

# TLP227A, TLP227A-2

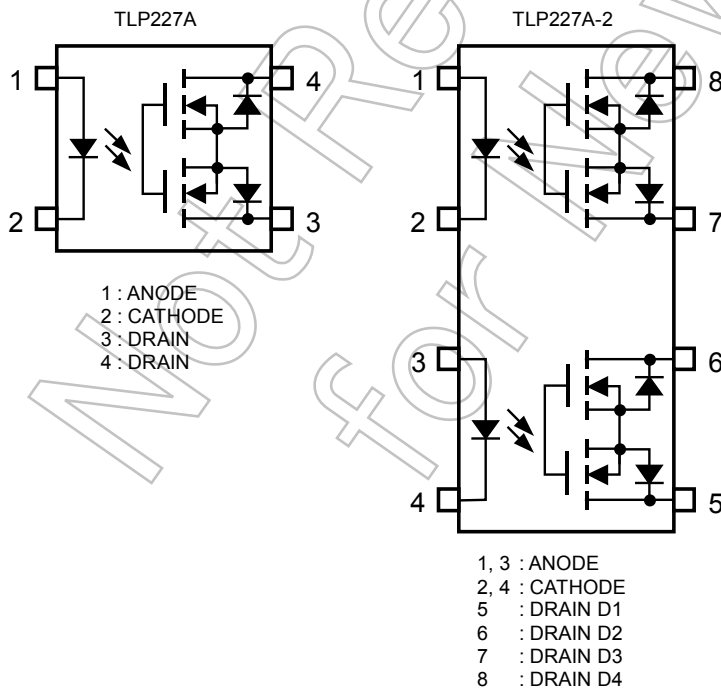
CORDLESS TELEPHONE  
PBX  
MODEM

The TOSHIBA TLP227A series consist of an 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.

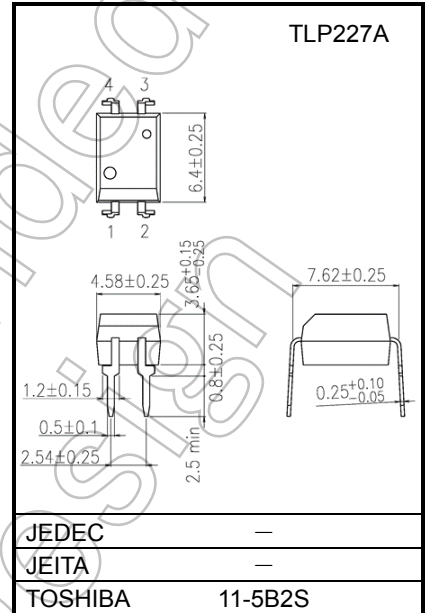
## Features

- 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 : UL 1577, File No.E67349
- cUL-recognized : CSA Component Acceptance Service No.5A  
File No.E67349

## Pin Configuration (top view)

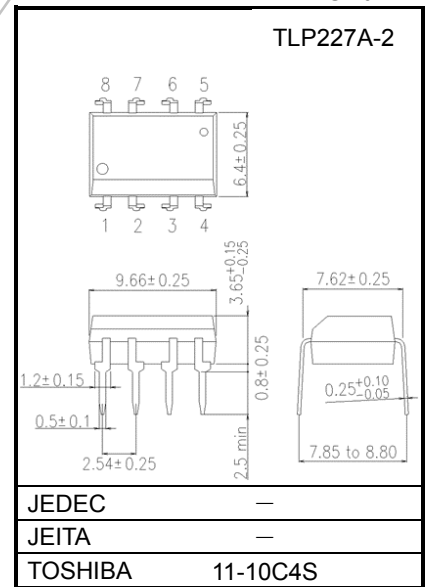


Unit: mm



Weight: 0.26 g (typ.)

Unit: mm



Weight: 0.54 g (typ.)

