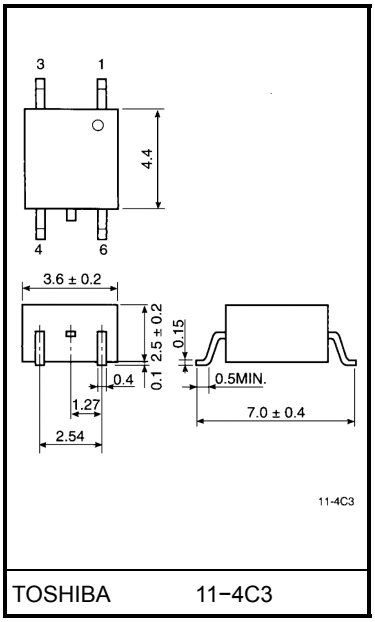
TOSHIBA Photocoupler GaAs Ired + Photo−Triac

TLP166J

Triac Drivers
Programmable Controllers
AC−Output Modules
Solid State Relays

Unit: mm



TOSHIBA 11−4C3

Weight: 0.09 g (typ.)

The TOSHIBA mini-flat coupler TLP166J is a small-outline coupler, suitable for surface-mount assembly.
The TLP166J consists of a gallium arsenide infrared emitting diode optically coupled to a triac-output photocoupler.

- 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-approved: UL1577, file no. E67349
- Option(V4) type
  VDE approved: EN 60747-5-2 satisfied
  Maximum operating insulation voltage: 565 Vpk
  Maximum permissible overvoltage: 4000 Vpk

(Note): Please designate “Option (V4)”,when an EN60747-5-2 approved type is needed.
Please note that this product doesn't have 0.4mm insulator thickness when you apply for the safety standard.

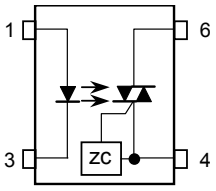
Trigger LED Current

Type (Note 1)	Trigger LED Current (mA) V_T = 3 V, Ta = 25°C		Marking Of Classification
	Min	Max	
(IFT7)	—	7	T7
None	—	10	T7, blank

* e.g., IFT7: TLP166J(IFT7)

(Note 1): When applying for safety standard certification, use the standard part number. For example, TLP166J(IFT7): TLP166J

Pin Configurations



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

Absolute Maximum Ratings (Ta = 25°C)

Characteristic			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, 100pps)		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	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, 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 (10s)			T_{sol}	260	°C
Isolation voltage (AC, 1min., R.H.≤ 60%) (Note 2)			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 2): Device considered a two−terminal device: Pins 1 and 3 shorted together and Pin 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.

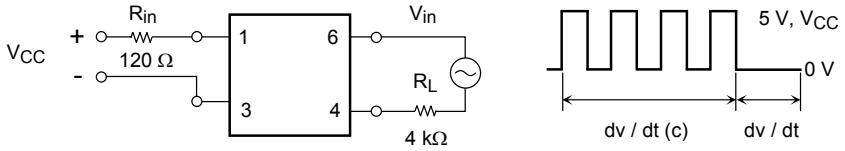
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V_F	I_F = 10 mA	1.0	1.15	1.3	V
	Reverse current	I_R	V_R = 5 V	—	—	10	μA
	Capacitance	C_T	V = 0, f = 1 MHz	—	30	—	pF
Detector	Peak off−state current	I_{DRM}	V_{DRM} = 600 V	—	30	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} = 240 Vrms, Ta = 85°C (Note 3)	200	500	—	V / μs
	Critical rate of rise of commutating voltage	dv / dt(c)	I_T = 15 mA, V_{in} = 60 Vrms (Note 3)	—	0.2	—	V / μs

Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}	V_T=3 V	—	—	10	mA
Inhibit voltage	V_{IH}	I_F = rated I_{FT}	—	—	50	V
Leakage in inhibited state	I_{IH}	I_F = rated I_{FT} V_T = rated V_{DRM}	—	—	600	μA
Capacitance input to output	C_S	V_S = 0, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R_S	V_S = 500 V, R.H.≤ 60%	1×10^{12}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	2500	—	—	Vrms
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000	—	Vdc

(Note 3): dv / dt Test circuit



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