#### TOSHIBA Photocoupler Photo Relay

# TLP599A

Telecommunication

Data Acquisition

Measurement Instrumentation

The TOSHIBA TLP599A consists of a gallium arsenide infrared emitting diode optically coupled to a photo–MOS FET in a six lead plastic DIP package (DIP6).

The TLP599A is a bi-directional switch which can replace mechanical relays in many applications.

- Peak off-state voltage: 60V (min.)
- On-state current: 300mA (max.) (A connection)
- On-state resistance: 2Ω (max.) (A connection)
- Insulation Thickness: 0.4 mm (max.)
- Isolation voltage: 2500Vrms (min.)
- UL recognized: UL1577, file no. E67349
- Trigger LED current (Ta = 25°C)

	Unit in mm
6 5 4 6 5 7 1 2 3 7.12 ± 0.25 1.2 ± 0.15 NIWS: 2.54 ± 0.25	7.62 ± 0.25 0.25 -0.05 7.85 ~ 8.80
TOSHIBA 11-7	7A8

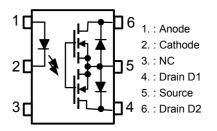
Weight: 0.4 g

Classification (Note 1)	()		Marking Of Classification
, ,	Min.	Max.	
(IFT2)	_	2	T2
Standard		5	T2, blank

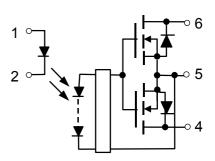
(Note 1): Application type name for certification test, please use standard product type name, i.e.

TLP599A (IFT2): TLP599A

#### Pin Configuration (top view)



#### **Schematic**



## **Maximum Ratings (Ta = 25°C)**

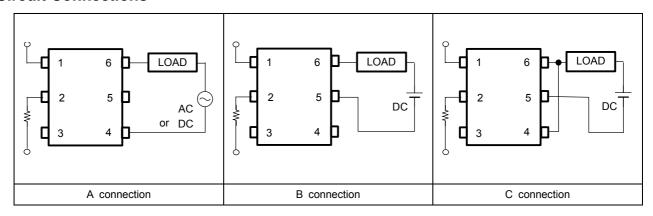
Characteristic			Symbol	Rating	Unit		
	Forward current		IF	50	mA		
LED	Forward current derating (Ta ≥ 25°C)				ΔI <sub>F</sub> / °C	-0.5	mA / °C
	Peak forward current (100 µs pulse, 100 pps)		I <sub>FP</sub>	1	А		
	Reverse voltage		$V_{R}$	5	V		
	Junction temperature		Tj	125	°C		
	Off-state output terminal volt	age	V <sub>OFF</sub>	60	V		
	On-state RMS current	A connection	I <sub>ON</sub>	300			
er		B connection		450	mA		
Jetecter		C connection		600			
ă		A connection		-3			
	On–state current derating (Ta ≥ 25°C)	B connection	ΔI <sub>ON</sub> / °C	-4.5	mA / °C		
	,	C connection		-6			
	Junction temperature		Tj	125	°C		
Storage temperature range		T <sub>stg</sub>	-55~125	°C			
Operating temperature range		T <sub>opr</sub>	-40~85	°C			
Lead soldering temperature (10 s)		T <sub>sol</sub>	260	°C			
Isolation voltage (AC, 1 min., R.H.≤ 60%) (Note 2)		BVS	2500	Vrms			

(Note 2): 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.	Тур.	Max.	Unit
Supply voltage	$V_{DD}$	_	_	48	V
Forward current	l <sub>F</sub>	7.5	15	25	mA
On-state current	I <sub>ON</sub>	_	_	300	mA
Operating temperature	T <sub>opr</sub>	-20	_	80	°C

