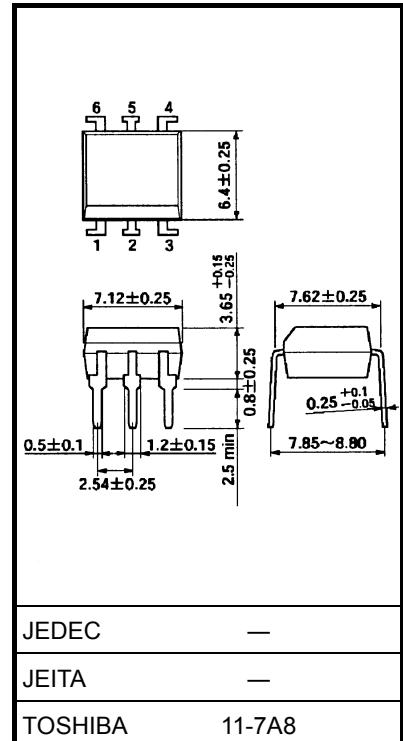


TOSHIBA Photocoupler Photorelay

TLP592A

Telecommunications
 Measurement and Control Equipment
 Data Acquisition System
 Measurement Equipment

Unit: mm

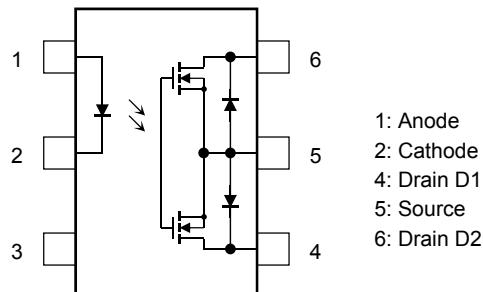


JEDEC

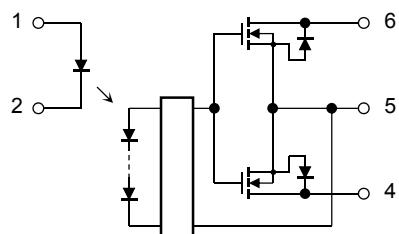
JEITA

TOSHIBA 11-7A8

Weight: 0.4 g (typ.)



Schematic



Start of commercial production
 2002/03

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics		Symbol	Rating	Unit
LED	Forward current	I_F	50	mA
	Forward current derating ($T_a \geq 25^\circ\text{C}$)	$\Delta I_F/^\circ\text{C}$	-0.5	mA/°C
	Peak forward current (100 μs pulse, 100 pps)	I_{FP}	1	A
	Reverse voltage	V_R	5	V
	Junction temperature	T_j	125	°C
Detector	Off-state output terminal voltage	V_{OFF}	60	V
	On-state current	I_{ON}	500	mA
			500	
			1000	
	Forward current derating ($T_a \geq 25^\circ\text{C}$)	$\Delta I_{ON}/^\circ\text{C}$	-5.0	mA/°C
			-5.0	
			-10.0	
	Junction temperature	T_j	125	°C
	Storage temperature	T_{stg}	-55 to 125	°C
Operating temperature		T_{opr}	-40 to 85	°C
Lead soldering temperature (10 s)		T_{sol}	260	°C
Isolation voltage (AC, 1 minute, R.H. $\leq 60\%$) (Note 1)		BV_S	2500	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.).

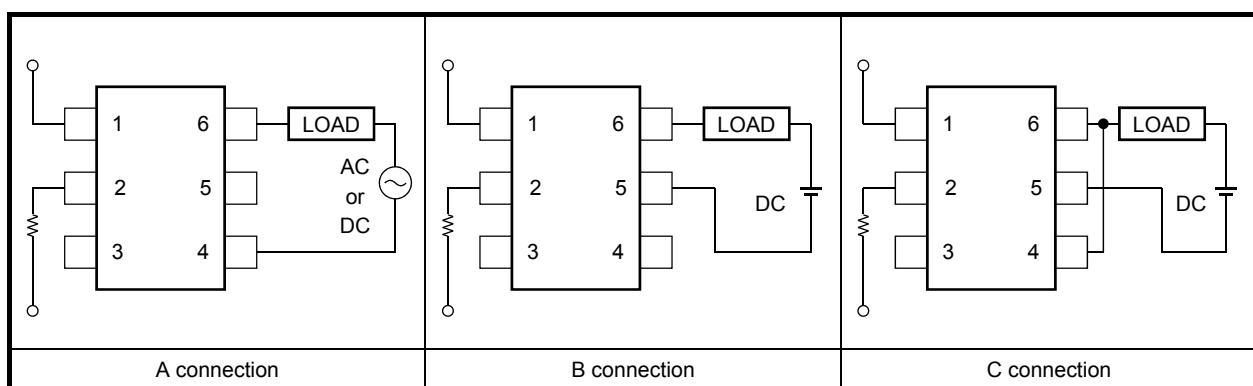
Note 1: LED pins are shorted together. Detector pins are also shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{DD}	—	—	48	V
Forward current	I_F	5	7.5	25	mA
On-state current	I_{ON}	—	—	500	mA
Operating temperature	T_{opr}	-20	—	65	°C

