

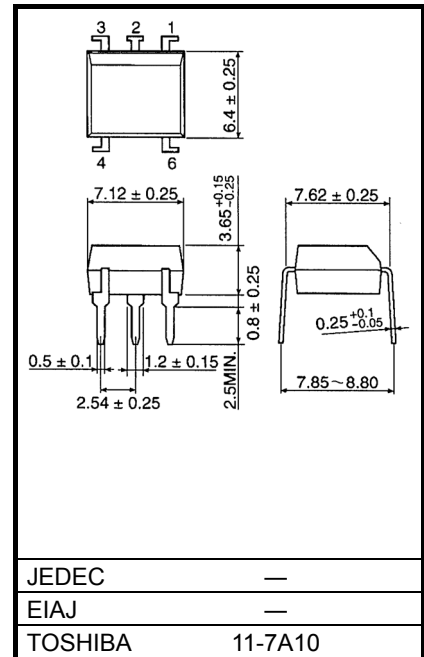
TOSHIBA PHOTOCOUPLER GaAlAs IRED & PHOTO-TRIAC

TLP3782(S),TLP3783(S)

Unit: mm

- Office Equipment
- Home Appliances
- Triac Drivers
- Solid State Relays

The TOSHIBA TLP3782(S) and TLP3783(S) consist of a GaAlAs light-emitting diode optically coupled to a triac-output photocoupler featuring a zero-cross voltage and is housed in a 6-pin DIP package. The TLP3782(S) and TLP3783(S) offer higher impulse noise immunity than that of the TLP3082(S).



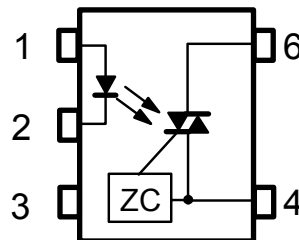
weight: 0.39g (Typ.)

- Peak Off-State Voltage: 800 V (min)
- Trigger LED Current: 10 mA (max) (TLP3782(S))
5 mA (max) (TLP3783(S))
- On-State Current: 100 mA (max)
- Isolation Voltage: 5000 Vrms (min)
- UL pending approval
- VDE DIN EN60747-5-2 pending approval

• Construction mechanical rating

	7.62 mm pitch Standard Type	10.16 mm pitch TLPxxxxF 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)

Pin configuration (top view)



- 1: Anode
- 2: Cathode
- 3: N.C.
- 4: Terminal 1
- 6: Terminal 2

ZC:Zero-cross Circuit

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	I_F	30	mA
	Forward current derating (Ta ≥ 53 °C)	$\Delta I_F / ^\circ\text{C}$	-0.42	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}	800	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, 120pps)	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
	Operating temperature range	T_{opr}	-40 to 100	°C
Storage temperature range	T_{stg}	-55 to 125	°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 %)	(Note 1) BV_S	5000	Vrms	

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

(Note 1) The devices are considered two-terminal devices: pins 1, 2 and 3 are shorted together, as are pins 4 and 6.

Recommended Operating Conditions

Characteristic		Symbol	Min.	Typ.	Max.	Unit
Supply voltage		V_{AC}	—	—	400	Vac
Forward current	TLP3782	I_F	15	20	25	mA
	TLP3783		10	15	20	
Peak on-state current		I_{TP}	—	—	1	A
Operating temperature		T_{opr}	-25	—	85	°C

Recommended operating conditions are given as a design guideline to obtain expected performance of the devices. Each item also has its own independent guideline document. In developing designs using these products, please confirm the specified characteristics shown in these documents.

Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	V_F	$I_F = 10 \text{ mA}$	1.05	1.2	1.35	V
	Reverse current	I_R	$V_R = 5 \text{ V}$	—	—	10	μA
	Capacitance	C_T	$V = 0, f = 1 \text{ MHz}$	—	10	—	pF
Detector	Peak off-state current	I_{DRM}	$V_{DRM} = 800 \text{ V}$	—	10	1000	nA
	Peak on-state voltage	V_{TM}	$I_{TM} = 100 \text{ mA}$	—	1.7	3.0	V
	Holding current	I_H	—	—	0.6	—	mA
	Critical rate of rise of off-state voltage	dv/dt	$V_{in} = 240 \text{ Vrms}, T_a = 85^\circ\text{C}$ (Note 2)	200	2000	—	$\text{V}/\mu\text{s}$
	Critical rate of rise of commutating voltage	$dv/dt(c)$	$V_{in} = 60 \text{ Vrms}, I_T = 15 \text{ mA}$ (Note 2)	—	2	—	$\text{V}/\mu\text{s}$

