

TOSHIBA Photocoupler GaAs Ired & Photo-Triac

# TLP3041, TLP3042, TLP3043

Office Machine

Household Use Equipment

Triac Driver

Solid State Relay

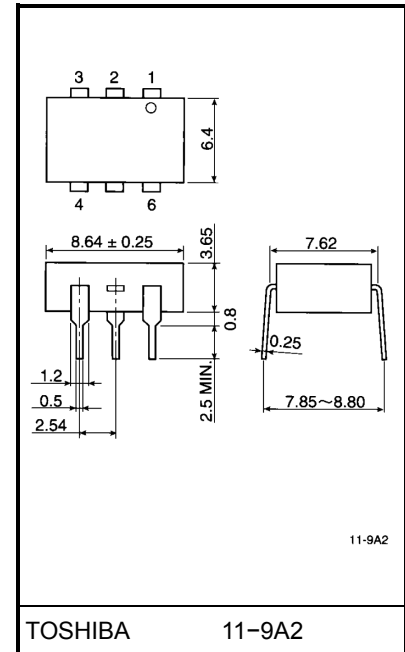
The TOSHIBA TLP3041, TLP3042 and TLP3043 consist of a zero voltage crossing turn-on photo-triac optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP package.

- Peak off-state voltage: 400V(min.)
- Trigger LED current: 15mA(max.) (TLP3041)  
10mA(max.) (TLP3042)  
5mA(max.) (TLP3043)
- On-state current: 100mA(max.)
- UL recognized: UL1577, file no. E67349  
Isolation voltage: 5000Vrms(min.)
- Option (D4) type  
VDE approved: DIN VDE0884 / 08.87,  
certificate no. 68329  
Maximum operating insulation voltage: 630V<sub>PK</sub>  
Highest permissible over voltage: 6000V<sub>PK</sub>

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

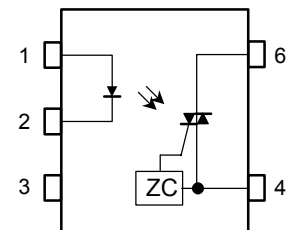
	7.62mm pitch standard type	10.16mm pitch (LF2) type
• Creepage distance:	7.0mm(min.)	8.0mm(min.)
• Clearance:	7.0mm(min.)	8.0mm(min.)
• Insulation thickness:	0.5mm(min.)	0.5mm(min.)

Unit in mm



Weight: 0.44 g

## Pin Configuration(top view)



- 1 : Anode
- 2 : Cathode
- 3 : NC
- 4 : Terminal 1
- 6 : Terminal 2

**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
	Power dissipation		P <sub>D</sub>	100	mW
	Power dissipation derating (Ta ≥ 25°C)		ΔP <sub>D</sub> / °C	−1.0	mW / °C
	Reverse voltage		V <sub>R</sub>	5	V
	Junction temperature		T <sub>j</sub>	125	°C
Detector	Off-state output terminal voltage		V <sub>DRM</sub>	400	V
	On-state RMS current	Ta=25°C	I <sub>T(RMS)</sub>	100	mA
		Ta=70°C		50	
	On-state current derating (Ta ≥ 25°C)		ΔI <sub>T</sub> / °C	−1.1	mA / °C
	Peak on-state current (100μs pulse, 120pps)		I <sub>TP</sub>	2	A
	Peak nonrepetitive surge current (P <sub>w</sub> =10ms, DC=10%)		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>	−55~150	°C
Operating temperature range			T <sub>opr</sub>	−40~100	°C
Lead soldering temperature (10s)			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, 1 min., R.H. ≤ 60%) (Note 1)			BV <sub>S</sub>	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-state current	$I_{TP}$	—	—	1	A
Operating temperature	$T_{opr}$	-25	—	85	°C

※ In the case of TLP3042

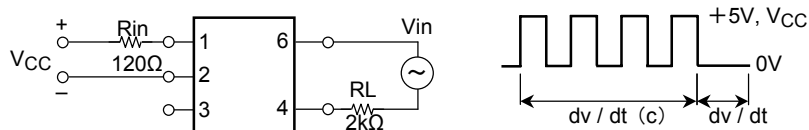
## Individual Electrical Characteristics (Ta = 25°C)

