

TOSHIBA PHOTOCOUPLER PHOTO RELAY

TLP227A, TLP227A-2

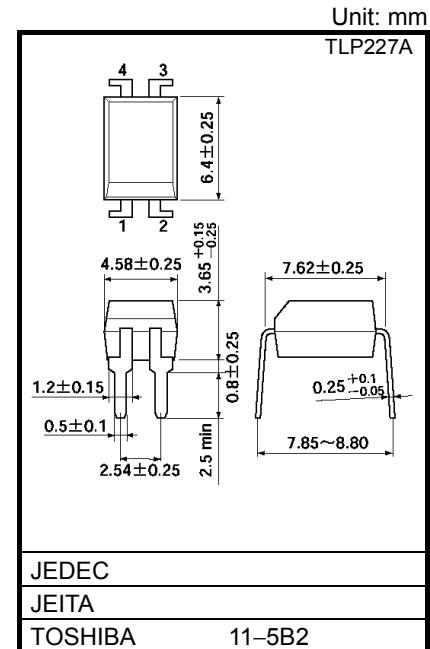
CORDLESS TELEPHONE
PBX
MODEM

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

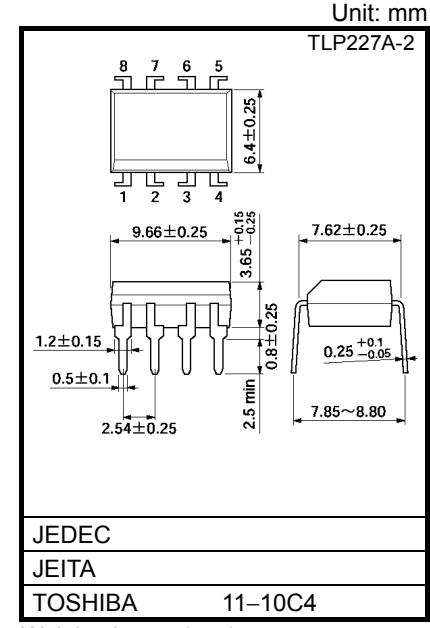
The TLP227A series are a bi-directional switch, which can replace mechanical relays in many applications.

Features

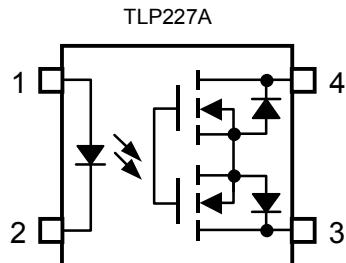
- TLP227A : 4 pin DIP (DIP4)
1 Channel Type (1 Form A)
- TLP227A-2 : 8 pin DIP (DIP8)
2 Channel Type (2 Form A)
- Peak Off-State Voltage : 60 V (min)
- Trigger LED Current : 3 mA (max)
- On-State Current : 500 mA (max)
- On-State Resistance : 2 Ω (max)
- Isolation Voltage : 2500 Vrms (min)
- UL Recognized : UL1577, File No. E67349



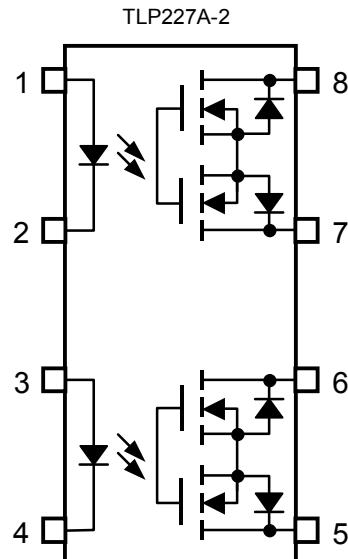
Weight: 0.26 g (typ.)



Weight: 0.54 g (typ.)

Pin Configuration (top view)

1 : ANODE
2 : CATHODE
3 : DRAIN
4 : DRAIN



1, 3 : ANODE
2, 4 : CATHODE
5 : DRAIN D1
6 : DRAIN D2
7 : DRAIN D3
8 : DRAIN D4

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)		ΔI _F /°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			
	On-State Current Derating (Ta ≥ 25°C)	Both Channel (Note 1)			
		TLP227A	ΔI _{ON} /°C	-5.0	mA/°C
		TLP227A-2			
	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%)			(Note 2)	BV _S	2500
					V _{rms}

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 mA	1.0	1.15	1.3	V
	Reverse Current	I _R	V _R = 5 V	—	—	10	μA
	Capacitance	C _T	V = 0, f = 1 MHz	—	30	—	pF
DETECTOR	Off-State Current	I _{OFF}	V _{OFF} = 60 V	—	—	1	μA
	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} = 300 mA	—	1	3	mA
Close LED Current	I _{FC}	I _{OFF} = 100 µA	0.1	—	—	mA
On-State Resistance	R _{ON}	I _{ON} = 300 mA, I _F = 5 mA	—	1	2	Ω

