

TLP160J

Triac Drive
 Programmable Controllers
 AC-Output Module
 Solid State Relay

The TOSHIBA mini flat coupler TLP160J is a small outline coupler, suitable for surface mount assembly. The TLP160J consists of a photo triac, optically coupled to a gallium arsenide infrared emitting diode.

- Peak off-state voltage: 600 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

Classification*	Trigger LED Current (mA)		Marking of Classification
	$V_T=6V, T_a=25^\circ C$		
	Min	Max	
(IFT7)	—	7	T7
Standard	—	10	T7, blank

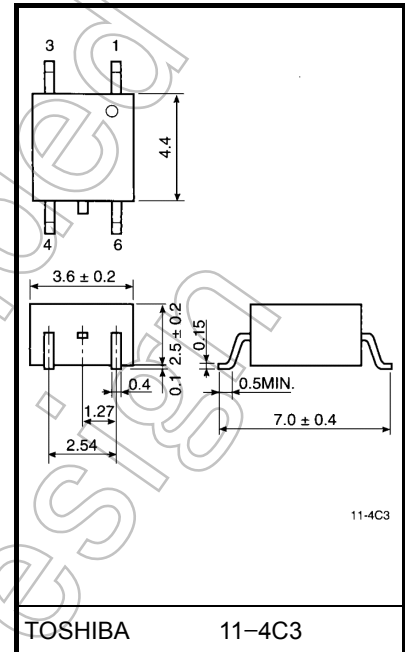
*Ex. (IFT7); TLP160J (IFT7)

(Note) Application type name for certification test, please

use standard product type name, i.e.

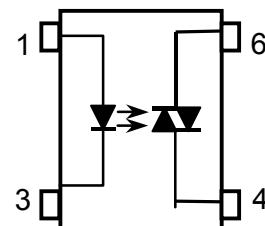
TLP160J(IFT7); TLP160J

Unit: mm



Weight: 0.09 g (typ.)

Pin Configurations



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

Start of commercial production
 1988/04

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit	
LED	Forward current	I_F	50	mA	
	Forward current derating (Ta ≥ 53°C)	$\Delta I_F / ^\circ\text{C}$	-0.7	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_{DRM}	600	V	
	On-state RMS current	$I_{T(RMS)}$	Ta=25°C	70	mA
			Ta=70°C	40	
	On-state current derating (Ta ≥ 25°C)	$\Delta I_T / ^\circ\text{C}$	-0.67	mA / °C	
	Peak on-state current (100μs pulse, 120pps)	I_{TP}	2	A	
	Peak nonrepetitive surge current (PW=10ms)	I_{TSM}	1.2	A	
	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 (10 s)	T_{sol}	260	°C		
Isolation voltage (AC, 1 minute, R.H. ≤ 60%) (Note)	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) Device considered a two terminal device: Pins 1 and 3 shorted together and pins 4 and 6 shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{AC}	—	—	240	Vac
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.

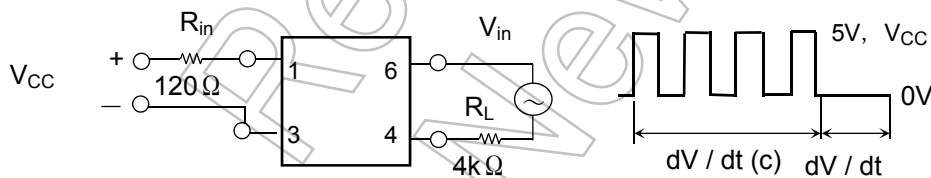
Individual Electrical Characteristics (Ta = 25°C)

