

TOSHIBA Photocoupler GaAs Ired & Photo-Triac

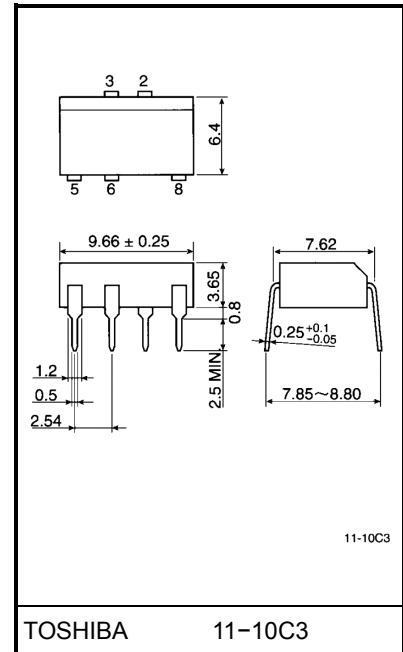
# TLP3502

- Trica Driver
- Programmable Controllers
- AC-Output Module
- Solid State Relay

The TOSHIBA TLP3502 consists of a photo-triac optically coupled to a gallium arsenide infrared emitting diode in a 8 lead plastic DIP package.

- Peak off-state voltage: 400V(min.)
- Trigger LED current: 10mA(max.)
- On-state current: 0.5A<sub>rms</sub>(max.)
- Isolation voltage: 2500V<sub>rms</sub>(min.)
- UL recognized: UL1577, file no. E67349
- Trigger LED Current

Unit in mm



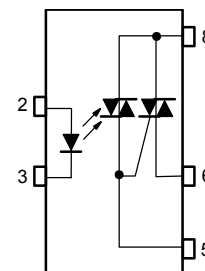
Weight: 0.52 g

Classi- fication*	Trigger LED Current (mA)		Marking Of Classification
	V <sub>T</sub> =6V, T <sub>a</sub> =25°C		
	Min.	Max.	
(IFT5)	—	5.0	T5
(IFT7)	—	7.0	T5,T7
Standard	—	10	T5,T7, blank

\*Ex. (IFT5); TLP3502(IFT5)

(Note ) Application type name for certification test, please use standard product type name, i.e. TLP3502(IFT5): TLP3502

### Pin Configurations(top view)



- 2: ANODE
- 3: CATHODE
- 5: TRIAC GATE
- 6: TRIAC T1
- 8: TRIAC T2

## 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
	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=40°C	0.5	A
		Ta=60°C	0.35	
	On-state current derating (Ta ≥ 40°C)	$\Delta I_T/^\circ\text{C}$	-7.2	mA/°C
	Peak current from snubber circuit(100µs pulse, 120pps)	$I_{SP}$	2	A
	Peak nonrepetitive surge current(50Hz,peak)	$I_{TSM}$	5	A
	Junction temperature	$T_j$	110	°C
Storage temperature range	$T_{stg}$	-40~125	°C	
Operating temperature range	$T_{opr}$	-20~80	°C	
Lead soldering temperature (10s)	$T_{sol}$	260	°C	
Isolation voltage (AC, 1min., R.H. ≤ 60%) (Note)	$BV_S$	2500	Vrms	

(Note) Device considered a two terminal: LED side pins shorted together and detector side pins shorted together.

