

TOSHIBA Photocoupler Photorelay

## TLP222G, TLP222G-2

Cordless Telephones

PBX

Modems

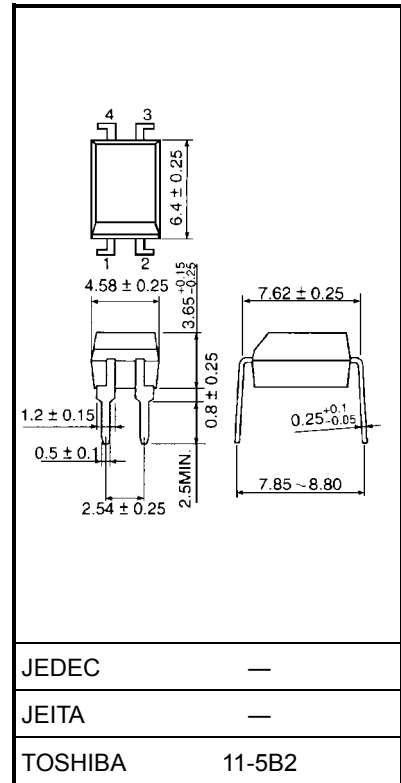
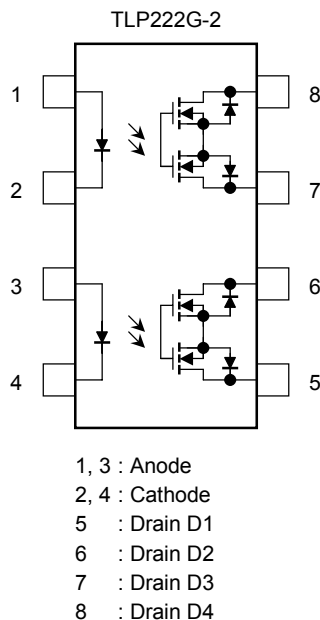
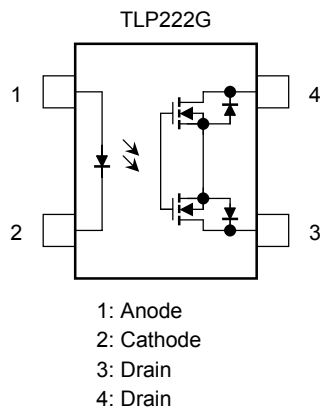
Unit: mm

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

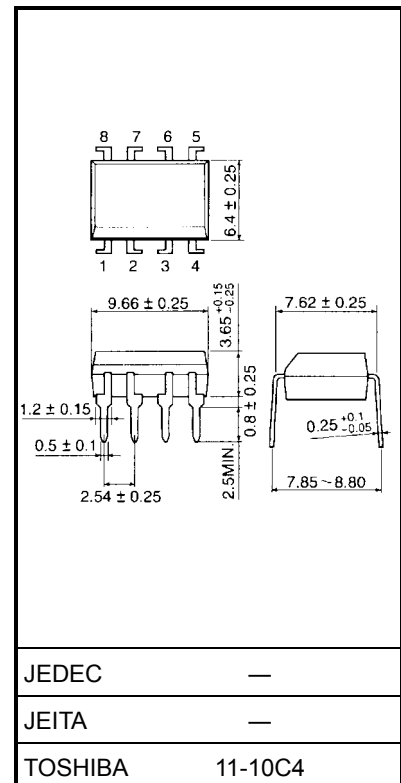
The TLP222G series are a bi-directional switch, which can replace mechanical relays in many applications.

- 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.)

**Maximum Rating (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
	Junction temperature			T <sub>j</sub>	125	°C
Detector	Off-state output terminal voltage			V <sub>OFF</sub>	350	V
	On-state current	TLP222G		I <sub>ON</sub>	120	mA
		TLP222G-2	One channel operation			
			Two channel operations (Note 1)			
	On-state current derating (Ta ≥ 25°C)	TLP222G		ΔI <sub>ON</sub> /°C	−1.2	mA/°C
		TLP222G-2	One channel operation			
			Two channel operations (Note 1)			
	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, 1 min, R.H. ≤ 60%) (Note 2)				BV <sub>S</sub>	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	Typ.	Max	Unit
Supply voltage	$V_{DD}$	—	—	280	V
Forward current	$I_F$	5	7.5	25	mA
On-state current	$I_{ON}$	—	—	100	mA
Operating temperature	$T_{opr}$	-20	—	65	°C

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

Characteristics		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	$I_{OFF}$	$V_{OFF} = 350\text{ V}$	—	—	1	μA
	Capacitance	$C_{OFF}$	$V = 0, f = 1\text{ MHz}$	—	30	—	pF

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	$I_{FT}$	$I_{ON} = 120 \text{ mA}$	—	1	3	mA
Return LED current	$I_{FC}$	$I_{OFF} = 100 \mu\text{A}$	0.1	—	—	mA
On-state resistance	$R_{ON}$	$I_{ON} = 120 \text{ mA}$ , $I_F = 5 \text{ mA}$ , $t < 1 \text{ s}$	—	25	35	$\Omega$
		$I_{ON} = 120 \text{ mA}$ , $I_F = 5 \text{ mA}$ , continuous	—	35	50	

