

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRIAC

TLP3021(S),TLP3022(S),TLP3023(S)

OFFICE MACHINE
HOUSEHOLD USE EQUIPMENT
TRIAC DRIVER
SOLID STATE RELAY

The TOSHIBA TLP3021 (S), TLP3022 (S) and TLP3023 (S) consist of photo-triac optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP.

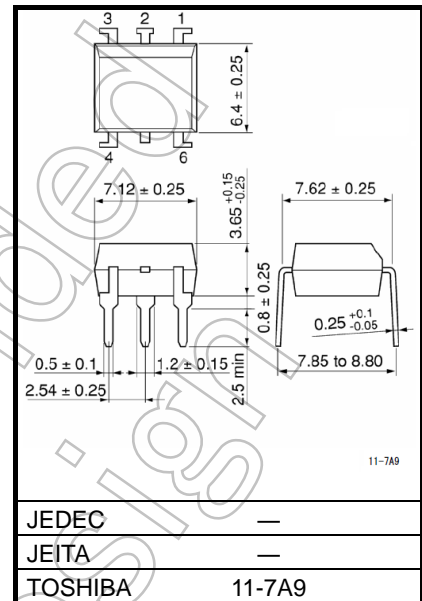
- Peak Off-State Voltage : 400 V (min)
- Trigger LED Current : 15 mA (max) (TLP3021(S))
10 mA (max) (TLP3022(S))
5 mA (max) (TLP3023(S))
- On-State Current : 100 mA (max)
- Isolation Voltage : 5000Vrms(Min)
- UL Recognized : UL1577,File No.E67349
- cUL approved :CSA Component Acceptance Service
No. 5A, File No.E67349
- Option (D4) type VDE approved: EN60747-5-5,
EN60065, EN60950-1 (Note 1)
EN62368-1(Pending) (Note1)

(Note 1):When a VDE approved type is needed,
please designate the "Option (D4)"

- Construction Mechanical Rating

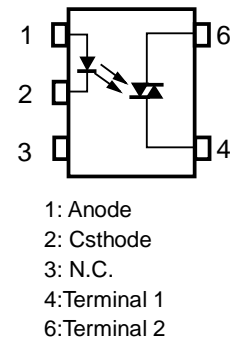
	7.62 mm pitch Standard Type	10.16 mm pitch TLPxxxxF Type
Creepage Distance	7.0 mm (Min)	8.0 mm (Min)
Clearance	7.0 mm (Min)	8.0 mm (Min)
Insulation Thickness	0.5 mm (Min)	0.5 mm (Min)

Unit: mm



Weight: 0.39g (typ.)

Pin Configuration (top view)



Start of commercial production
1986-11

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
	Power Dissipation	P _D	100	mW
	Power Dissipation Derating (Ta≥25°C)	ΔP _D /°C	-1.0	mW/°C
	Junction Temperature	T _j	125	°C
DETECTOR	Off-State Output Terminal Voltage	V _{DRM}	400	V
	On-State RMS Current	I _{T(RMS)}	100	mA
			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)	I _{TSM}	1.2	A
	Power Dissipation	P _D	300	mW
	Power Dissipation Derating (Ta≥25°C)	ΔP _D /°C	-4.0	mW/°C
	Junction Temperature	T _j	115	°C
	Storage Temperature Range	T _{stg}	-55 to 150	°C
Operating Temperature Range		T _{opr}	-40 to 100	°C
Lead Soldering Temperature (10s)		T _{sol}	260	°C
Total Package Power Dissipation		P _T	330	mW
Total Package Power Dissipation Derating (Ta≥25°C)		ΔP _T /°C	-4.4	mW /°C
Isolation Voltage (AC, 1min., R.H.≤60%) (Note 2)		BV _S	5000	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 : 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}	—	—	120	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.

