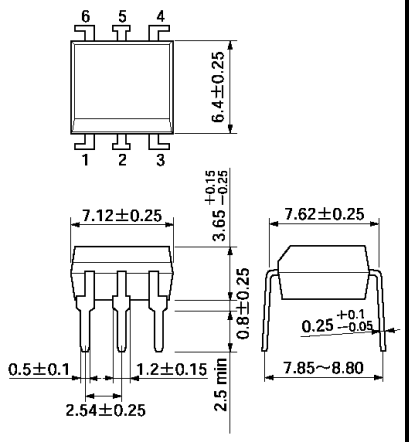
TOSHIBA PHOTOCOUPLER PHOTO RELAY

T L P 5 9 7 A

TELECOMMUNICATION
DATA ACQUISITION
MEASUREMENT INSTRUMENTATION

Unit: mm



JEDEC	
EIAJ	
TOSHIBA	11-7A8

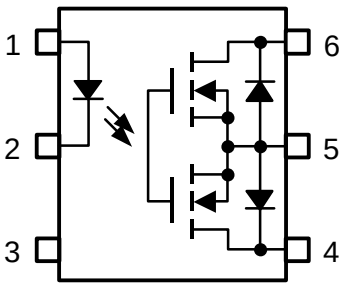
Weight: 0.4 g

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

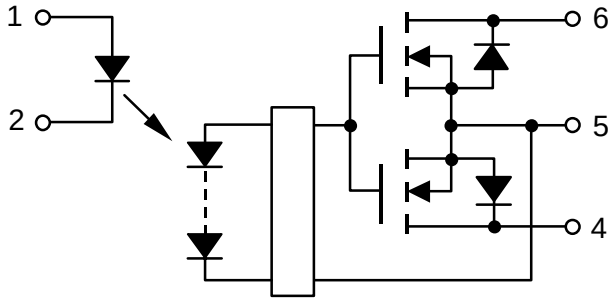
- 6 pin DIP (DIP6)
- 1-Form-A
- Peak Off-State Voltage : 60 V (MIN.)
- Trigger LED Current : 3 mA (MAX.)
- On-State Current : 500 mA (MAX.)
- On-State Resistance : 2 Ω (MAX.)
- Isolation Voltage : 2500 Vrms (MIN.)
- UL Recognized : UL1577, File No. E67349

PIN CONFIGURATION (TOL VIEW)



1 : ANODE
2 : CATHODE
3 : N.C.
4 : DRAIN D1
5 : SOURCE
6 : DRAIN D2

SCHEMATIC



MAXIMUM RATINGS (Ta = 25°C)

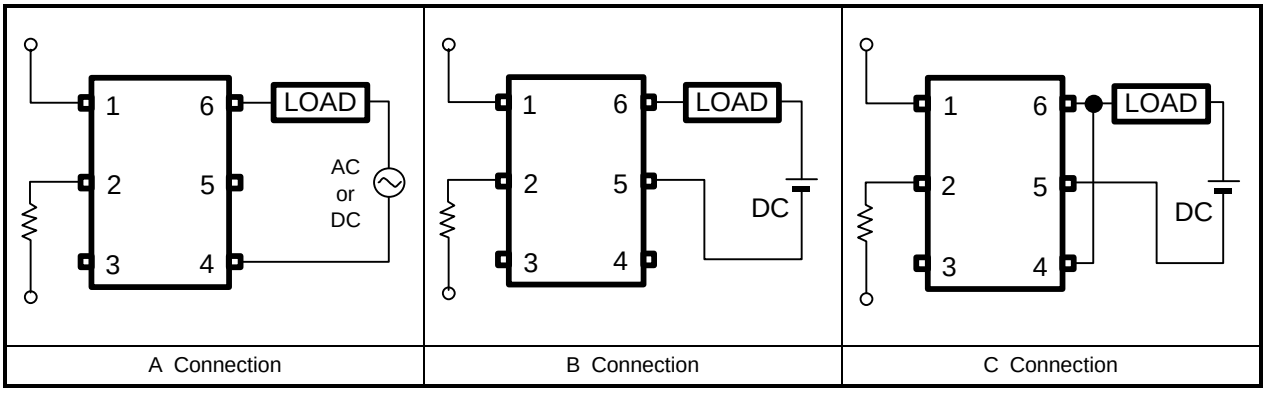
CHARACTERISTIC			SYMBOL	RATING	UNIT
LED	Forward Current		I_F	50	mA
	Forward Current Derating (Ta ≧ 25°C)		ΔI_F/°C	−0.5	mA/°C
	Peak Forward Current (100 μs pulse, 100 pps)		I_{FP}	1	A
	Reverse Voltage		V_R	5	V
	Junction Temperature		T_j	125	°C
DETECTOR	Off-State Output Terminal Voltage		V_{OFF}	60	V
	On-State RMS Current	A Connection	I_{ON}	500	mA
		B Connection		500	
		C Connection		1000	
	On-State Current Derating (Ta ≧ 25°C)	A Connection	ΔI_{ON}/°C	−5.0	mA/°C
		B Connection		−5.0	
		C Connection		−10.0	
	Junction Temperature		T_j	125	°C
Operating Temperature Range			T_{opr}	−40~85	°C
Storage Temperature Range			T_{stg}	−55~125	°C
Lead Soldering Temperature (10 s)			T_{sol}	260	°C
Isolation Voltage (AC, 1 minute, R.H. ≦ 60%) (NOTE1)			BV_S	2500	Vrms

