TOSHIBA Photocoupler Photorelay

# **TLP222G, TLP222G-2**

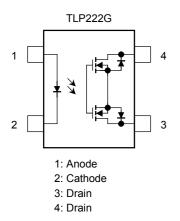
#### Cordless Telephones PBX Modems

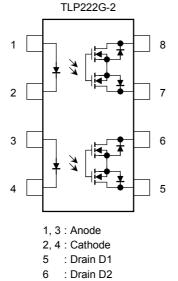
The Toshiba TLP222G series consist of a gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a DIP package.

The TLP222G series are a bi-directional switch, which can replace mechanical relays in many applications.

- TLP222G: 4-pin DIP (DIP4), 1-channel type (1-form-A)
- TLP222G-2: 8-pin DIP (DIP8), 2-channel type (2-form-A)
- Peak Off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 120 mA (max)
- On-state resistance:  $35 \Omega$  (max, t < 1 s)
- On-state resistance: 50  $\Omega$  (max, continuous)
- Isolation voltage: 2500 Vrms (min)

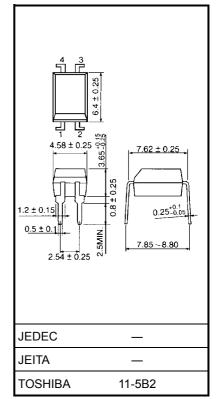
#### Pin Configuration (top view)



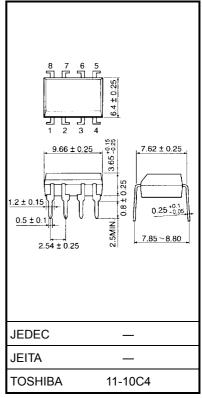








Weight: 0.26 g (typ.)



Weight: 0.54 g (typ.)

#### Unit: mm

#### Maximum Rating (Ta = 25°C)

	Cha	racteristics		Symbol	Rating	Unit	
	Forward curr	rent		lF	50	mA	
	Forward curr	ent derating (	Ta≧25°C)	∆l <sub>F</sub> /°C	-0.5	mA/°C	
LED	Peak forward (100 μs puls			I <sub>FP</sub>	1	А	
	Reverse volt	age		V <sub>R</sub>	5	V	
	Junction tem	perature		Тj	125	°C	
	Off-state out	put terminal v	oltage	V <sub>OFF</sub>	350	V	
		TLP222G					
	On-state current	TLP222G-2	One channel operation	ION	120	mA	
			Two channel operations (Note 1)				
Detector	On-state current	TLP222G	•				
			One channel operation	∆l <sub>ON</sub> /°C	-1.2	mA/°C	
	derating (Ta≧25°C)	TLP222G-2	Two channel operations (Note 1)				
	Junction tem	perature		Тj	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, 1	min, R.H. ≦ 6	60%) (Note 2)	BVS	2500	Vrms	

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**

Characteristics	Symbol	Min	Тур.	Max	Unit
Supply voltage	V <sub>DD</sub>	_	_	280	V
Forward current	١ <sub>F</sub>	5	7.5	25	mA
On-state current	I <sub>ON</sub>	_	_	100	mA
Operating temperature	T <sub>opr</sub>	-20		65	°C

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

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
	Forward voltage	VF	I <sub>F</sub> = 10 mA	1.0	1.15	1.3	V
LED	Reverse current	Ι <sub>R</sub>	$V_R = 5 V$	_		10	μA
	Capacitance	CT	V = 0, f = 1 MHz	_	30		pF
Detector	Off-state current	I <sub>OFF</sub>	V <sub>OFF</sub> = 350 V	_		1	μA
	Capacitance	C <sub>OFF</sub>	V = 0, f = 1 MHz	_	30	_	pF

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

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Trigger LED current	I <sub>FT</sub>	I <sub>ON</sub> = 120 mA	_	1	3	mA
Return LED current	I <sub>FC</sub>	I <sub>OFF</sub> = 100 μA	0.1	_	_	mA
On-state resistance	R <sub>ON</sub>	$I_{ON} = 120 \text{ mA}, I_F = 5 \text{ mA}, t < 1 \text{ s}$	_	25	35	Ω
		$I_{ON} = 120 \text{ mA}, I_F = 5 \text{ mA}, \text{ continuous}$	_	35	50	