*In The case of TLP3022

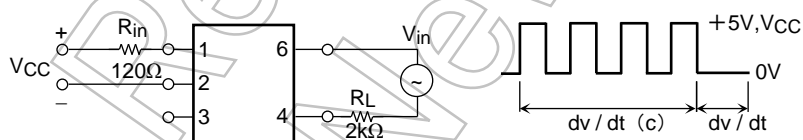
Individual Electrical Characteristics (Ta=25°C)

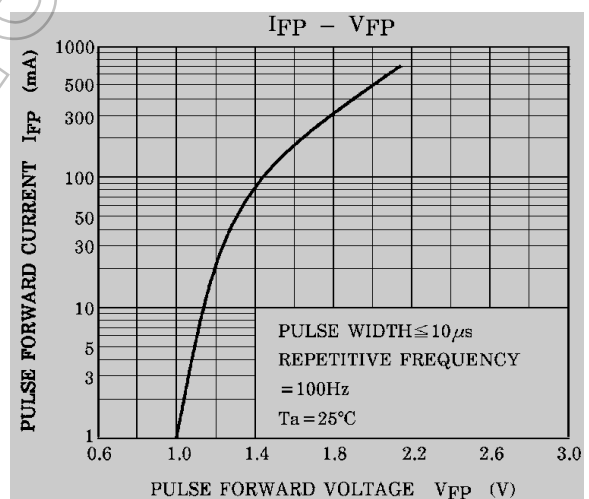
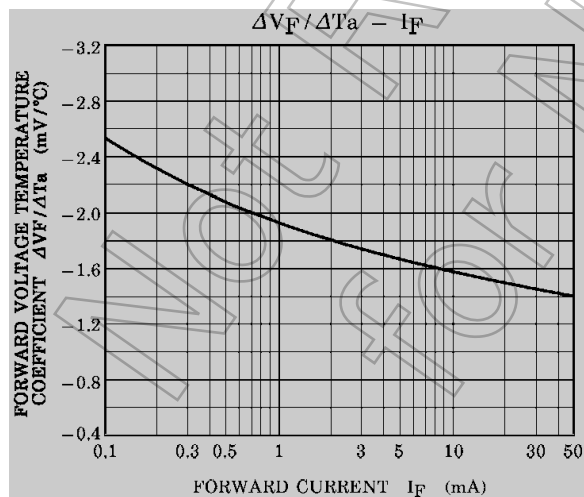
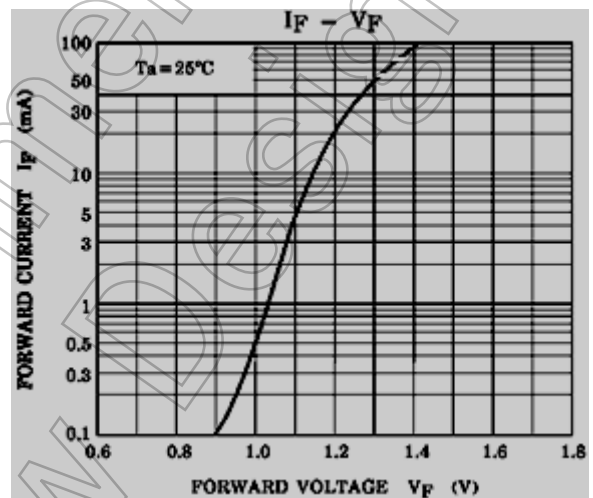
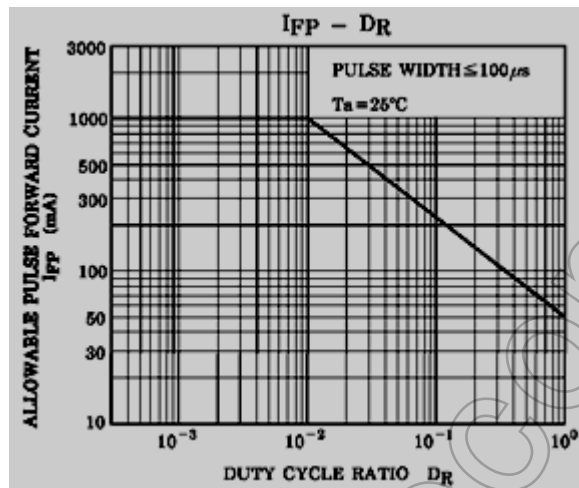
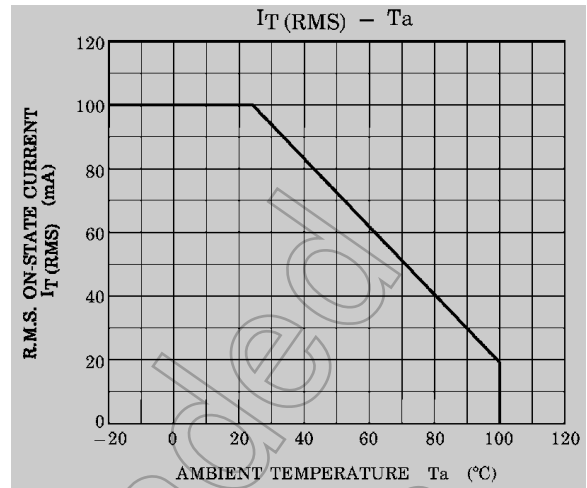
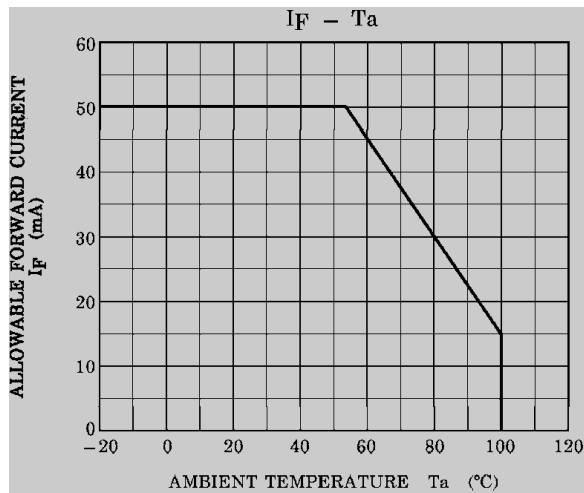
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse Current	I_R	$V_R = 5 \text{ V}$	—	—	10	μA
	Capacitance	C_T	$V = 0 \text{ V}, f = 1\text{MHz}$	—	10	—	pF
R T O T A L	Peak Off-State Current	I_{DRM}	$V_{DRM} = 400\text{V}$	—	10	1000	nA
	Peak On-State Voltage	V_{TM}	$I_{TM} = 100\text{mA}$	—	1.7	3.0	V
	Holding Current	I_H	—	—	0.6	—	mA
	Critical Rate of Rise of Off-State Voltage	dv/dt	$V_{in} = 120\text{Vrms}, T_a = 85^\circ\text{C}$ (Fig.1)	200	500	—	$\text{V}/\mu\text{s}$
	Critical Rate of Rise of Commutating Voltage	$dv/dt(c)$	$V_{in} = 30\text{Vrms}, I_T = 15\text{mA}$ (Fig.1)	—	0.2	—	$\text{V}/\mu\text{s}$

