

# TLP597A

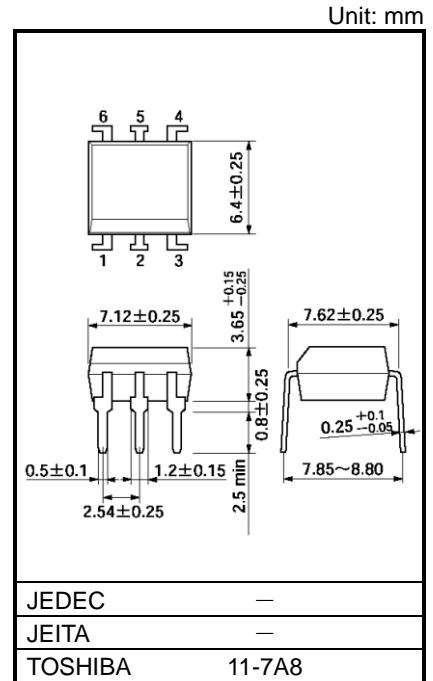
TELECOMMUNICATION  
 DATA ACQUISITION  
 MEASUREMENT INSTRUMENTATION

The TOSHIBA TLP597A consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a six lead plastic DIP package (DIP6).

The TLP597A is a bi-directional switch can replace mechanical relays in many applications.

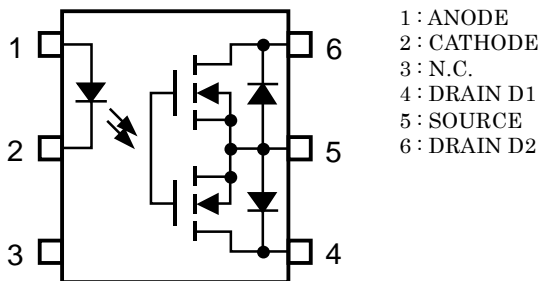
### Features

- 6 pin DIP (DIP6)
- 1-Form-A
- Peak Off-State Voltage : 60 V (min)
- Trigger LED Current : 3 mA (max)
- On-State Current : 500 mA (max)
- On-State Resistance : 2 Ω (max)
- Isolation Voltage : 2500 Vrms (min)
- UL Recognized : UL1577, File No. E67349

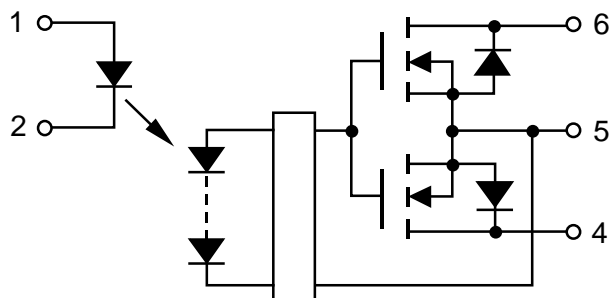


Weight: 0.4 g (typ.)

### Pin Configuration (top view)



### Schematic



Start of commercial production  
 2001-01

## Absolute Maximum Ratings (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT	
LED	Forward Current	I <sub>F</sub>	50	mA	
	Forward Current Derating (Ta ≥ 25°C)	ΔI <sub>F</sub> /°C	-0.5	mA/°C	
	Peak Forward Current (100 μs pulse, 100 pps)	I <sub>FP</sub>	1	A	
	Reverse Voltage	V <sub>R</sub>	5	V	
	Diode Power Dissipation	P <sub>D</sub>	50	mW	
	Diode Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>D</sub> /°C	-0.5	mW/°C	
	Junction Temperature	T <sub>j</sub>	125	°C	
DETECTOR	Off-State Output Terminal Voltage		V <sub>OFF</sub>	60	V
	On-State RMS Current	A Connection	I <sub>ON</sub>	500	mA
		B Connection		500	
		C Connection		1000	
	On-State Current Derating (Ta ≥ 25°C)	A Connection	ΔI <sub>ON</sub> /°C	-5.0	mA/°C
		B Connection		-5.0	
		C Connection		-10.0	
	Output Power Dissipation	A connection	P <sub>o</sub>	450	mW
		B connection		225	
		C connection		450	
	Output Power Dissipation Derating (Ta ≥ 25°C)	A connection	ΔP <sub>o</sub> /°C	-4.5	mW / °C
		B connection		-2.25	
		C connection		-4.5	
Junction Temperature		T <sub>j</sub>	125	°C	
Operating Temperature Range		T <sub>opr</sub>	-40 to 85	°C	
Storage Temperature Range		T <sub>stg</sub>	-55 to 125	°C	
Lead Soldering Temperature (10 s)		T <sub>sol</sub>	260	°C	
Isolation Voltage (AC, 60 s, R.H. ≤ 60%) (Note 1)		BV <sub>S</sub>	2500	V <sub>rms</sub>	

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).

