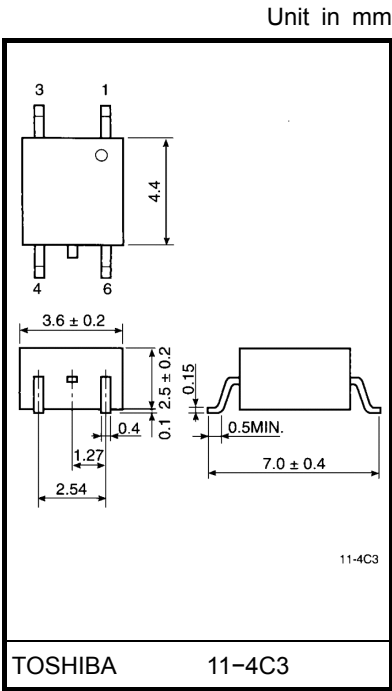


TLP165J

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 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
- Option (V4) type
VDE approved: EN 60747-5-2 satisfied
Maximum operating insulation voltage: 565Vpk
Highest permissible over voltage: 4000Vpk



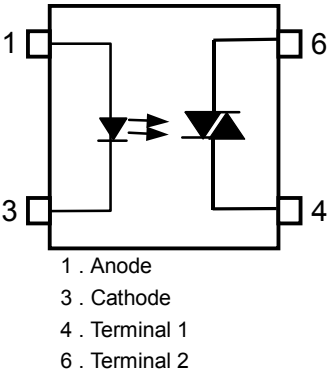
Weight: 0.09 g

Trigger LED Current

Type (Note 1)	Trigger LED Current (mA)		Marking Of Classification
	Min.	Max.	
(IFT7)	—	7	T7
None	—	10	T7, blank

* Exp. rank IFT7: TLP165J (IFT7)
(Note 1) Application type name for certification test, please use standard product type name, i.e.
TLP165J(IFT7): TLP165J

Pin Configurations



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
	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, 120 pps)		I _{TP}	2	A
	Peak nonrepetitive surge current (PW=10ms, DC=10%)		I _{TSM}	1.2	A
	Junction temperature		T _j	115	°C
Storage temperature range			T _{stg}	−55~125	°C
Operating temperature range			T _{opr}	−40~100	°C
Lead soldering temperature (10s)			T _{sol}	260	°C
Isolation voltage (AC, 1 min., 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 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

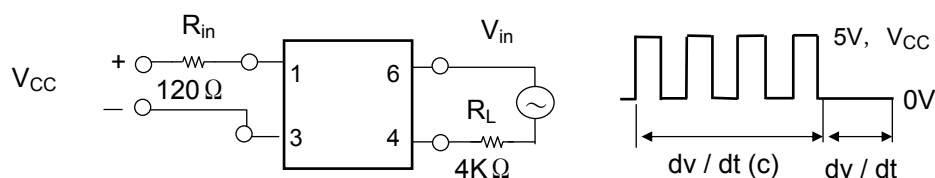
Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	V_F	$I_F=10\text{mA}$	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}	$V_{\text{DRM}}=600\text{V}$	—	10	1000	nA
	Peak on-state voltage	V_{TM}	$I_{\text{TM}}=70\text{mA}$	—	1.7	2.8	V
	Holding current	I_H	—	—	1.0	—	mA
	Critical rate of rise of off-state voltage	dv/dt	$V_{\text{in}}=240\text{Vrms}, T_a=85^\circ\text{C}$ (Note 3)	—	500	—	V / μs
	Critical rate of rise of commutating voltage	$dv/dt(c)$	$I_T=15\text{mA}, V_{\text{in}}=60\text{Vrms}$ (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}	$V_T=6\text{V}$	—	—	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	—	
		DC, 1 minute, in oil	—	5000	—	Vdc
Turn-on time	t_{ON}	$V_D=6 \rightarrow 4\text{V}, R_L = 100\Omega$ $I_F=\text{Rated } I_{\text{FT}} \times 1.5$	—	—	100	μs

(Note 3) dv/dt test circuit

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20070701-EN

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