

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRIAC

TLP3041(S), TLP3042(S), TLP3043(S)

OFFICE MACHINE
 HOUSEHOLD USE EQUIPMENT
 TRIAC DRIVER
 SOLID STATE RELAY

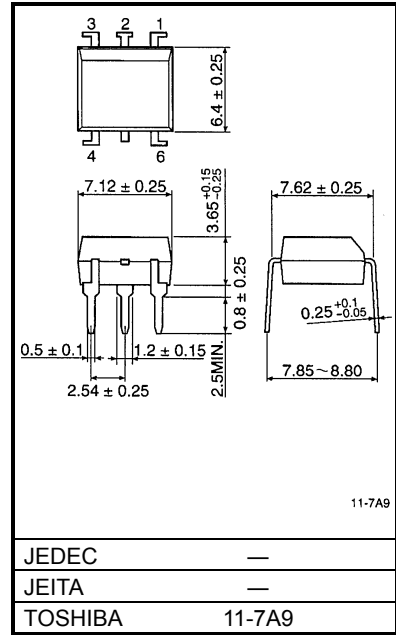
The TOSHIBA TLP3041 (S), TLP3042 (S), TLP3043 (S) consist of a zero voltage crossing turn-on photo-triac optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP package.

- Peak Off-State Voltage : 400 V (min)
 - Trigger LED Current : 15 mA (max) (TLP3041(S))
 10 mA (max) (TLP3042(S))
 5 mA (max) (TLP3043(S))
 - On-State Current : 100 mA (max)
 - Isolation Voltage : 5000 Vrms (min)
 - UL Recognized : UL1577, File No. E67349
 - SEMKO Approved : SS EN60065
 SS EN60950, File No.9841109
 - BSI Approved : BS EN60065, File No.8385
 BS EN60950, File No.8386
 - Option (D4) type
 VDE approved: DIN EN60747-5-2
 Approved No. 40009302
 Maximum operating insulation voltage: 890V_{PK}
 Highest permissible over voltage: 8000V_{PK}
- (Note):When a EN60747-5-2 approved type is needed, please designate the "Option (D4)"

● Construction mechanical rating

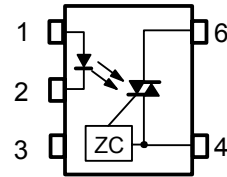
	7.62 mm pitch Standard Type	10.16 mm pitch TLPxxxxF Type
Creepage Distance	7.0 mm (Min)	8.0 mm (Min)
Clearance	7.0 mm (Min)	8.0 mm (Min)
Insulation Thickness	0.5 mm (Min)	0.5 mm (Min)

Unit: mm



weight: 0.39g (typ.)

Pin Configuration (top view)



- 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	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
	Power Dissipation	P _D	100	mW
	Power Dissipation Derating (Ta ≥ 25°C)	ΔP _D / °C	-1.0	mW / °C
	Reverse Voltage	V _R	5	V
	Junction Temperature	T _j	125	°C
DETECTOR	Off-State Output Terminal Voltage	V _{DRM}	400	V
	On-Stage RMS Current	I _{T(RMS)}	100	mA
	Current		50	
	On-State Current Derating (Ta ≥ 25°C)	ΔI _T / °C	-1.1	mA / °C
	Peak On-Stage Current (100μs pulse, 120pps)	I _{TP}	2	A
	Peak Nonrepetitive Surge Current (P _W = 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, 1 min., R.H. ≤ 60%) (Note 1)	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 1: Device considered a two terminal device: Pins 1, 2 and 3 shorted together and pins 4 and 6 shorted together.