(NOTE1) :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_{DD}	—	—	48	V
Forward Current	I_F	5	7.5	25	mA
On-State Current	I_{ON}	—	—	400	mA
Operating Temperature	T_{opr}	−20	—	65	°C

CIRCUIT CONNECTIONS



A Connection | B Connection | C Connection

INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

	CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	I_F = 10 mA	1.0	1.15	1.3	V
LED	Reverse Current	I_R	V_R = 5 V	—	—	10	μA
LED	Capacitance	C_T	V = 0, f = 1 MHz	—	30	—	pF
DETECTOR	Off-State Current	I_{OFF}	V_{OFF} = 60 V	—	—	1	μA
DETECTOR	Capacitance	C_{OFF}	V = 0, f = 1 MHz	—	130	—	pF

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Trigger LED Current		I_{FT}	I_{ON} = 500 mA	—	—	3	mA
Close LED Current		I_{FC}	I_{OFF} = 100 μA	0.1	—	—	mA
On-State Resistance	A Connection	R_{ON}	I_{ON} = 500 mA, I_F = 5 mA	—	1	2	Ω
On-State Resistance	B Connection	R_{ON}	I_{ON} = 500 mA, I_F = 5 mA	—	0.5	1	Ω
On-State Resistance	C Connection	R_{ON}	I_{ON} = 1000 mA, I_F = 5 mA	—	0.25	—	Ω

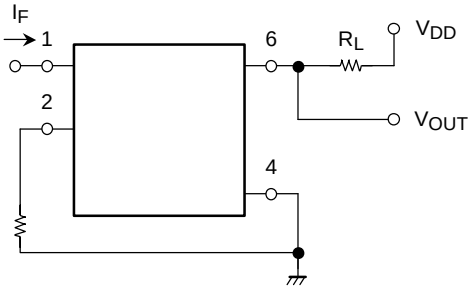
ISOLATION CHARACTERISTICS (Ta = 25°C)

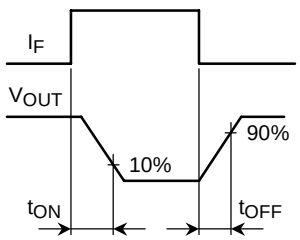
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C_S	V_S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation Resistance	R_S	V_S = 500 V, R.H. ≦ 60%	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	2500	—	—	Vrms
Isolation Voltage	BV_S	AC, 1 second (in oil)	—	5000	—	Vrms
Isolation Voltage	BV_S	DC, 1 minute (in oil)	—	5000	—	Vdc

SWITCHING CHARACTERISTICS (Ta = 25°C)