Start of commercial production  
2001-02

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

Characteristics		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 Current	I <sub>ON</sub>	500	mA
	On-State Current Derating (Ta ≥ 25°C)	ΔI <sub>ON</sub> /°C	-5.0	mA/°C
	Output Power Dissipation	P <sub>O</sub>	450	mW
	Output Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>O</sub> /°C	-4.5	mW/°C
	Junction Temperature	T <sub>j</sub>	125	°C
Storage Temperature Range		T <sub>stg</sub>	-55 to 125	°C
Operating Temperature Range		T <sub>opr</sub>	-40 to 85	°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 : LED side pins shorted together, and DETECTOR side pins shorted together.

### Recommended Operating Conditions

Characteristics	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.

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

Characteristics		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)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED Current	I <sub>FT</sub>	I <sub>ON</sub> = 300 mA	—	1	3	mA
Close LED Current	I <sub>FC</sub>	I <sub>OFF</sub> = 100 μA	0.1	—	—	mA
On-State Resistance	R <sub>ON</sub>	I <sub>ON</sub> = 300 mA, I <sub>F</sub> = 5 mA	—	1	2	Ω

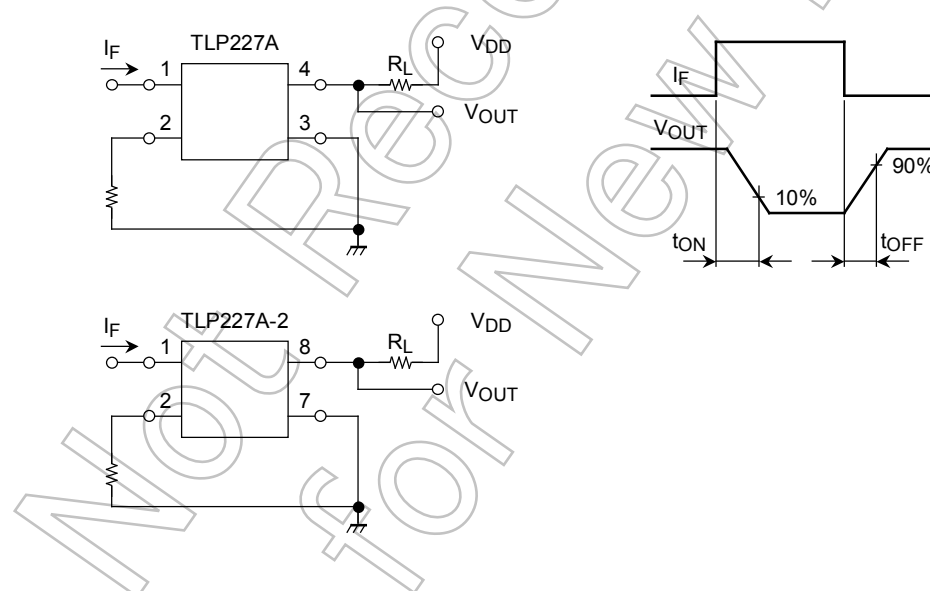
### Isolation Characteristics (Ta = 25°C)

