

TOSHIBA Photocoupler Photorelay

TLP222G, TLP222G-2

Cordless Telephones

PBX

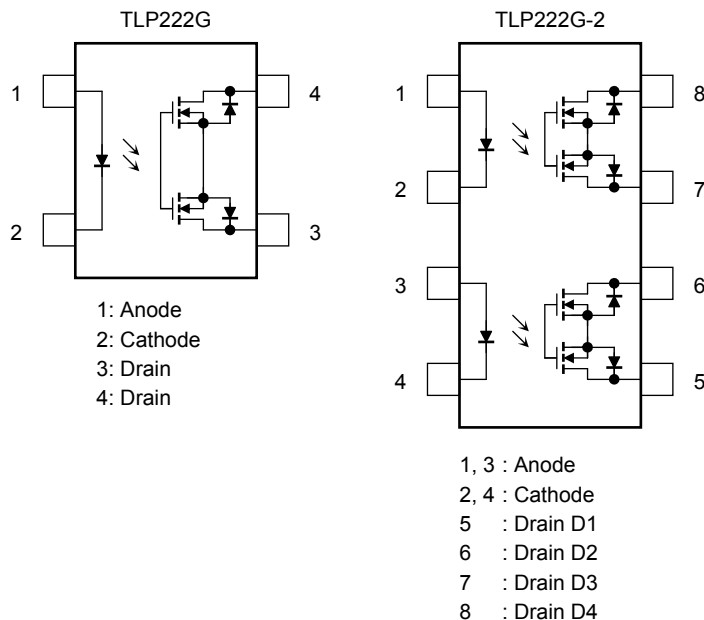
Modems

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

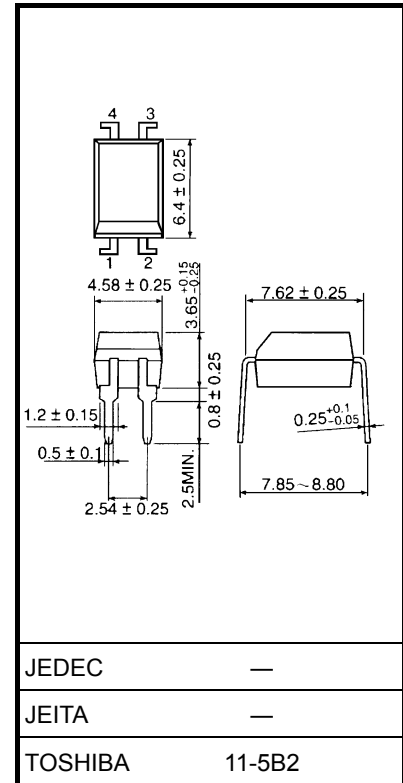
The TLP222G series are a bi-directional switch, which can replace mechanical relays in many applications.

- 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 Ω (max, $t < 1$ s)
- On-state resistance: 50 Ω (max, continuous)
- Isolation voltage: 2500 Vrms (min)
- BSI approved: BS EN60065:2002, certificate no.8773
BS EN60950-1:2002, certificate no.8774

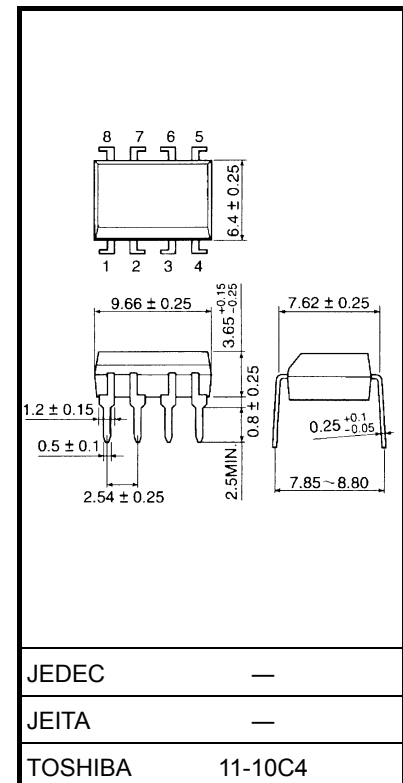
Pin Configuration (top view)



Unit: mm



Weight: 0.26 g (typ.)



Weight: 0.54 g (typ.)

