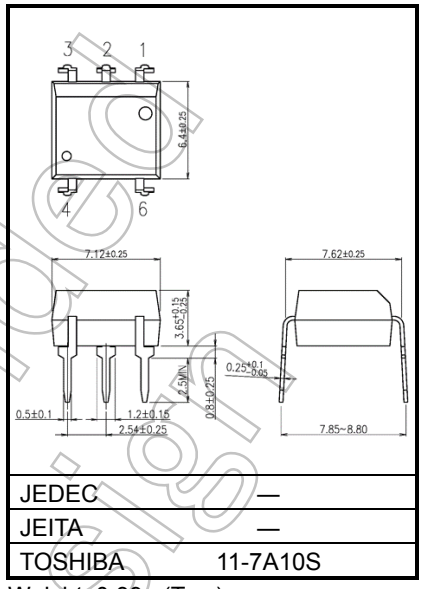
TOSHIBA PHOTOCOUPLER IRED & PHOTO-TRIAC

TLP3782(S),TLP3783(S)

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	11-7A10S

Weight: 0.39g (Typ.)

Office Equipment
Home Appliances
Triac Drivers
Solid State Relays

The TOSHIBA TLP3782(S) and TLP3783(S) consist of an infrared 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).

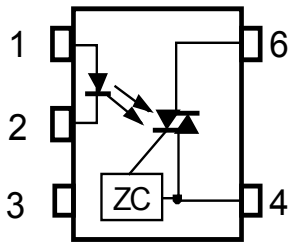
- Peak Off-State Voltage: 800 V (min)
- Trigger LED Current: 10 mA (max) (TLP3782(S))
  5 mA (max) (TLP3783(S))
- On-State Current: 100 mA (max)
- Isolation Voltage: 5000 Vrms (min)
- UL-recognized: UL 1577, File No.E67349
- cUL-recognized: CSA Component Acceptance Service No.5A File No.E67349
- VDE-approved : EN 60747-5-5 , EN 62368-1 (Note1)

Note 1 : When a VDE approved type is needed, please designate the **Option(D4)**.

- 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

Start of commercial production
2008-02

Absolute Maximum Ratings (Ta = 25°C)

Characteristic			Symbol	Rating	Unit
LED	Forward current		I_F	30	mA
	Forward current derating (Ta ≥ 53 °C)		ΔI_F /°C	−0.42	mA /°C
	Peak forward current (100 μs pulse, 100 pps)		I_{FP}	1	A
	Reverse voltage		V_R	5	V
	Power dissipation		P_D	100	mW
	Power dissipation derating (Ta ≥ 53°C)		ΔP_D / °C	-1.4	mW / °C
	Junction temperature		Tj	125	°C
Detector	Off-state output terminal voltage		V_{DRM}	800	V
	On-state RMS current	Ta=25°C	$I_{T(RMS)}$	100	mA
		Ta=70°C		50	
	On-state current derating (Ta ≥ 25°C)		ΔI_T / °C	-1.1	mA /°C
	Peak on-state current (100 μs pulse, 120pps)		I_{TP}	2	A
	Peak nonrepetitive surge current (Pw = 10 ms)		I_{TSM}	1.2	A
	Power dissipation		P_D	300	mW
	Power dissipation derating (Ta ≥ 25 °C)		ΔP_D / °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)			ΔP_T / °C	-4.4	mW / °C
Isolation voltage (AC, 60 s. , 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

Note: 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 mA	1.05	1.2	1.35	V
	Reverse current	I_R	V_R = 5 V	—	—	10	μA
	Capacitance	C_T	V = 0 V, f = 1 MHz	—	10	—	pF
Detector	Peak off-state current	I_{DRM}	V_{DRM} = 800 V	—	10	1000	nA
	Peak on-state voltage	V_{TM}	I_{TM} = 100 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 Vrms , Ta = 85 °C (Note 2)	200	2000	—	V/μs
	Critical rate of rise of commutating voltage	dv/dt(c)	V_{in} = 60 Vrms , I_T = 15 mA (Note 2)	—	2	—	V/μs

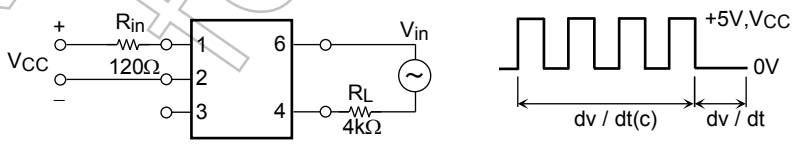
Coupled Electrical Characteristics (Ta = 25°C)