#### **Circuit Connections**



## **Individual Electrical Characteristics (Ta = 25°C)**

	Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
	Forward voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA	1.0	1.15	1.3	V
LED	Reverse current	I <sub>R</sub>	V <sub>R</sub> = 5 V	_	_	10	μΑ
	Capacitance	C <sub>T</sub>	V = 0, f = 1 MHz	_	30	_	pF
Detector	Off-state current	l <sub>OFF</sub>	V <sub>OFF</sub> = 60 V	_	_	1	μΑ
Dete	Capacitance	C <sub>OFF</sub>	V = 0, f = 1 MHz	_	_	_	pF

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

Charae	cteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Trigger LED curre	nt	I <sub>FT</sub>	I <sub>ON</sub> = 300 mA	_	1	5	mA
	A connection		$I_{ON} = 300 \text{ mA}, I_F = 10 \text{ mA}$	_	1.4	2	
On–state Resistance	B connection	R <sub>ON</sub>	$I_{ON} = 450 \text{ mA}, I_F = 10 \text{ mA}$	_	0.7	1	Ω
	C connection		$I_{ON} = 600 \text{ mA}, I_F = 10 \text{ mA}$	_	0.35	0.5	

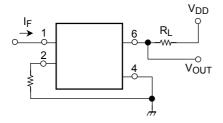
## Isolation Characteristics (Ta = 25°C)

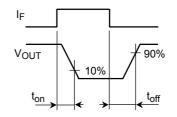
Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Capacitance input to output	CS	V <sub>S</sub> = 0, f = 1 MHz	_	0.8	_	pF
Isolation resistance	R <sub>S</sub>	V <sub>S</sub> = 500 V, R.H.≤ 60%	5 × 10 <sup>10</sup>	10 <sup>14</sup>	_	Ω
Isolation voltage	BVS	AC, 1 minute	2500	_	_	Vrms
		AC, 1 second (in oil)	_	5000	_	VIIIIS
		DC, 1 minute (in oil)	_	5000	_	V <sub>dc</sub>

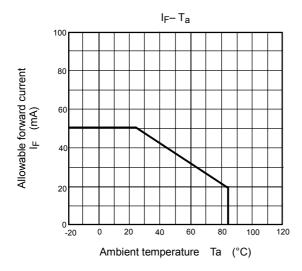
## **Switching Characteristics (Ta = 25°C)**

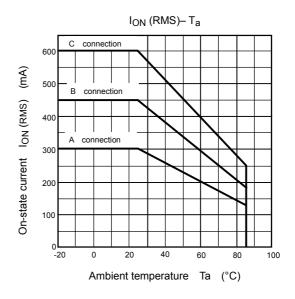
Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Turn-on time	t <sub>on</sub>	R <sub>L</sub> = 200Ω, V <sub>DD</sub> = 20 V	_	_	2	ms
Turn-off time	t <sub>off</sub>	I <sub>F</sub> = 10 mA	_	_	2	1113

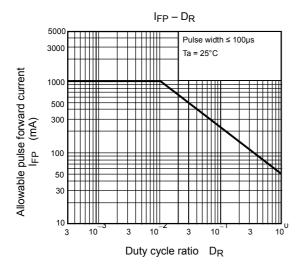
## **Switching Time Test Circuit**

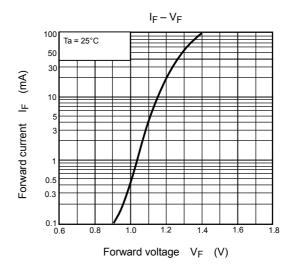


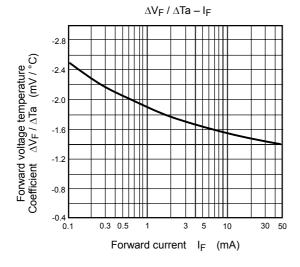


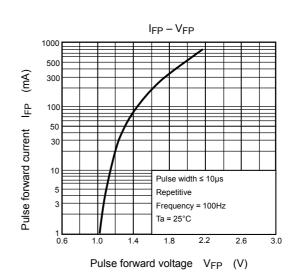












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