

TOSHIBA Photocoupler GaAs Ired & Photo-Triac

# TLP3051, TLP3052

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

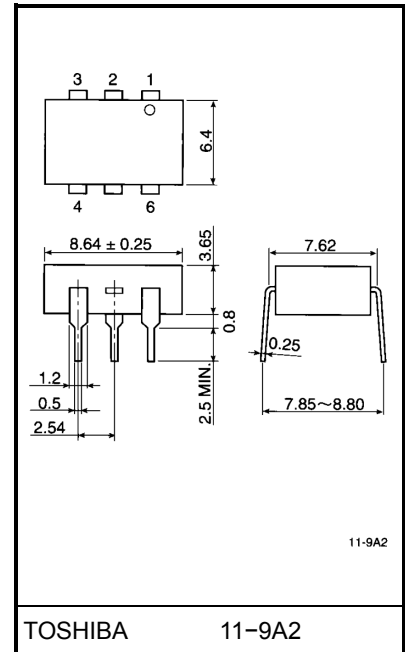
The TOSHIBA TLP3051 and TLP3052 consist of a photo-triac optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP package.

- Peak off-state voltage: 600 V (min.)
- Trigger LED current: 15 mA (max.) (TLP3051)  
10 mA (max.) (TLP3052)
- On-state current: 100 mA (max.)
- UL recognized: UL1577, file no. E67349  
Isolation voltage: 5000 Vrms (min.)
- Option (D4) type  
VDE approved: DIN VDE0884 / 08.87,  
Certificate no. 68329  
Maximum operating insulation voltage: 630 VPK  
Highest permissible over voltage: 6000 VPK

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

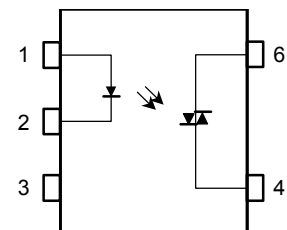
- |                       |                               |                             |
|-----------------------|-------------------------------|-----------------------------|
|                       | 7.62 mm pich<br>standard type | 10.16 mm pich<br>(LF2) type |
| • Creepage distance:  | 7.0 mm (min.)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

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 (100 μs pulse, 100 pps)	$I_{FP}$	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	$V_{DRM}$	600	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 (100 μs pulse, 120 pps)	$I_{TP}$	2	A
	Peak nonrepetitive surge current (Pw = 10 ms, 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 (10 s)	$T_{sol}$	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	$V_{AC}$	—	—	240	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 TLP3052

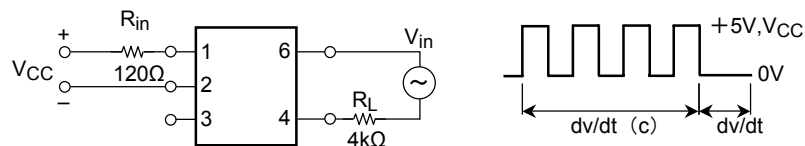
## Individual Electrical Characteristics (Ta = 25°C)

