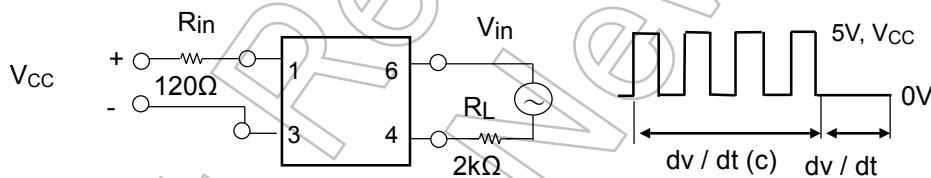
**Electrical Characteristics (Ta = 25°C)**

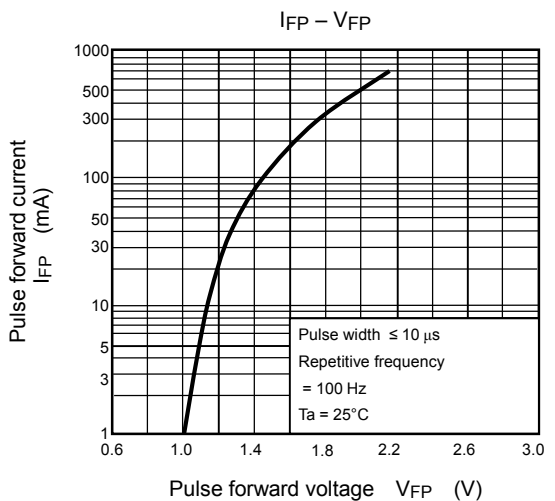
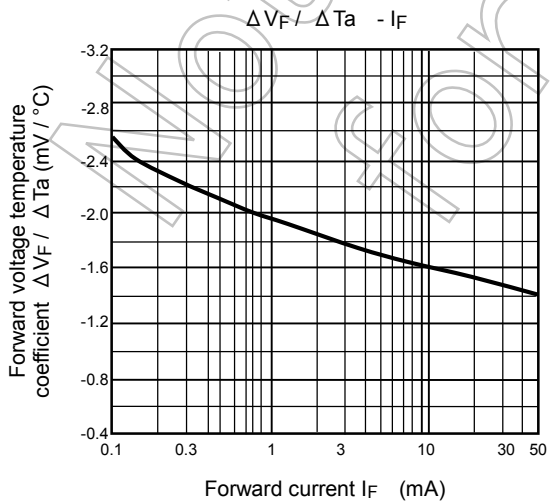
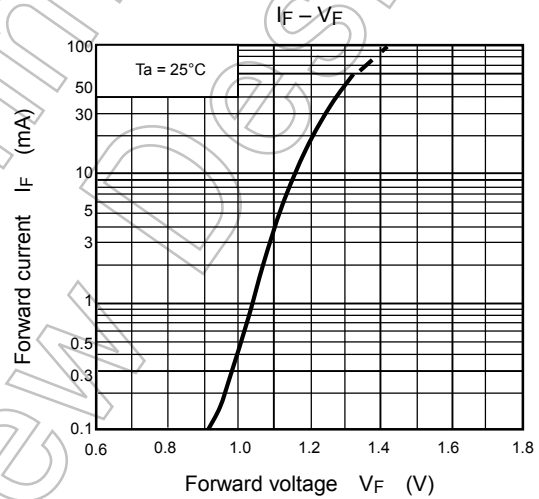
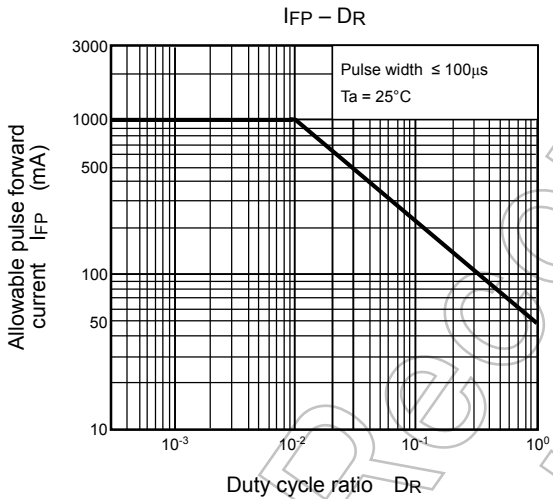
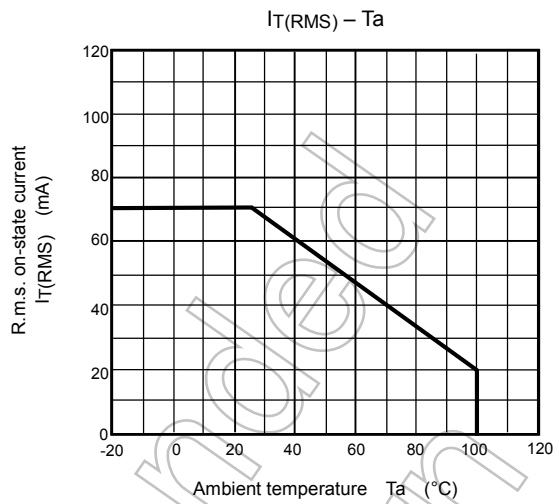
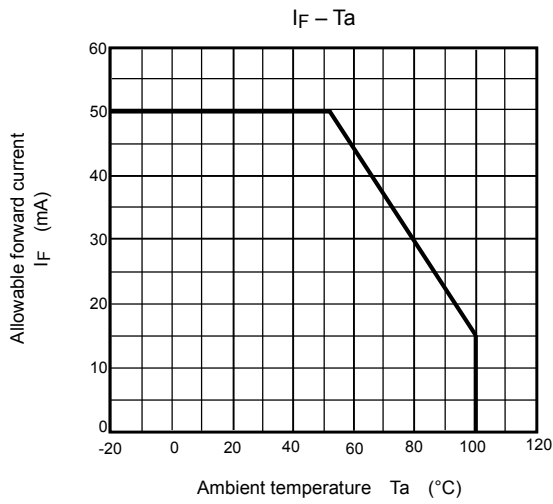
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V <sub>F</sub>	I <sub>F</sub> = 10mA	1.0	1.15	1.3	V
	Reverse current	I <sub>R</sub>	V <sub>R</sub> = 5V	—	—	10	μA
	Capacitance	C <sub>T</sub>	V <sub>F</sub> = 0 V, f = 1 MHz	—	30	—	pF
Detector	Peak off-state current	I <sub>DRM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

