

TOSHIBA PHOTOCOUPLER PHOTO RELAY

TLP227A, TLP227A-2

CORDLESS TELEPHONE
PBX
MODEM

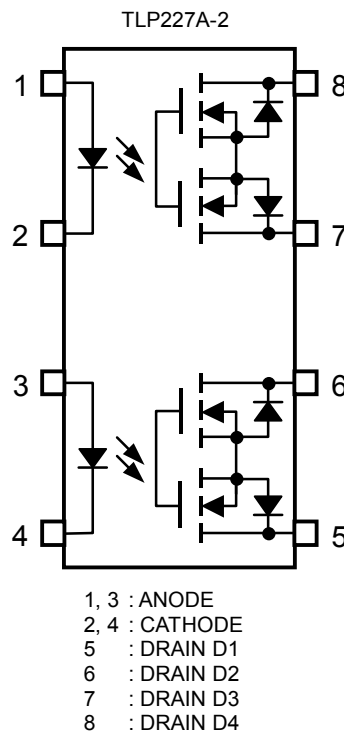
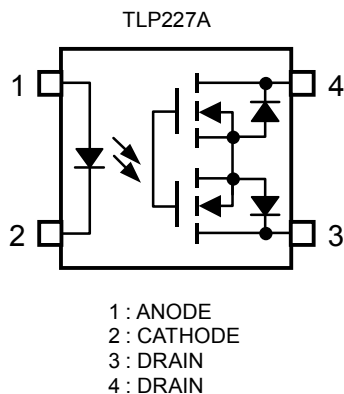
The TOSHIBA TLP227A series consist of a gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a plastic DIP package.

The TLP227A series are a bi-directional switch, which can replace mechanical relays in many applications.

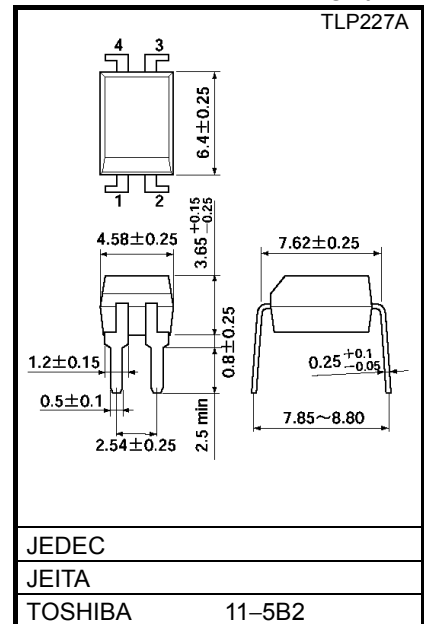
Features

- TLP227A : 4 pin DIP (DIP4)
1 Channel Type (1 Form A)
- TLP227A-2 : 8 pin DIP (DIP8)
2 Channel Type (2 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 (top view)

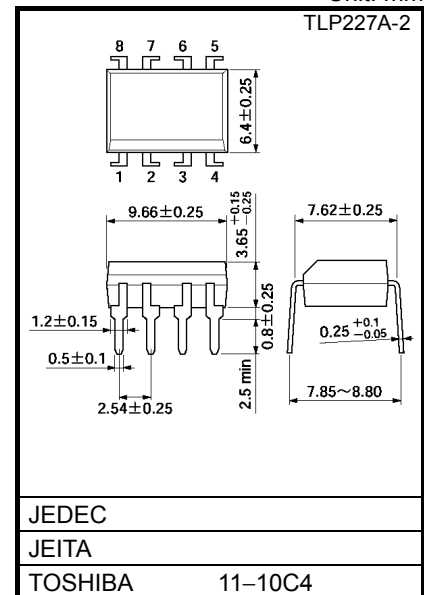


Unit: mm



Weight: 0.26 g (typ.)

Unit: mm



Weight: 0.54 g (typ.)

