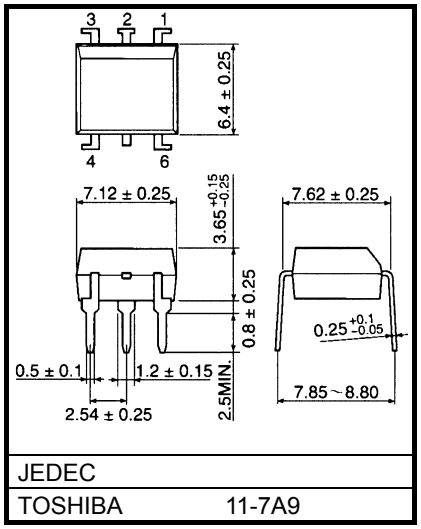
TOSHIBA Photocoupler GaAℓAs Ired & Photo-Triac

TLP668J(S)

Office Machine
Household Use Equipment
Triac Driver
Solid State Relay

Unit: mm



JEDEC	
TOSHIBA	11-7A9

Weight: 0.39 g (Typ.)

The TOSHIBA TLP668J(S) consists of a zero voltage crossing turn-on photo-triac optically coupled to a GaAlAs infrared emitting diode in a six lead plastic DIP package.

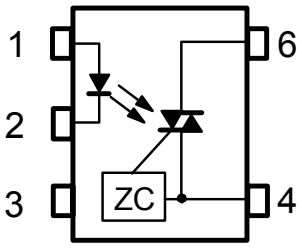
- Peak off-state voltage: 600V (Min.)
- Trigger LED current: 3mA (Max.)
- On-state current: 100mA (Max.)
- Isolation voltage: 5000Vrms (Min.)
- UL recognized: UL1577, file No. E67349
- BSI approved: BS EN60065:2002, file No. 8385
  BS EN60950-1:2002, file No. 8386
- SEMCO approved:EN60065,EN60950-1,EN60335-1
  Certificate no.708960
- Option(D4) type
  VDE approved: DIN EN 60747-5-2
  Certificate No. 40009302
  Maximum operating insulation voltage : 890Vpk
  Highest permissible over voltage : 8000 Vpk

(Note) When an EN60747-5-2 approved type is needed, please designate the "Option(D4)".

•Construction mechanical rating

	7.62 mm pich standard type	10.16 mm pich TLPXXXF type
Creepage distance	7.0 mm (Min.)	8.0 mm (Min.)
Clearance	7.0 mm (Min.)	8.0 mm (Min.)
Insulation thickness	0.5 mm (Min.)	0.5 mm (Min.)

Pin configuration (top view)



1: Anode
2: Cathode
3: N.C.
4:Terminal 1
6:Terminal 2

ZC:Zero-cross circuit

Absolute Maximum Ratings (Ta = 25°C)

Characteristic			Symbol	Rating	Unit
LED	Forward current		I_F	30	mA
	Forward current derating (Ta≥25°C)		ΔI_F /°C	−0.3	mA /°C
	Peak forward current (100μs pulse, 100pps)		I_{FP}	1	A
	Reverse voltage		V_R	5	V
	Junction temperature		Tj	125	°C
Detector	Off-state output terminal voltage		V_{DRM}	600	V
	On-state RMS current	Ta=25°C	$I_{T(RMS)}$	100	mA
		Ta=70°C		50	
	On-state current derating (Ta≥25°C)		ΔI_T/°C	-1.1	mA /°C
	Peak on-state current (100μs pulse, 120pps)		I_{TP}	2	A
	Peak nonrepetitive surge current (Pw=10ms,DC=10%)		I_{TSM}	1.2	A
	Junction temperature		T_j	110	°C
Operating temperature range			T_{opr}	−40~100	°C
Storage temperature range			T_{stg}	−55~125	°C
Lead soldering temperature (10s)			T_{sol}	260	°C
Isolation voltage (AC,1min. , R.H. ≤60%)		(Note 2)	BV_S	5000	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:Pins1,2 and 3 shorted together and pin4 and pin6 shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{AC}	—	—	240	Vac
Forward current	I_F	4.5	6	7.5	mA
Peak on-state current	I_{TP}	—	—	1	A
Operating temperature	T_{opr}	−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.

