

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

Unit: mm

OFFICE MACHINE  
HOUSEHOLD USE EQUIPMENT  
TRIAC DRIVER  
SOLID STATE RELAY

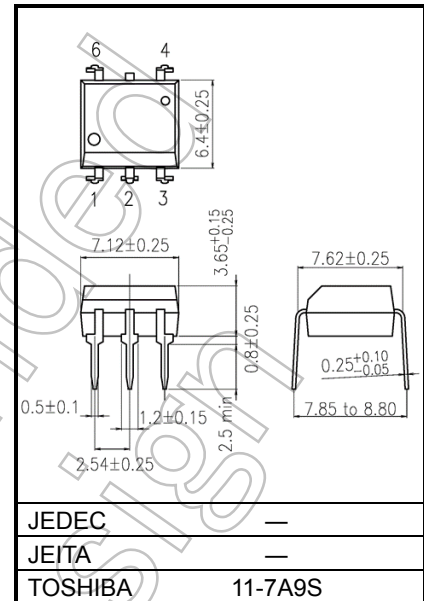
The TOSHIBA TLP3041 (S), TLP3042 (S), TLP3043 (S) consist of a zero voltage crossing turn-on photo-triac optically coupled to an infrared emitting diode in a six lead plastic DIP package.

- 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 : UL 1577, File No.E67349
- cUL-recognized : CSA Component Acceptance Service No.5A  
File No.E67349
- VDE-approved : EN 60747-5-5, EN 62368-1 (Note 1)

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

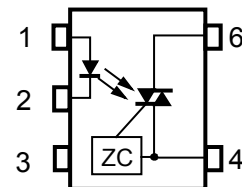
- Construction mechanical rating

	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)



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

Start of commercial production  
1986-11

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

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I <sub>F</sub>	50	mA
	Forward Current Derating (Ta ≥ 53°C)	ΔI <sub>F</sub> / °C	-0.7	mA / °C
	Peak Forward Current (100μs pulse, 100pps)	I <sub>FP</sub>	1	A
	Reverse Voltage	V <sub>R</sub>	5	V
	Power Dissipation	P <sub>D</sub>	100	mW
	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>	400	V
	On-Stage RMS Current	I <sub>T(RMS)</sub>	100	mA
	Current		50	
	On-Stage Current Derating (Ta ≥ 25°C)	ΔI <sub>T</sub> / °C	-1.1	mA / °C
	Peak On-Stage Current (100μs pulse, 120pps)	I <sub>TP</sub>	2	A
	Peak Nonrepetitive Surge Current (P <sub>W</sub> = 10ms)	I <sub>TSM</sub>	1.2	A
	Power Dissipation	P <sub>D</sub>	300	mW
	Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>D</sub> / °C	-4.0	mW / °C
	Junction Temperature	T <sub>j</sub>	115	°C
	Storage Temperature Range	T <sub>stg</sub>	-55 to 150	°C
Operating Temperature Range		T <sub>opr</sub>	-40 to 100	°C
Lead Soldering Temperature (10 s)		T <sub>sol</sub>	260	°C
Total Package Power Dissipation		P <sub>T</sub>	330	mW
Total Package Power Dissipation Derating (Ta ≥ 25°C)		ΔP <sub>T</sub> / °C	-4.4	mW / °C
Isolation Voltage (AC, 60 s., R.H. ≤ 60 %) (Note 1)		BVS	5000	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, 2 and 3 shorted together and pins 4 and 6 shorted together.

## Recommended Operating Conditions

CHARACTERISTIC	SYMBOL	MIN	TYP.	MAX	UNIT
Supply Voltage	V <sub>AC</sub>	—	—	120	V <sub>ac</sub>
Forward Current	I <sub>F</sub> *	15	20	25	mA
Peak On-Stage Current	I <sub>TP</sub>	—	—	1	A
Operating Temperature	T <sub>opr</sub>	-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

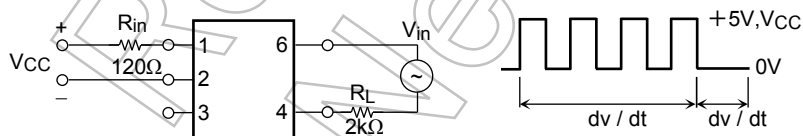
### Individual Electrical Characteristics (Ta = 25°C)

