

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)"

Trigger LED Current

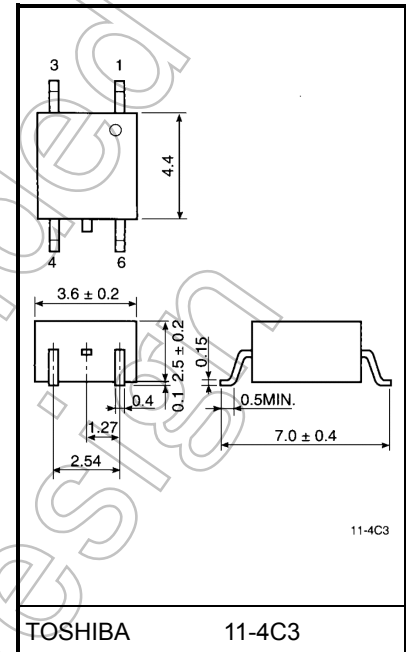
Classification (Note 1)	Trigger LED Current (mA)		Marking of Classification
	VT=3V, Ta=25°C		
	Min	Max	
(IFT5)	—	5.0	T5
(IFT7)	—	7.0	T5, T7
Standard	—	10.0	T5, T7, blank

Note 1: (IFT5); TLP160G (IFT5)

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

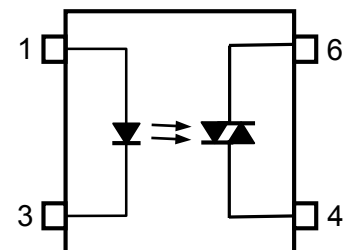
TLP160G(IFT5): TLP160G

Unit: mm



Weight: 0.09 g (typ.)

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		I _F	50	mA
	Forward current derating (Ta ≥ 53°C)		ΔI _F / °C	-0.7	mA / °C
	Peak forward current (100μs pulse, 100 pps)		I _{FP}	1	A
	Reverse voltage		V _R	5	V
	Diode power dissipation		P _D	100	mW
	Diode power dissipation derating (Ta ≥ 53°C)		ΔP _D /°C	-1.4	mW/°C
	Junction temperature		T _j	125	°C
Detector	Off- state output terminal voltage		V _{DRM}	400	V
	On-state RMS current	Ta=25°C	I _{T(RMS)}	70	mA
		Ta=70°C		40	
	On-state current derating (Ta ≥ 25°C)		ΔI _T / °C	-0.67	mA / °C
	Peak on–state current (100μs pulse, 120 pps)		I _{TP}	2	A
	Peak non-repetitive surge current (P _W =10ms)		I _{TSM}	1.2	A
	Output power dissipation		P _O	200	mW
	Output power dissipation derating (Ta ≥ 25°C)		ΔP _O / °C	-2.0	mW / °C
	Junction temperature		T _j	115	°C
Storage temperature range			T _{stg}	-55 to 125	°C
Operating temperature range			T _{opr}	-40 to 100	°C
Lead soldering temperature (10s)			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: Pins 1 and 3 shorted together and pins 4 and 6 shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	V _{AC}	—	—	120	V _{ac}
Forward current	I _F	15	20	25	mA
Peak on-state current	I _{TP}	—	—	1	A
Operating temperature	T _{opr}	-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.

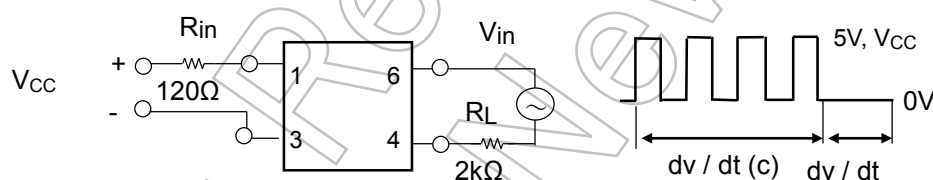
Electrical Characteristics (Ta = 25°C)

