

TOSHIBA Photocoupler GaAs Ired & Photo-Triac

# TLP3041, TLP3042, TLP3043

- Office Machine
- Household Use Equipment
- Triac Driver
- Solid State Relay

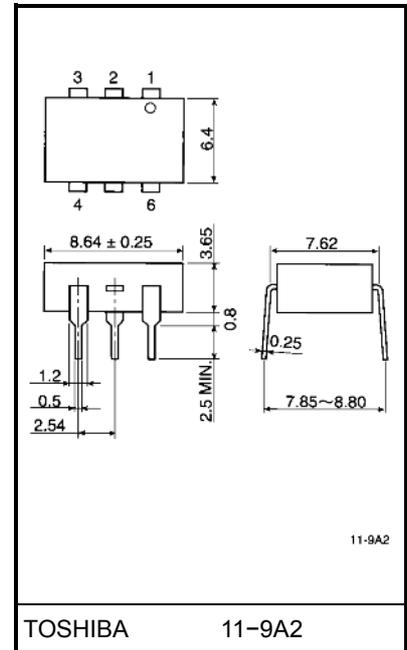
The TOSHIBA TLP3041, TLP3042 and TLP3043 consist of a zero voltage crossing turn-on photo-triac optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP package.

- 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)"

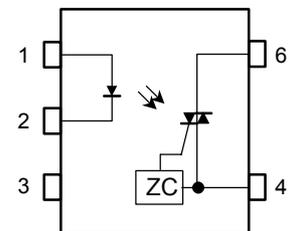
	7.62mm pich <u>standard type</u>	10.16mm pich <u>(LF2) type</u>
• Creepage distance:	7.0mm(min.)	8.0mm(min.)
• Clearance:	7.0mm(min.)	8.0mm(min.)
• Insulation thickness:	0.5mm(min.)	0.5mm(min.)

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	$I_F$	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-state RMS current	Ta=25°C	100	mA
		Ta=70°C	50	
	On-state current derating (Ta ≥ 25°C)	$\Delta I_T / ^\circ\text{C}$	-1.1	mA / °C
	Peak on-state 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%)	$BV_S$	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-state current	$I_{TP}$	—	—	1	A
Operating temperature	$T_{opr}$	-25	—	85	°C

※ In the case of TLP3042

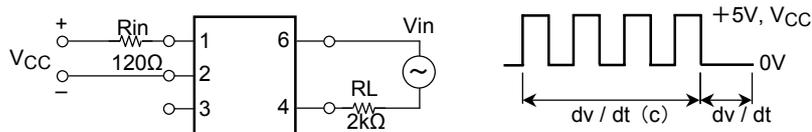
## Individual Electrical Characteristics (Ta = 25°C)

