

TLP3503

Triac Driver  
Programmable Controllers  
AC-Output Module  
Solid State Relay

The TOSHIBA TLP3503 consists of a zero voltage crossing turn-on photo-triac optically coupled to a gallium arsenide infrared emitting diode in a 8 lead plastic DIP package.

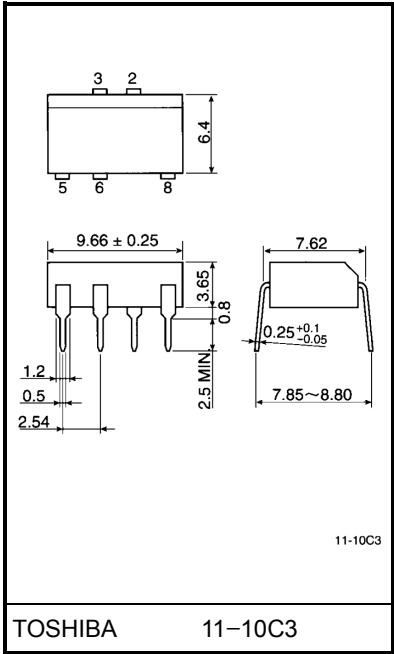
- Peak off-state voltage: 400V (min.)
- Trigger LED current: 10mA (max.)
- On-state current: 0.5A<sub>rms</sub> (max.)
- Isolation voltage: 2500V<sub>rms</sub> (min.)
- UL recognized: UL1577, file No. E67349
- Trigger LED Current

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

\*Ex. (IFT5); TLP3503 (IFT5)

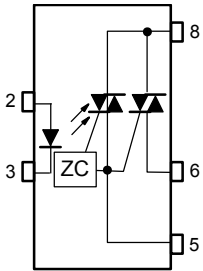
(Note)Application type name for certification test, please  
use standard product type name, i.e.  
TLP3503 (IFT5): TLP3503

Unit in mm



Weight: 0.52 g

Pin Configuration (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 <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
	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 = 40°C	I <sub>T</sub> (RMS)	0.5	A
		Ta = 60°C		0.35	
	On-state current derating (Ta ≥ 40°C)		ΔI <sub>T</sub> / °C	−7.2	mA / °C
	Peak current from snubber circuit (100μs pulse, 120pps)		I <sub>SP</sub>	2	A
	Peak nonrepetitive surge current (50Hz, peak)		I <sub>TSM</sub>	5	A
	Junction temperature		T <sub>j</sub>	110	°C
Storage temperature range			T <sub>stg</sub>	−40~125	°C
Operating temperature range			T <sub>opr</sub>	−20~80	°C
Lead soldering temperature (10s)			T <sub>sol</sub>	260	°C
Isolation voltage (AC, 1min., R.H. ≤ 60%) (Note)			BV <sub>S</sub>	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 <sub>ac</sub>
Forward current	$I_F$	15	20	25	mA
Peak current from snubber circuit	$I_{SP}$	—	—	1	A
Operating temperature	$T_{opr}$	-20	—	80	°C

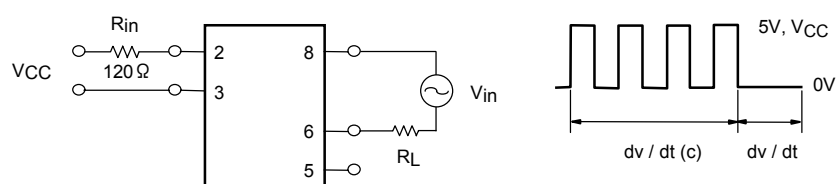
## Individual Electrical Characteristics (Ta = 25°C)