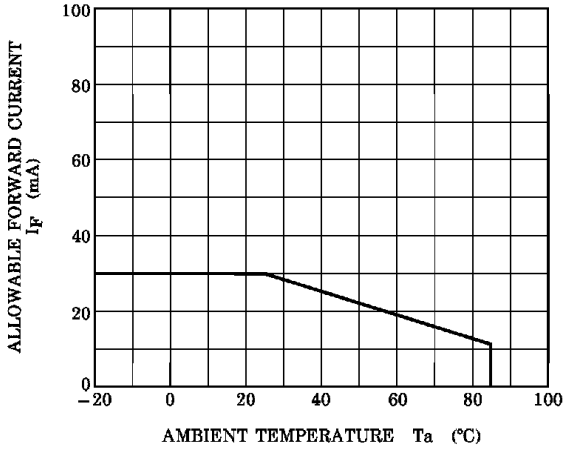
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	V_F	I_F = 10 mA	1.2	1.4	1.7	V
	Reverse current	I_R	V_R = 3 V	—	—	10	μA
	Capacitance	C_T	V = 0, f=1MHz	—	30	—	pF
Detector	Peak off-state current	I_{DRM}	V_{DRM} =600V	—	10	1000	nA
	Peak on-state voltage	V_{TM}	I_{TM} =100mA	—	—	3.0	V
	Holding current	I_H	—	—	0.6	—	mA
	Critical rate of rise of off-state voltage	dv/dt	Vin=240Vrms , Ta=85°C	200	500	—	V/μs
	Critical rate of rise of commutating voltage	dv/dt(c)	Vin=60Vrms , IT=15mA	—	0.2	—	V/μs

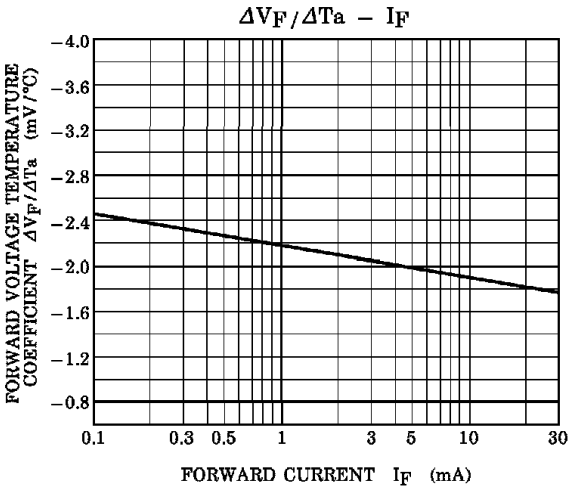
Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Trigger LED current	I_{FT}	V_T =6V ,Resistive load	—	—	3	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}	—	200	600	μA
Capacitance (input to output)	C_S	V_S =0 , f=1MHz	—	0.8	—	pF
Isolation resistance	R_S	V_S =500V	1×10^{12}	10^{14}	—	Ω
Isolation voltage	BV_S	AC , 1minute	5000	—	—	Vrms
		AC , 1second,in oil	—	10000	—	
		DC , 1minute,in oil	—	10000	—	Vdc