Start of commercial production
2001/02

Absolute Maximum Ratings (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT		
LED	Forward Current	I_F	50	mA		
	Forward Current Derating (Ta ≥ 25°C)	$\Delta I_F/^\circ\text{C}$	-0.5	mA/°C		
	Peak Forward Current (100μs 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	TLP227A	I_{ON}	500	mA	
		TLP227A-2				One Channel
						Both Channel (Note 1)
	On-State Current Derating (Ta ≥ 25°C)	TLP227A	$\Delta I_{ON}/^\circ\text{C}$	-5.0	mA/°C	
		TLP227A-2				One Channel
						Both Channel (Note 1)
Junction Temperature	T_j	125	°C			
Storage Temperature Range	T_{stg}	-55 to 125	°C			
Operating Temperature Range	T_{opr}	-40 to 85	°C			
Lead Soldering Temperature (10 s)	T_{sol}	260	°C			
Isolation Voltage (AC, 1 minute, R.H. ≤ 60%)	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) : Two channels operating simultaneously.

(Note 2): Device considered a two-terminal device : LED side pins shorted together, and DETECTOR side pins 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

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.

Individual Electrical Characteristics (Ta = 25°C)

CHARACTERISTIC		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 Current	I_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 (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	Min	Typ.	Max	UNIT
Trigger LED Current	I_{FT}	$I_{ON} = 300 \text{ mA}$	—	1	3	mA
Close LED Current	I_{FC}	$I_{OFF} = 100 \mu\text{A}$	0.1	—	—	mA
On-State Resistance	R_{ON}	$I_{ON} = 300 \text{ mA}, I_F = 5 \text{ mA}$	—	1	2	Ω

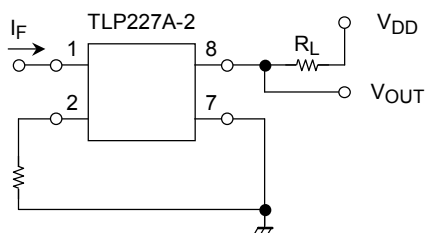
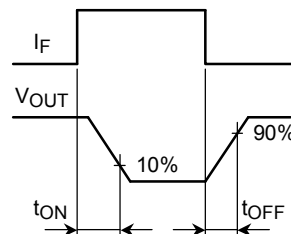
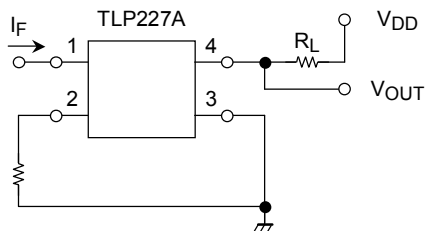
Isolation Characteristics (Ta = 25°C)