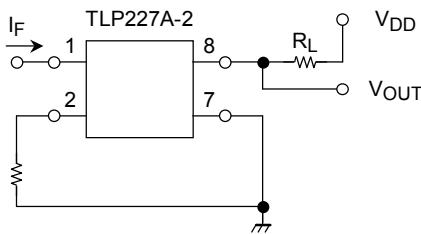
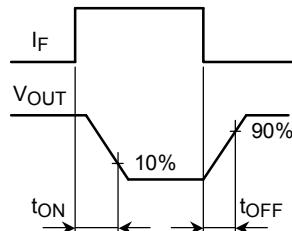
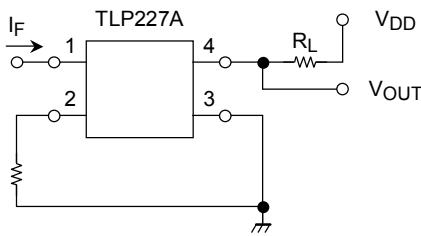
Isolation Characteristics (Ta = 25°C)

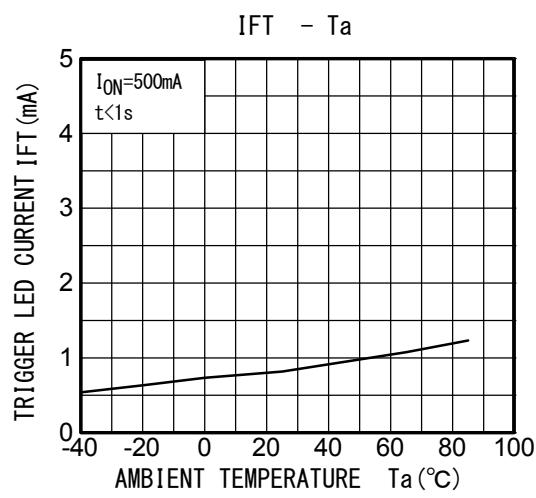
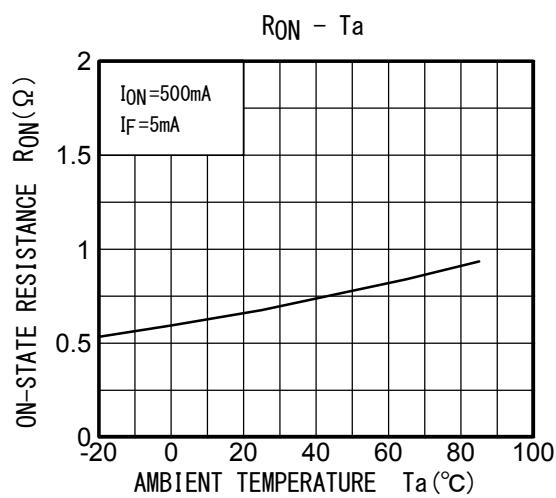
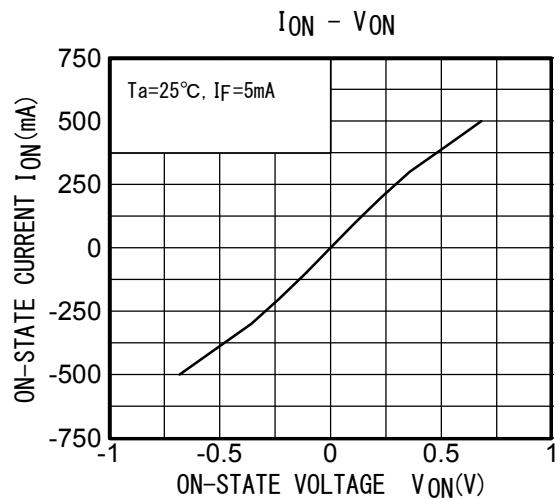
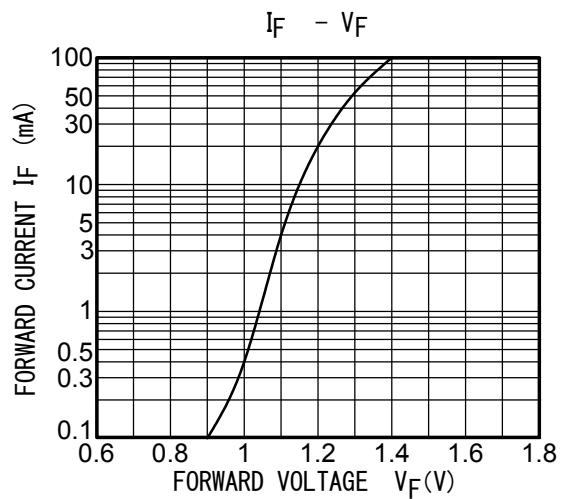
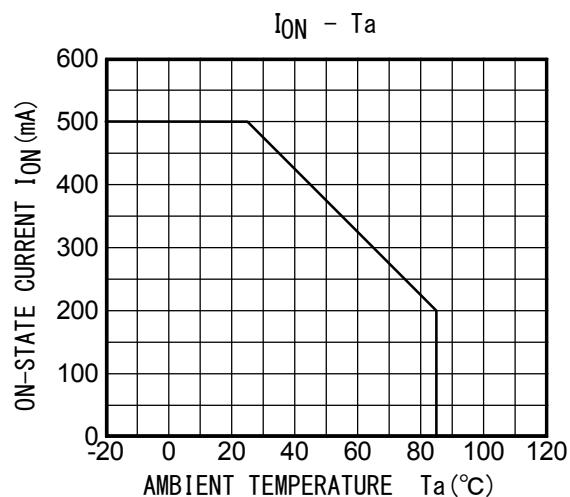
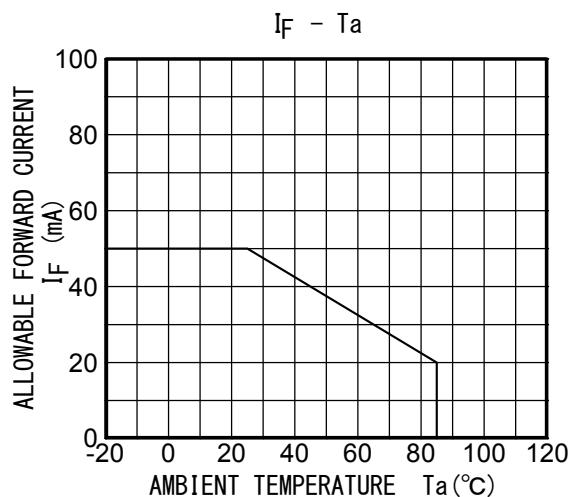
CHARACTERISTIC	SYMBOL	TEST CONDITION	Min	Typ.	Max	UNIT
Capacitance Input to Output	C _S	V _S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation Resistance	R _S	V _S = 500 V, R.H. ≤ 60%	5 × 10 ¹⁰	10 ¹⁴	—	Ω
Isolation Voltage	BVS	AC, 1 minute	2500	—	—	V _{rms}
		AC, 1 second (in oil)	—	5000	—	
		DC, 1 minute (in oil)	—	5000	—	V _{dc}