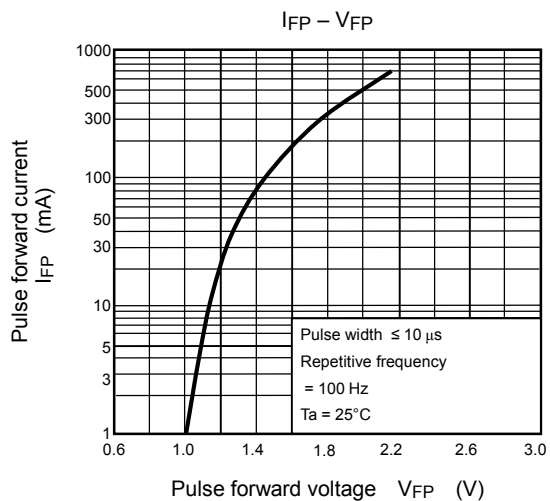
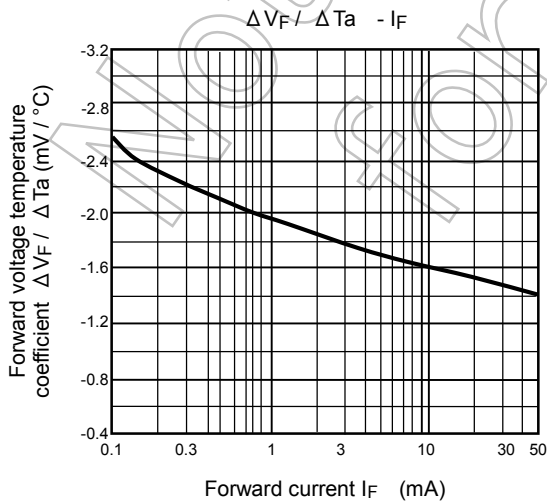
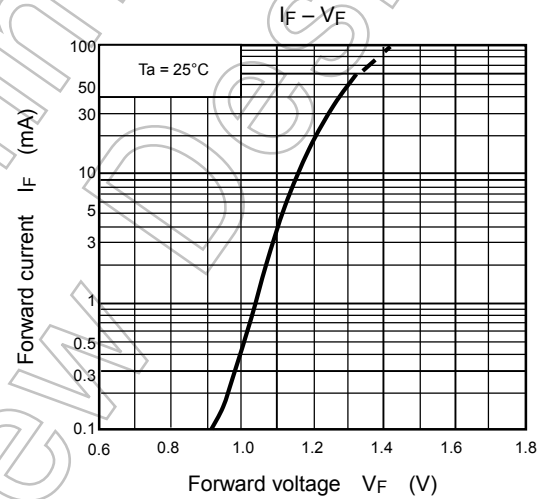
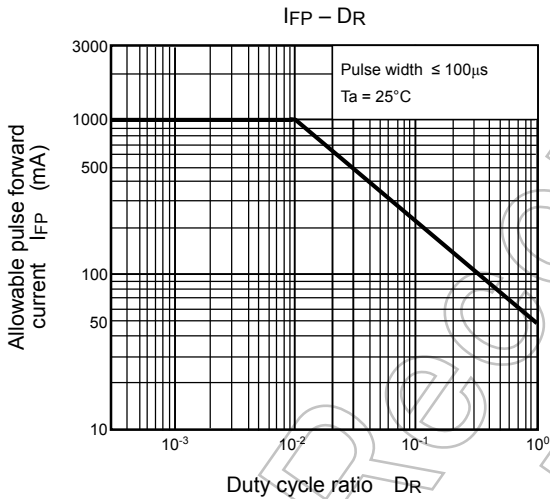
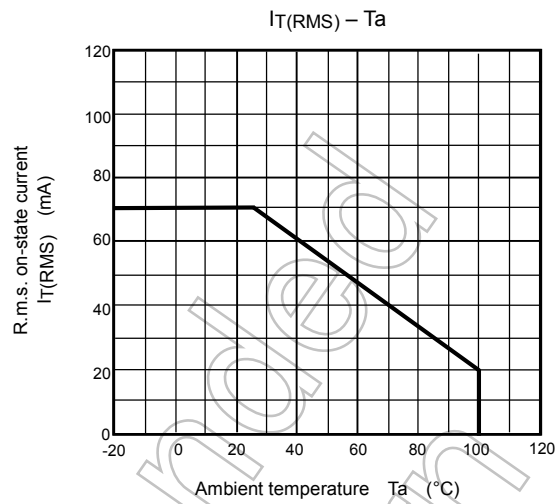
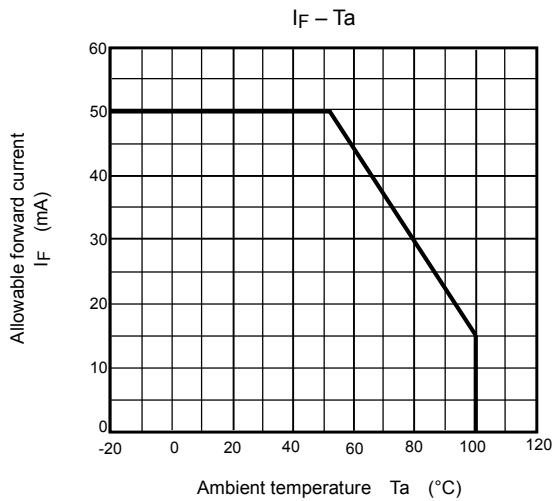
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V _F	I _F = 10mA	1.0	1.15	1.3	V
	Reverse current	I _R	V _R = 5V	—	—	10	μA
	Capacitance	C _T	V _F = 0 V, f = 1 MHz	—	30	—	pF
Detector	Peak off-state current	I _{DRM}	V _{DRM} = 400 V	—	10	1000	nA
	Peak on-state voltage	V _{TM}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