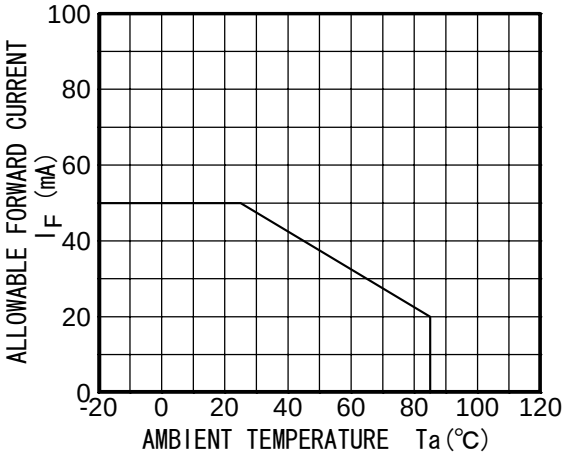
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Turn-on Time	t_{ON}	R_L = 200 Ω (NOTE 2), V_{DD} = 20 V, I_F = 5 mA	—	0.6	2	ms
Turn-off Time	t_{OFF}	R_L = 200 Ω (NOTE 2), V_{DD} = 20 V, I_F = 5 mA	—	0.1	1	ms
Turn-on Time	t_{ON}	R_L = 200 Ω (NOTE 2), V_{DD} = 20 V, I_F = 10 mA	—	0.3	1	ms
Turn-off Time	t_{OFF}	R_L = 200 Ω (NOTE 2), V_{DD} = 20 V, I_F = 10 mA	—	0.1	1	ms

