

## TLP168J

Triac Driver  
Programmable Controllers  
AC-Output Modules  
Solid State Relays

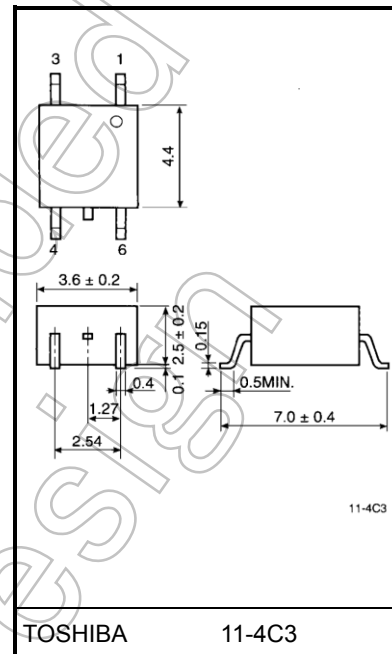
The TOSHIBA mini-flat coupler TLP168J is a small-outline coupler suitable for surface mount assembly.

The TLP168J consists of an infrared emitting diode optically coupled to a triac-output photocoupler.

- Peak off-state voltage: 600 V (min)
- Trigger LED current: 3 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)

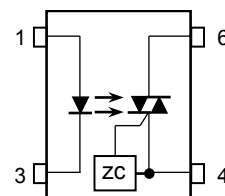
Note 1: When a VDE approved type is needed,  
please designate the **Option(V4)**.

Unit: mm



Weight: 0.09 g (typ.)

### Pin Configurations (top view)



- 1: Anode
- 3: Cathode
- 4: Triac Terminal
- 6: Triac Terminal

Start of commercial production  
1993-01

## Absolute Maximum Ratings (Ta = 25°C)

Characteristic			Symbol	Rating	Unit
LED	Forward current		I <sub>F</sub>	20	mA
	Forward current derating (Ta ≥ 25°C)		ΔI <sub>F</sub> / °C	-0.2	mA / °C
	Peak forward current (100 μs pulse, 100 pps)		I <sub>FP</sub>	1	A
	Reverse voltage		V <sub>R</sub>	5	V
	Diode power dissipation		P <sub>D</sub>	100	mW
	Diode power dissipation derating (Ta ≥ 25°C)		ΔP <sub>D</sub> / °C	-1.0	mW/°C
	Junction temperature		T <sub>j</sub>	125	°C
Detector	Off-state output terminal voltage		V <sub>DRM</sub>	600	V
	On-state RMS current	Ta = 25°C	I <sub>T(RMS)</sub>	70	mA
		Ta = 70°C		40	
	On-state current derating (Ta ≥ 25°C)		ΔI <sub>T</sub> / °C	-0.67	mA / °C
	Peak on-state current (100 μs pulse, 120 pps)		I <sub>TP</sub>	2	A
	Peak non-repetitive surge current (P <sub>W</sub> =10 ms)		I <sub>TSM</sub>	1.2	A
	Output power dissipation		P <sub>o</sub>	200	mW
	Output power dissipation derating (Ta ≥ 25°C)		ΔP <sub>O</sub> / °C	-2.0	mW / °C
	Junction temperature		T <sub>j</sub>	115	°C
Storage temperature range			T <sub>stg</sub>	-55 to 125	°C
Operating temperature range			T <sub>opr</sub>	-40 to 100	°C
Lead soldering temperature (10 s)			T <sub>sol</sub>	260	°C
Isolation voltage (AC, 60 s, R.H. ≤ 60 %) (Note 1)			BV <sub>S</sub>	2500	V <sub>rms</sub>

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 1: 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 <sub>AC</sub>	—	—	240	V <sub>ac</sub>
Forward current	I <sub>F</sub>	4.5	6	7.5	mA
Peak on-state current	I <sub>TP</sub>	—	—	1	A
Operating temperature	T <sub>opr</sub>	-10	—	85	°C