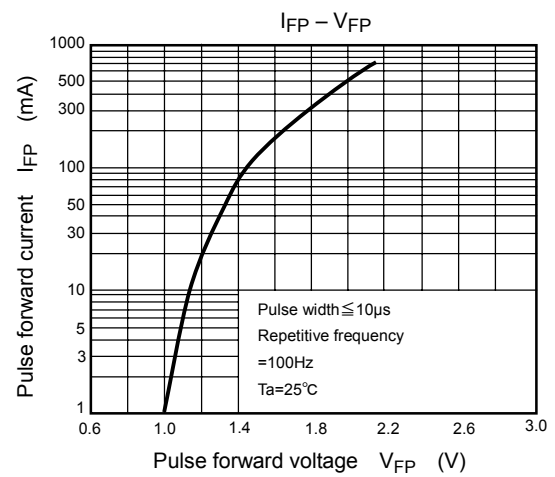
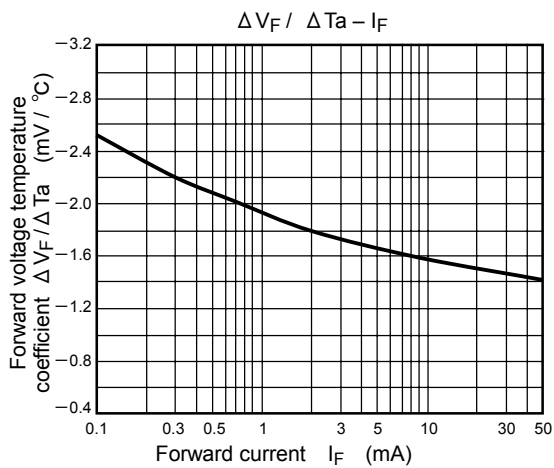
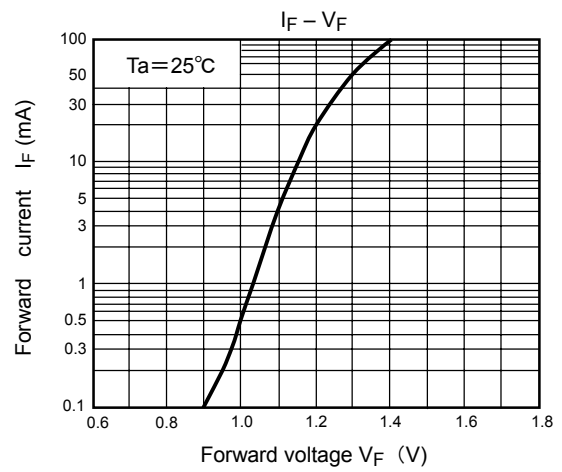
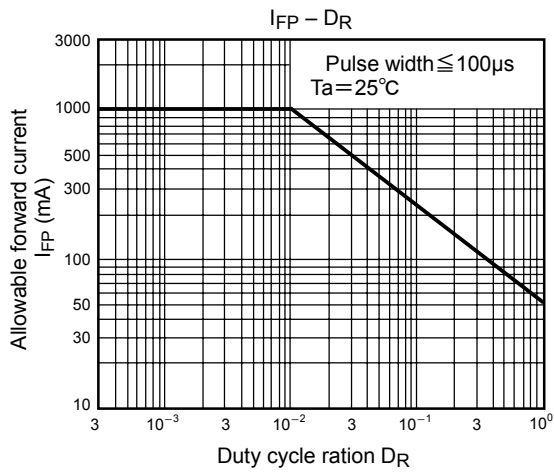
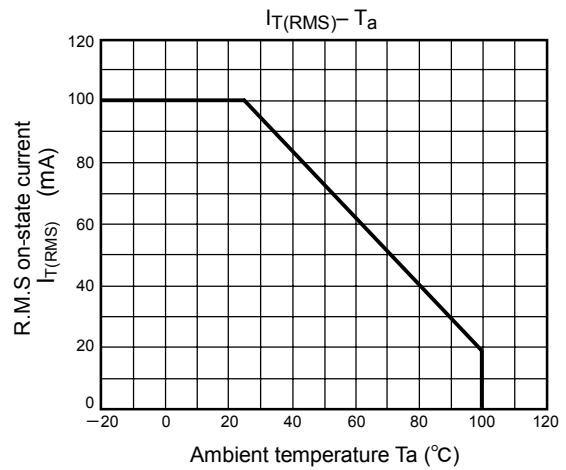
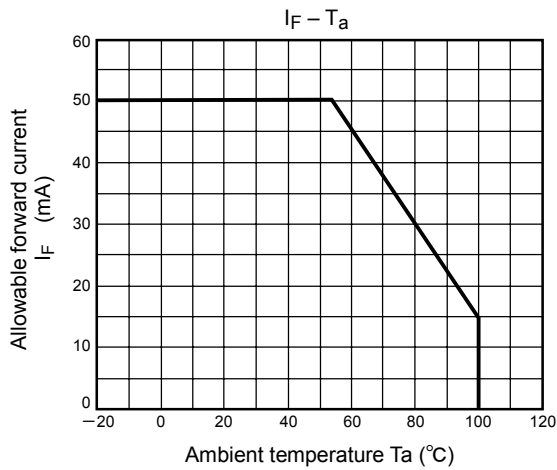
Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	$V_F$	$I_F = 10\text{mA}$	1.0	1.15	1.3	V
	Reverse current	$I_R$	$V_R = 5\text{V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0, f = 1\text{MHz}$	—	10	—	pF
Detector	Peak off-state current	$I_{\text{DRM}}$	$V_{\text{DRM}} = 400\text{V}$	—	10	100	nA
	Peak on-state voltage	$V_{\text{TM}}$	$I_{\text{TM}} = 100\text{mA}$	—	1.7	3.0	V
	Holding current	$I_H$	—	—	0.6	—	mA
	Critical rate of rise of off-state voltage	$dv / dt$	$V_{\text{in}} = 120\text{Vrms}, T_a = 85^\circ\text{C}$ (Fig.1)	200	500	—	V / $\mu\text{s}$
	Critical rate of rise of commutating voltage	$dv / dt(c)$	$V_{\text{in}} = 30\text{Vrms}, I_T = 15\text{mA}$ (Fig.1)	—	0.2	—	V / $\mu\text{s}$