Absolute Maximum Rating (Ta = 25°C)

Characteristics				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 (100 μs 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}	350	V
	On-state current	TLP222G		I _{ON}	120	mA
		TLP222G-2	One channel operation			
			Two channel operations (Note 1)			
	On-state current derating (Ta ≥ 25°C)	TLP222G		ΔI _{ON} /°C	−1.2	mA/°C
		TLP222G-2	One channel operation			
			Two channel operations (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 min, 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

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

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 _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} = 350 V	—	—	1	μA
	Capacitance	C _{OFF}	V = 0, f = 1 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	Ω
		$I_{ON} = 120 \text{ mA}$, $I_F = 5 \text{ mA}$, continuous	—	35	50	

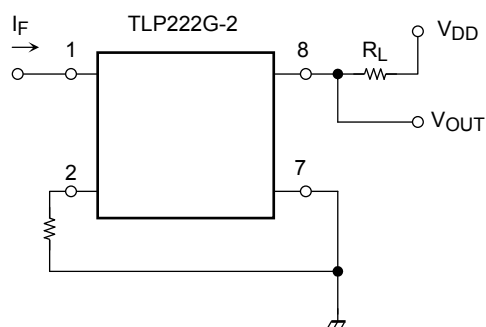
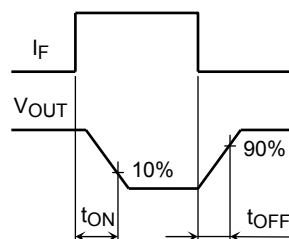
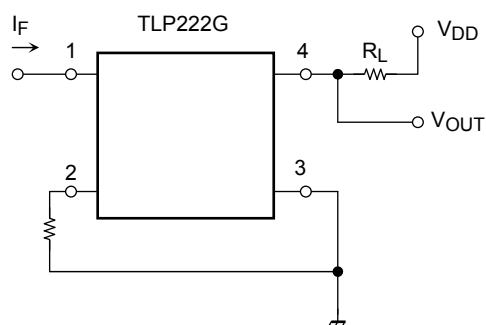
Isolation Characteristics (Ta = 25°C)

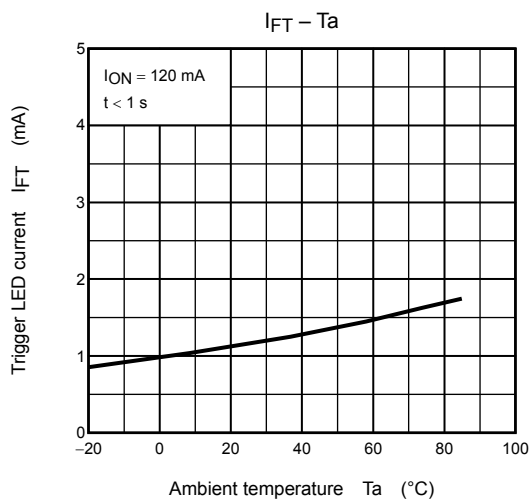
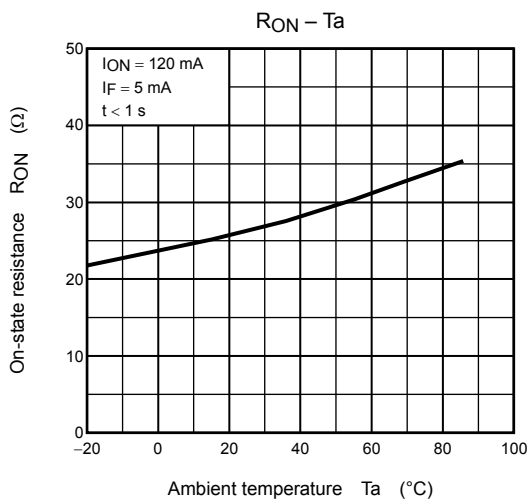
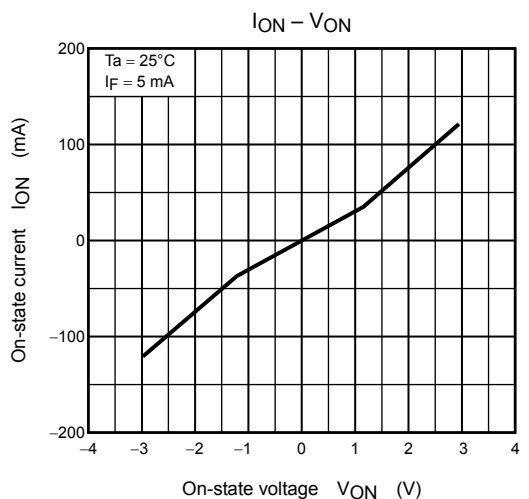
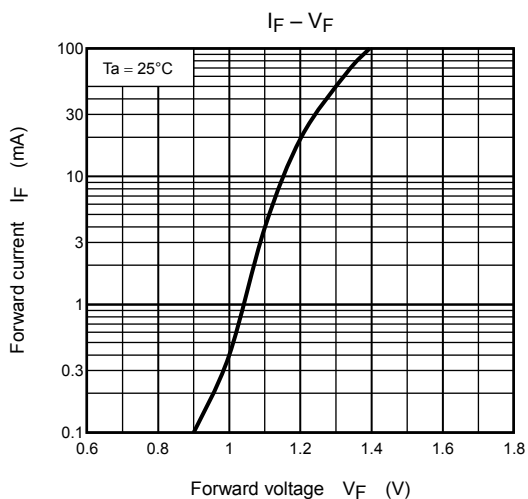
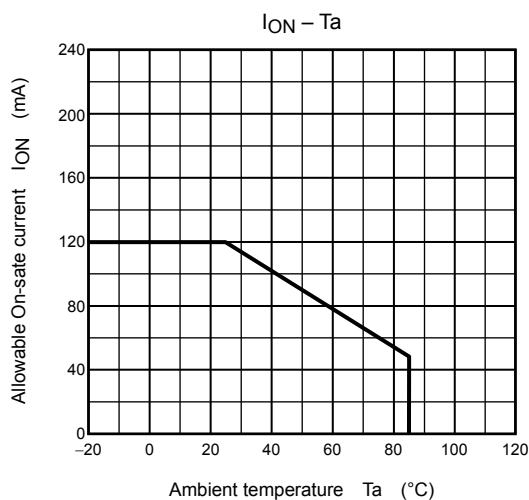
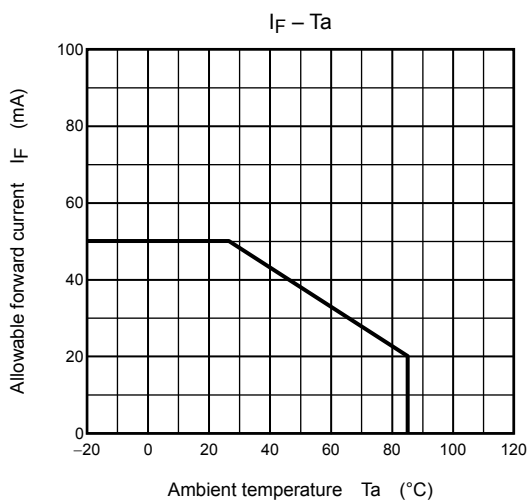
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	$V_S = 0 \text{ V}$, $f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V}$, R.H. $\leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 min	2500	—	—	Vrms
		AC, 1 s, in oil	—	5000	—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