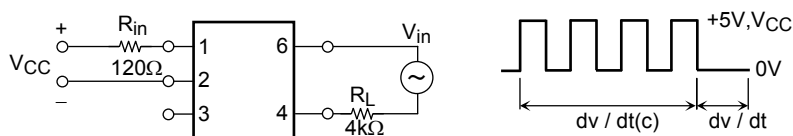
Coupled Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Trigger LED current	TLP3782(S)	I_{FT}	$V_T = 3 \text{ V}$	—	5	10	mA
	TLP3783(S)			—	—	5	
Inhibit voltage	V_{IH}	$I_F = \text{Rated } I_{FT}$	—	—	20	V	
Leakage in inhibited state	I_{IH}	$I_F = \text{Rated } I_{FT}, V_T = \text{Rated } V_{DRM}$	—	200	600	μA	
Turn-on time	t_{ON}	$V_D = 3 \rightarrow 1.5 \text{ V}, R_L = 20 \Omega,$ $I_F = \text{Rated } I_{FT} \times 1.5$	—	30	100	μs	
Impulse noise durability	V_N	$t_N = 1 \mu\text{s}$, snubber condition $100 \Omega + 0.1 \mu\text{F}$ (Note 3)	—	1500	—	V	

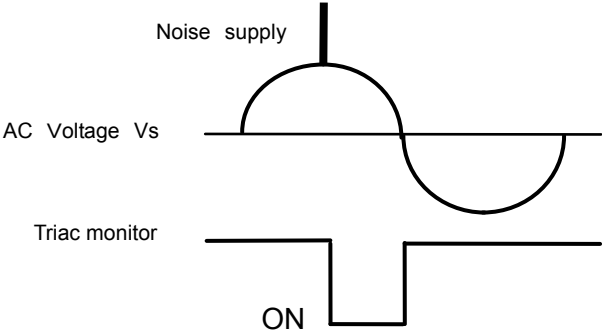
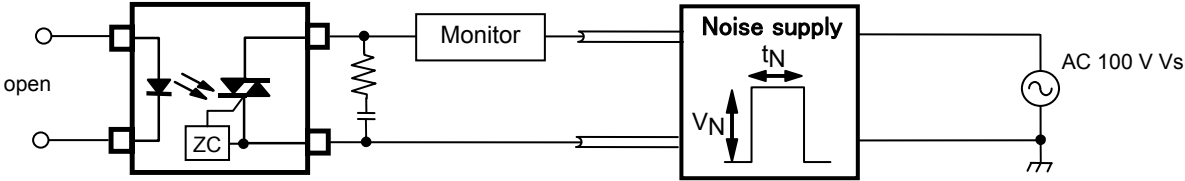
Isolation Characteristics (Ta = 25°C)

