

# TLP3544

## 1. Applications

- Mechanical relay replacements
- Security Systems
- Measuring Equipments
- Factory Automation (FA)
- Amusement Equipments

## 2. General

The TLP3544 photorelay consists of a photo MOSFET optically coupled to an infrared light emitting diode. It is housed in a 6-pin DIP package. The low ON-state resistance and the high permissible ON-state current of the the TLP3544 make it suitable for power line control applications.

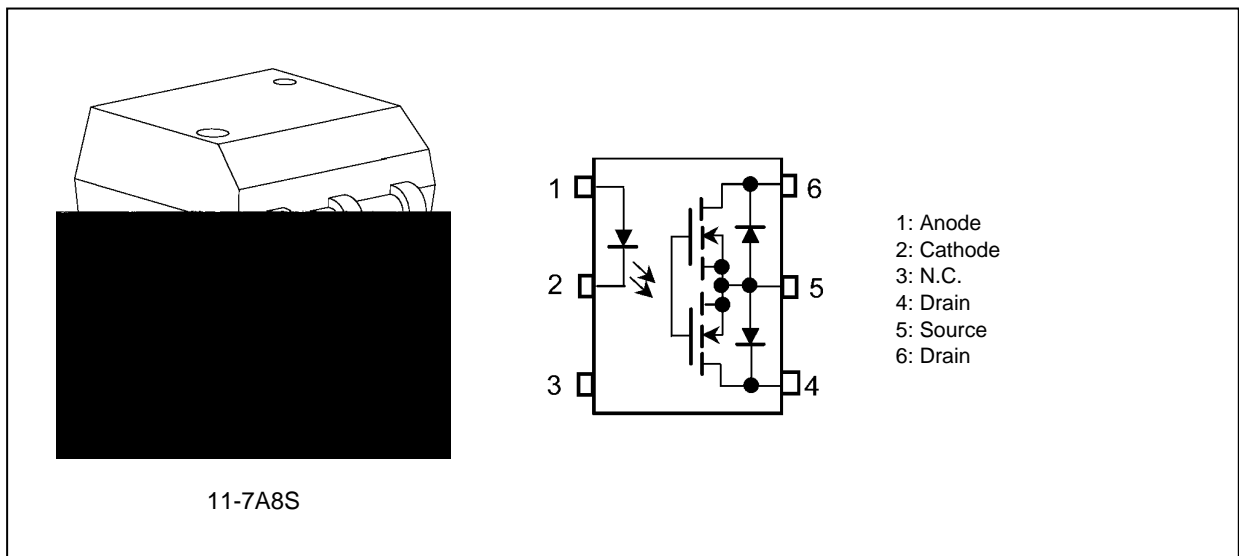
## 3. Features

- (1) Normally off (1-Form-A)
- (2) OFF-state output terminal voltage: 40 V (min)
- (3) Trigger LED current: 3 mA (max)
- (4) ON-state current: 3.5 A (max) (A connection)
- (5) ON-state resistance: 60 mΩ (max) (A connection)
- (6) Isolation voltage: 2500 Vrms (min)
- (7) Safety standards