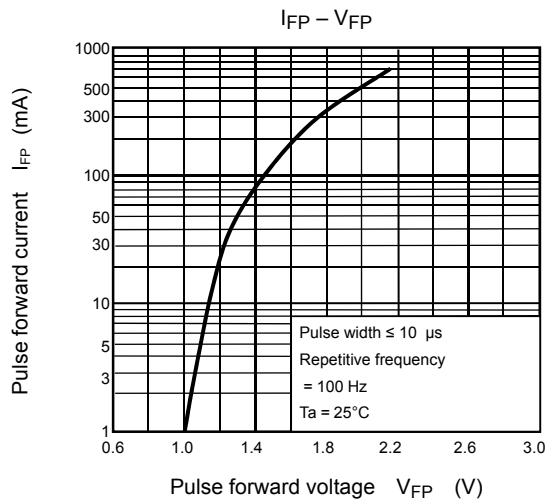
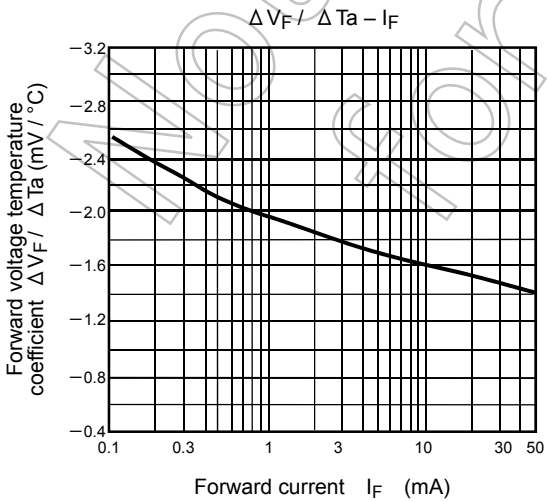
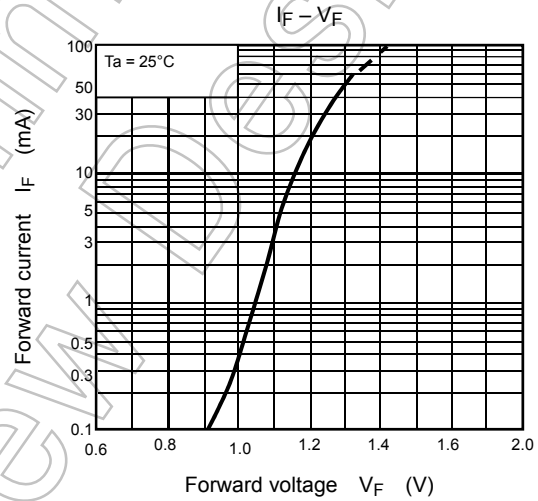
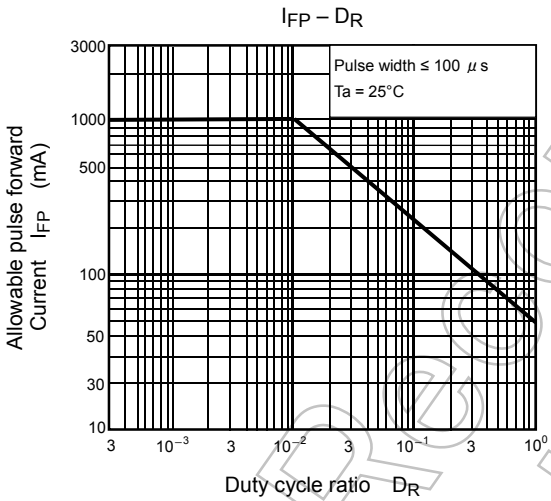
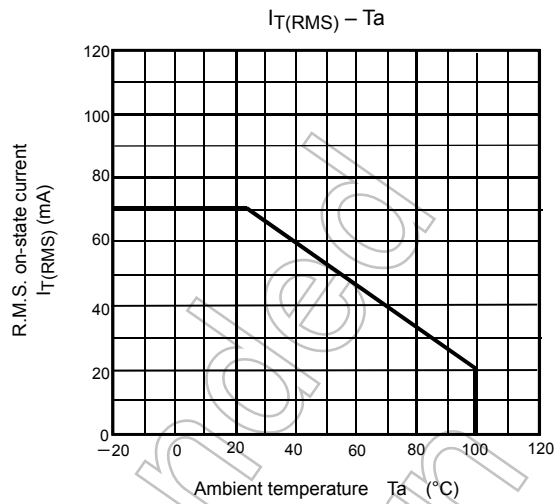
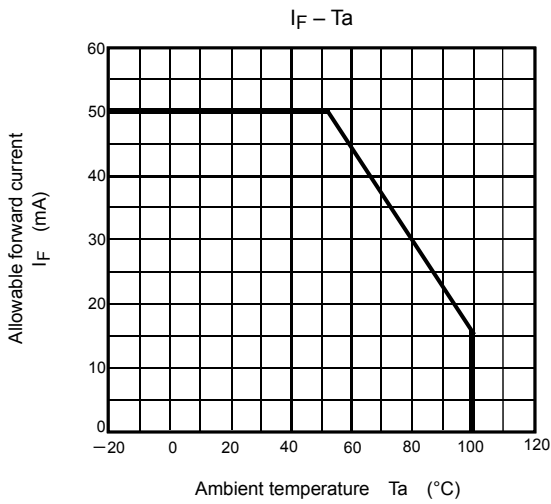
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V_F	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse current	I_R	$V_R = 5 \text{ V}$	—	—	10	μA
	Capacitance	C_T	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Peak off-state current	I_{DRM}	$V_{DRM} = 600 \text{ V}$	—	10	1000	nA
	Peak on-state voltage	V_{TM}	$I_{TM} = 70 \text{ mA}$	—	1.7	2.8	V
	Holding current	I_H	—	—	1.0	—	mA
	Critical rate of rise of off-state voltage	dv / dt	$V_{in} = 240 \text{ Vrms}, T_a = 85^\circ\text{C}$ (Fig.1)	—	500	—	$\text{V} / \mu\text{s}$
	Critical rate of rise of commutating voltage	$dv / dt(c)$	$I_T = 15 \text{ mA}, V_{in} = 60 \text{ Vrms}$ (Fig.1)	—	0.2	—	$\text{V} / \mu\text{s}$