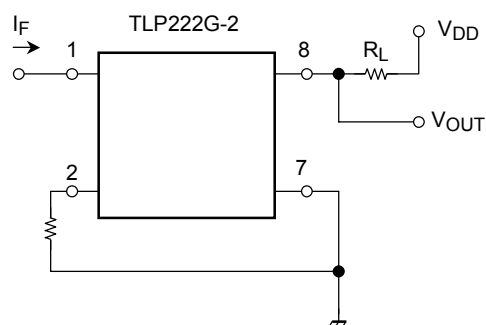
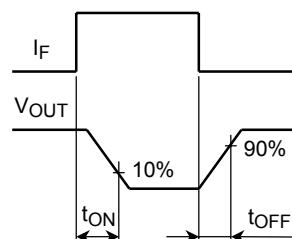
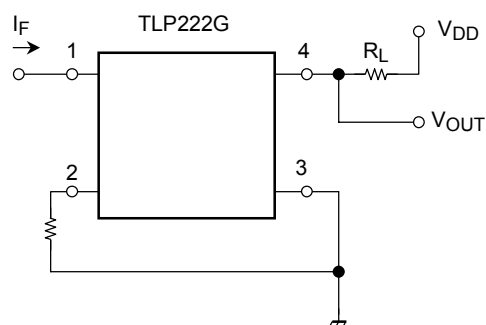
## Isolation Characteristics (Ta = 25°C)

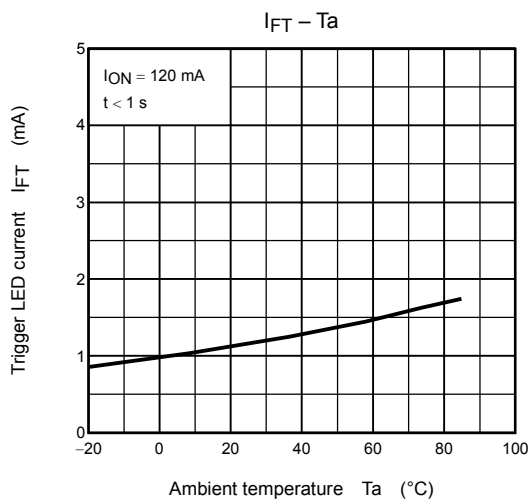
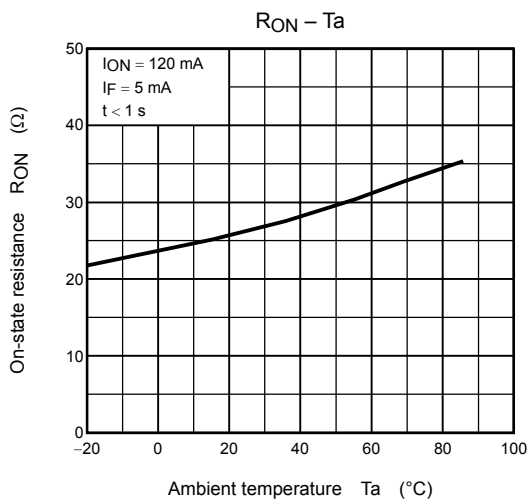
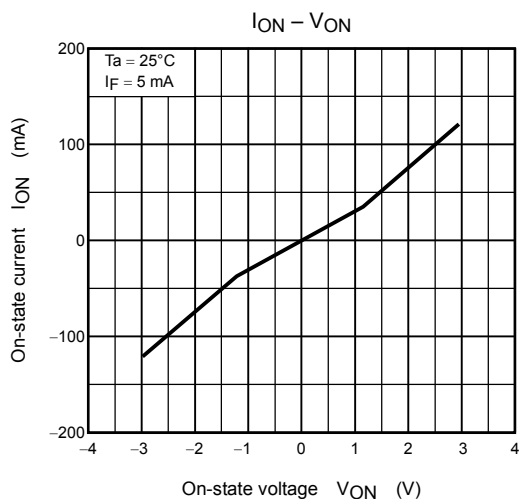
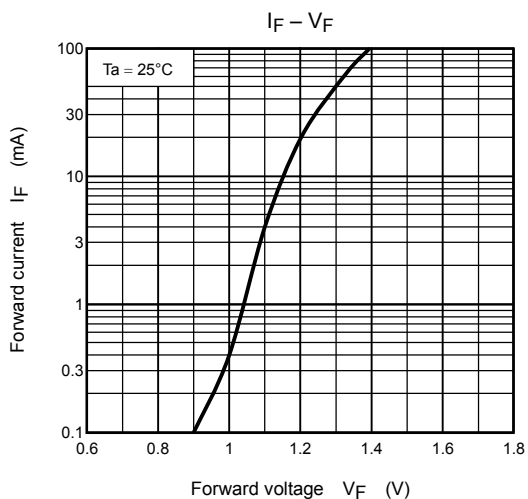
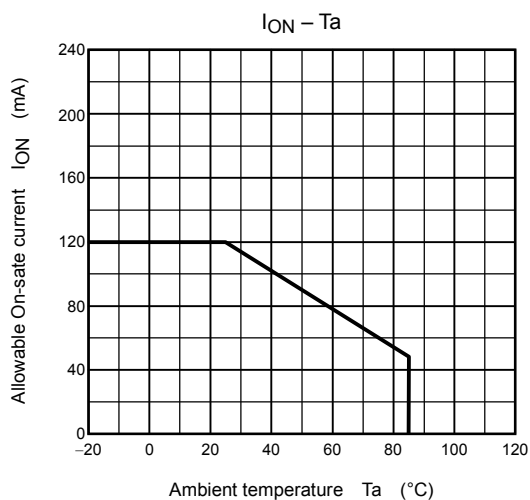
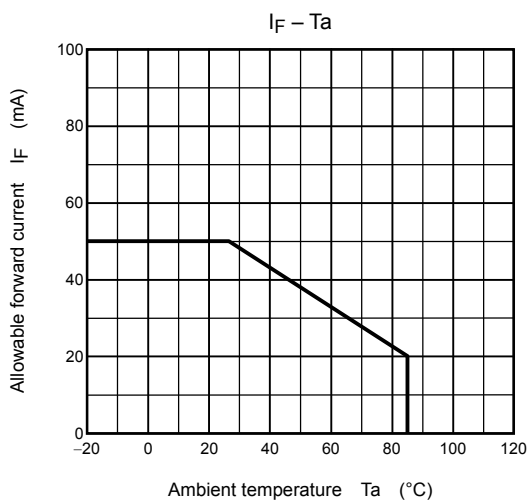
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	$C_S$	$V_S = 0 \text{ V}$ , $f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	$R_S$	$V_S = 500 \text{ V}$ , R.H. $\leq 60\%$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 1 min	2500	—	—	Vrms
		AC, 1 s, in oil	—	5000	—	
		DC, 1 min, in oil	—	5000	—	Vdc