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

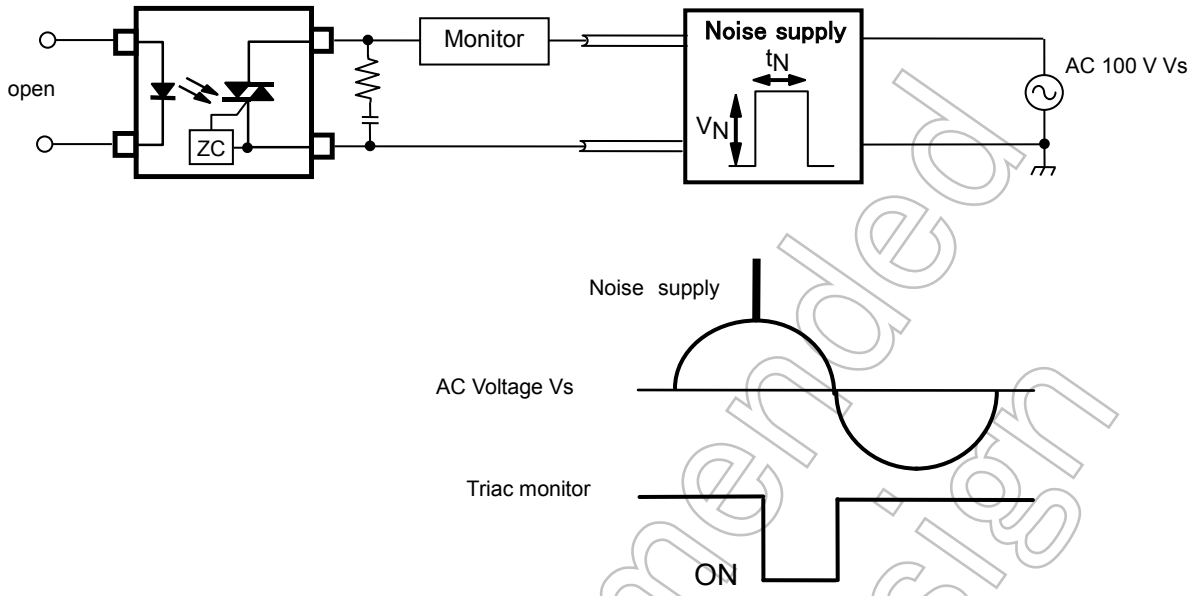
Isolation Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance (input to output)	C_S	V_S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R_S	V_S = 500 V (R.H. ≤ 60 %)	1×10^{12}	10^{14}	—	Ω
Isolation voltage	BV_S	AC , 60 s	5000	—	—	Vrms

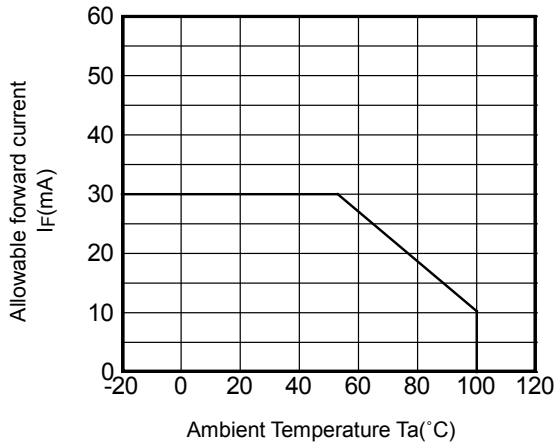
(Note2) dv / dt test circuit



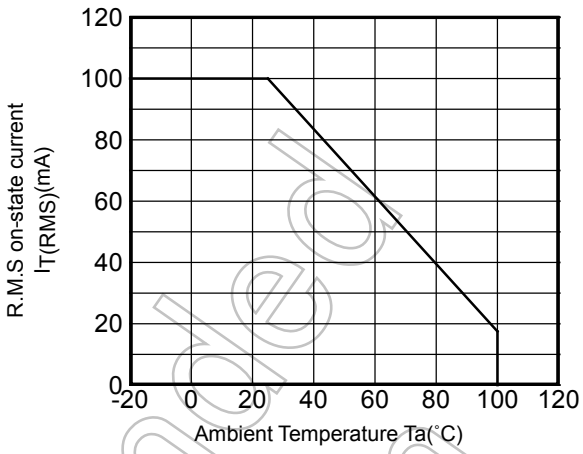
(Note 3): impulse noise durability test circuit