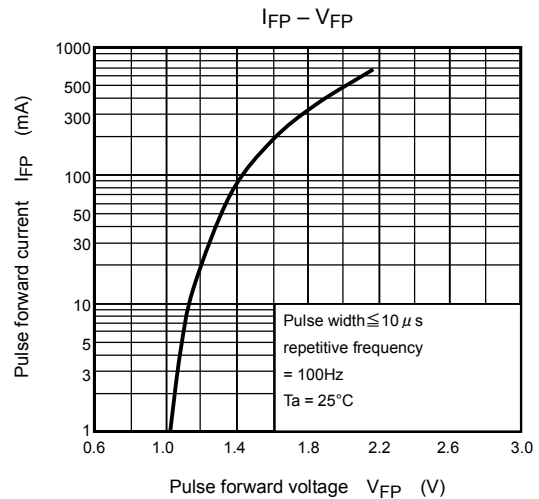
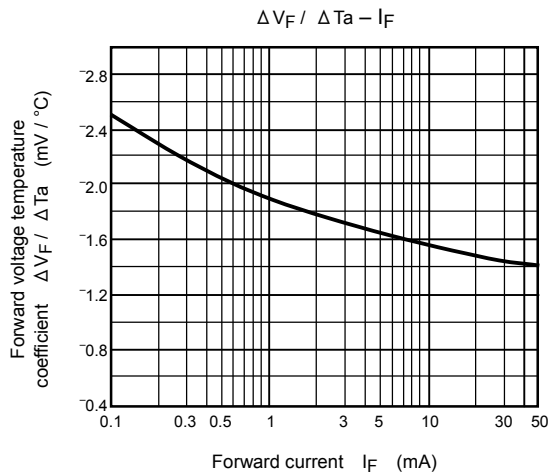
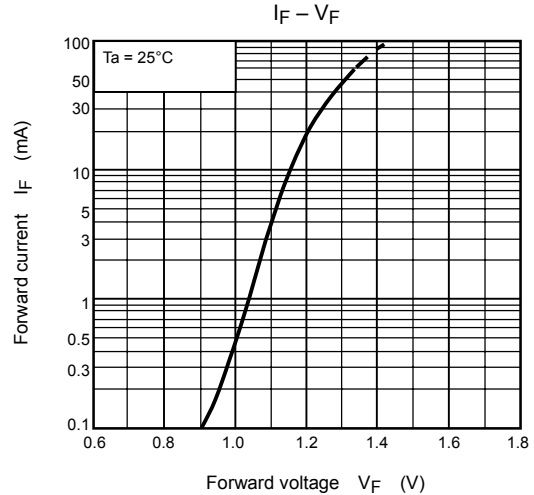
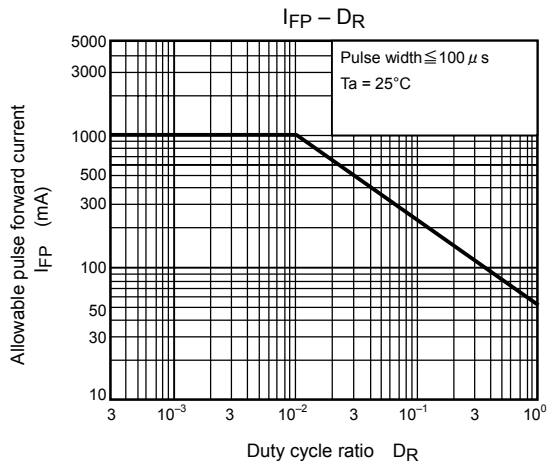
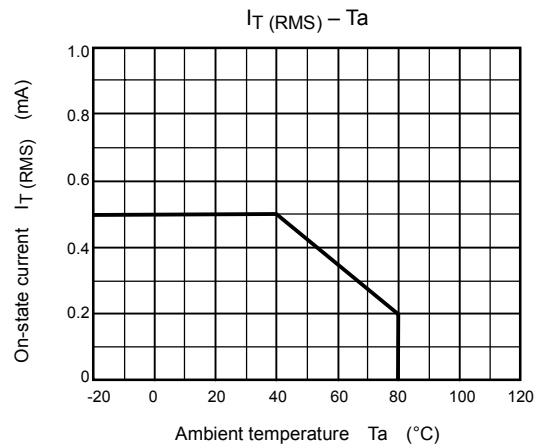
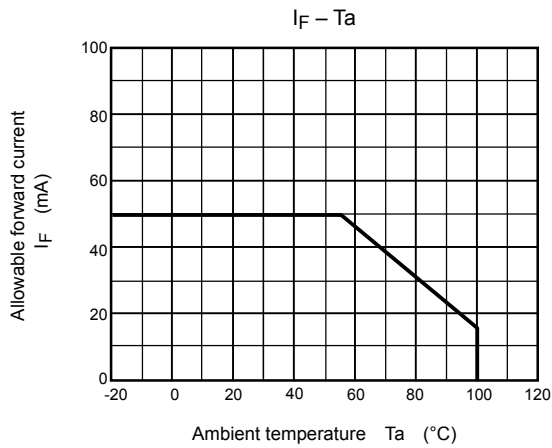
Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	$V_F$	$I_F = 10\text{mA}$	1.0	1.15	1.3	V
	Reverse current	$I_R$	$V_R = 5\text{V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0, f = 1\text{MHz}$	—	30	—	pF
Detector	Peak off-state current	$I_{\text{DRM}}$	$V_{\text{DRM}} =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

