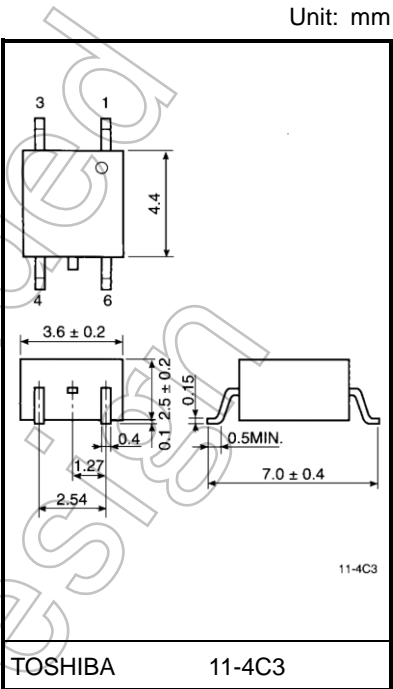


TLP166J

Triac Drivers
Programmable Controllers
AC-Output Modules
Solid State Relays

The TOSHIBA mini-flat coupler TLP166J is a small-outline coupler, suitable for surface-mount assembly.
The TLP166J consists of an 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-recognized: UL 1577, File No.E67349
- cUL-recognized: CSA Component Acceptance Service No.5A
File No.E67349
- VDE-approved: EN 60747-5-5 (Note 1)



Weight: 0.09 g (typ.)

Note 1: When a VDE approved type is needed, please designate the **Option(V4)**.

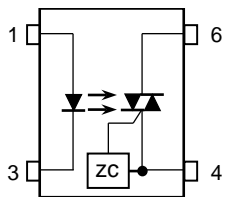
Trigger LED Current

Type (Note 2)	Trigger LED Current (mA)		Marking of Classification
	Min	Max	
(IFT7)	—	7	T7
None	—	10	T7, blank

Note 2: e.g., IFT7: TLP166J(IFT7)

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

Pin Configurations
(top view)



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

Start of commercial production
1994-11

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
	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}	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 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 (10 s)			T _{sol}	260	°C
Isolation voltage (AC, 60 s, R.H.≤ 60 %) (Note 3)			BV _S	2500	V _{rms}

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 3: 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	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.

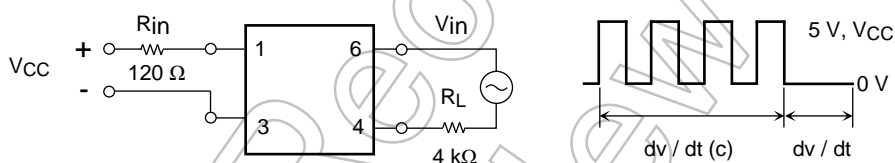
Electrical Characteristics (Ta = 25°C)

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	$V_F = 0 \text{ V}, f = 1 \text{ MHz}$	—	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	—	—	0.6	—	mA
	Critical rate of rise of off-state voltage	dv / dt	$V_{in} = 240 \text{ Vrms}, T_a = 85^\circ\text{C}$ (Note 4)	200	500	—	V / μs
	Critical rate of rise of commutating voltage	$dv / dt(c)$	$I_T = 15 \text{ mA}, V_{in} = 60 \text{ Vrms}$ (Note 4)	—	0.2	—	V / μs

Coupled Electrical Characteristics (Ta = 25°C)

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

Note 4: dv / dt Test circuit



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