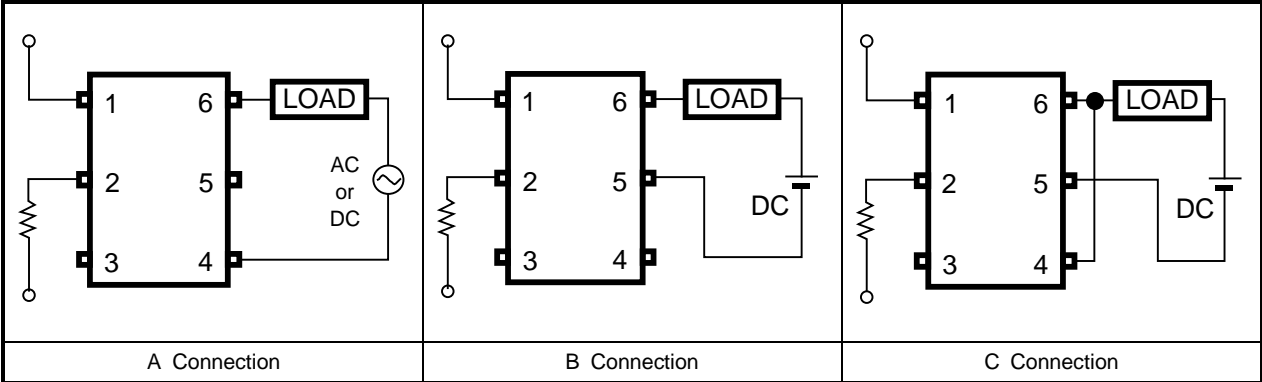
Note 1: Device considered a two-terminal device : Pins 1, 2 and 3 shorted together, and pins 4, 5 and 6 shorted together.

## Recommended Operating Conditions

CHARACTERISTIC	SYMBOL	MIN	TYP.	MAX	UNIT
Supply Voltage	V <sub>DD</sub>	—	—	48	V
Forward Current	I <sub>F</sub>	5	7.5	25	mA
On-State Current	I <sub>ON</sub>	—	—	400	mA
Operating Temperature	T <sub>opr</sub>	-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 (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
LED	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA	1.0	1.15	1.3	V
	Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 5 V	—	—	10	μA
	Capacitance	C <sub>T</sub>	V = 0 V, f = 1 MHz	—	30	—	pF
DETECTOR	Off-State Current	I <sub>OFF</sub>	V <sub>OFF</sub> = 60 V	—	—	1	μA
	Capacitance	C <sub>OFF</sub>	V = 0 V, f = 1 MHz	—	130	—	pF

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

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Trigger LED Current		I <sub>FT</sub>	I <sub>ON</sub> = 500 mA	—	—	3	mA
Close LED Current		I <sub>FC</sub>	I <sub>OFF</sub> = 100 μA	0.1	—	—	mA
On-State Resistance	A Connection	R <sub>ON</sub>	I <sub>ON</sub> = 500 mA, I <sub>F</sub> = 5 mA	—	1	2	Ω
	B Connection		I <sub>ON</sub> = 500 mA, I <sub>F</sub> = 5 mA	—	0.5	1	
	C Connection		I <sub>ON</sub> = 1000 mA, I <sub>F</sub> = 5 mA	—	0.25	—	

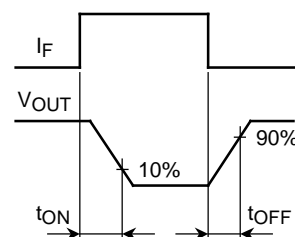
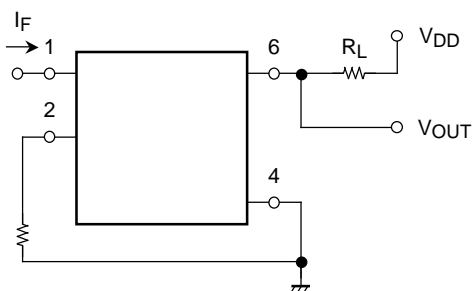
## Isolation Characteristics (Ta = 25°C)