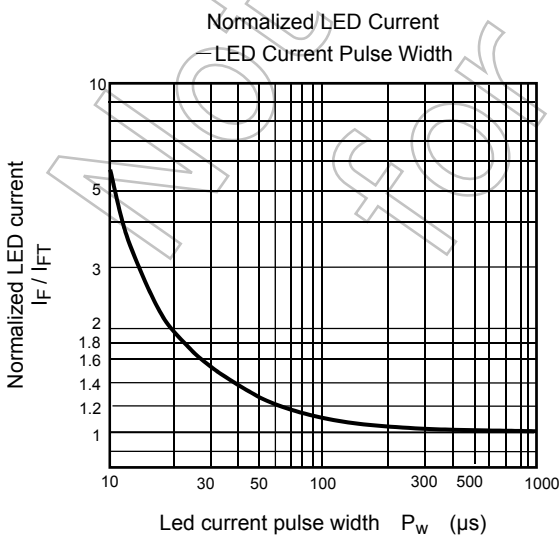
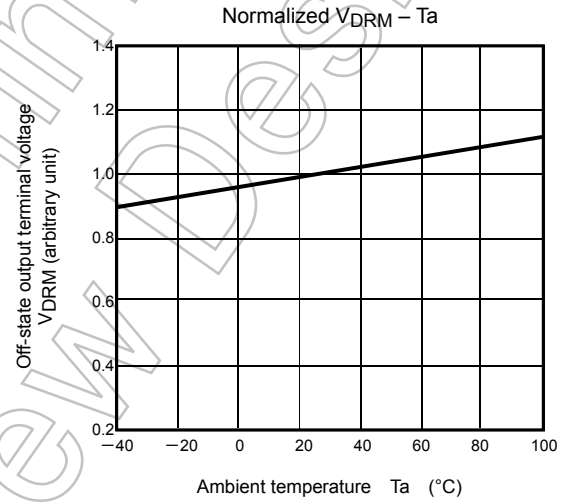
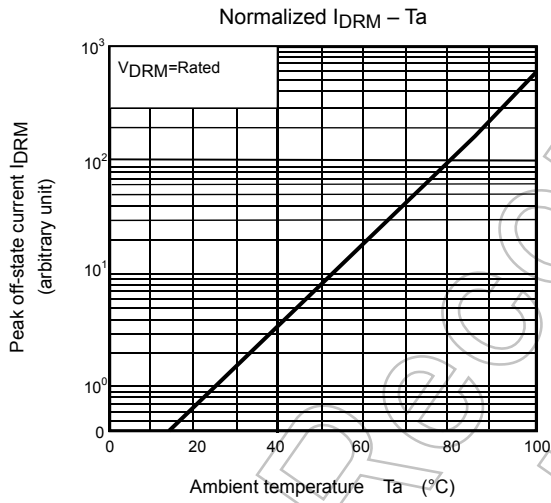
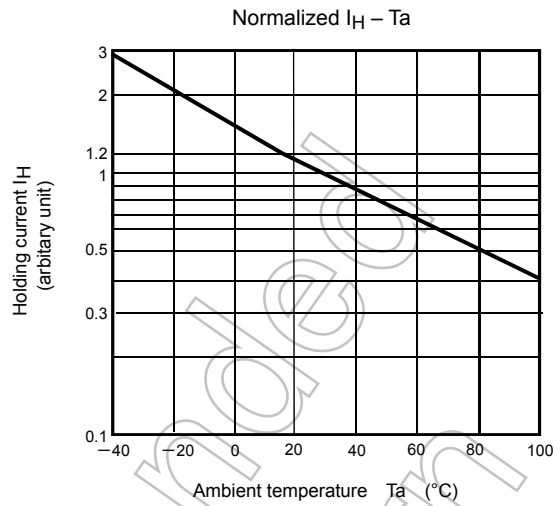
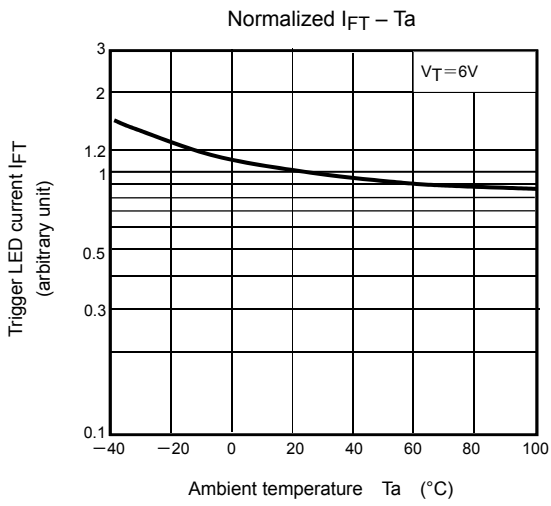
Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}	$V_T = 6 \text{ V}$	—	5	10	mA
Capacitance input to output	C_S	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	1×10^{12}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	2500	—	—	Vrms
		AC, 1 second, in oil	—	5000	—	Vdc
		DC, 1 minute, in oil	—	5000	—	Vdc
Turn-on time	t_{ON}	$V_D = 6 \rightarrow 4 \text{ V}, R_L = 100 \Omega$ $I_F = \text{rated } I_{FT} \times 1.5$	—	30	100	μs

Fig.1 dv / dt test circuit







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