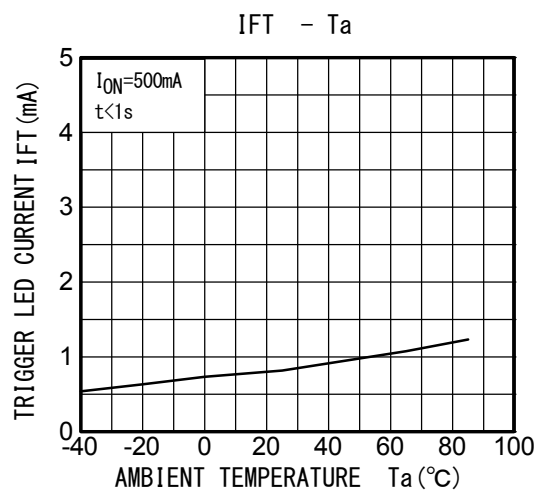
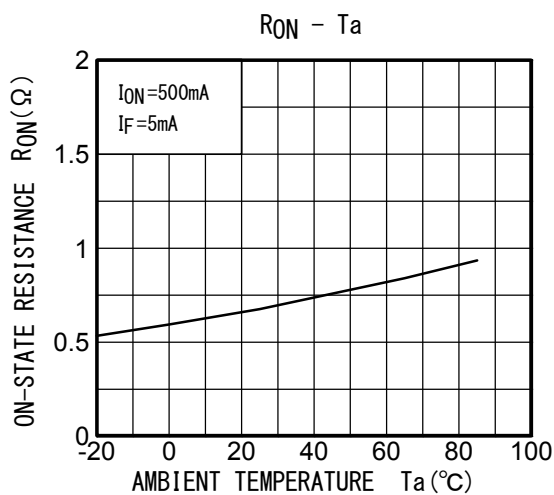
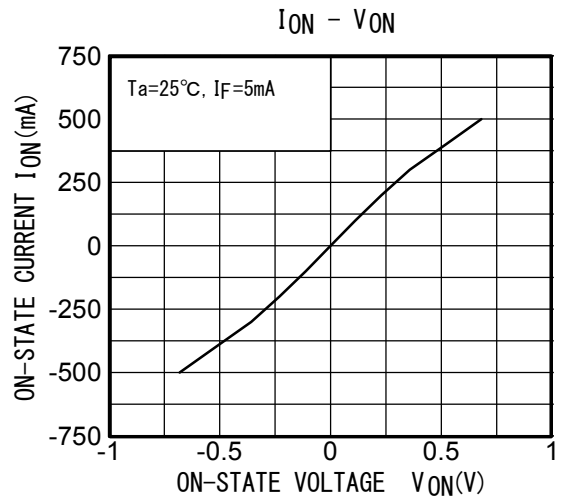
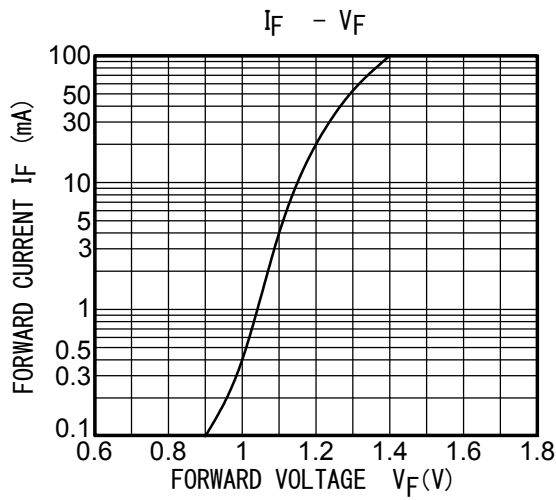
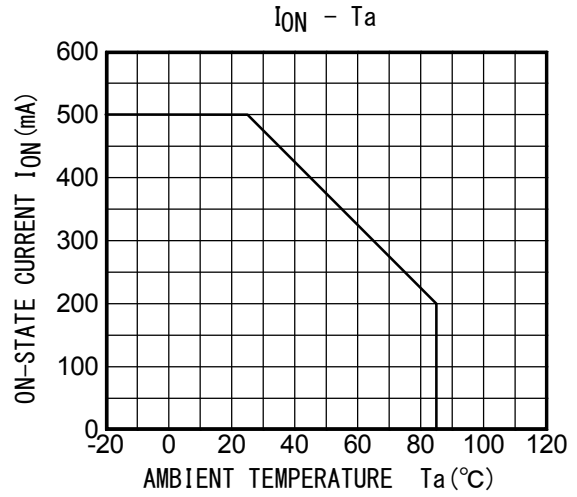
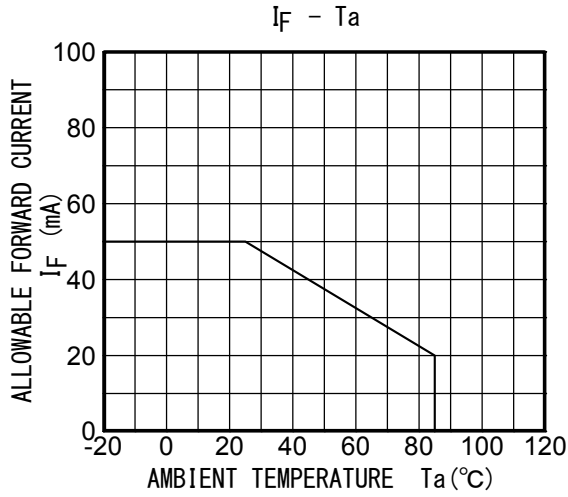
CHARACTERISTIC	SYMBOL	TEST CONDITION	Min	Typ.	Max	UNIT
Capacitance Input to Output	C_S	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation Resistance	R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	2500	—	—	Vrms
		AC, 1 second (in oil)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