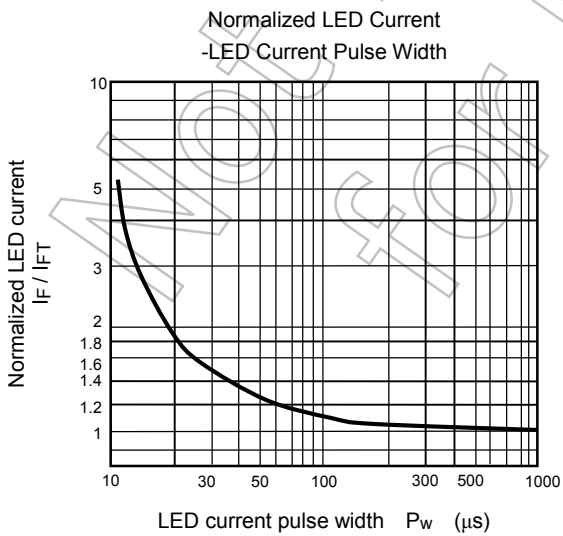
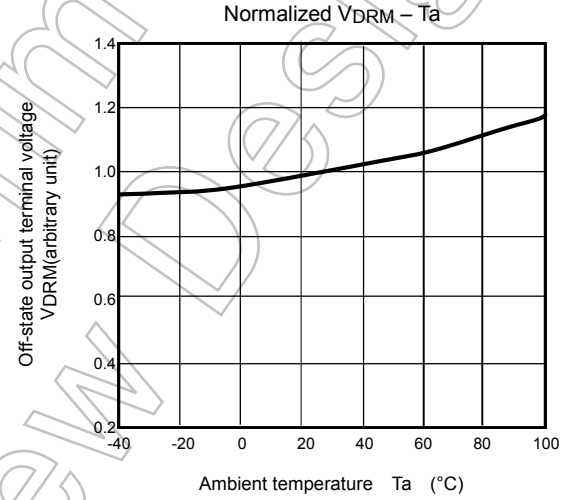
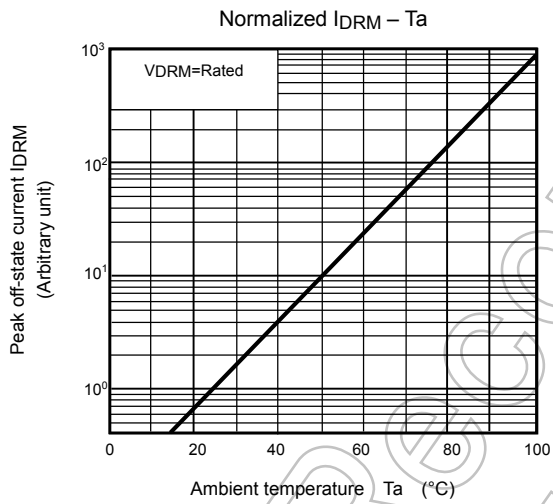
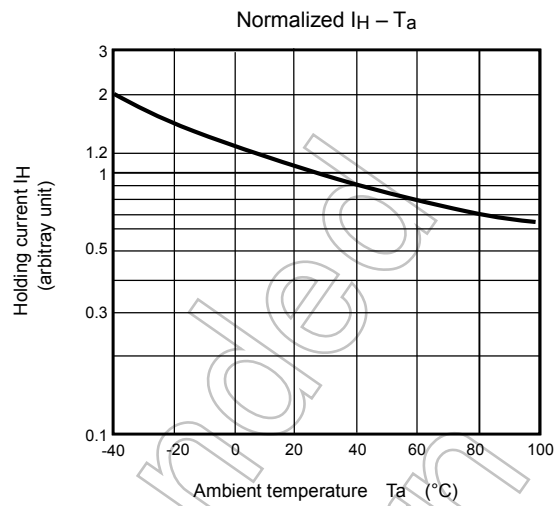
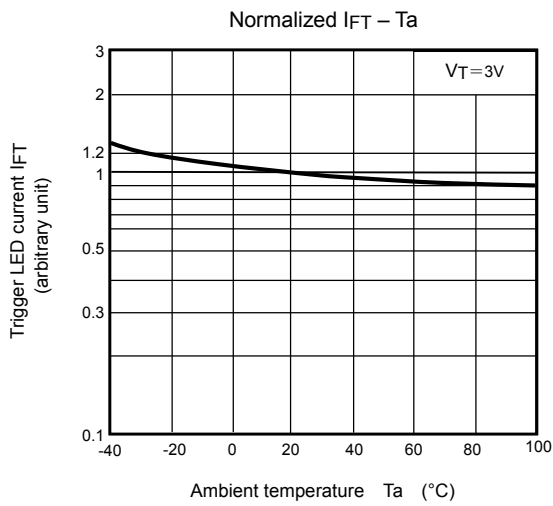
Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I _{FT}	V _T = 3V	—	5	10	mA
Capacitance input to output	C _s	V _S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R _S	V _S = 500V, R.H. ≤ 60%	1×10 ¹²	10 ¹⁴	—	Ω
Isolation voltage	BV _S	AC, 60 s	2500	—	—	Vrms
		AC, 1 s, in oil	—	5000	—	
		DC, 60 s, in oil	—	5000	—	Vdc
Turn-on time	t _{ON}	V _D = 6→4 V, R _L = 100Ω I _F = Rated I _{FT} ×1.5	—	30	100	μs

Fig.1: dv / dt Test Circuit







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