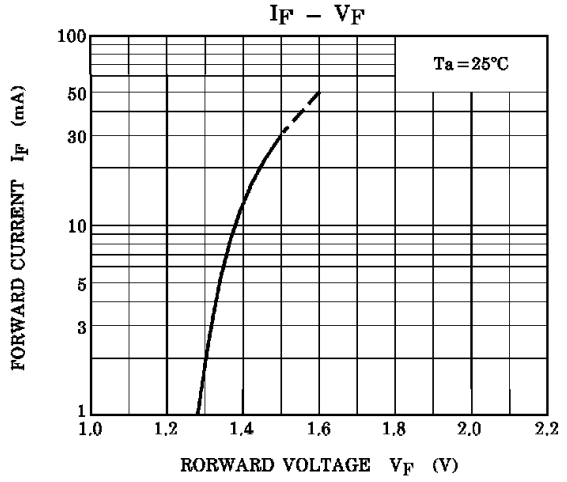
I_F – Ta



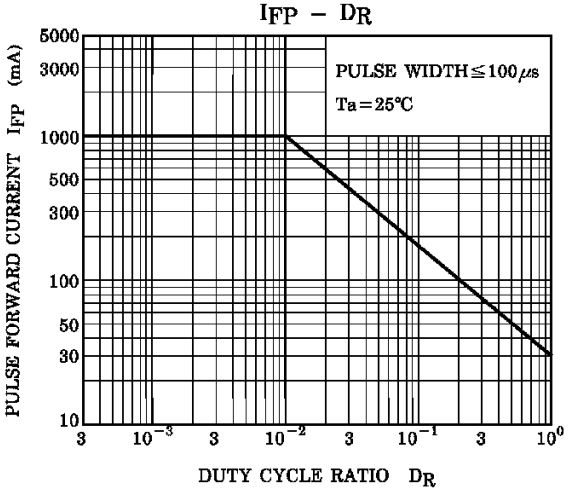
$\Delta V_F / \Delta Ta$ – I_F



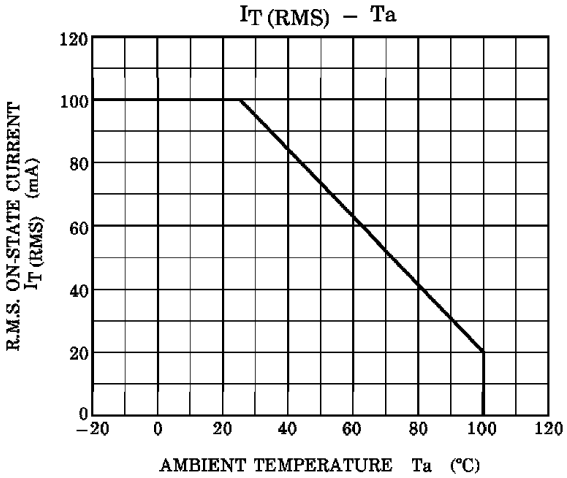
I_F – V_F



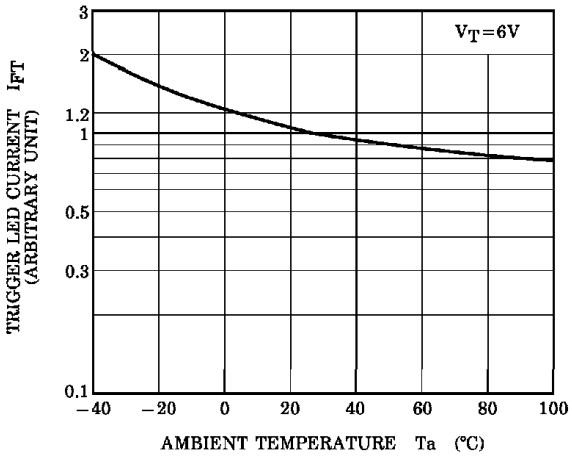
I_{FP} – D_R



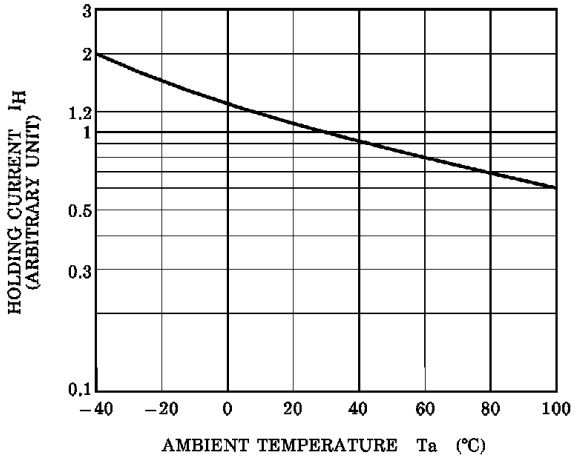
$I_{T\,(RMS)}$ – Ta



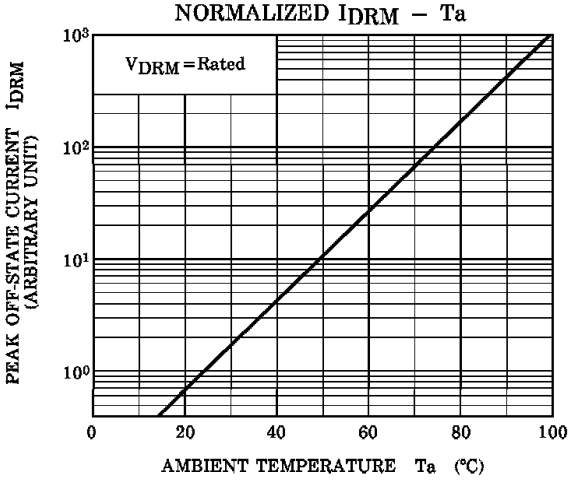
NORMALIZED I_{FT} – Ta



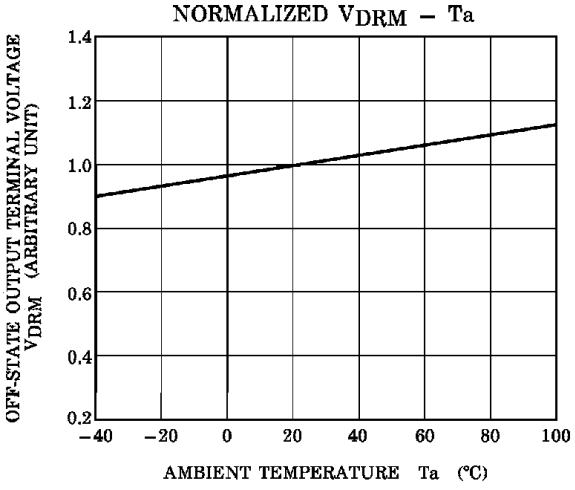
NORMALIZED I_H – Ta



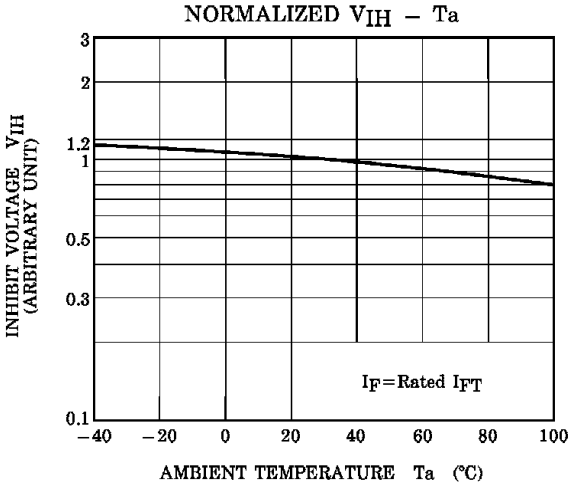