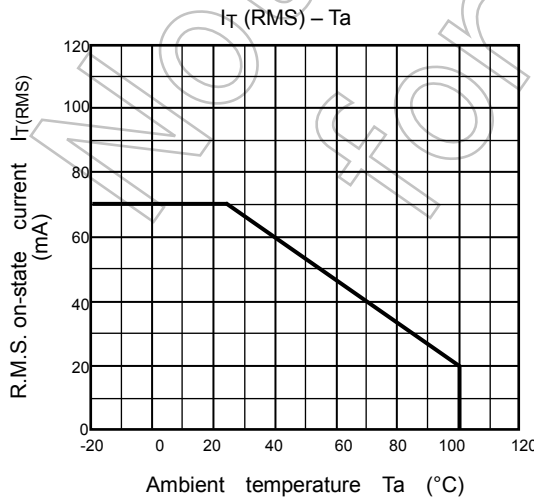
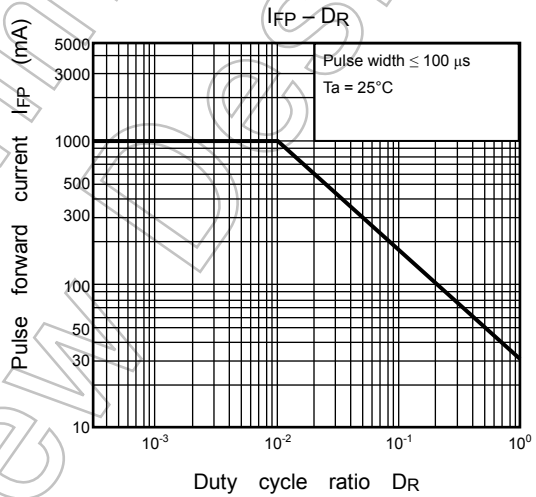
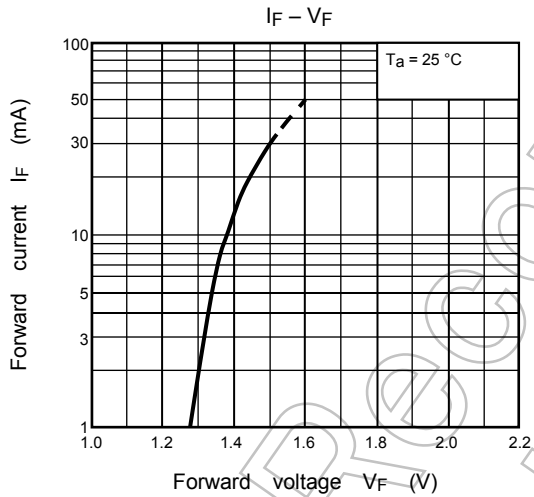
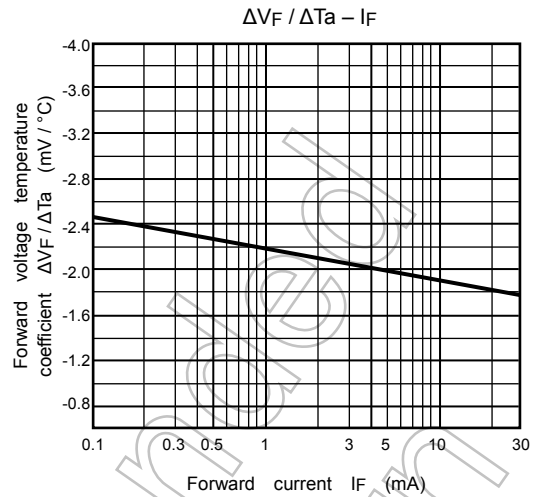
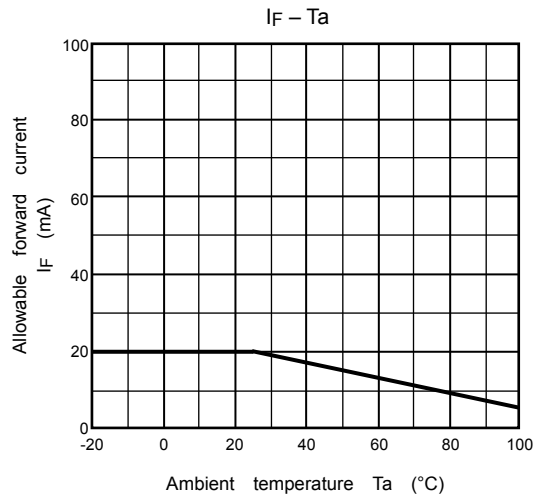
Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