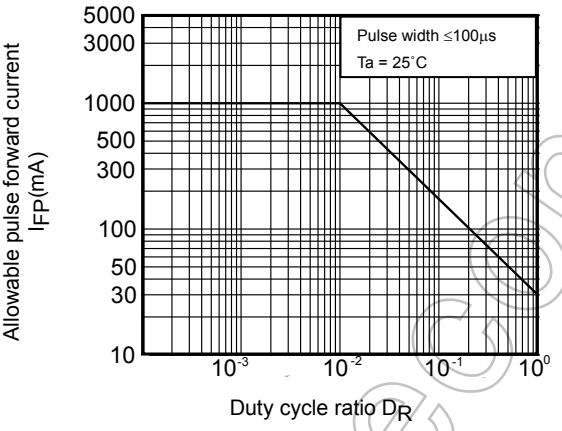
I_F - Ta



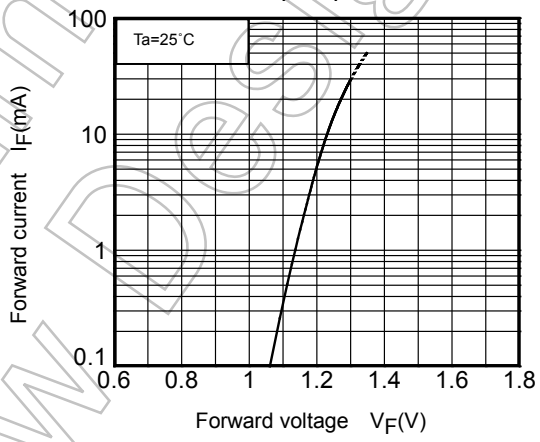
$I_{T(RMS)}$ - Ta



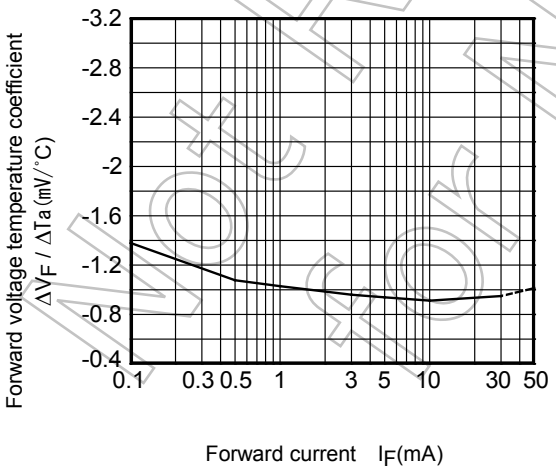
I_{FP} - D_R



I_F - V_F

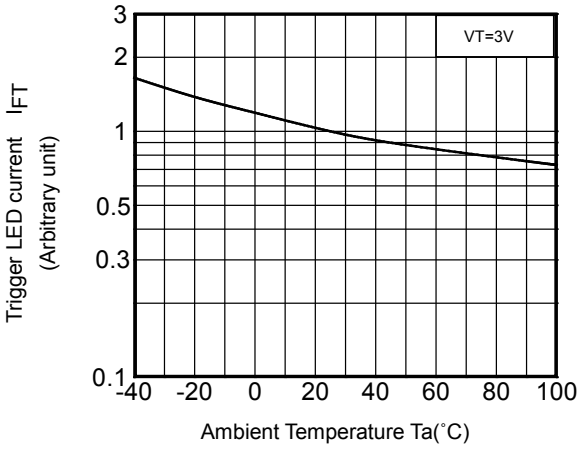


ΔV_F / ΔTa - I_F

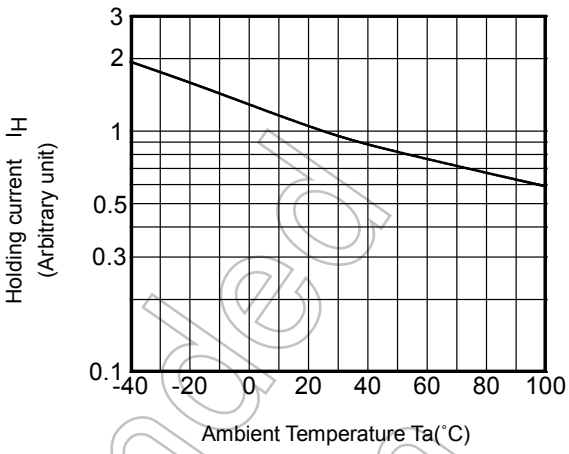


NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