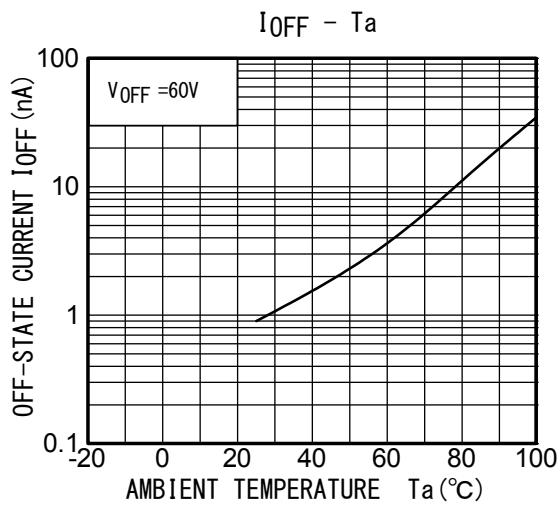
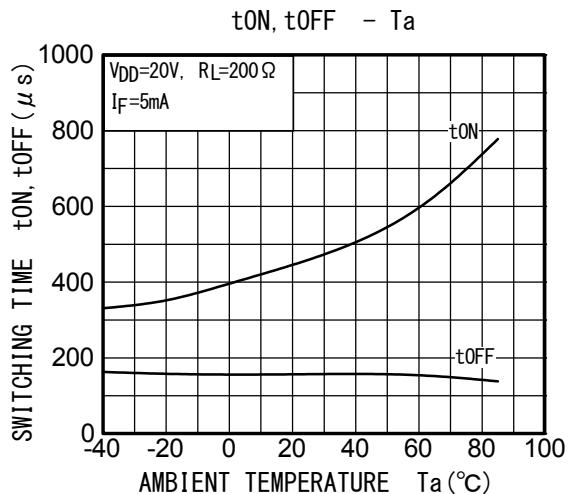
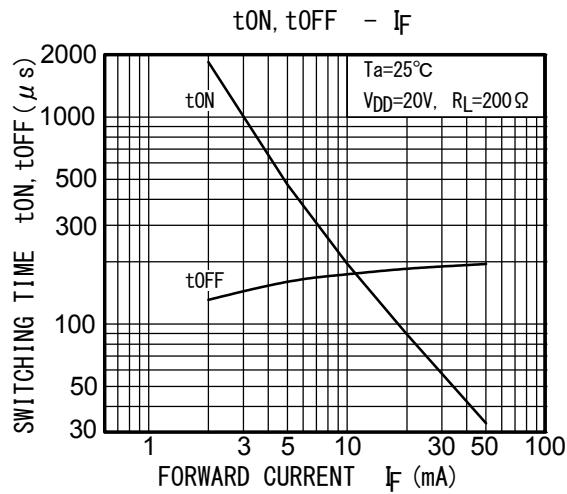
Switching Characteristics (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	Min	Typ.	Max	UNIT
Turn-on Time	t _{ON}	R _L = 200 Ω V _{DD} = 20 V, I _F = 5 mA (Note 3)	—	0.6	2	ms
Turn-off Time	t _{OFF}		—	0.1	1	
Turn-on Time	t _{ON}	R _L = 200 Ω V _{DD} = 20 V, I _F = 10 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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