UL-approved: UL1577 File No.E 67349

cUL-approved: CSA Component Acceptance Service No.5A, File No.E 67349

## 4. Packaging and Pin Configuration



5. Internal Circuit

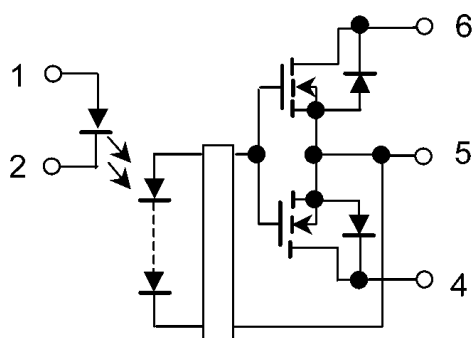


Fig. 5.1 Internal Circuit

6. Absolute Maximum Ratings (Note) (Unless otherwise specified,  $T_a = 25^\circ\text{C}$ )

Characteristics		Symbol	Note	Rating	Unit
LED	Input forward current	$I_F$		30	mA
	Input forward current derating ( $T_a \geq 25^\circ\text{C}$ )	$\Delta I_F / \Delta T_a$		-0.3	mA/°C
	Input forward current (pulsed) (100 $\mu\text{s}$ pulse, 100 pps)	$I_{FP}$		1	A
	Input reverse voltage	$V_R$		5	V
	Input power dissipation	$P_D$		50	mW
	Junction temperature	$T_j$		125	°C
Detector	OFF-state output terminal voltage	$V_{OFF}$		40	V
	ON-state current (A connection)	$I_{ON}$	(Note 1)	3.5	A
	ON-state current (B connection)	$I_{ON}$	(Note 1)	3.5	
	ON-state current (C connection)	$I_{ON}$	(Note 1)	7	
	ON-state current derating (A connection) ( $T_a \geq 25^\circ\text{C}$ )	$\Delta I_{ON} / \Delta T_a$	(Note 1)	-35	mA/°C
	ON-state current derating (B connection) ( $T_a \geq 25^\circ\text{C}$ )	$\Delta I_{ON} / \Delta T_a$	(Note 1)	-35	
	ON-state current derating (C connection) ( $T_a \geq 25^\circ\text{C}$ )	$\Delta I_{ON} / \Delta T_a$	(Note 1)	-70	
	ON-state current (pulsed) ( $t = 100 \text{ ms}$ , Duty = 1/10)	$I_{ONP}$		10.5	A
	Output power dissipation	$P_O$		500	mW
	Junction temperature	$T_j$		125	°C
Common	Storage temperature	$T_{stg}$		-55 to 125	
	Operating temperature	$T_{opr}$		-40 to 85	
	Lead soldering temperature (10 s)	$T_{sol}$		260	
	Isolation voltage AC, 1 min, R.H. $\leq$ 60%	$BV_S$	(Note 2)	2500	Vrms

**7. Recommended Operating Conditions (Note)**

Characteristics	Symbol	Note	Min	Typ.	Max	Unit
Supply voltage	$V_{DD}$		—	—	32	V
Input forward current	$I_F$		5	10	25	mA
ON-state current (A connection)	$I_{ON}$		—	—	3.5	A
Operating temperature	$T_{opr}$		-20	—	65	°C

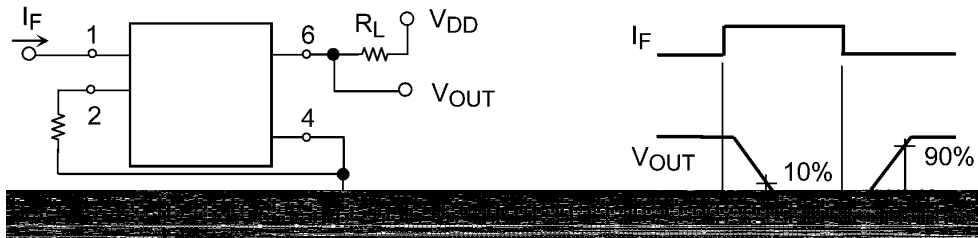
Note: The recommended operating conditions are given as a design guide necessary to obtain the intended performance of the device. Each parameter is an independent value. When creating a system design using this device, the electrical characteristics specified in this datasheet should also be considered.

**8. Electrical Characteristics (Unless otherwise specified,  $T_a = 25^\circ\text{C}$ )**

	Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
LED	Input forward voltage	$V_F$		$I_F = 10 \text{ mA}$	1.18	1.33	1.48	V
	Input reverse current	$I_R$		$V_R = 5 \text{ V}$	—	—	10	$\mu\text{A}$
	Input capacitance	$C_t$		$V = 0 \text{ V}, f = 1 \text{ MHz}$	—	70	—	pF
Detector	OFF-state current	$I_{OFF}$		$V_{OFF} = 40 \text{ V}$	—	—	1	$\mu\text{A}$
	Output capacitance	$C_{OFF}$		$V = 0 \text{ V}, f = 1 \text{ MHz}$	—	1000	—	pF

**11. Switching Characteristics (Unless otherwise specified,  $T_a = 25^\circ\text{C}$ )**

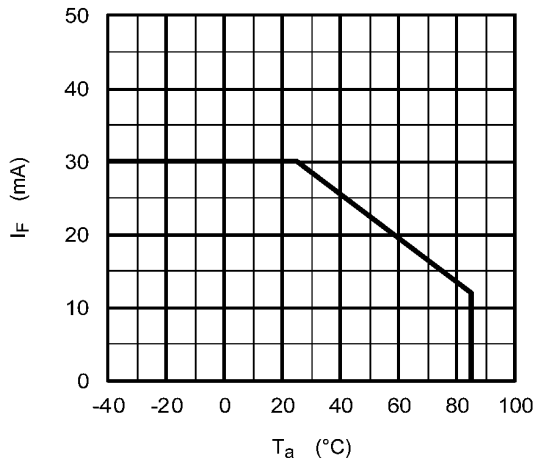
Characteristics	Symbol	Note	Test Condition	Min	Typ	Max	Unit
Turn-on time	$t_{ON}$		See Fig. 11.1. $R_L = 200 \Omega, V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$	—	2	5	ms
Turn-off time	$t_{OFF}$			—	0.1	1	
Turn-on time	$t_{ON}$		See Fig. 11.1. $R_L = 200 \Omega, V_{DD} = 20 \text{ V}, I_F = 10 \text{ mA}$	—	1	3	
Turn-off time	$t_{OFF}$			—	0.1	1	