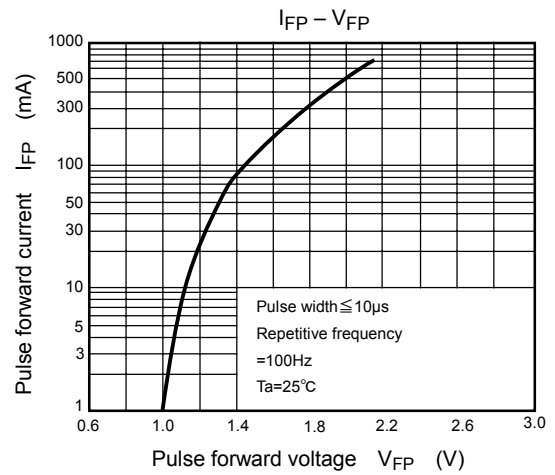
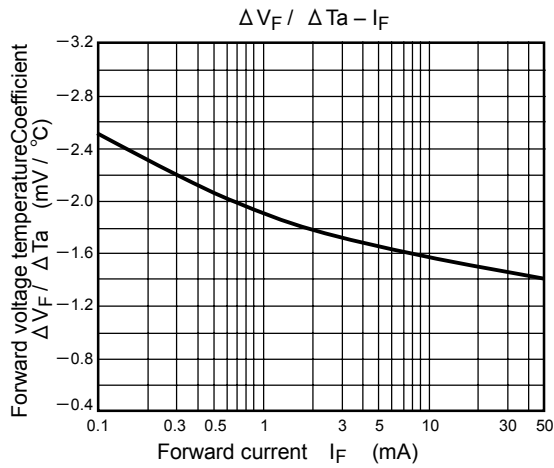
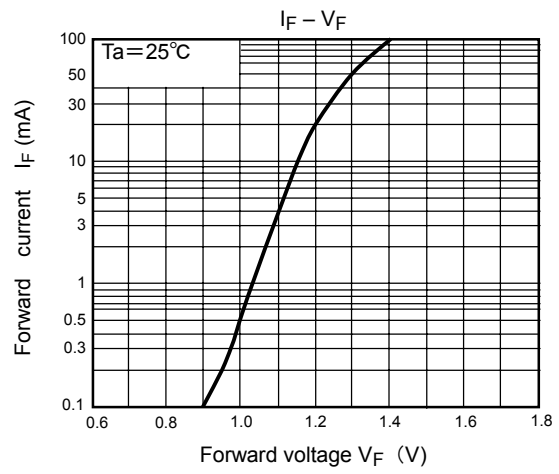
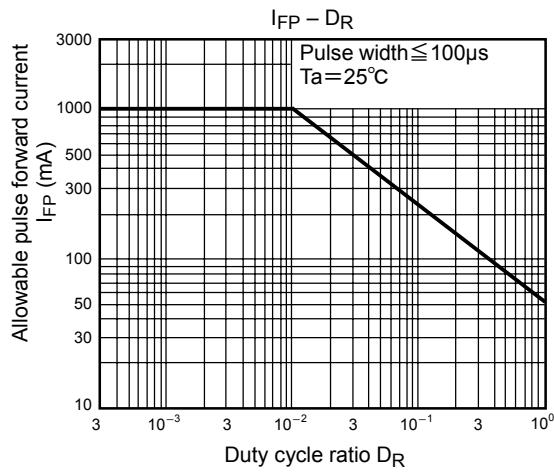
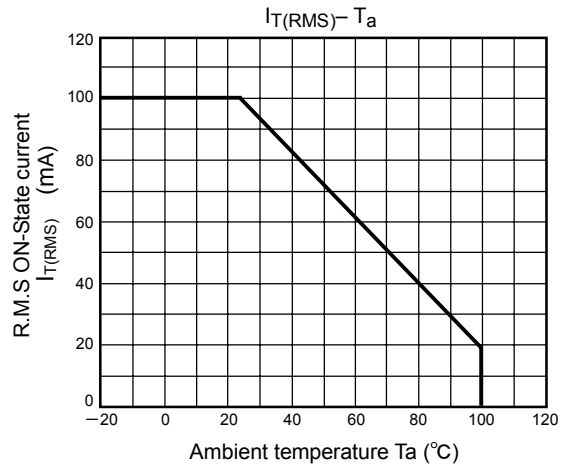
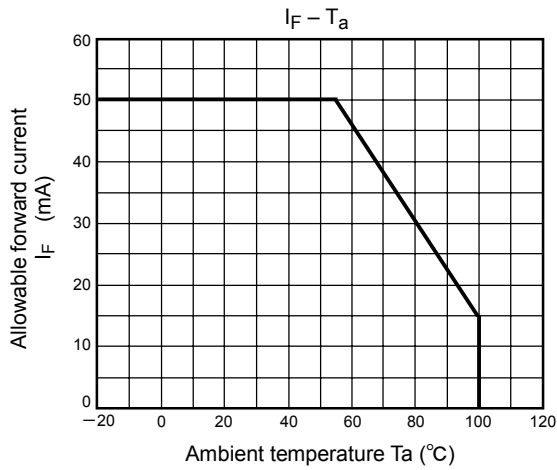
Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	$V_F$	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse current	$I_R$	$V_R = 5 \text{ V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Peak off-state current	$I_{DRM}$	$V_{DRM} = 600 \text{ V}$	—	10	1000	nA
	Peak on-state voltage	$V_{TM}$	$I_{TM} = 100 \text{ mA}$	—	1.7	3.0	V
	Holding current	$I_H$	—	—	1.0	—	mA
	Critical rate of rise of off-state voltage	$dv/dt$	$V_{in} = 240 \text{ Vrms}, T_a = 85^\circ\text{C}$ (Fig.1)	—	500	—	$\text{V}/\mu\text{s}$
	Critical rate of rise of commutating voltage	$dv/dt (c)$	$V_{in} = 60 \text{ Vrms}, I_T = 15\text{mA}$ (Fig.1)	—	0.2	—	$\text{V}/\mu\text{s}$