Recommended Operating Conditions

CHARACTERISTIC	SYMBOL	MIN	TYP.	MAX	UNIT
Supply Voltage	V _{AC}	—	—	120	Vac
Forward Current	I _F *	15	20	25	mA
Peak On-Stage 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 TLP3042

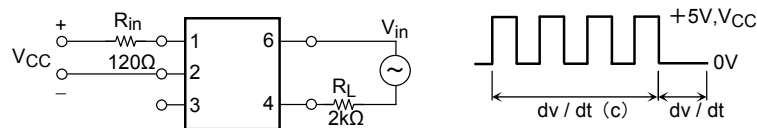
Individual Electrical Characteristics (Ta = 25°C)

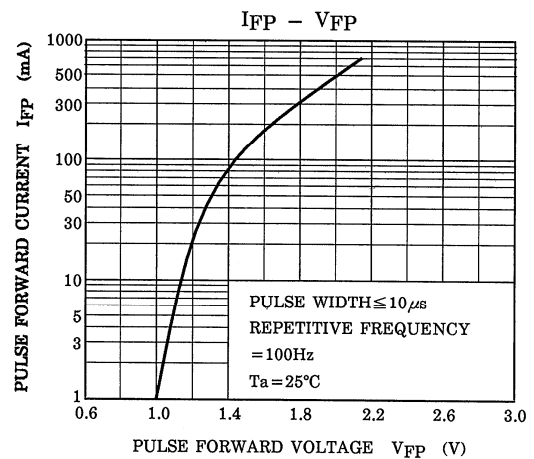
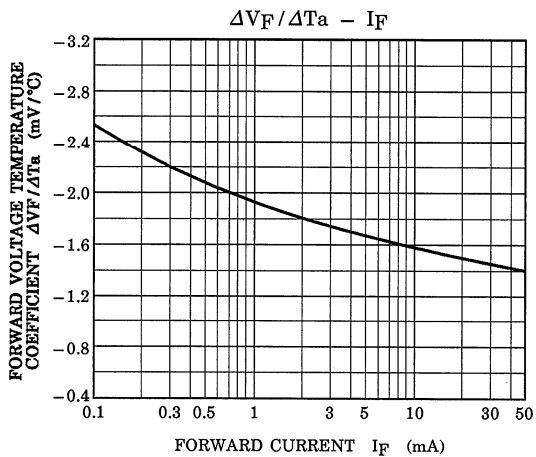
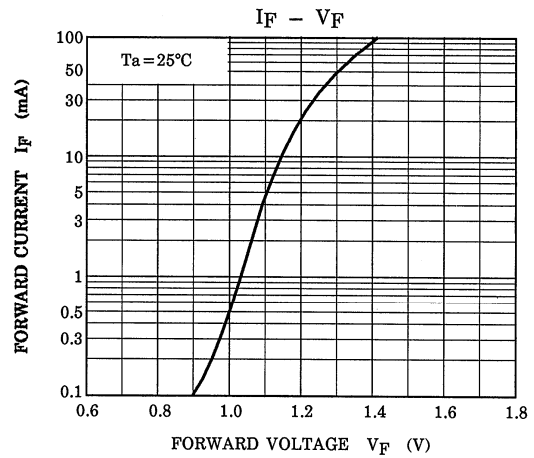
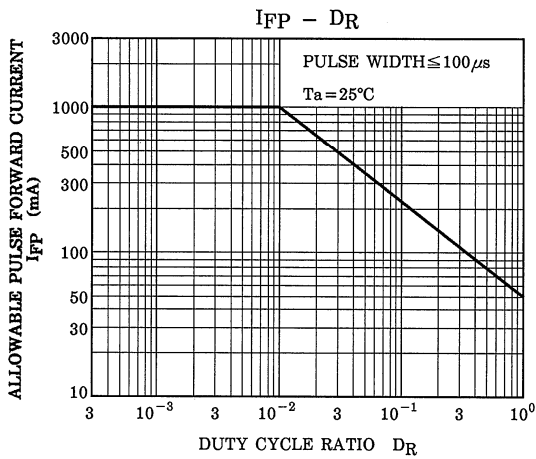