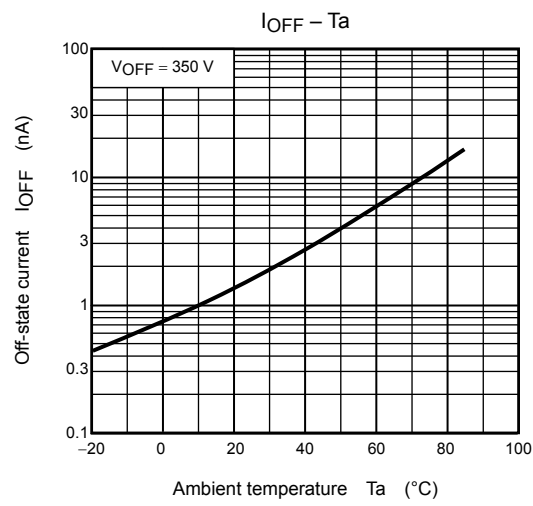
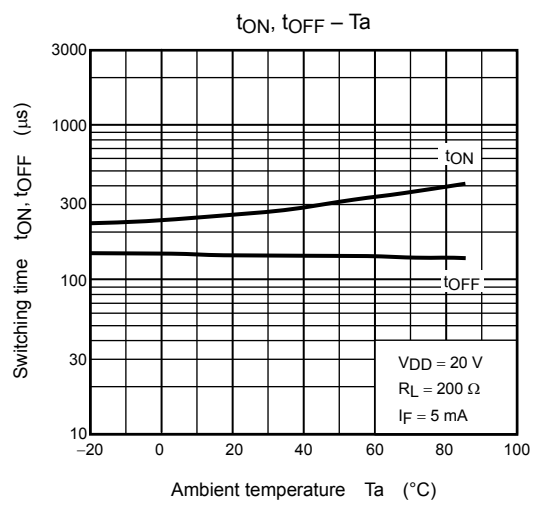
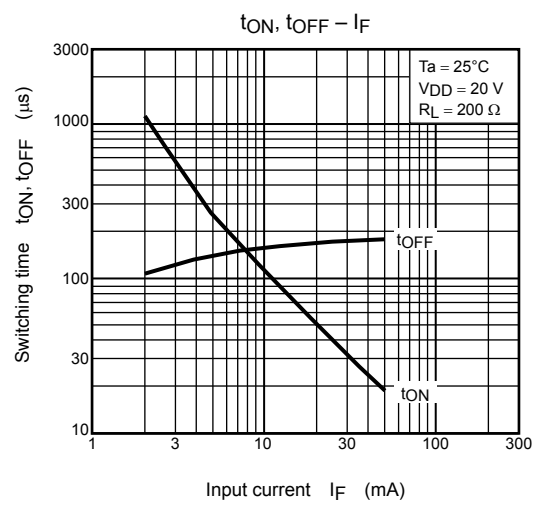
Switching Characteristics (Ta = 25°C)

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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