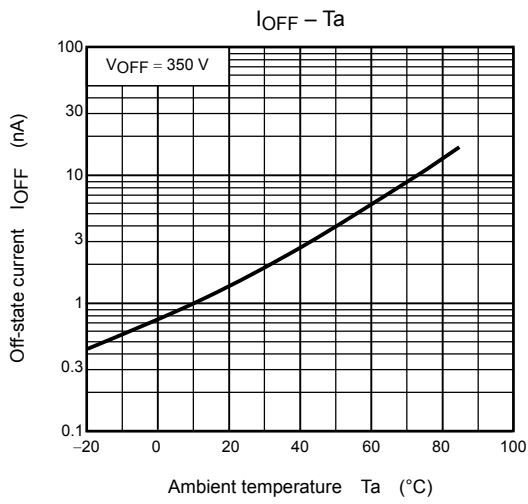
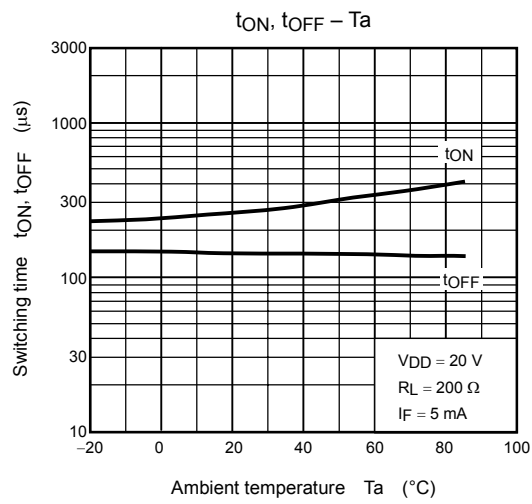
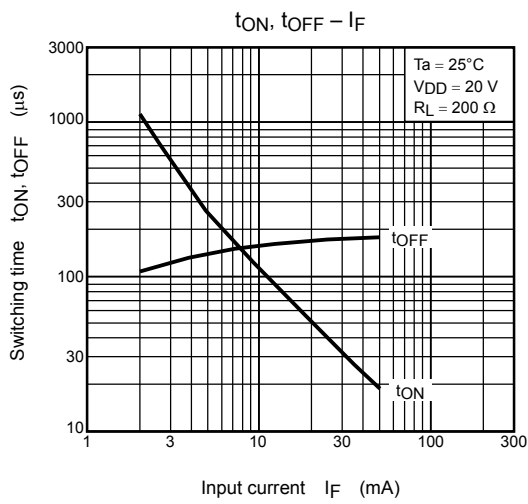
## Switching Characteristics (Ta = 25°C)

Characteristics	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)	—	0.3	1	ms
Turn-off time	$t_{OFF}$		—	0.1	1	

Note 3: Switching time test circuit







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