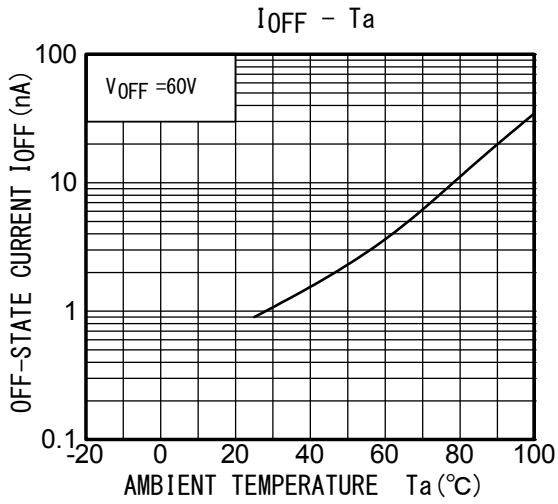
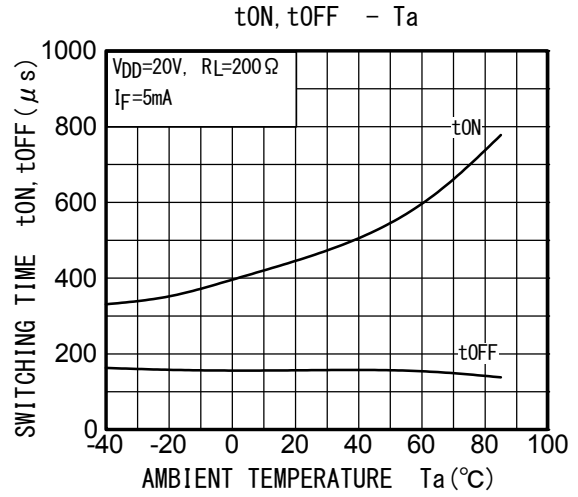
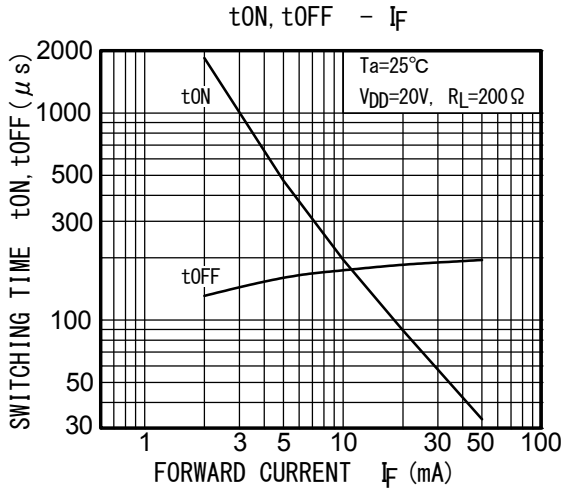
Switching Characteristics (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	Min	Typ.	Max	UNIT
Turn-on Time	t_{ON}	$R_L = 200 \Omega$ $V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$ (Note 3)	—	0.6	2	ms
Turn-off Time	t_{OFF}		—	0.1	1	
Turn-on Time	t_{ON}	$R_L = 200 \Omega$ $V_{DD} = 20 \text{ V}, I_F = 10 \text{ mA}$ (Note 3)	—	0.3	1	ms
Turn-off Time	t_{OFF}		—	0.1	1	

(Note 3): SWITCHING TIME TEST CIRCUIT







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