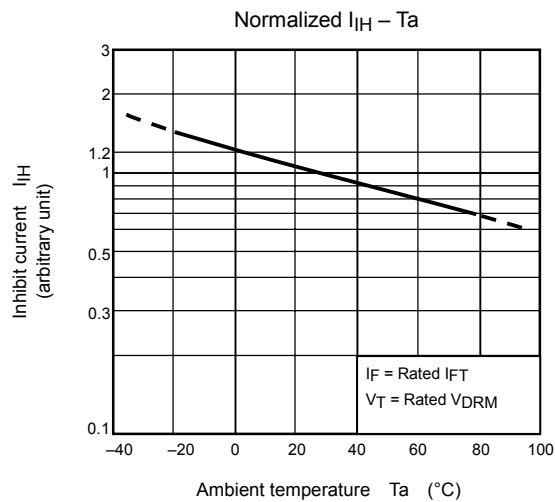
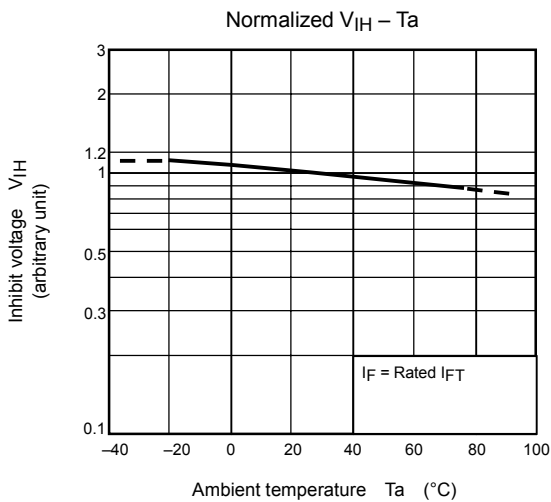
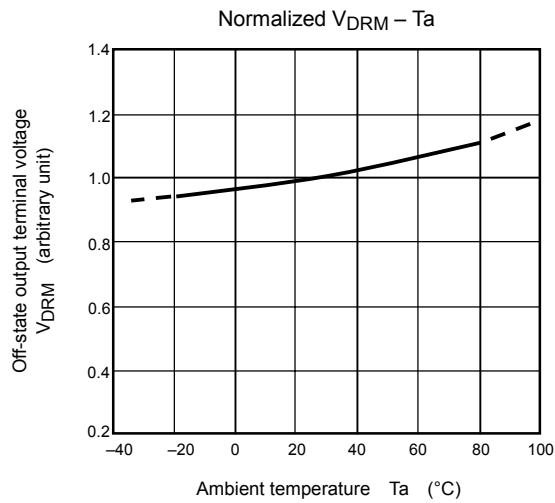
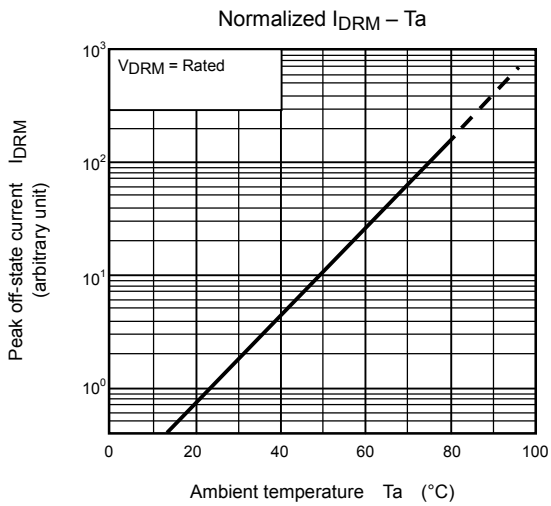
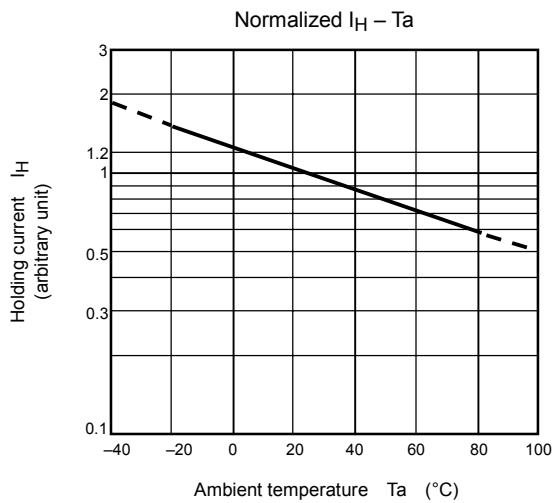
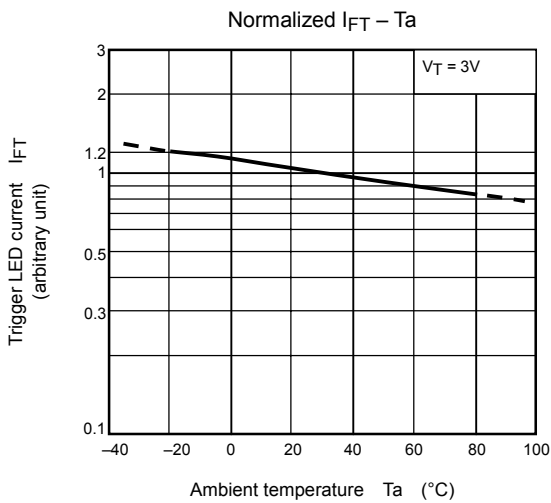
## Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Trigger LED current	$I_{\text{FT}}$	$V_T = 6\text{V}$	—	—	10	mA
Inhibit voltage	$V_{\text{IH}}$	$I_F = \text{Rated } I_{\text{FT}}$	—	—	50	V
Leakage in inhibited state	$I_{\text{IH}}$	$I_F = \text{Rated } I_{\text{FT}}$ $V_T = \text{Rated } V_{\text{DRM}}$	—	200	—	$\mu\text{A}$
Capacitance (input to output)	$C_S$	$V_S = 0, f = 1\text{MHz}$	—	0.8	—	pF
Isolation resistance	$R_S$	$V_S = 500\text{V}$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 1 minute	2500	—	—	$V_{\text{rms}}$
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000	—	$V_{\text{dc}}$

Fig.1:  $dv/dt$  test circuit







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