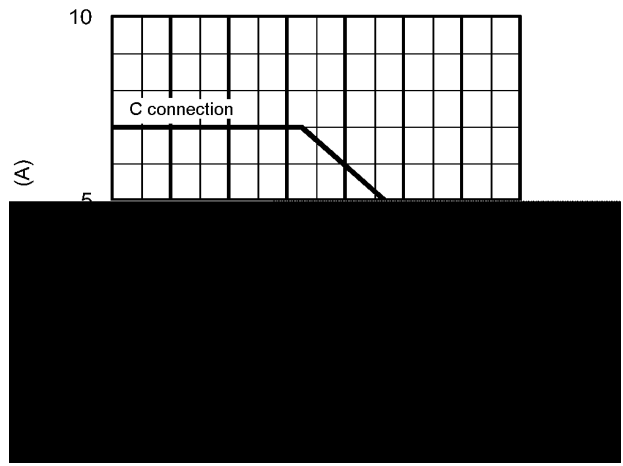
**Fig. 11.1 Switching Time Test Circuit**

**12. Characteristics Curves and Circuit Connections**

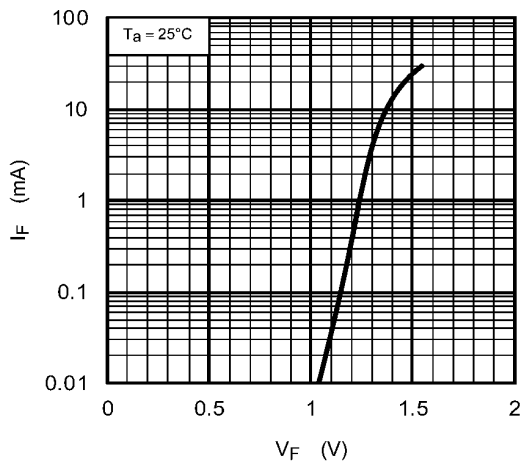
**12.1. Characteristics Curves (Note)**



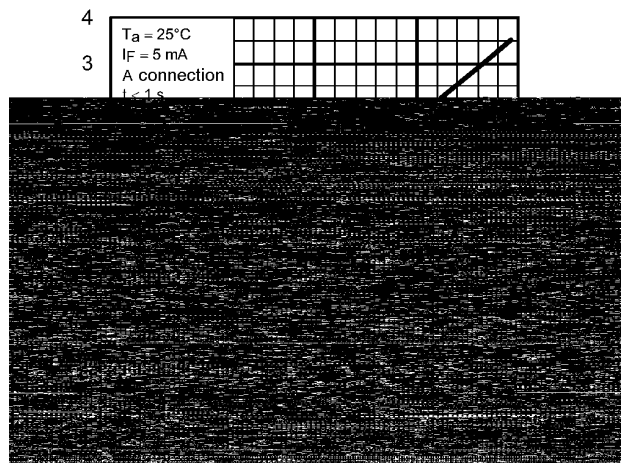
**Fig. 12.1.1 IF - Ta**



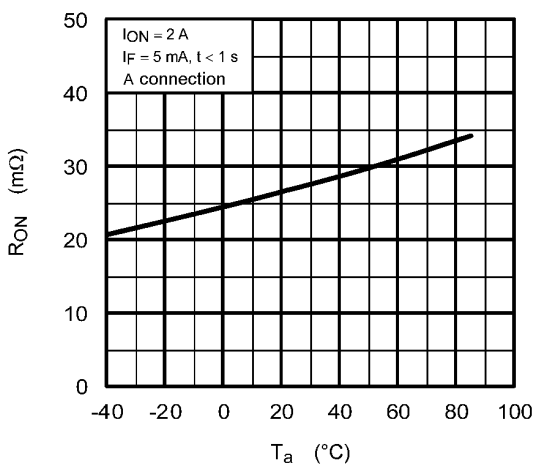
**Fig. 12.1.2 ION - Ta**



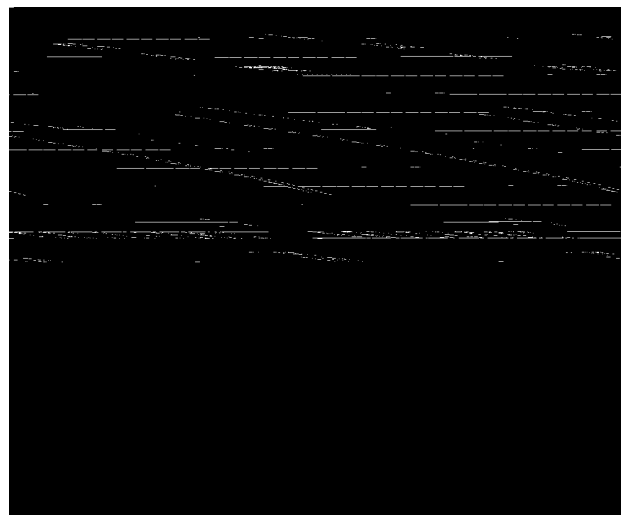