(NOTE 2) : SWITCHING TIME TEST CIRCUIT

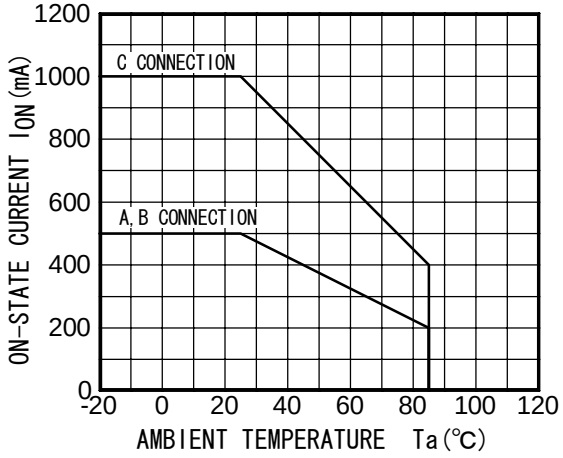




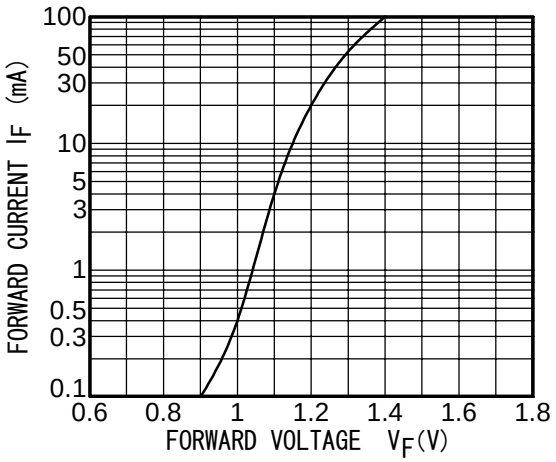
I_F – Ta



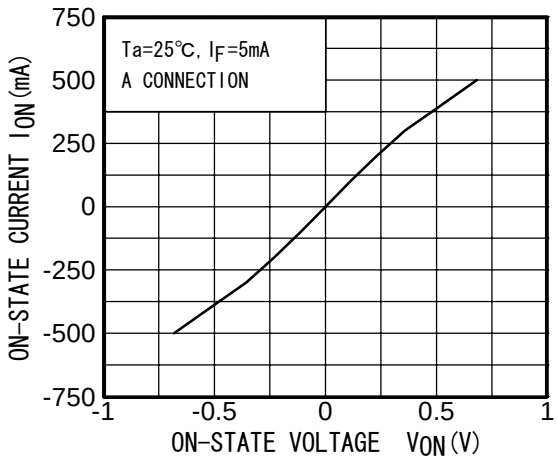
I_{ON} – Ta



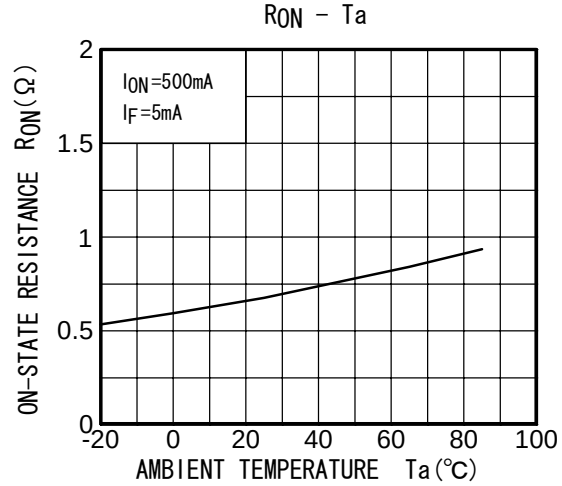
I_F – V_F



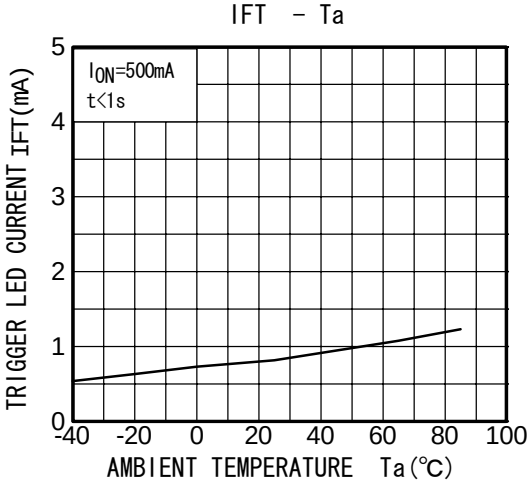
I_{ON} – V_{ON}



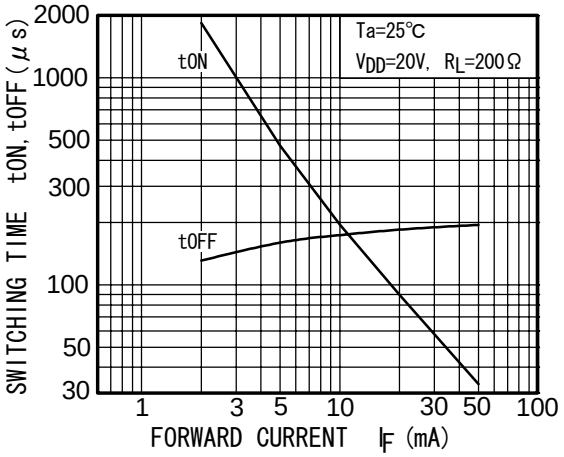
R_{ON} – Ta



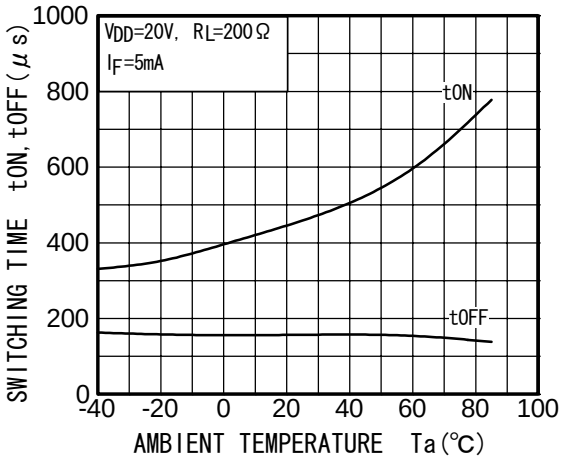
IFT – Ta



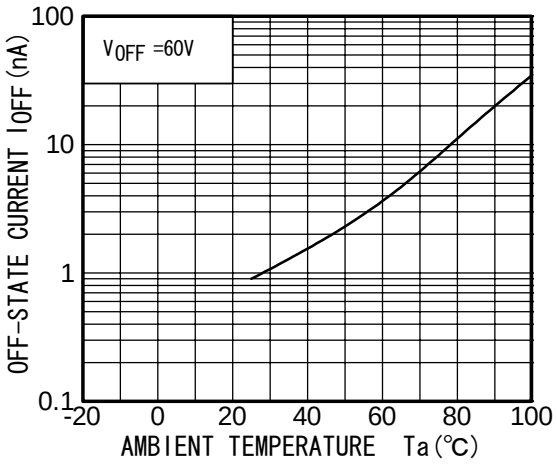
tON, tOFF – I_F



tON, tOFF – Ta



I_{OFF} – Ta



RESTRICTIONS ON PRODUCT USE

000707EBC

- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
  In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the “Handling Guide for Semiconductor Devices,” or “TOSHIBA Semiconductor Reliability Handbook” etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury (“Unintended Usage”). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer’s own risk.
- Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.