

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRIAC

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

- OFFICE MACHINE
- HOUSEHOLD USE EQUIPMENT
- TRIAC DRIVER
- SOLID STATE RELAY

Unit: mm

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.

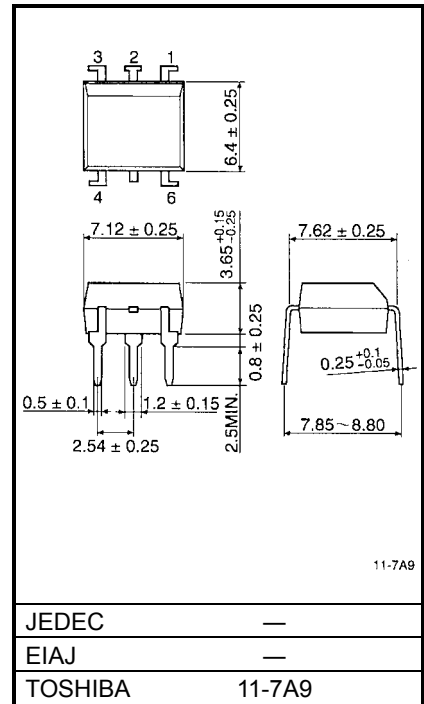
All parameters are tested to the specification of TLP3041, TLP3042, TLP3043.

- Peak Off-State Voltage : 400 V (min)
- Trigger LED Current : 15 mA (max) (TLP3041)  
10 mA (max) (TLP3042)  
5 mA (max) (TLP3043)
- On-State Current : 100 mA (max)
- UL Recognized : UL1577, File No. E67349
- Isolation Voltage : 5000 Vrms (min)
- Option (D4) Type VDE Approved : DIN VDE0884 / 06.92  
Certificate No. 68329

Maximum Operating Insulation Voltage : 890 Vpk  
Highest Permissible Over Voltage : 8000 Vpk

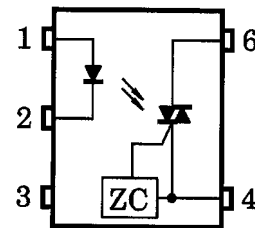
**Note:** When a VDE0884 approved type is needed, please designate the "Option (D4)"

Device Construction	7.62mm pich standard type	10.16 mm pich (LF2) 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

## PIN CONFIGURATION (Top view)



- 1: ANODE
- 2: CATHODE
- 3: N.C.
- 4: TERMINAL 1
- 6: TERMINAL 2

## MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	$I_F$	50	mA
	Forward Current Derating (Ta ≥ 53°C)	$\Delta I_F / ^\circ\text{C}$	-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)	$\Delta P_D / ^\circ\text{C}$	-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)	$\Delta I_T / ^\circ\text{C}$	-1.1	mA / °C
	Peak On-Stage Current (100µs pulse, 120pps)	$I_{TP}$	2	A
	Peak Nonrepetitive Surge Current (PW = 10ms, DC = 10%)	$I_{TSM}$	1.2	A
	Power Dissipation	$P_D$	300	mW
	Power Dissipation Derating (Ta ≥ 25°C)	$\Delta P_D / ^\circ\text{C}$	-4.0	mW / °C
	Junction Temperature	$T_j$	115	°C
	Storage Temperature Range	$T_{stg}$	-55 ~ 150	°C
Operating Temperature Range	$T_{opr}$	-40 ~ 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)	$\Delta P_T / ^\circ\text{C}$	-4.4	mW / °C	
Isolation Voltage (AC, 1 min., R.H. ≤ 60%) (Note 1)	$BV_S$	5000	Vrms	

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

\* : In the case of TLP3042

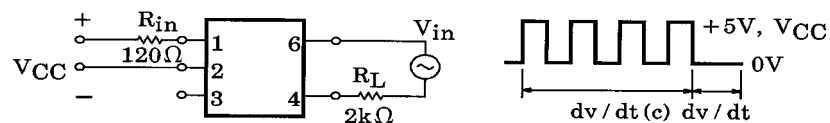
## INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