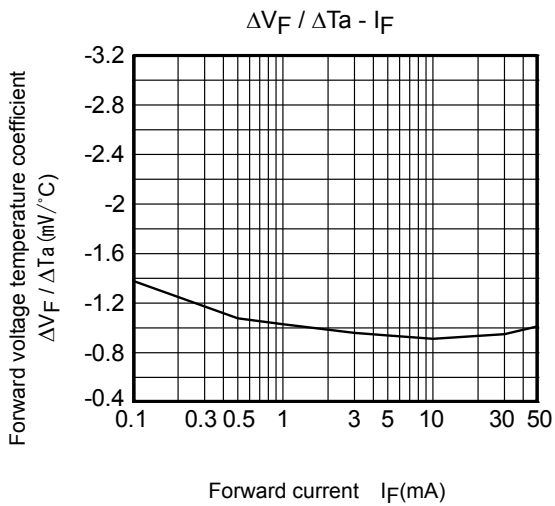
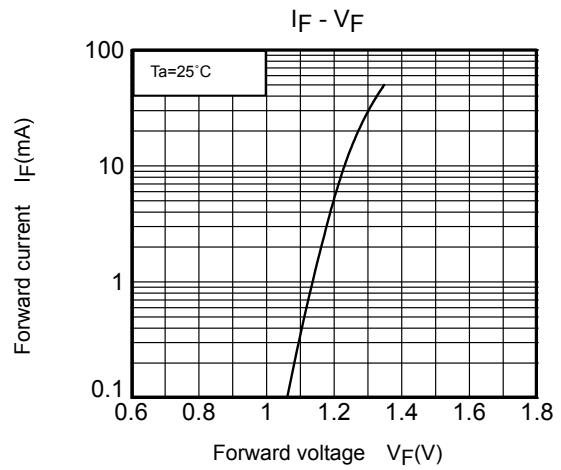
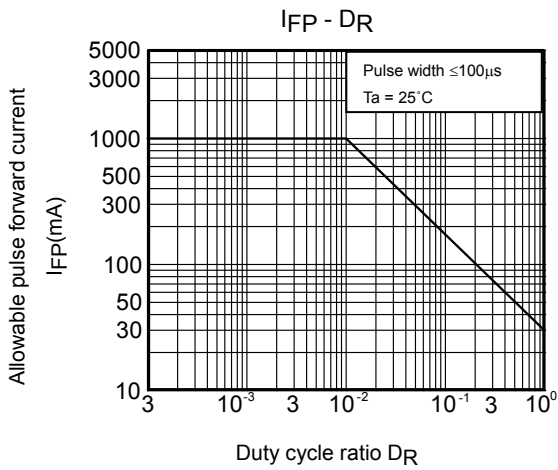
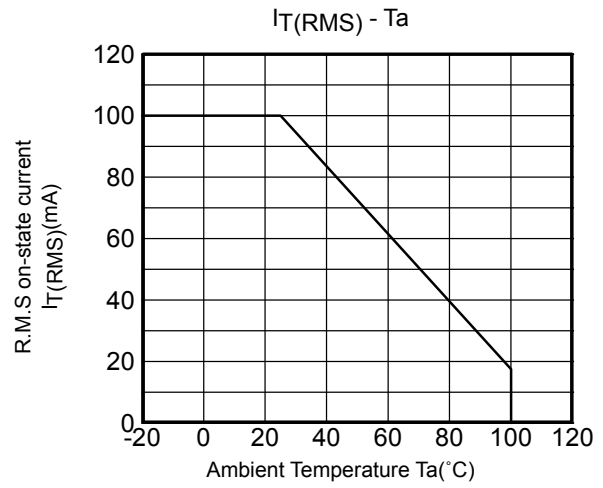
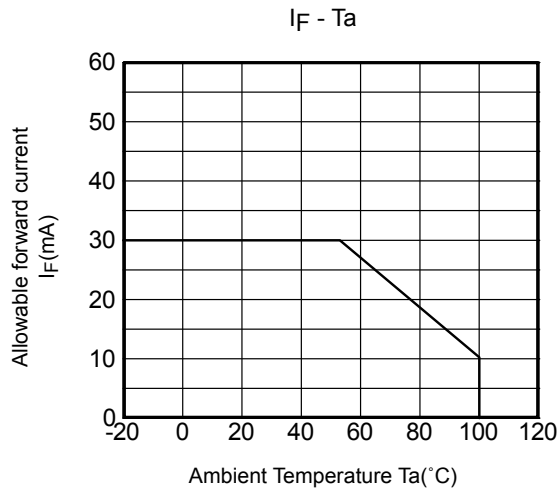
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance (input to output)	C_S	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V (R.H. } \leq 60\%)$	1×10^{12}	10^{14}	—	Ω
Isolation voltage	BVS	AC, 1minute	5000	—	—	Vrms
		AC, 1second, in oil	—	10000	—	
		DC, 1minute, in oil	—	10000	—	Vdc