Coupled Electrical Characteristics (Ta=25°C)

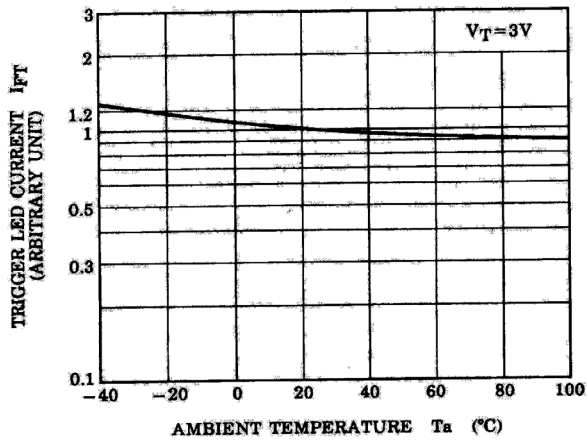
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Trigger LED Current	TLP3021(S)	I_{FT}	$V_T = 3\text{V}$	—	—	15	mA
	TLP3022(S)			—	5	10	
	TLP3023(S)			—	—	5	
Capacitance (Input to Output)		C_S	$V_S = 0\text{V}, f = 1\text{MHz}$	—	0.8	—	pF
Isolation Resistance		R_S	$V_S = 500\text{V}(\text{R.H.} \leq 60\%)$	5×10^{10}	10^{14}	—	Ω
Isolation Voltage		BV_S	AC, 1minute	5000	—	—	Vrms
			AC, 1second, in oil	—	10000	—	
			DC, 1minute, in oil	—	10000	—	Vdc