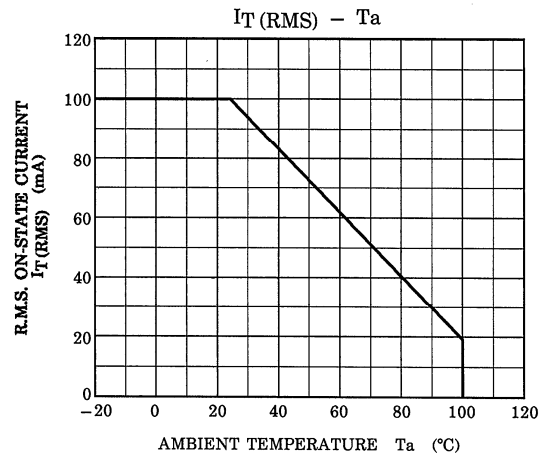
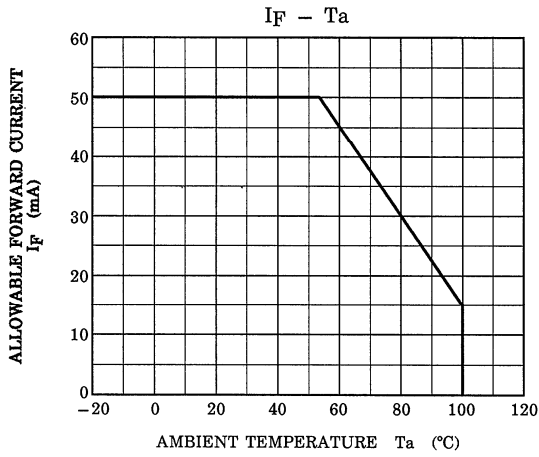
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
LED	Forward Voltage	V_F	$I_F = 10\text{mA}$	1.0	1.15	1.3	V
	Reverse Current	I_R	$V_R = 5\text{V}$	—	—	10	μA
	Capacitance	C_T	$V = 0, f = 1\text{MHz}$	—	10	—	pF
DETECTOR	Peak Off-State Current	I_{DRM}	$V_{DRM} = 400\text{V}$	—	10	100	nA
	Peak On-State 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	—	$\text{V} / \mu\text{s}$