## Recommended Operating Conditions

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	$V_{AC}$	—	—	120	$V_{ac}$
Forward current	$I_F$	15	20	25	mA
Peak current from snubber circuit	$I_{SP}$	—	—	1	A
Operating temperature	$T_{opr}$	-25	—	85	°C

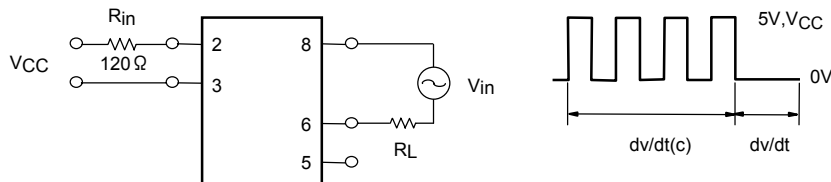
## Individual Electrical Characteristics (Ta = 25°C)

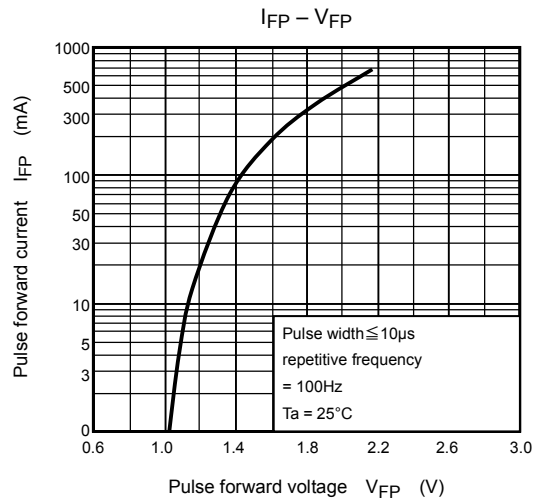
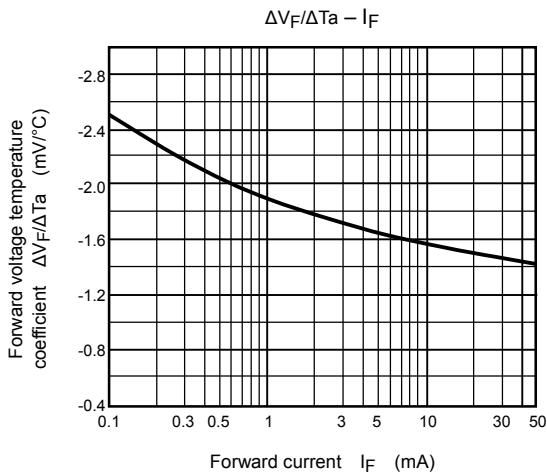
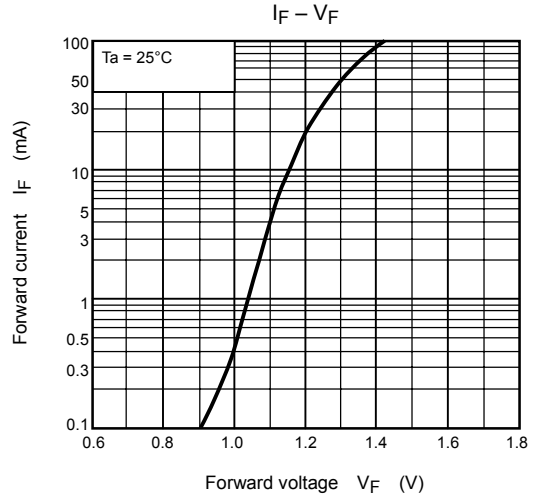
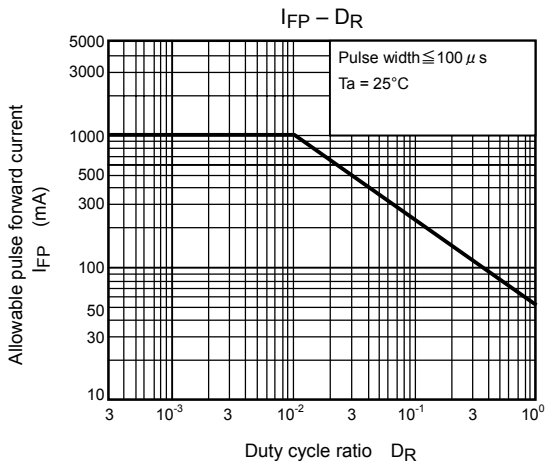
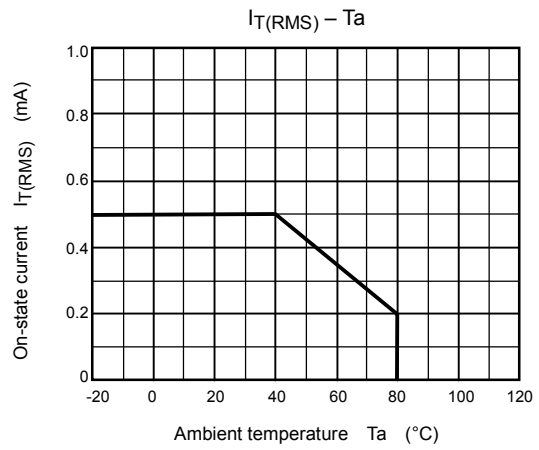
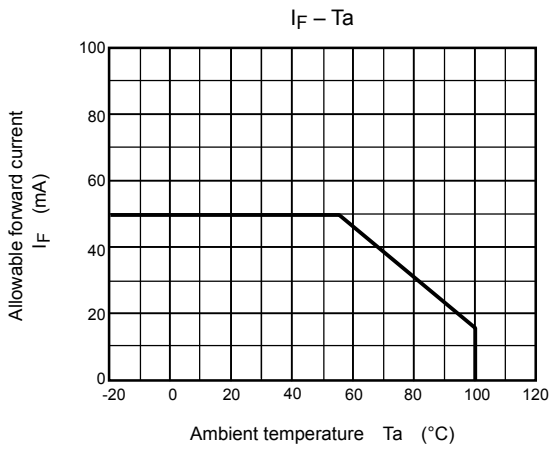
Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	$V_F$	$I_F=10\text{mA}$	1.0	1.15	1.3	V
	Reverse current	$I_R$	$V_R=5\text{V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_T$	$V=0, f=1\text{MHz}$	—	30	—	pF
Detector	Peak off-state current	$I_{DRM}$	$V_{DRM}=400\text{V}, T_a=110^\circ\text{C}$	—	—	100	$\mu\text{A}$
	Peak on-state voltage	$V_{TM}$	$I_{TM}=0.75\text{A}$	—	—	3.0	V
	Holding current	$I_H$	—	—	—	25	mA
	Critical rate of rise of off-state voltage	$dv/dt$	$V_{in}=120\text{Vrms}$ (fig. 1)	200	500	—	$\text{V}/\mu\text{s}$
	Critical rate of rise of commutating voltage	$dv/dt(c)$	$V_{in}=120\text{Vrms}, I_T=0.5\text{Arms}$ (fig. 1)	—	5	—	$\text{V}/\mu\text{s}$