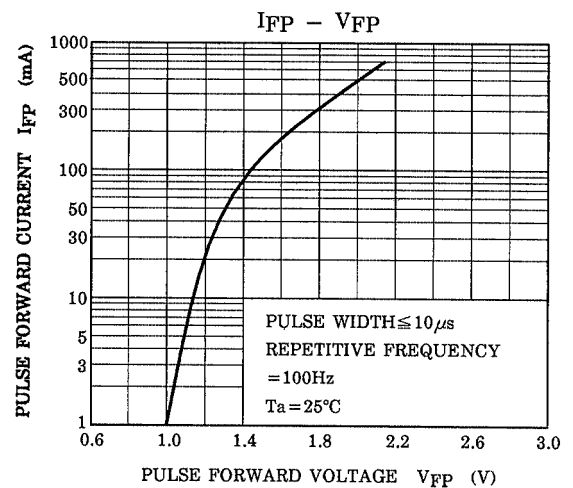
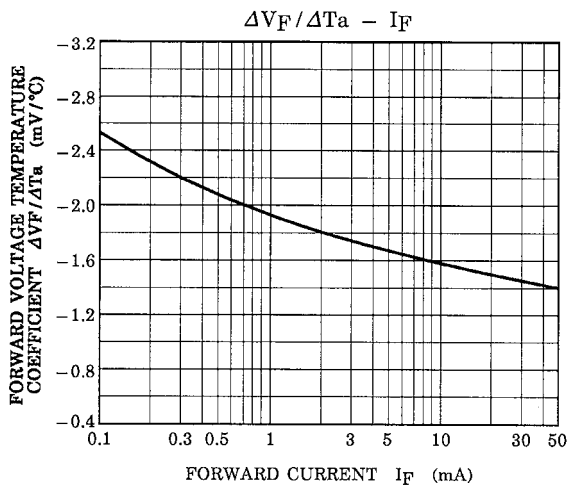
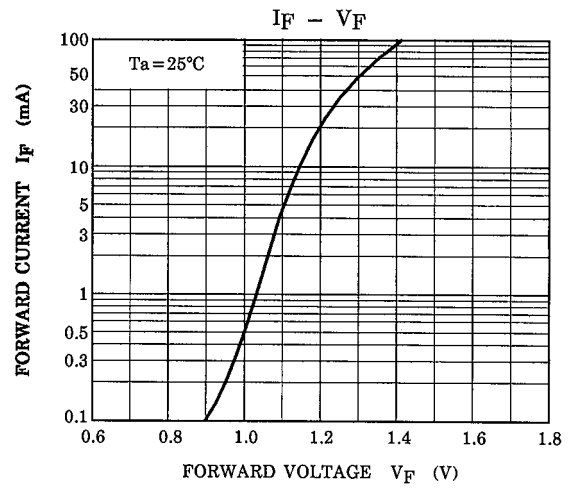
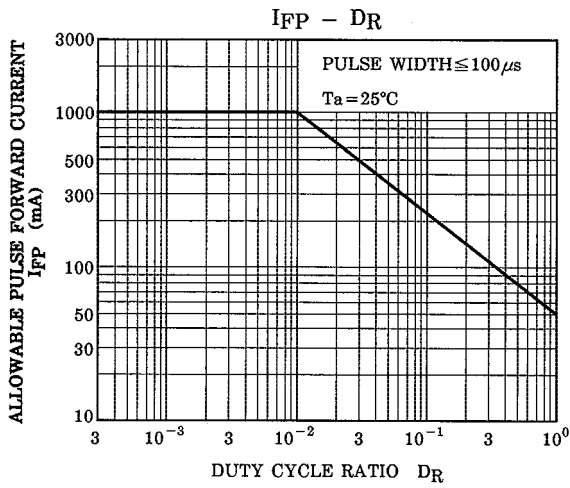
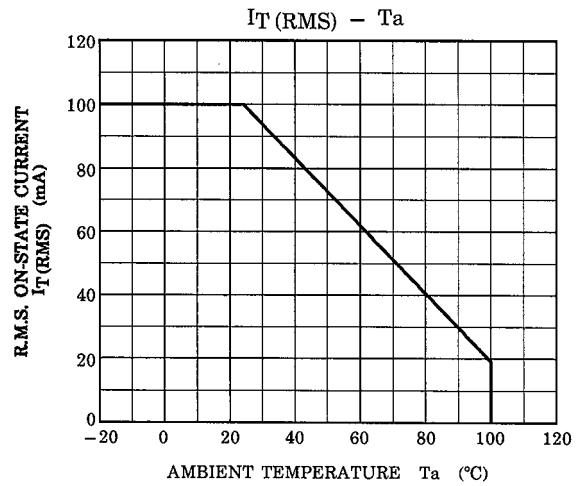
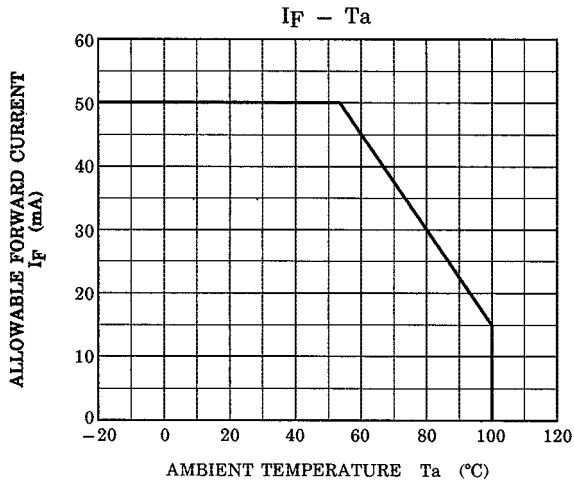
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
LED	Forward Voltage	$V_F$	$I_F = 10\text{mA}$	1.0	1.15	1.3	V
	Reverse Current	$I_R$	$V_R = 5\text{V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0, f = 1\text{MHz}$	—	10	—	pF
DETECTOR	Peak Off-State Current	$I_{DRM}$	$V_{DRM} = 400\text{V}$	—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