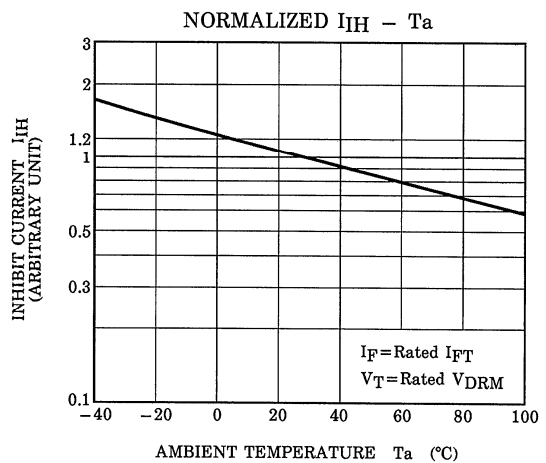
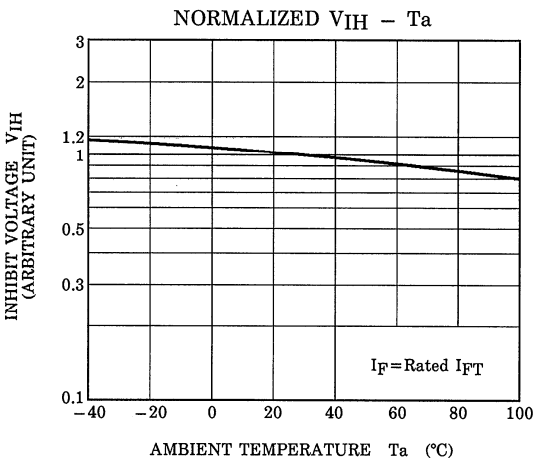
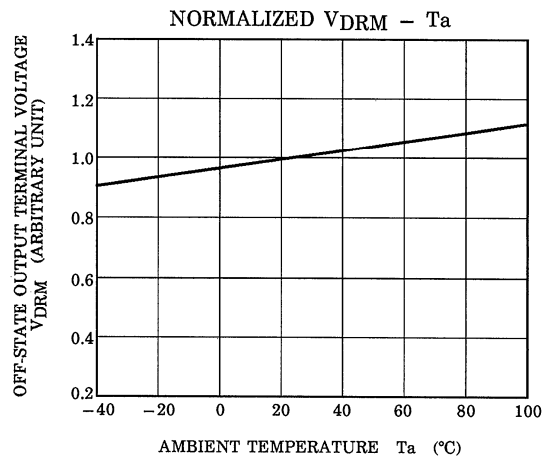
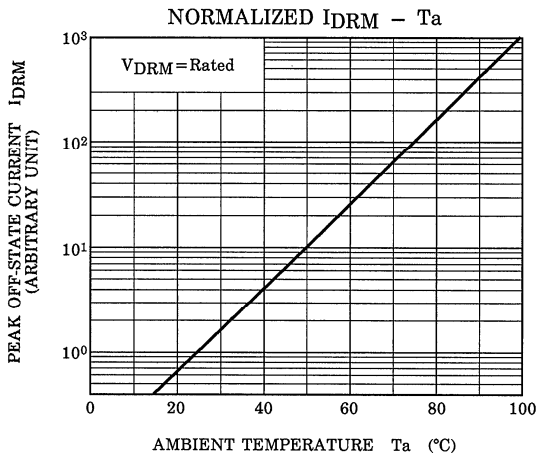
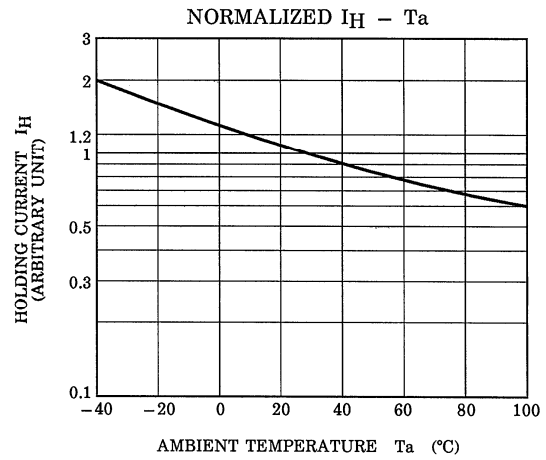
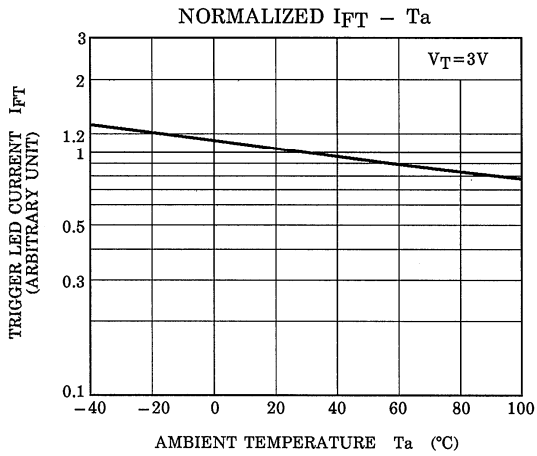
Coupled Electrical Characteristics (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Trigger LED Current	TLP3041(S)	I_{FT}	$V_T = 3\text{V}$	—	—	15	mA
	TLP3042(S)			—	5	10	
	TLP3043(S)			—	—	5	
Inhibit Voltage	V_{IH}	$I_F = \text{Rated } I_{FT}$	—	—	40	V	
Leakage in Inhibited State	I_{IH}	$I_F = \text{Rated } I_{FT}$ $V_T = \text{Rated } V_{DRM}$	—	100	300	μA	
Capacitance Input to Output	C_S	$V_S = 0, f = 1\text{MHz}$	—	0.8	—	pF	
Isolation Resistance	R_S	$V_S = 500\text{V}$ (R.H. $\leq 60\%$)	5×10^{10}	10^{14}	—	Ω	
Isolation Voltage	BV_S	AC, 1 minute	5000	—	—	Vrms	
		AC, 1 second (in oil)	—	10000	—	—	
		DC, 1 minute (in oil)	—	10000	—	—	Vdc

Fig. 1 dv / dt test circuit







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