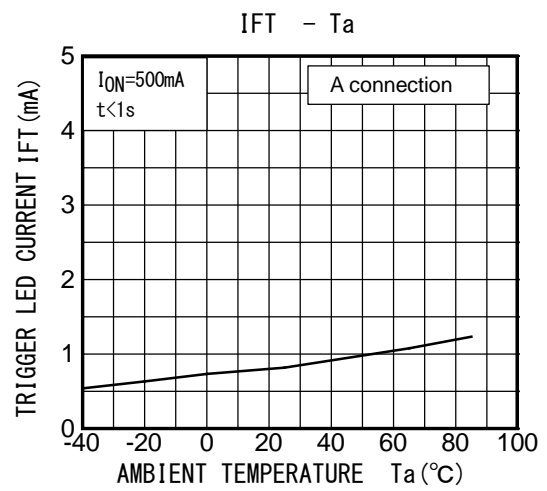
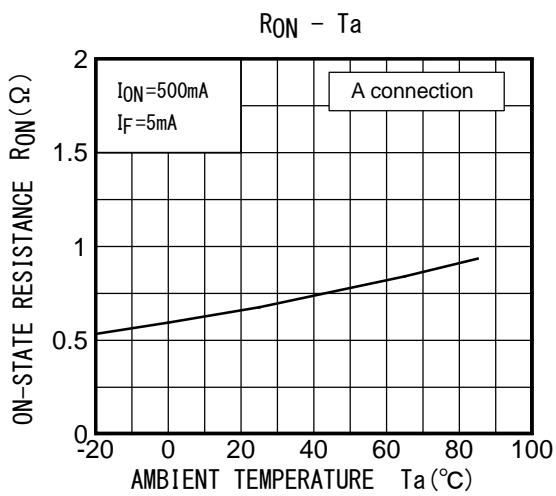
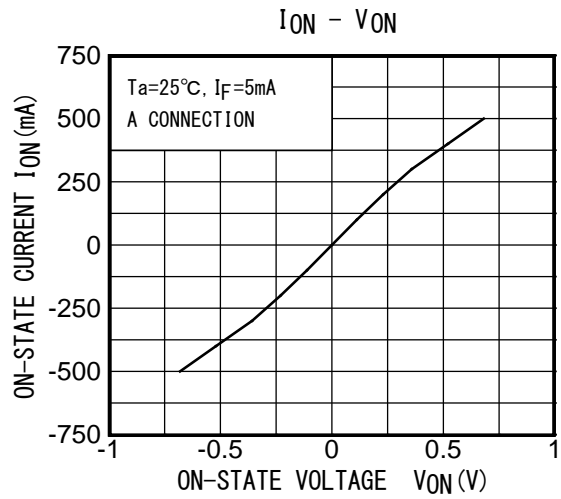
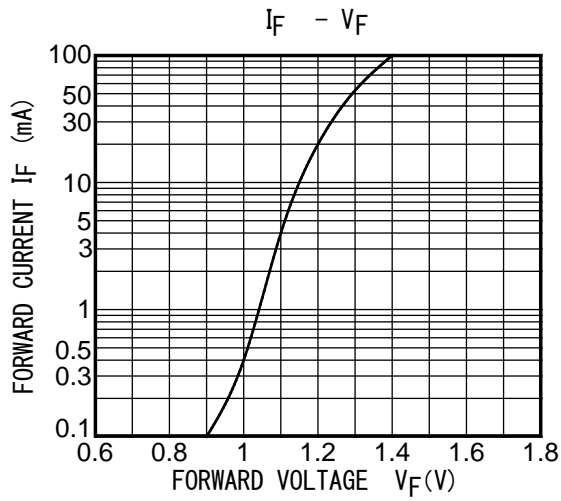
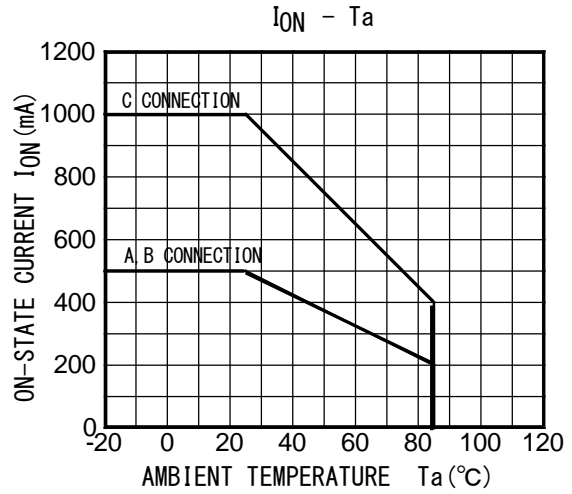
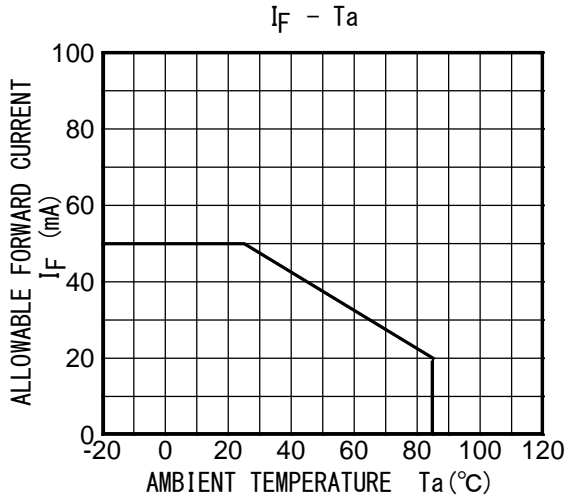
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Capacitance Input to Output	C <sub>S</sub>	V <sub>S</sub> = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation Resistance	R <sub>S</sub>	V <sub>S</sub> = 500 V, R.H. ≤ 60%	5 × 10 <sup>10</sup>	10 <sup>14</sup>	—	Ω
Isolation Voltage	BV <sub>S</sub>	AC, 60 s	2500	—	—	V <sub>rms</sub>
		AC, 1 s (in oil)	—	5000	—	
		DC, 60 s (in oil)	—	5000	—	V <sub>dc</sub>

