

TLP165J

Triac Drive
Programmable Controllers
AC-Output Module
Solid State Relay

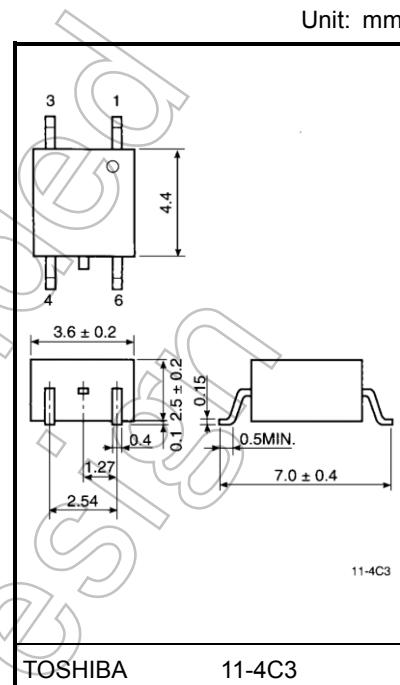
The TOSHIBA mini-flat coupler TLP165J is a small outline coupler, suitable for surface mount assembly.

The TLP165J consists of a photo triac, optically coupled to an 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: UL 1577, File No.E67349
- cUL-recognized: CSA Component Acceptance Service No.5A
File No.E67349
- VDE-approved: EN 60747-5-5 (Note 1)

Note 1: When a VDE approved type is needed,

please designate the **Option(V4)**.



TOSHIBA 11-4C3

Weight: 0.09 g (typ.)

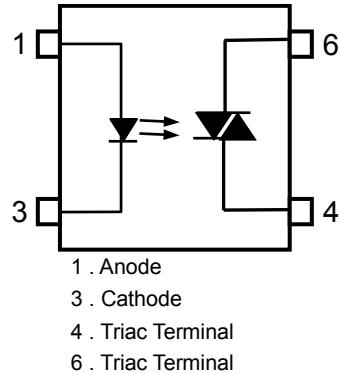
Trigger LED Current

Type (Note 1)	Trigger LED Current (mA)		Marking of Classification	
	VT=6V, Ta=25°C			
	Min	Max		
(IFT7)	—	7	T7	
None	—	10	T7, blank	

Note 1: Ex. rank IFT7: TLP165J (IFT7)

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

TLP165J(IFT7): TLP165J

Pin Configuration

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, 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}	600	V
	On-state RMS current	I _{T(RMS)}	70	mA
			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 (10 s)		T _{sol}	260	°C
Isolation voltage (AC, 60 s, R.H. ≤ 60 %)		BVs	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 2: Device considered a two terminal device: Pins 1 and 3 shorted together and 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.

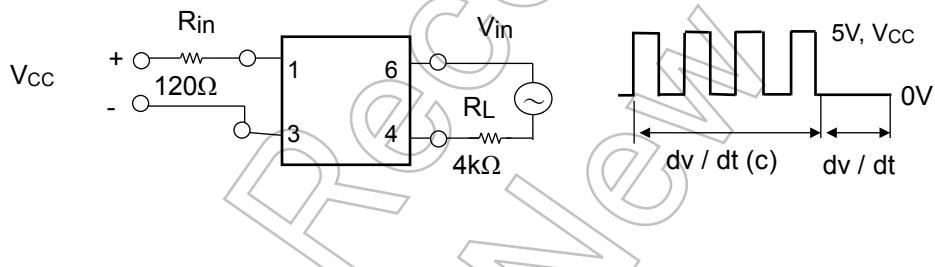
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V _F	I _F = 10 mA	1.0	1.15	1.3	V
	Reverse current	I _R	V _R = 5 V	—	—	10	μA
	Capacitance	C _T	V _F = 0 V, f = 1MHz	—	30	—	pF
Detector	Peak off-state current	I _{DRM}	V _{DRM} = 600 V	—	10	1000	nA
	Peak on-state voltage	V _{TM}	I _{TM} = 70 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 Vrms, Ta = 85 °C (Note 3)	—	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 = 6 V	—	5	10	mA
Capacitance input to output	C _s	V _S = 0 V, f = 1MHz	—	0.8	—	pF
Isolation resistance	R _S	V _S = 500 V, R.H. ≤ 60 %	1×10 ¹²	10 ¹⁴	—	Ω
Isolation voltage	B _{Vs}	AC, 60 s	2500	—	—	Vrms
Turn-on time	t _{ON}	V _D = 6 → 4 V, R _L = 100 Ω I _F = Rated I _{FT} × 1.5	—	—	100	μs

Note 3: dv / dt test circuit



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