Fig. 1 dv/dt test circuit

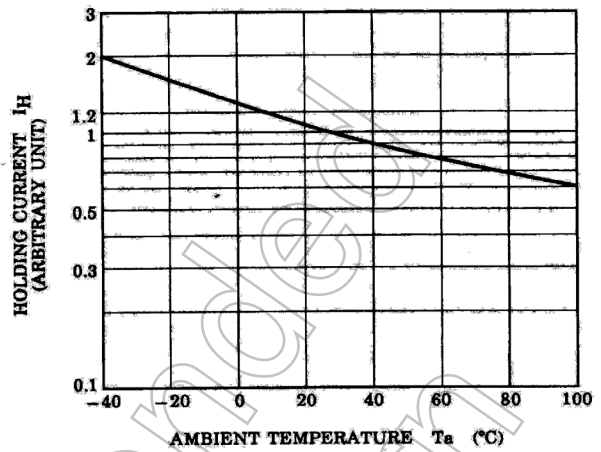




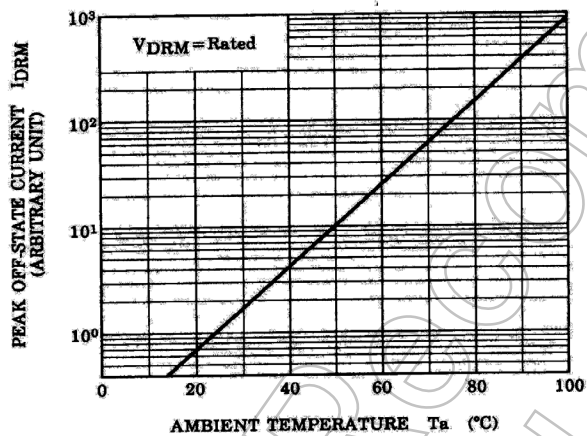
NORMALIZED $I_{FT} - T_a$



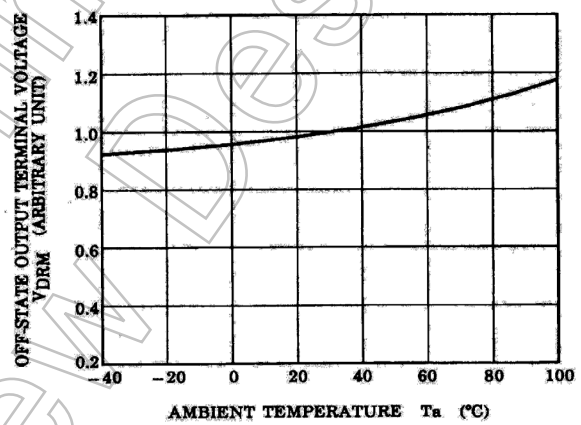
NORMALIZED $I_H - T_a$



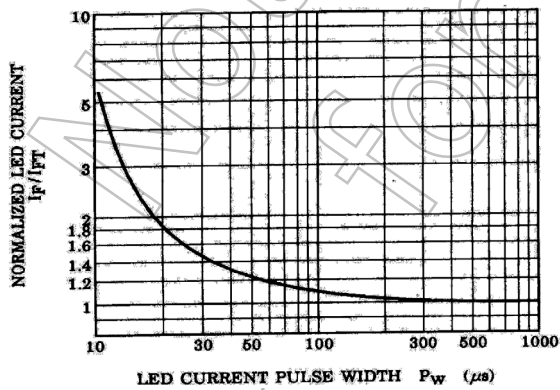
NORMALIZED $I_{DRM} - T_a$



NORMALIZED $V_{DRM} - T_a$



NORMALIZED LED CURRENT
- LED CURRENT PULSE WIDTH



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