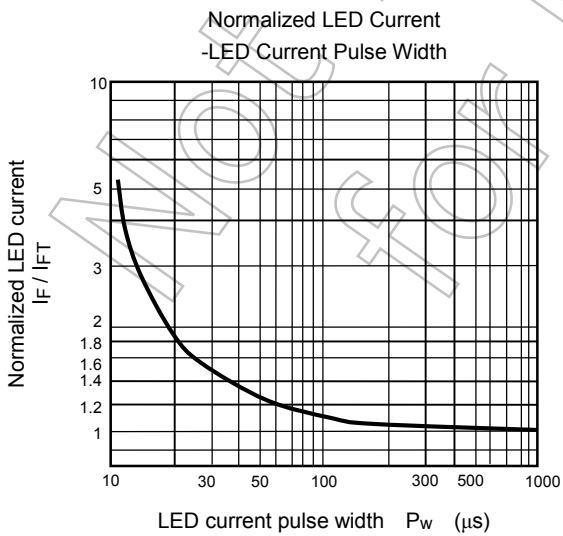
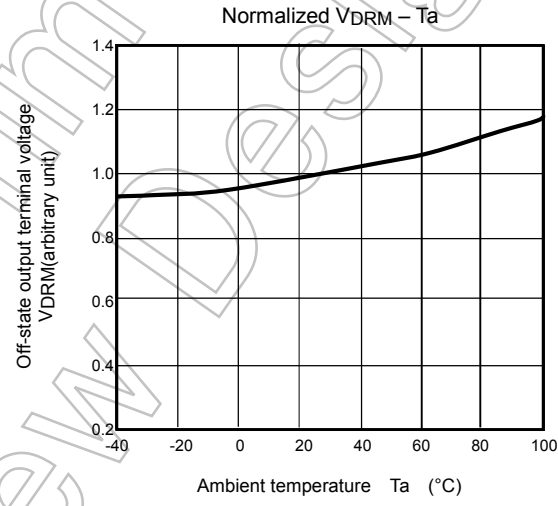
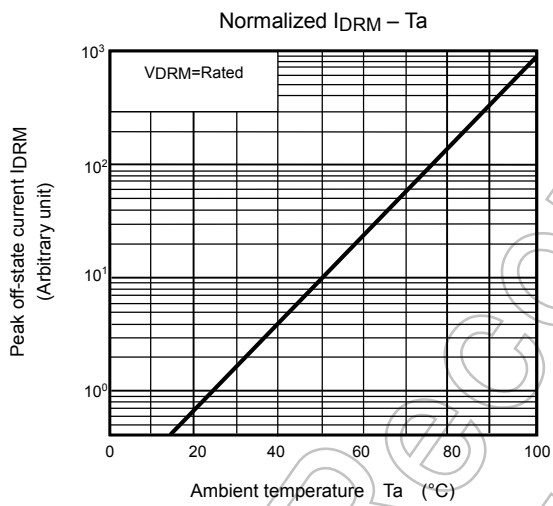
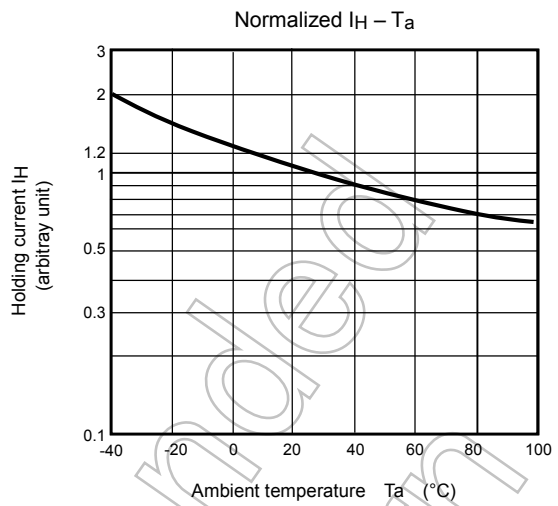
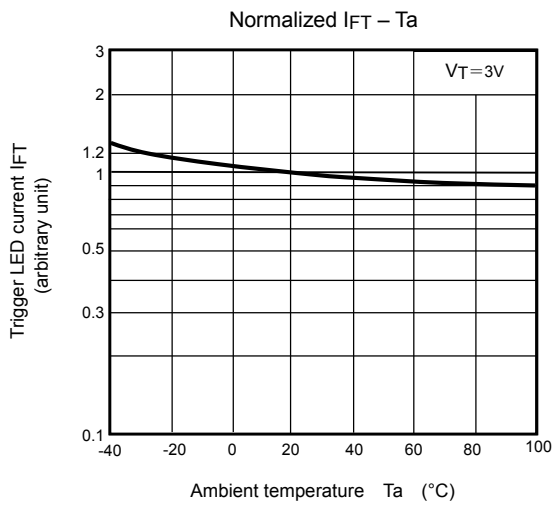
**Coupled Electrical Characteristics (Ta = 25°C)**

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I <sub>FT</sub>	V <sub>T</sub> = 3V	—	5	10	mA
Capacitance input to output	C <sub>s</sub>	V <sub>S</sub> = 0 V, f = 1 MHz	—	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
Isolation voltage	BV <sub>S</sub>	AC, 60 s	2500	—	—	Vrms
		AC, 1 s, in oil	—	5000	—	Vrms
		DC, 60 s, in oil	—	5000	—	Vdc
Turn-on time	t <sub>ON</sub>	V <sub>D</sub> = 6→4 V, R <sub>L</sub> = 100Ω I <sub>F</sub> = Rated I <sub>FT</sub> ×1.5	—	30	100	μs

Fig.1: dv / dt Test Circuit







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