**Fig. 12.1.3 IF - VF**



**Fig. 12.1.4 ION - VON**



**Fig. 12.1.5 RON - Ta**



**Fig. 12.1.6 IFT - Ta**

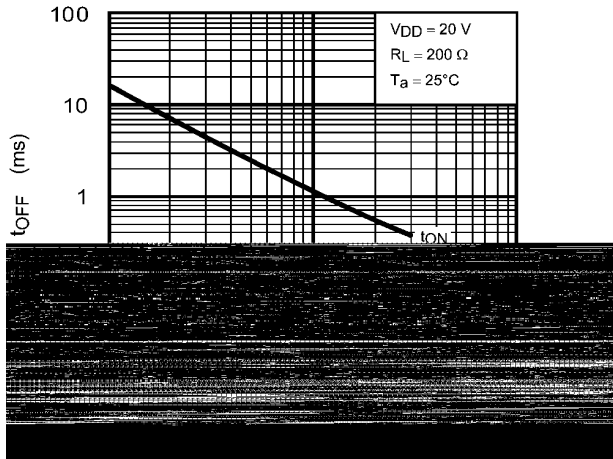


Fig. 12.1.7  $t_{ON}$ ,  $t_{OFF}$  -  $I_F$

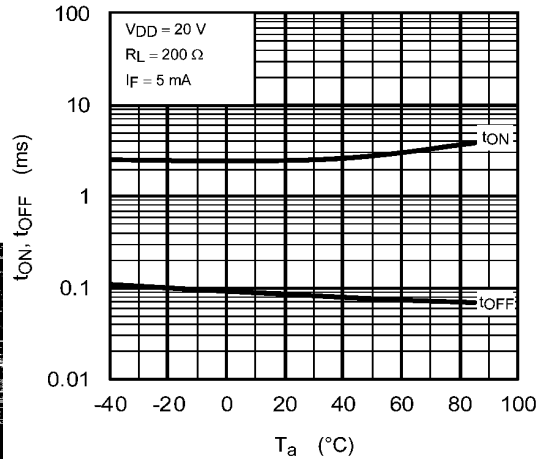


Fig. 12.1.8  $t_{ON}$ ,  $t_{OFF}$  -  $T_a$

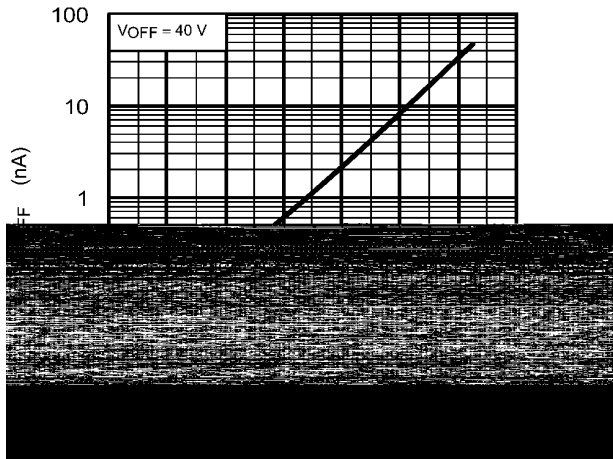


Fig. 12.1.9  $I_{OFF}$  -  $T_a$