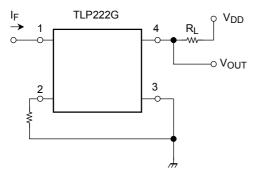
#### Isolation Characteristics (Ta = 25°C)

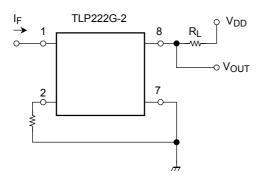
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Capacitance input to output	CS	$V_{S} = 0 V, f = 1 MHz$	_	0.8	_	pF
Isolation resistance	R <sub>S</sub>	$V_{S} = 500 \text{ V}, \text{ R.H.} \le 60\%$	$5\times10^{10}$	10 <sup>14</sup>	_	Ω
		AC, 1 min	2500	_	_	Vrms
Isolation voltage	BVS	AC, 1 s, in oil		5000	_	
		DC, 1 min, in oil	—	5000	_	Vdc

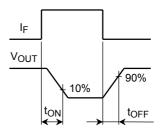
### Switching Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Turn-on time	t <sub>ON</sub>	R <sub>L</sub> = 200 Ω	_	0.3	1	ms
Turn-off time	t <sub>OFF</sub>	$V_{DD} = 20 \text{ V}, \text{ I}_{\text{F}} = 5 \text{ mA}$ (Note 3)	_	0.1	1	1113

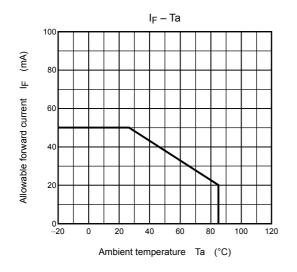
Note 3: Switching time test circuit

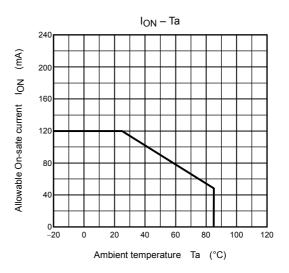


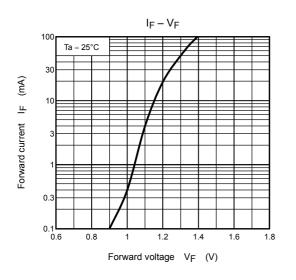


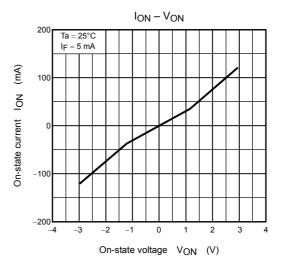


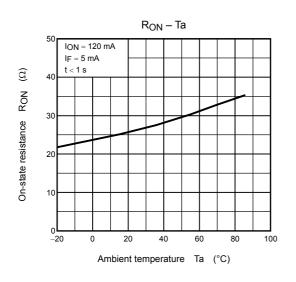
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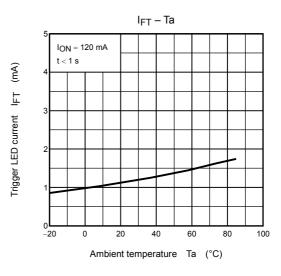




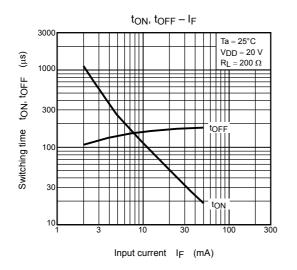


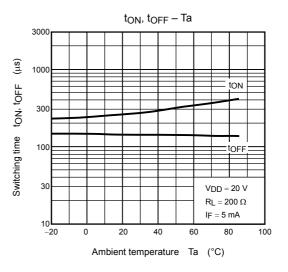


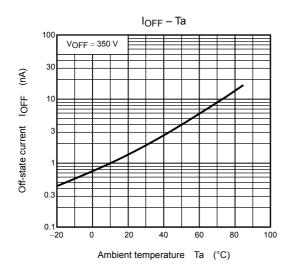




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