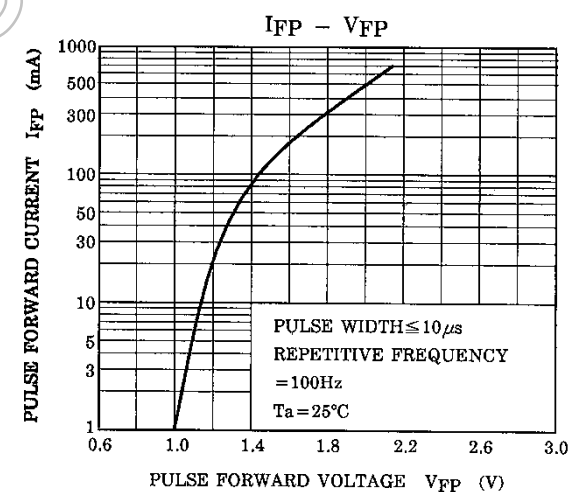
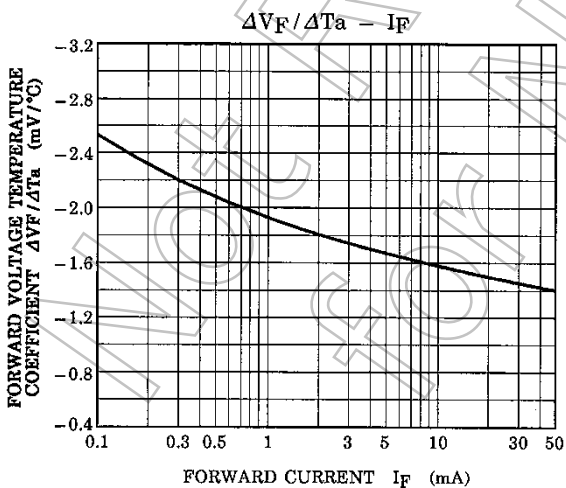
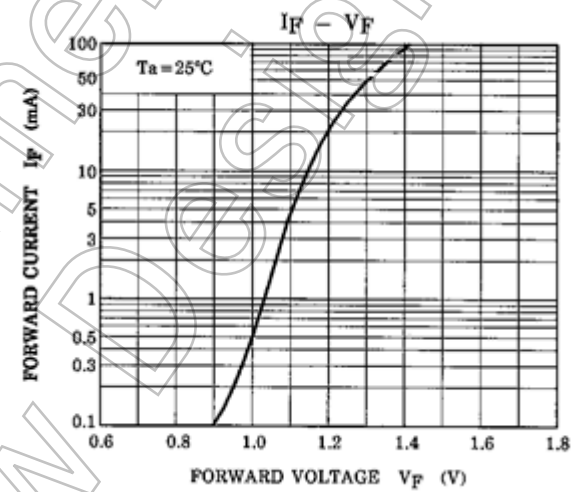
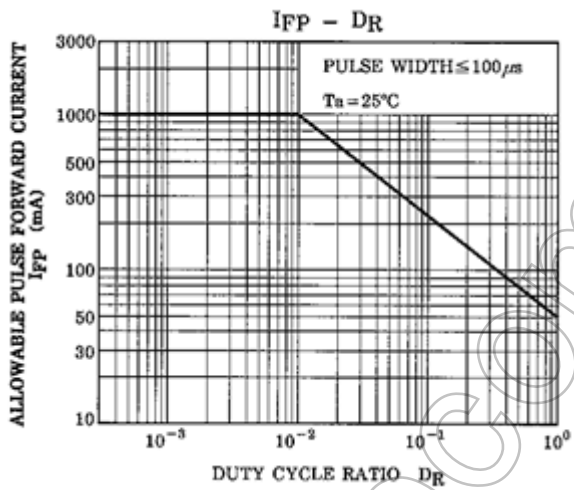
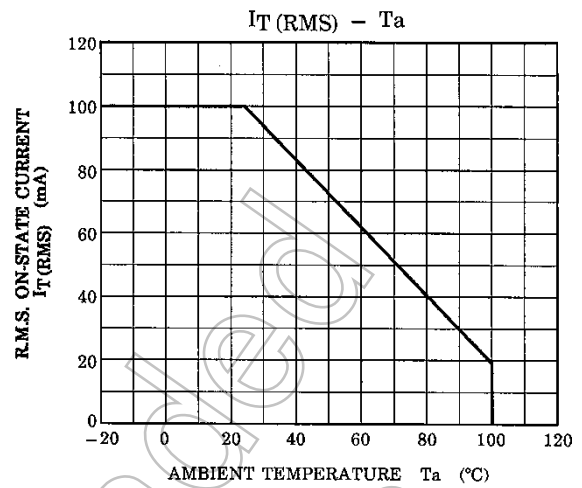
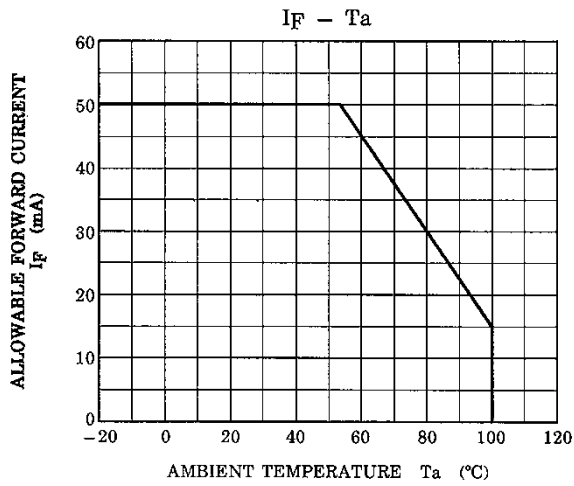
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
LED	Forward Voltage	$V_F$	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse Current	$I_R$	$V_R = 5 \text{ V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0 \text{ V}, f = 1 \text{ MHz}$	—	10	—	pF
DETECTOR	Peak Off-State Current	$I_{DRM}$	$V_{DRM} =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