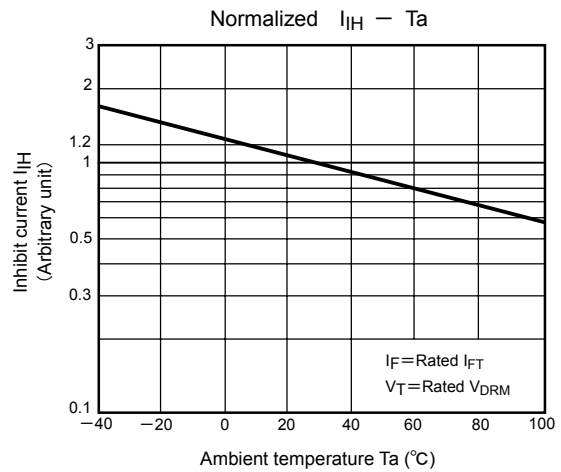
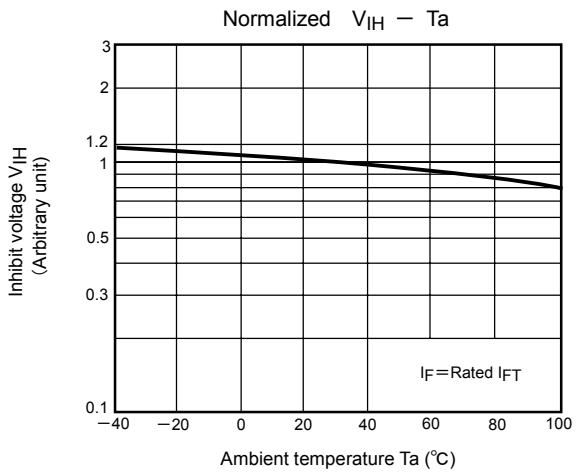
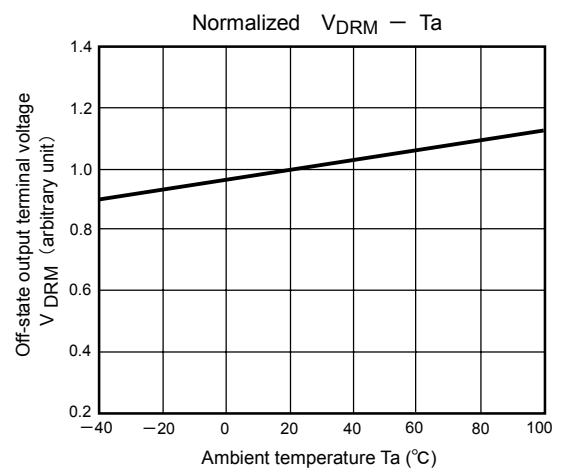
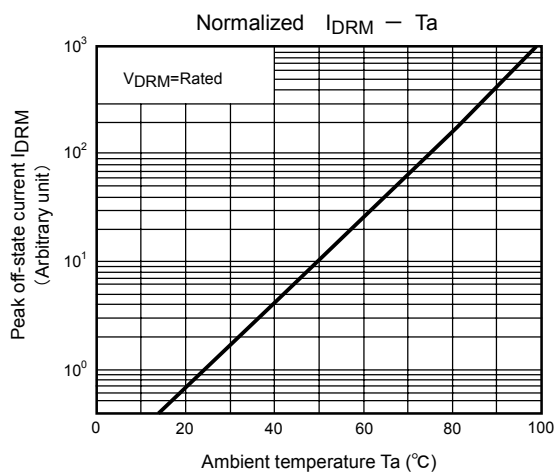
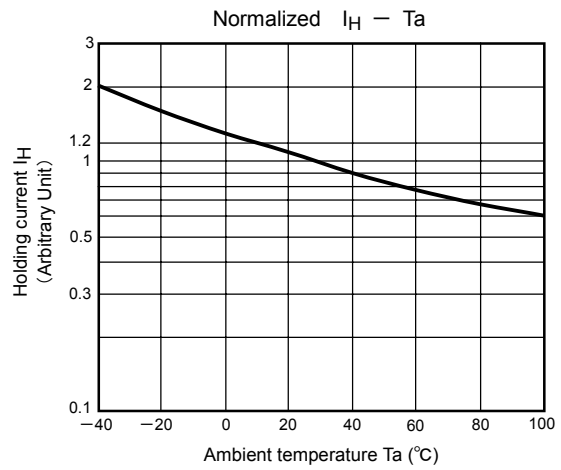
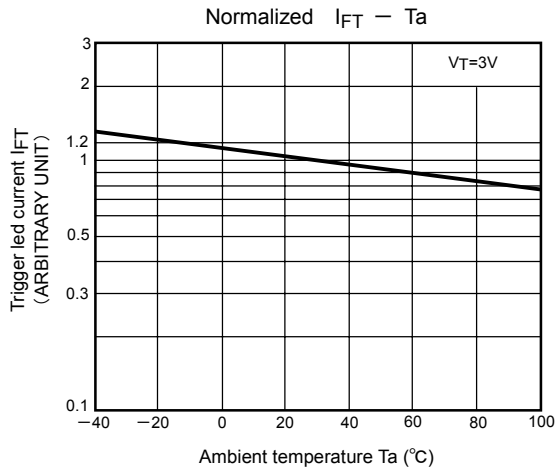
## Coupled Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Trigger LED current	TLP3041	$I_{\text{FT}}$	$V_T = 3\text{V}$	—	—	15	mA
	TLP3042			—	5	10	
	TLP3043			—	—	5	
Inhibit voltage		$V_{\text{IH}}$	$I_F = \text{rated } I_{\text{FT}}$	—	—	40	V
Leakage in inhibited state		$I_{\text{IH}}$	$I_F = \text{rated } I_{\text{FT}}$ $V_T = \text{rated } V_{\text{DRM}}$	—	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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