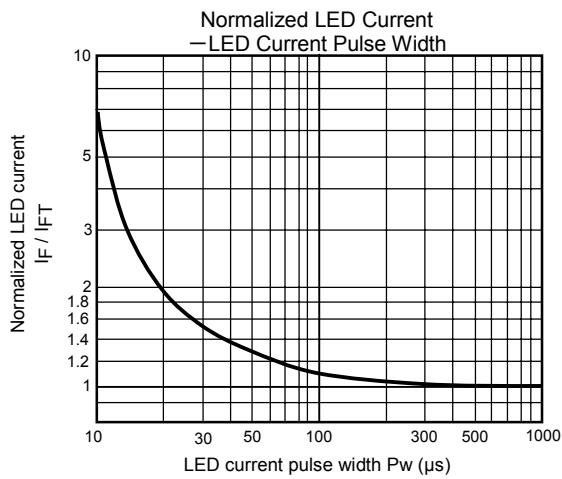
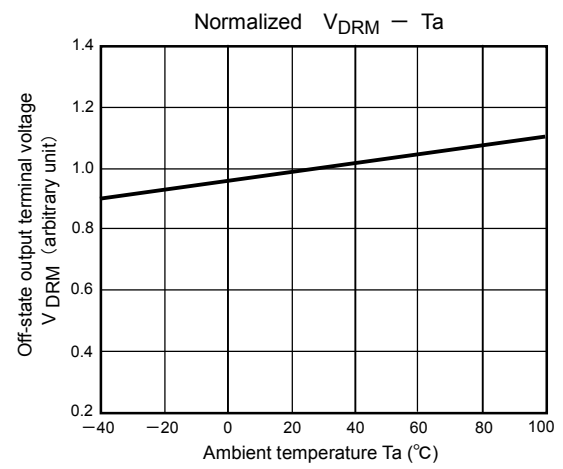
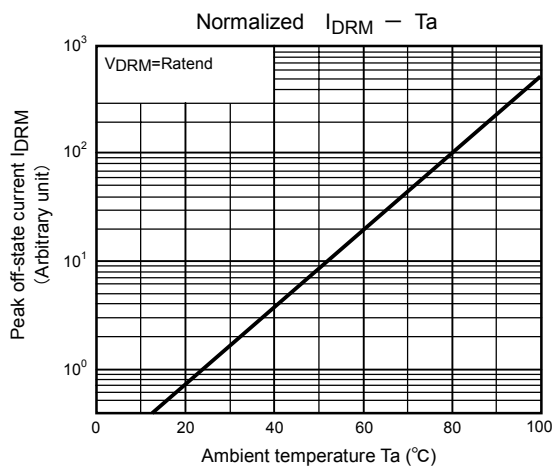
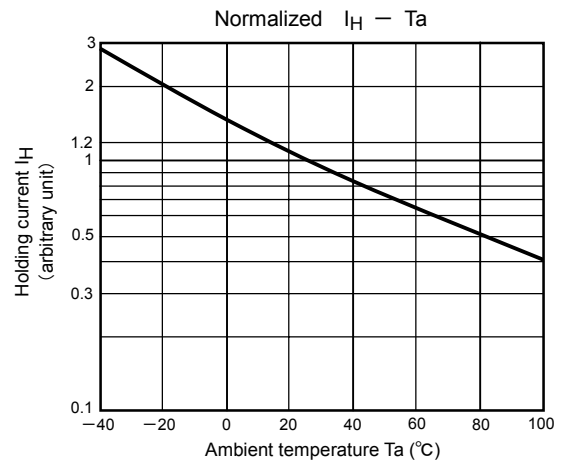
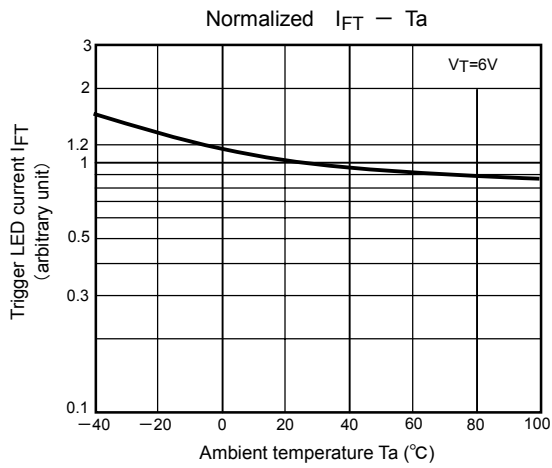
## Coupled Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Trigger LED current	TLP3051	$I_{FT}$	$V_T = 6 \text{ V}$	—	—	15	mA
	TLP3052			—	5	10	
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	—	V <sub>dc</sub>

Fig. 1  $dv/dt$  test circuit







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