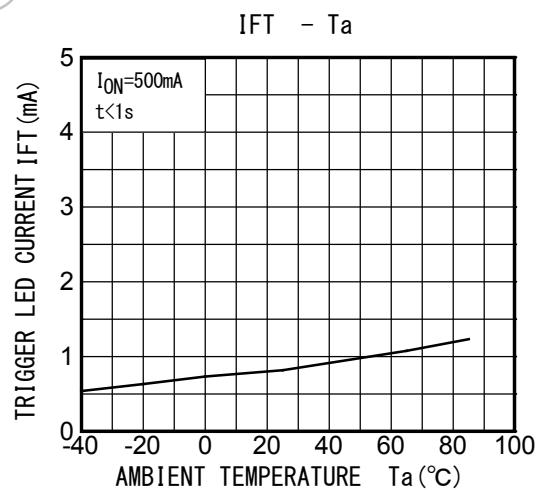
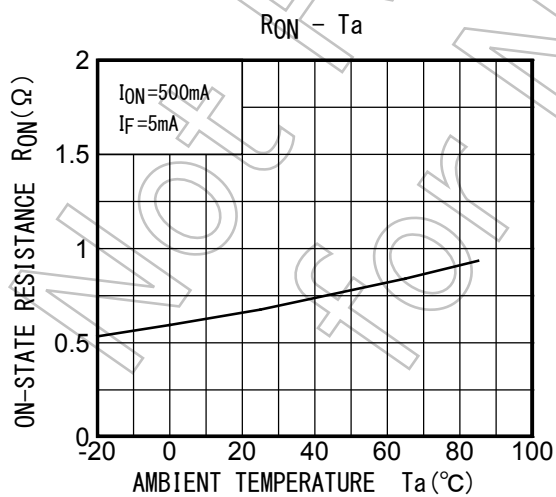
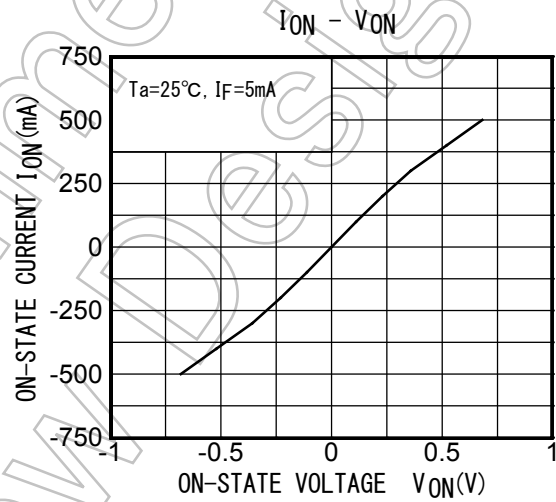
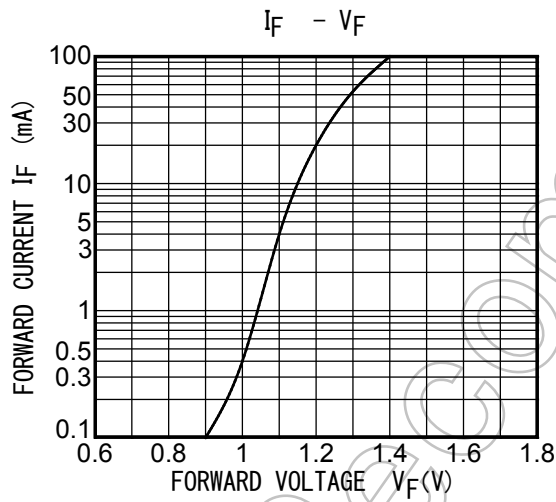
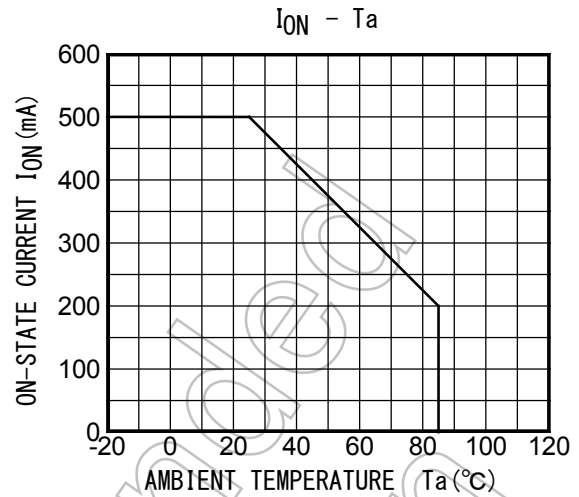
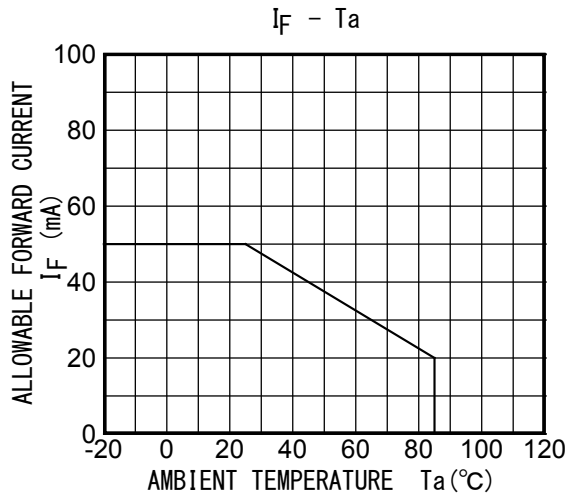
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance Input to Output	C <sub>S</sub>	V <sub>S</sub> = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation Resistance	R <sub>S</sub>	V <sub>S</sub> = 500 V, R.H. ≤ 60 %	5 × 10 <sup>10</sup>	10 <sup>14</sup>	—	Ω
Isolation Voltage	BV <sub>S</sub>	AC, 60 s	2500	—	—	V <sub>rms</sub>