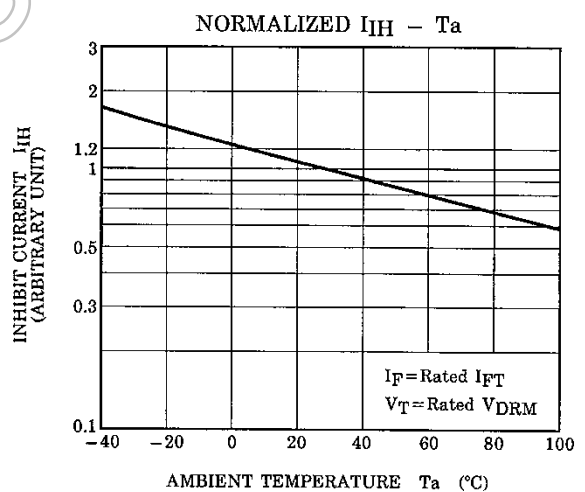
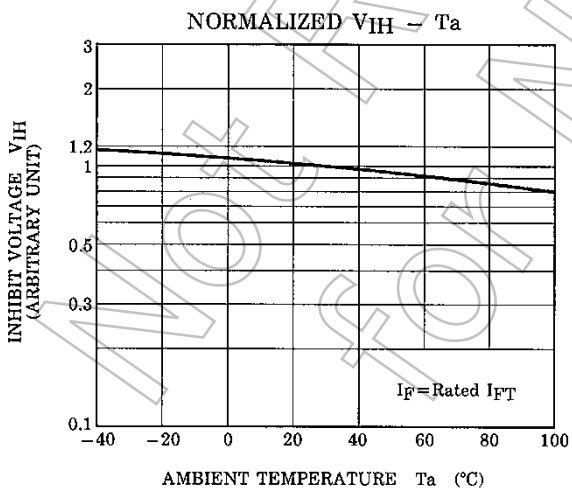
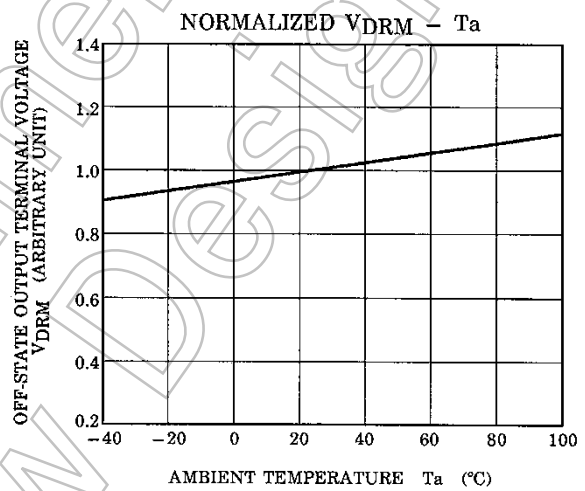
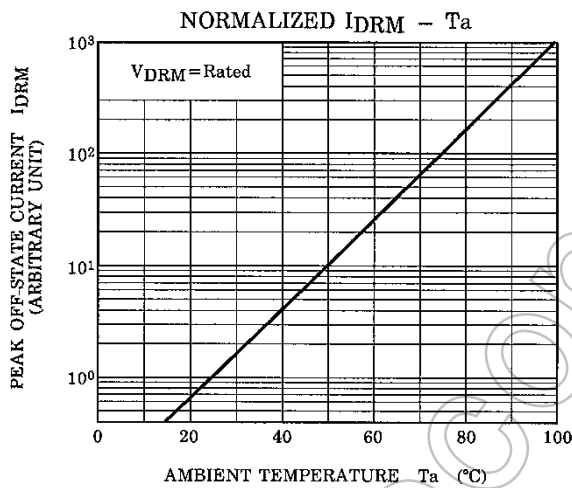
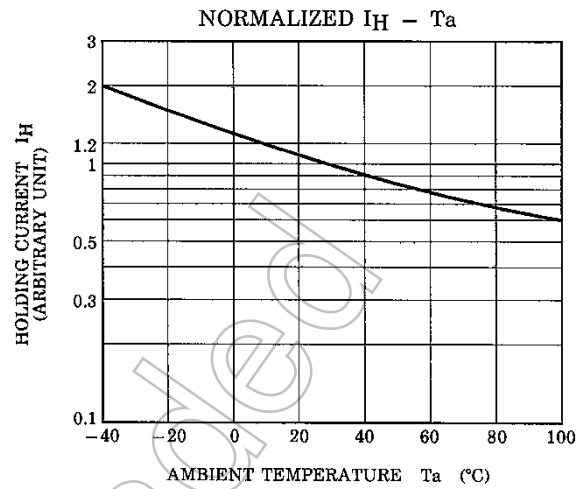
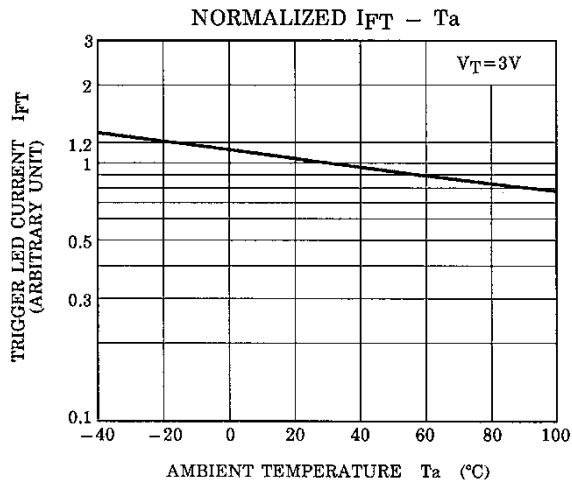
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Trigger LED Current	TLP3041(S)	$I_{FT}$	$V_T = 3 \text{ V}$	—	—	15	mA
	TLP3042(S)			—	5	10	
	TLP3043(S)			—	—	5	
Inhibit Voltage		$V_{IH}$	$I_F = \text{Rated } I_{FT}$	—	—	40	V
Leakage in Inhibited State		$I_{IH}$	$I_F = \text{Rated } I_{FT}$ $V_T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

Fig. 1  $dv / dt$  test circuit





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



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