NORMALIZED I_{DRM} – Ta



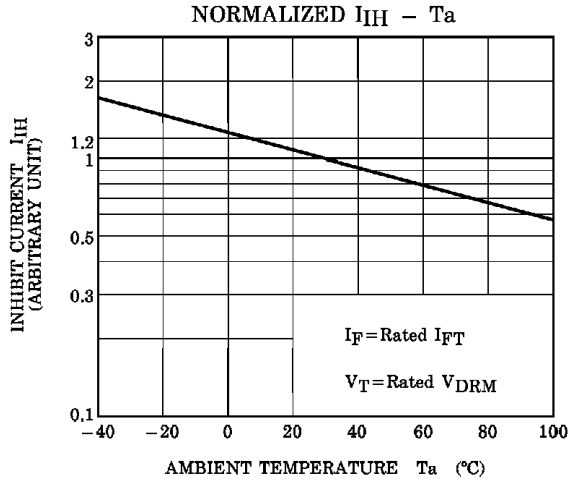
NORMALIZED V_{DRM} – Ta



NORMALIZED V_{IH} – Ta



NORMALIZED I_{IH} – Ta



RESTRICTIONS ON PRODUCT USE

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- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
  In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the “Handling Guide for Semiconductor Devices,” or “TOSHIBA Semiconductor Reliability Handbook” etc.
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