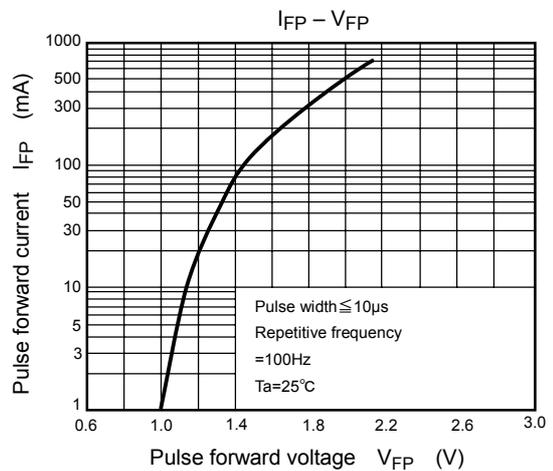
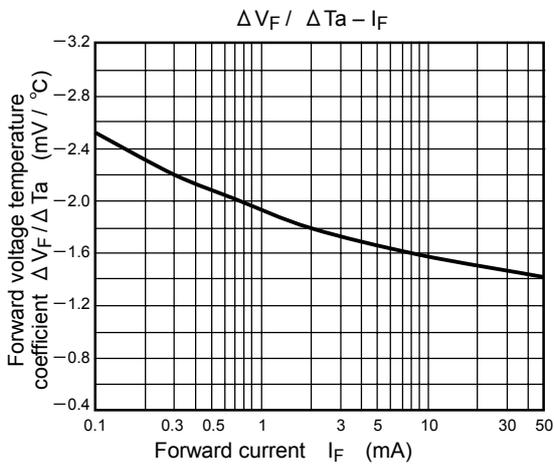
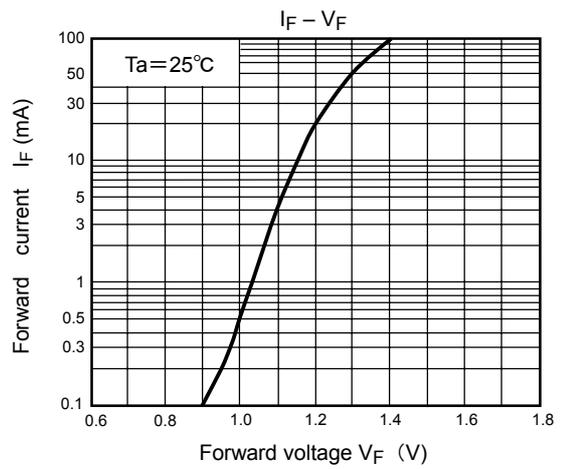
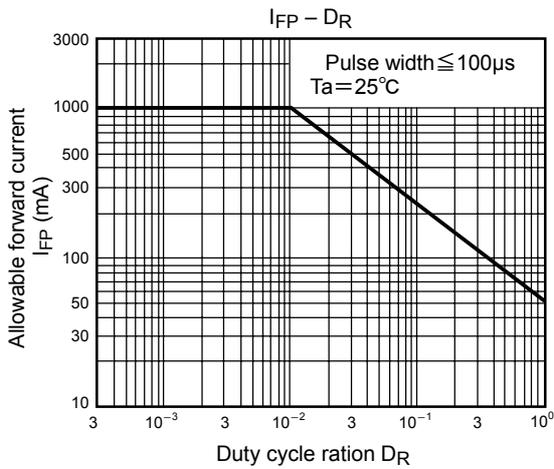
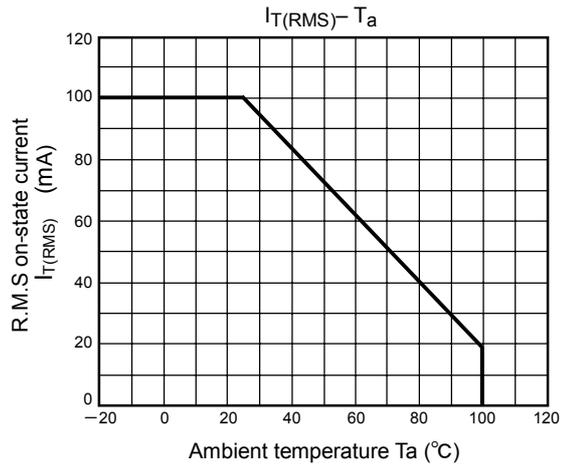
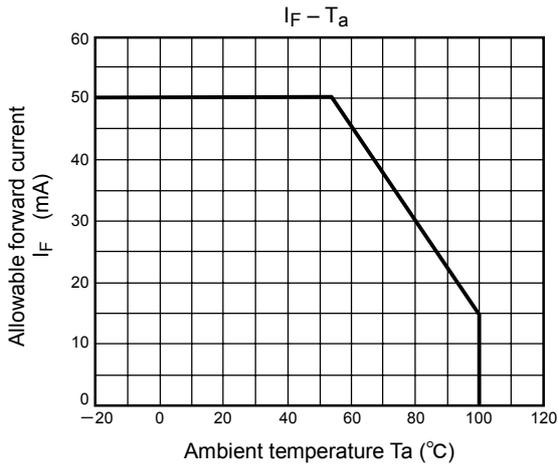
Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	$V_F$	$I_F = 10\text{mA}$	1.0	1.15	1.3	V
	Reverse current	$I_R$	$V_R = 5\text{V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0, f = 1\text{MHz}$	—	10	—	pF
Detector	Peak off-state current	$I_{DRM}$	$V_{DRM} = 400\text{V}$	—	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	—	$\text{V}/\mu\text{s}$