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

Circuit Connections



Electrical Characteristics $T_a = 25^\circ\text{C}$

Characteristics		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 voltage	V_R	$V_R = 5 \text{ V}$	—	—	10	μA
	Capacitance	C_T	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Off-state current	I_{OFF}	$V_{OFF} = 60 \text{ V}$	—	—	1	μA
	Capacitance	C_{OFF}	$V = 0, f = 1 \text{ MHz}$	—	130	—	pF

Coupled Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current		I_{FT}	$I_{ON} = 500 \text{ mA}$	—	1.6	3	mA
Return LED current		I_{FC}	$I_{OFF} = 100 \mu\text{A}$	0.1	—	—	mA
On-state resistance	A connection	R_{ON}	$I_{ON} = 500 \text{ mA}, I_F = 5 \text{ mA}$	—	1	2	Ω
	B connection		$I_{ON} = 500 \text{ mA}, I_F = 5 \text{ mA}$	—	0.5	1	
	C connection		$I_{ON} = 1000 \text{ mA}, I_F = 5 \text{ mA}$	—	0.25	—	

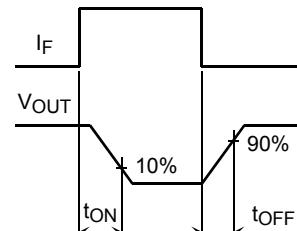
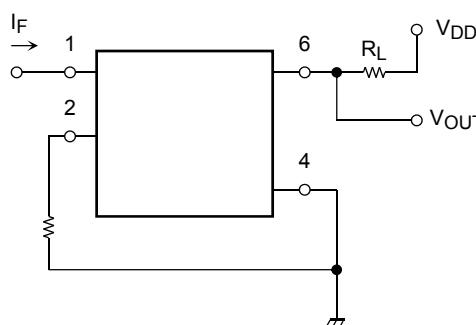
Isolation Characteristics ($T_a = 25^\circ\text{C}$)

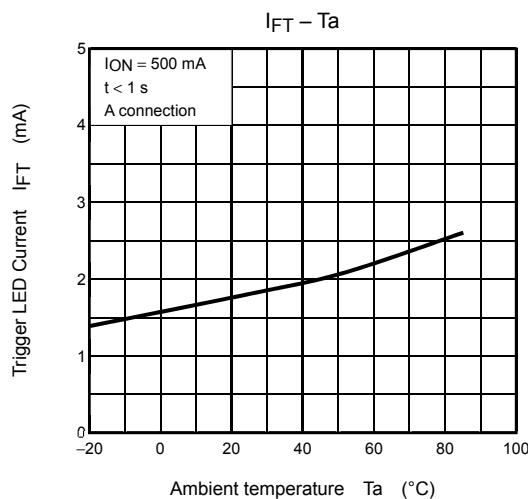
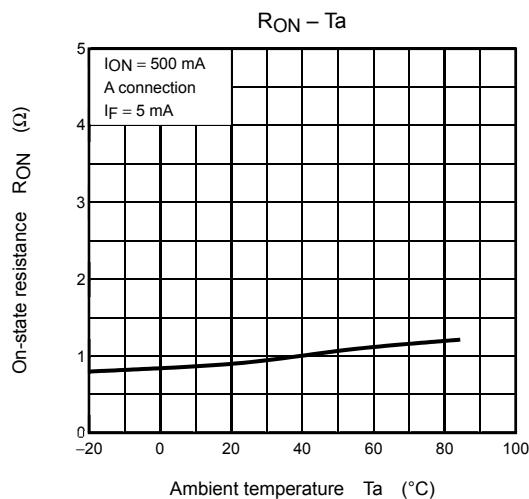
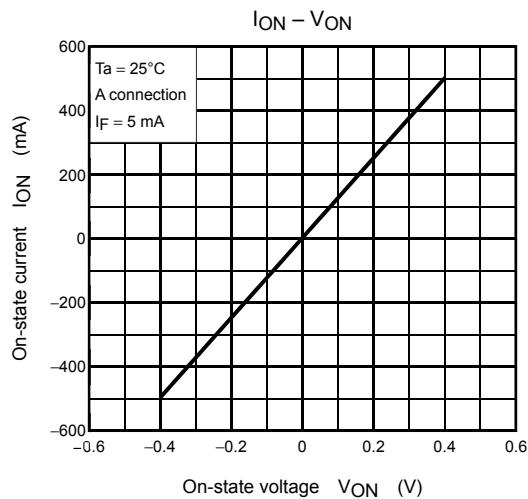
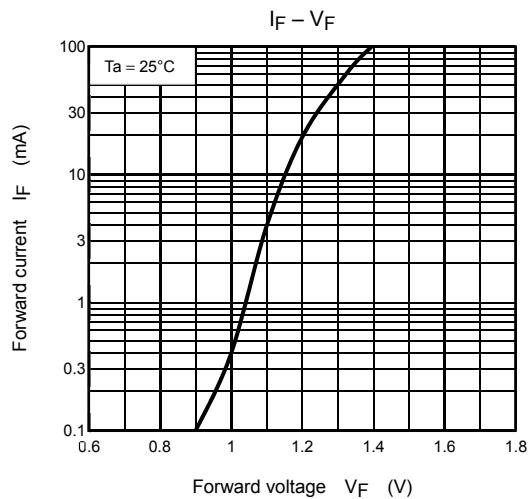
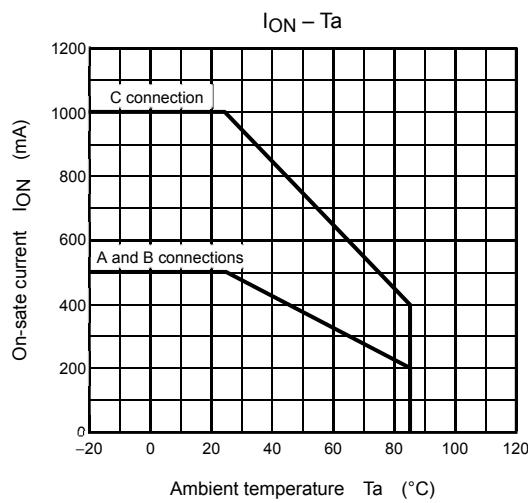
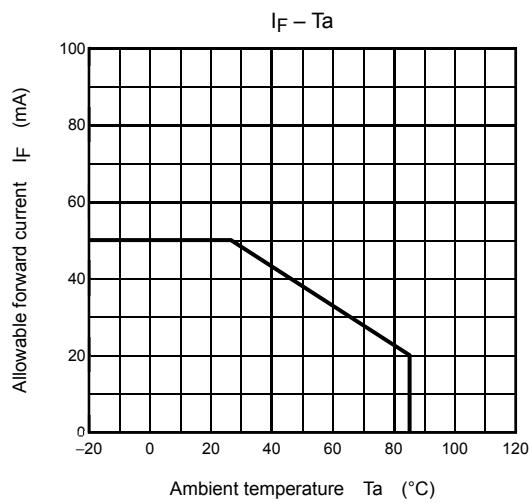
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output		C_S	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance		R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage		BVS	AC, 1 minute	2500	—	—	Vrms
			AC, 1 second, in oil	—	5000	—	
			DC, 1 minute, in oil	—	5000	—	Vdc