Fig. 1 dv/dt test circuit

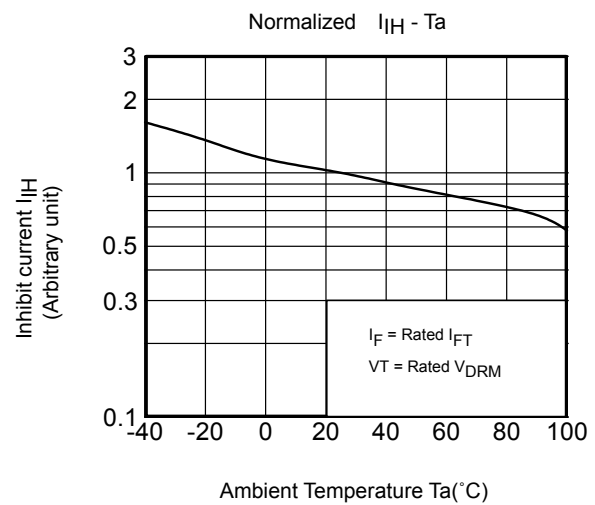
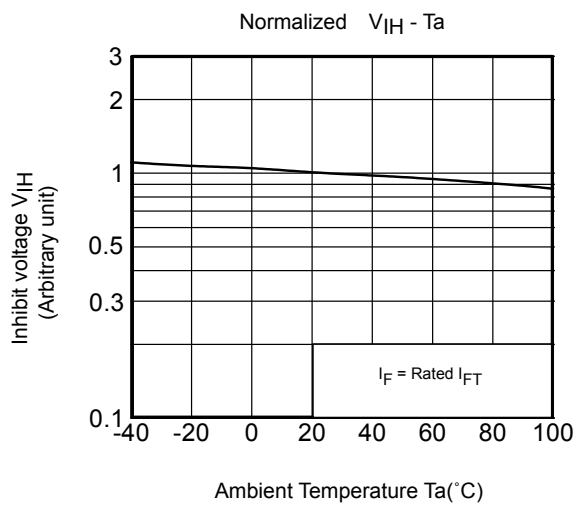
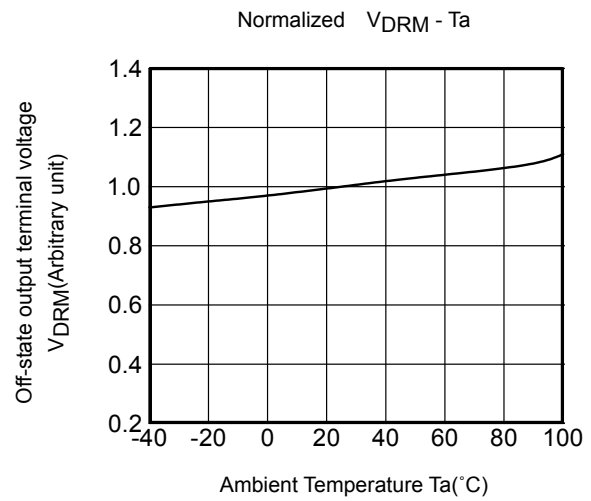
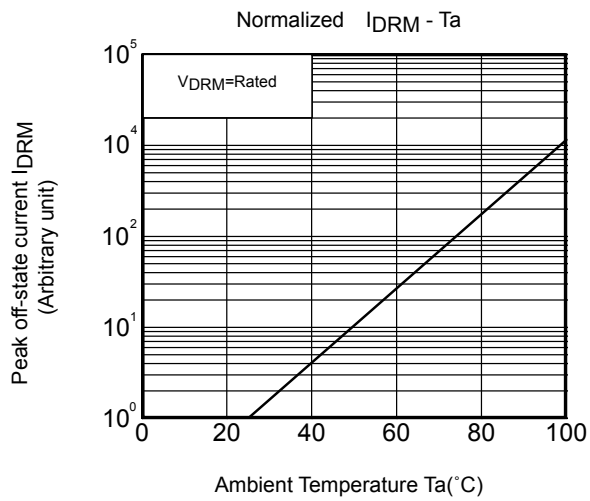
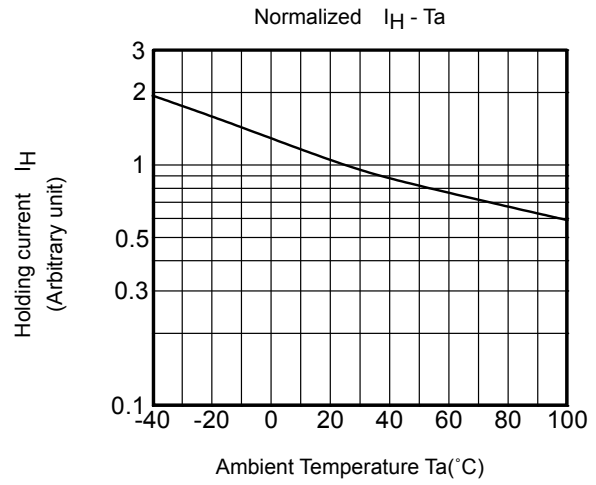
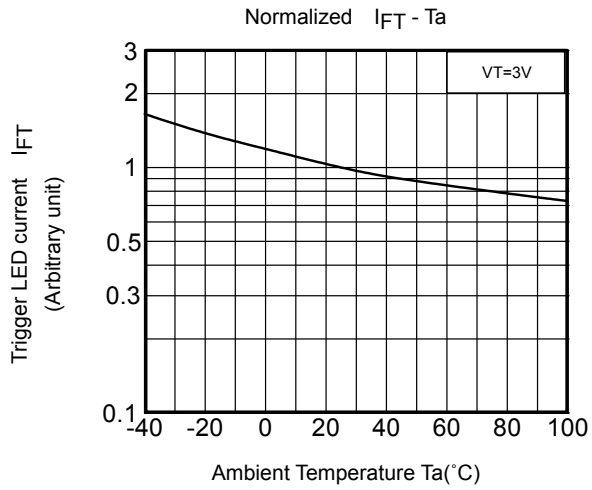


(Note 3): impulse noise durability test circuit





*: The above graphs show typical characteristics.



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20070701-EN GENERAL

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