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

12.2. Circuit Connections

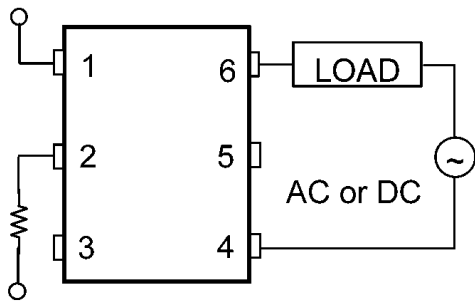


Fig. 12.2.1 A Connection

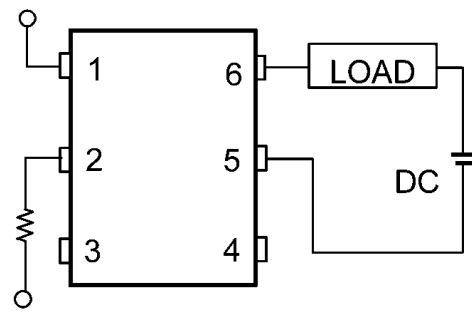


Fig. 12.2.2 B Connection

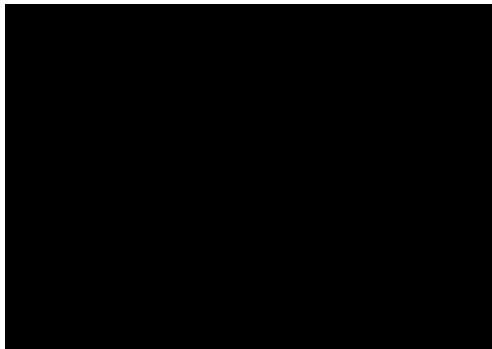
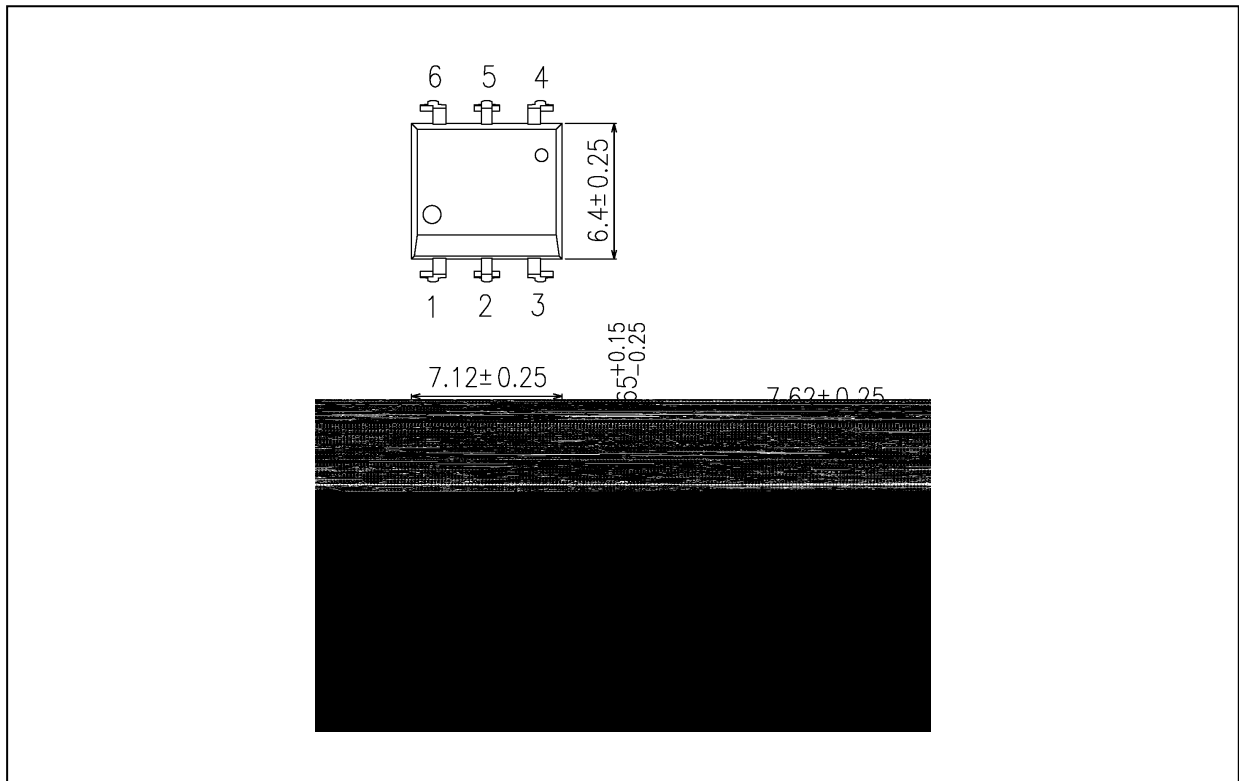


Fig. 12.2.3 C Connection

Package Dimensions

Unit: mm



Weight: 0.4 g (typ.)

Package Name(s)
TOSHIBA: 11-7A8S