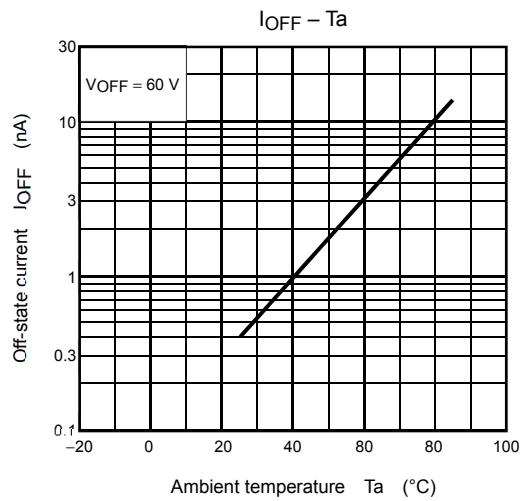
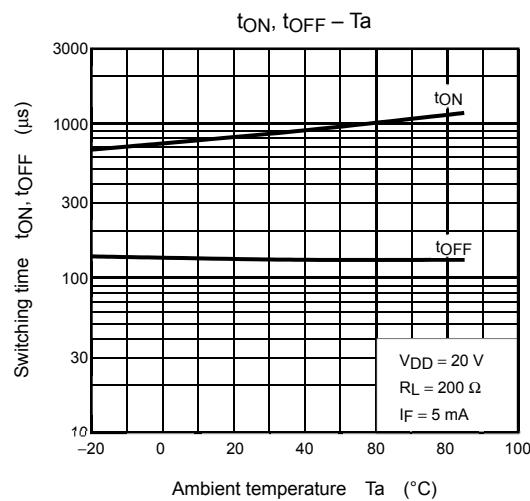
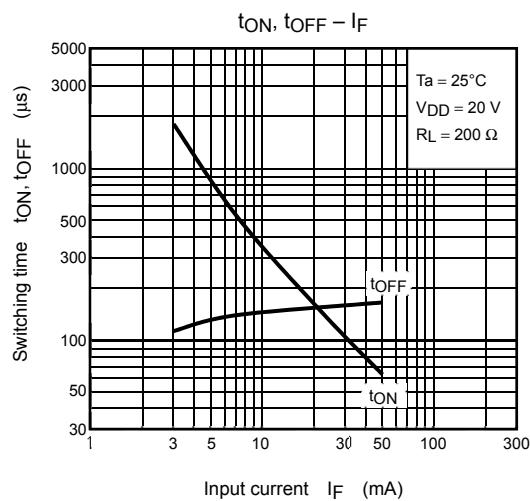
Switching Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time		t_{ON}	$R_L = 200 \Omega$ (Note 2)	—	0.8	2	ms
Turn-off time		t_{OFF}	$V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$	—	0.1	0.5	

Note 2: Switching time test circuit







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