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

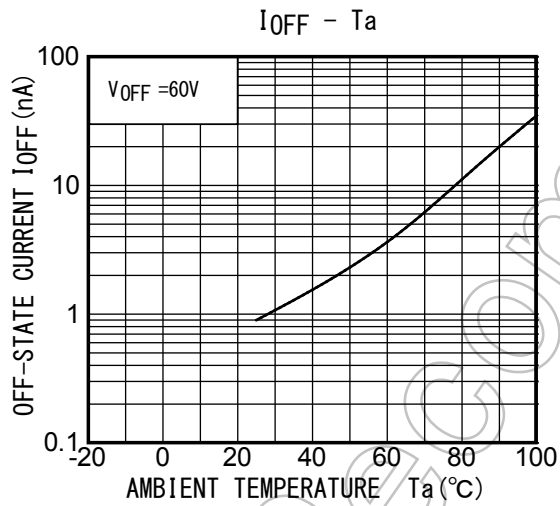
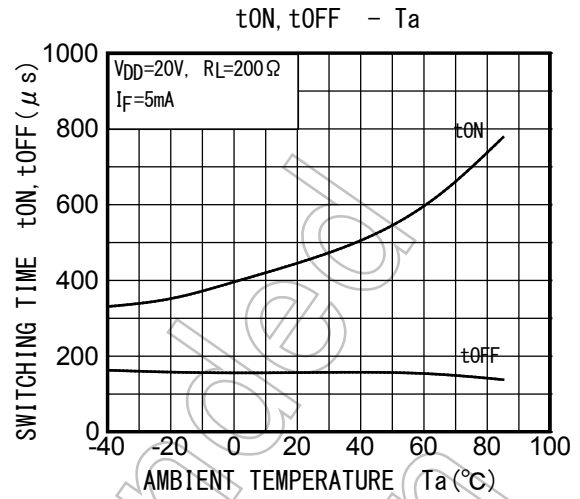
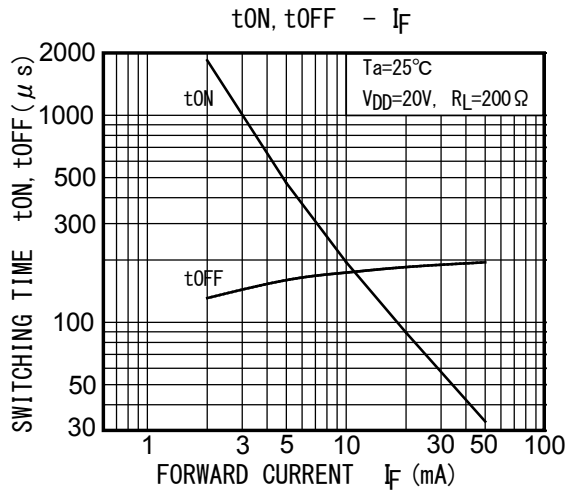
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on Time	t <sub>ON</sub>	R <sub>L</sub> = 200 Ω	—	0.6	2	ms
Turn-off Time	t <sub>OFF</sub>	V <sub>DD</sub> = 20 V, I <sub>F</sub> = 5 mA (Note 2)	—	0.1	1	
Turn-on Time	t <sub>ON</sub>	R <sub>L</sub> = 200 Ω	—	0.3	1	ms
Turn-off Time	t <sub>OFF</sub>	V <sub>DD</sub> = 20 V, I <sub>F</sub> = 10 mA (Note 2)	—	0.1	1	

Note 2: SWITCHING TIME TEST CIRCUIT





NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



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