## Electrical Characteristics (Ta = 25°C)

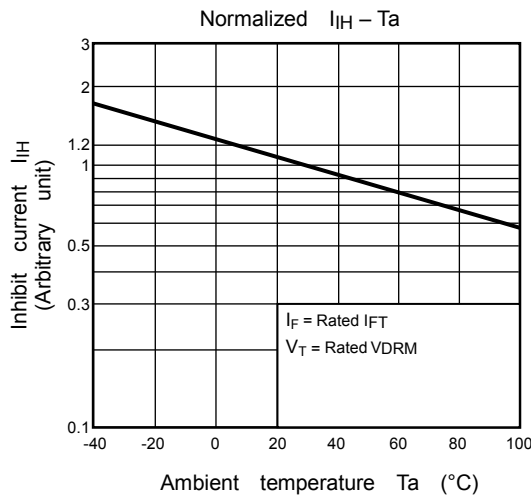
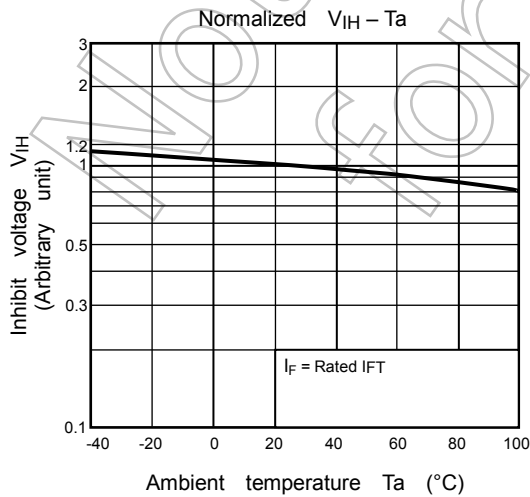
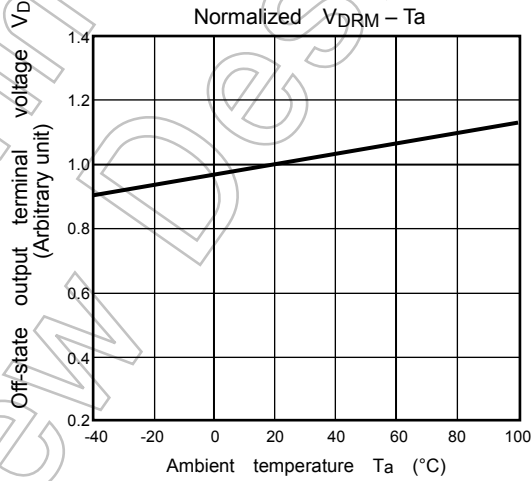
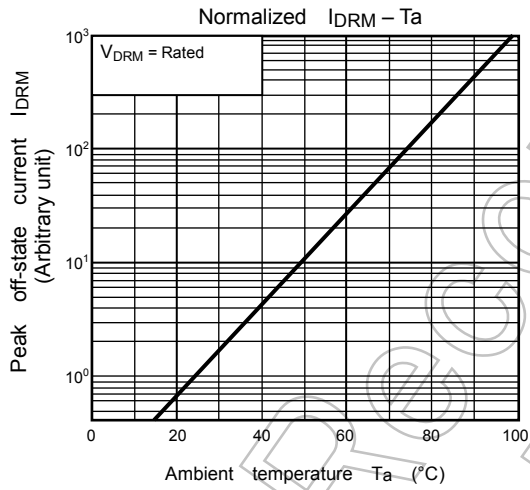
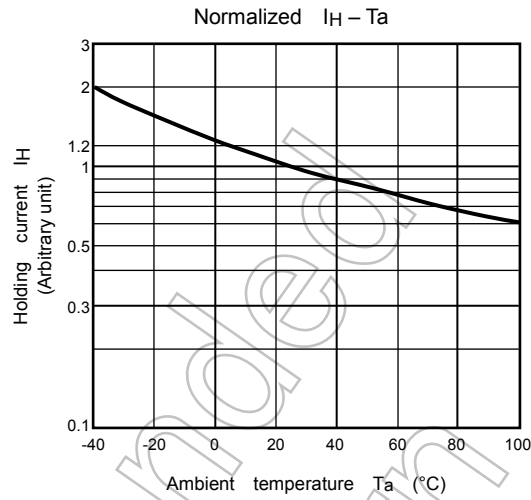
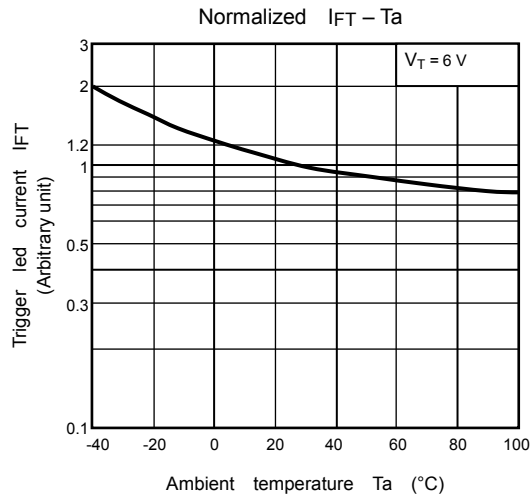
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA	1.2	1.4	1.7	V
	Reverse current	I <sub>R</sub>	V <sub>R</sub> = 3 V	—	—	10	μA
	Capacitance	C <sub>T</sub>	V <sub>F</sub> = 0 V, f = 1 MHz	—	30	—	pF
Detector	Peak off-state current	I <sub>DRM</sub>	V <sub>DRM</sub> = 600 V	—	10	1000	nA
	Peak on-state voltage	V <sub>TM</sub>	I <sub>TM</sub> = 70 mA	—	1.7	2.8	V
	Holding current	I <sub>H</sub>	—	—	0.6	—	mA
	Critical rate of rise of off-state voltage	dv / dt	V <sub>in</sub> = 240 Vrms, Ta = 85 °C	200	500	—	V / μs
	Critical rate of rise of commutating voltage	dv / dt(c)	V <sub>in</sub> = 60 Vrms, I <sub>T</sub> = 15 mA	—	0.2	—	V / μs

## Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I <sub>FT</sub>	V <sub>T</sub> = 3V	—	—	3	mA
Inhibit voltage	V <sub>IH</sub>	I <sub>F</sub> = Rated I <sub>FT</sub>	—	—	50	V
Leakage in inhibited state	I <sub>IH</sub>	I <sub>F</sub> = Rated I <sub>FT</sub> V <sub>T</sub> = Rated V <sub>DRM</sub>	—	200	600	μA
Capacitance (input to output)	C <sub>s</sub>	V <sub>S</sub> = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R <sub>S</sub>	V <sub>S</sub> = 500 V, R.H. ≤ 60 %	5×10 <sup>10</sup>	10 <sup>14</sup>	—	Ω
Isolation voltage	BV <sub>S</sub>	AC, 60 s	2500	—	—	Vrms



NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



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