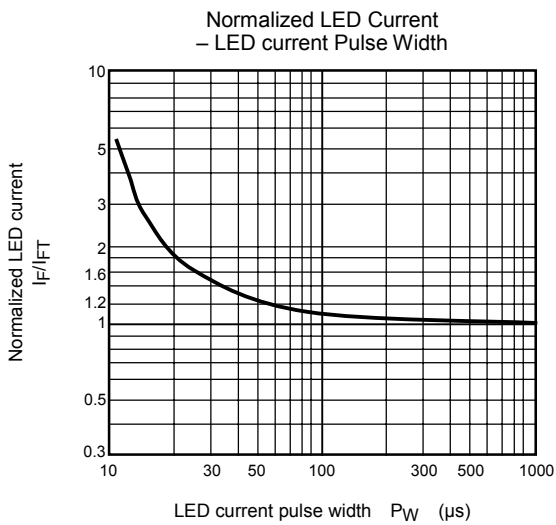
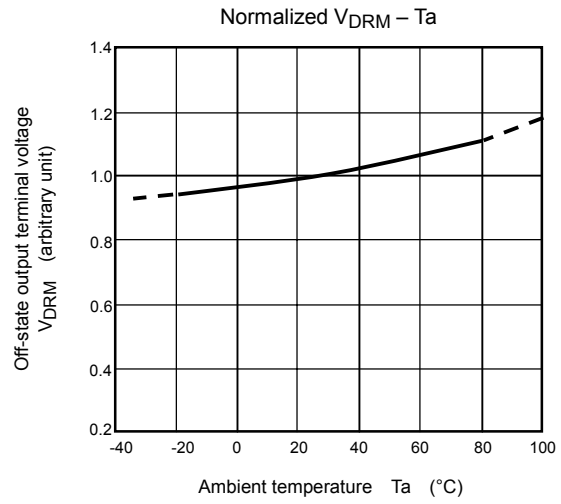
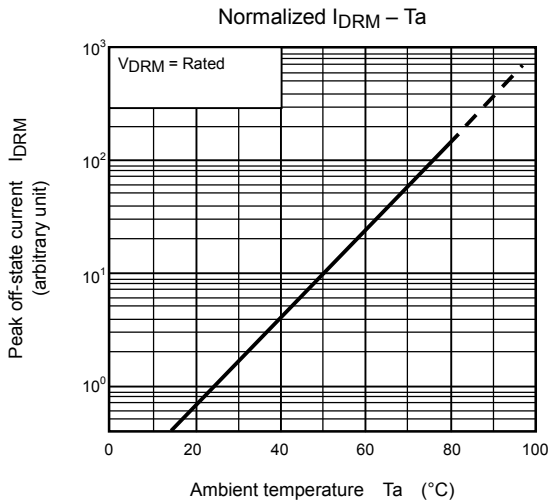
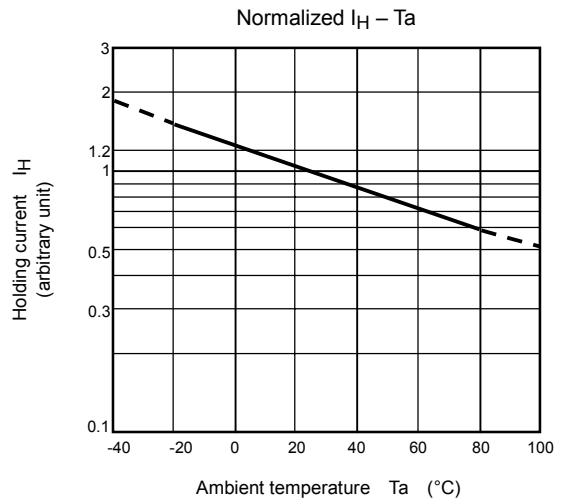
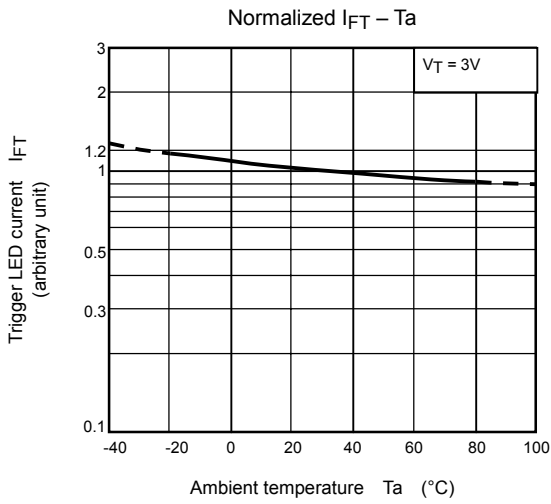
## Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Trigger LED current	$I_{FT}$	$V_T=6\text{V}$	—	—	10	mA
Capacitance (input to output)	$C_S$	$V_S=0, f=1\text{MHz}$	—	1.5	—	pF
Isolation resistance	$R_S$	$V_S=500\text{V}$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 1 minute	2500	—	—	$\text{Vrms}$
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000	—	$\text{V}_{dc}$

Fig. 1:  $dv/dt$  test circuit







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