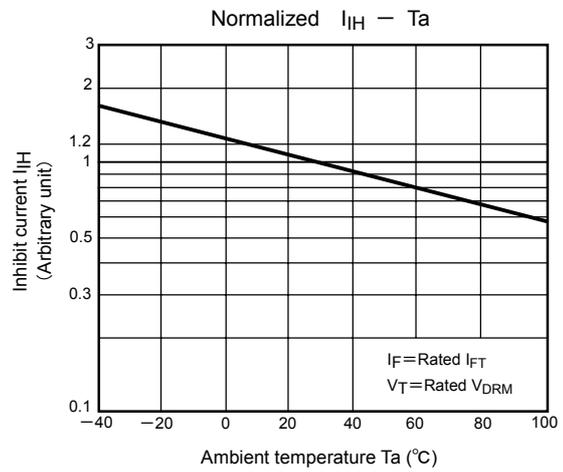
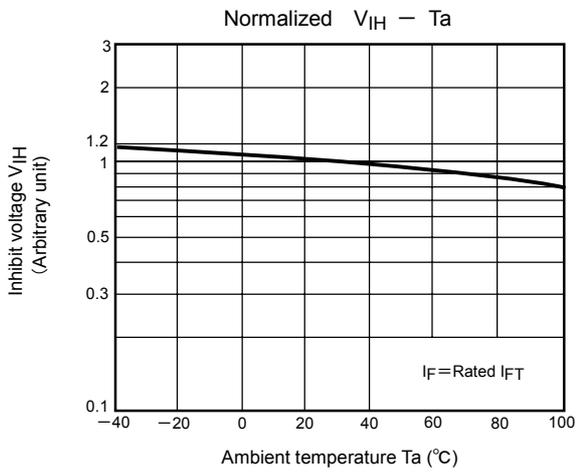
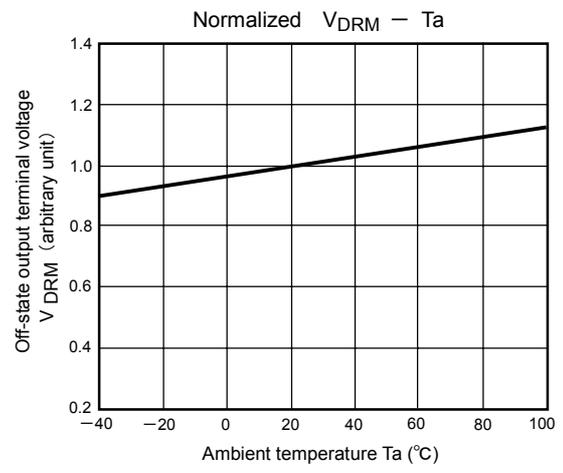
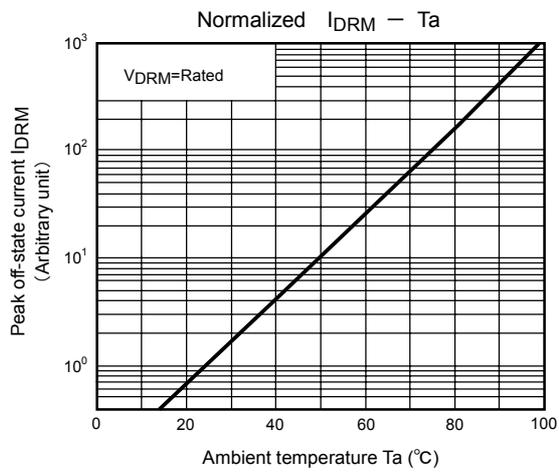
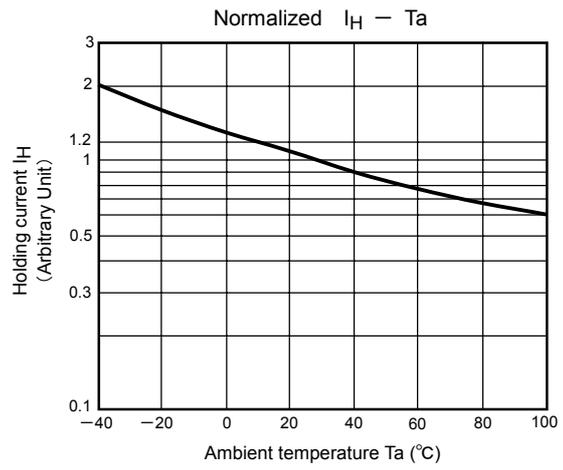
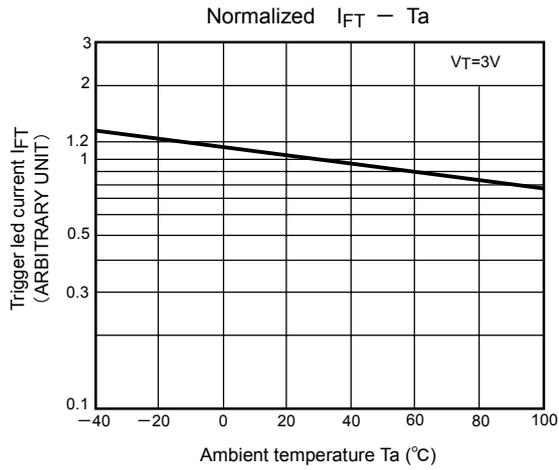
## Coupled Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Trigger LED current	TLP3041	$I_{FT}$	$V_T = 3\text{V}$	—	—	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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