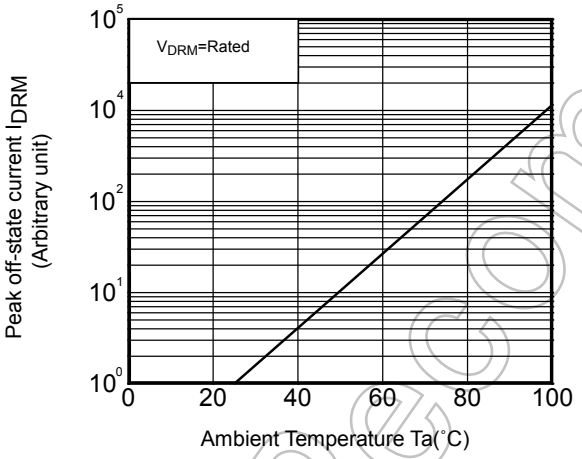
Normalized I_{FT} - Ta



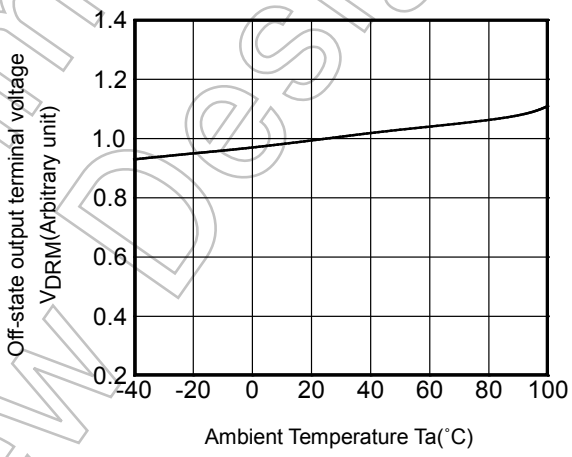
Normalized I_H - Ta



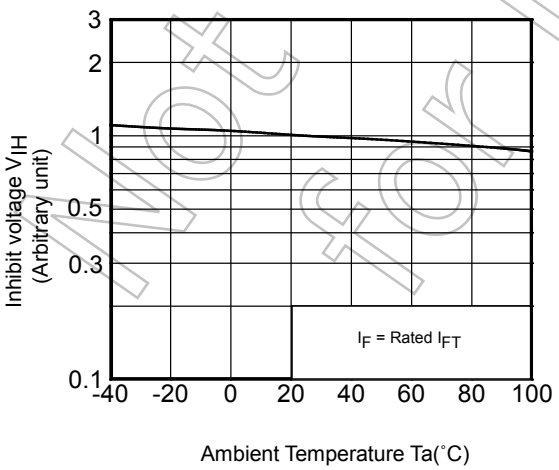
Normalized I_{DRM} - Ta



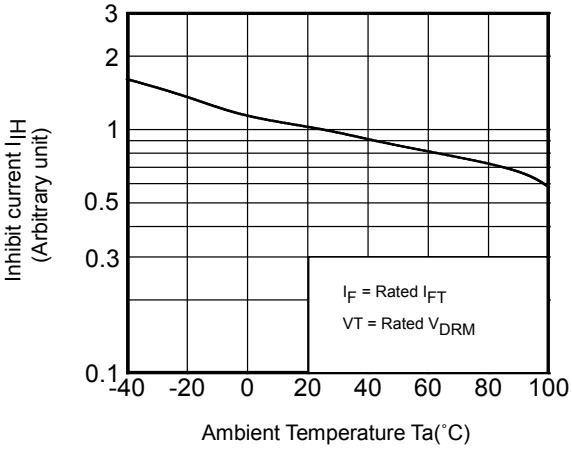
Normalized V_{DRM} - Ta



Normalized V_{IH} - Ta



Normalized I_{IH} - Ta



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