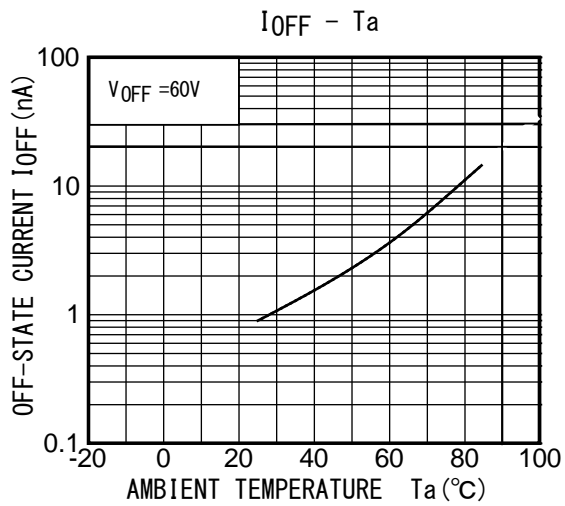
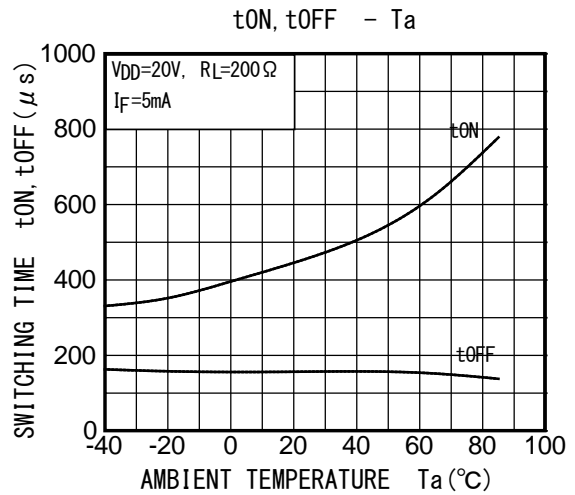
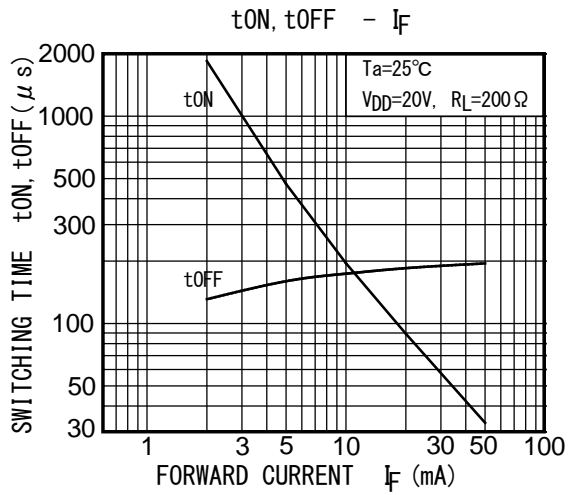
## Switching Characteristics (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Turn-on Time	t <sub>ON</sub>	R <sub>L</sub> = 200 Ω (Note 2)	—	0.6	2	ms
Turn-off Time	t <sub>OFF</sub>	V <sub>DD</sub> = 20 V, I <sub>F</sub> = 5 mA	—	0.1	1	
Turn-on Time	t <sub>ON</sub>	R <sub>L</sub> = 200 Ω (Note 2)	—	0.3	1	ms
Turn-off Time	t <sub>OFF</sub>	V <sub>DD</sub> = 20 V, I <sub>F</sub> = 10 mA	—	0.1	1	

Note 2: SWITCHING TIME TEST CIRCUIT







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