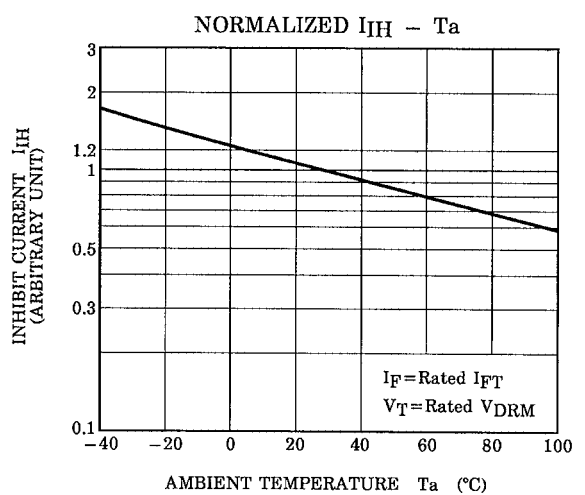
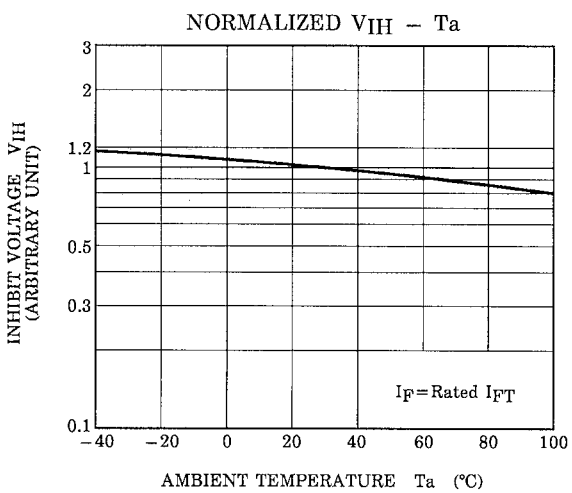
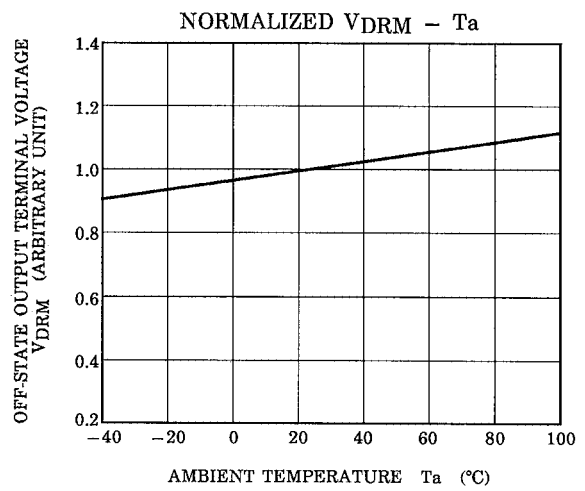
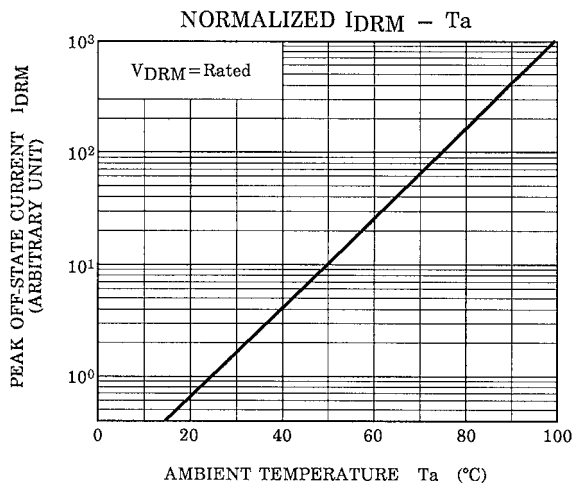
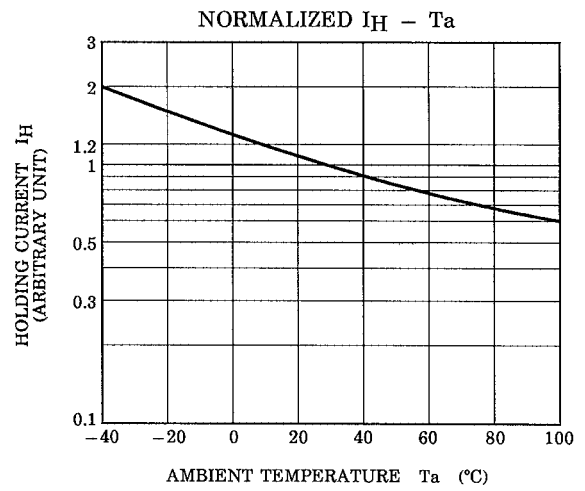
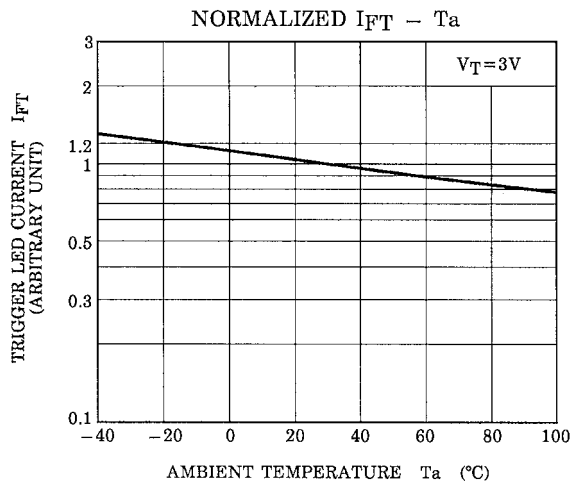
## COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Trigger LED Current	TLP3041	$I_{FT}$	$V_T = 3\text{V}$	—	—	15	mA
	TLP3042			—	5	10	
	TLP3043			—	—	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	$C_S$	$V_S = 0, f = 1\text{MHz}$	—	0.8	—	pF	
Isolation Resistance	$R_S$	$V_S = 500\text{V}$ (R.H. $\leq 60\%$ )	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$	
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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