

TOSHIBA Photocoupler Photorelay

TLP222G, TLP222G-2

Cordless Telephones

PBX

Modems

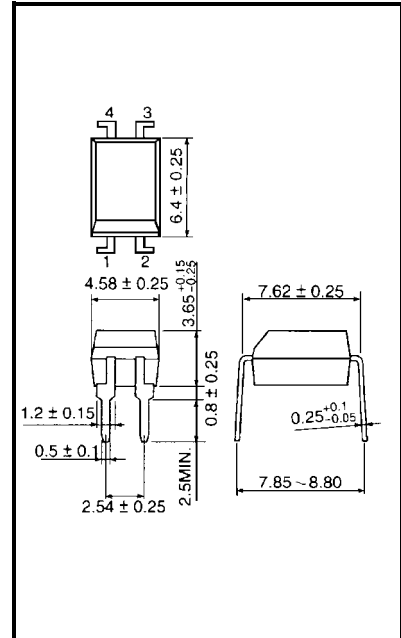
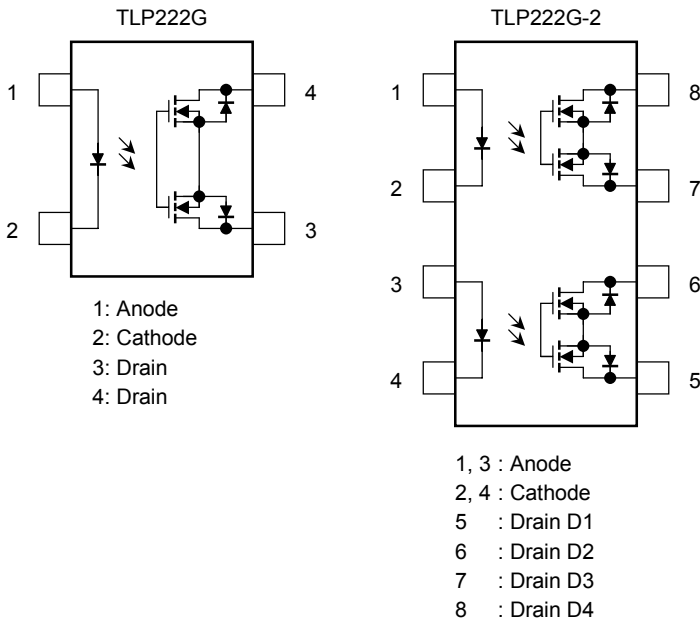
Unit: mm

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.

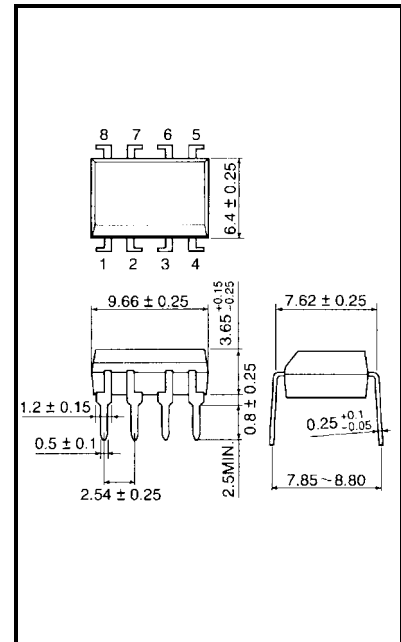
- TLP222G: 4-pin DIP (DIP4), 1-channel type (1-form-A)
- TLP222G-2: 8-pin DIP (DIP8), 2-channel type (2-form-A)
- Peak Off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 120 mA (max)
- On-state resistance: 35 Ω (max, t < 1 s)
- On-state resistance: 50 Ω (max, continuous)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

Pin Configuration (top view)



JEDEC	—
JEITA	—
TOSHIBA	11-5B2

Weight: 0.26 g (typ.)



JEDEC	—
JEITA	—
TOSHIBA	11-10C4

Weight: 0.54 g (typ.)

Maximum Rating (Ta = 25°C)

Characteristics		Symbol	Rating	Unit	
LED	Forward current	I_F	50	mA	
	Forward current derating (Ta ≥ 25°C)	$\Delta I_F/^\circ\text{C}$	-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			
	On-state current derating (Ta ≥ 25°C)	TLP222G	$\Delta I_{ON}/^\circ\text{C}$	-1.2	mA/°C
		TLP222G-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 min, R.H. ≤ 60%) (Note 2)		BV_S	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	Ω
		$I_{ON} = 120 \text{ mA}, I_F = 5 \text{ mA}, \text{continuous}$	—	35	50	

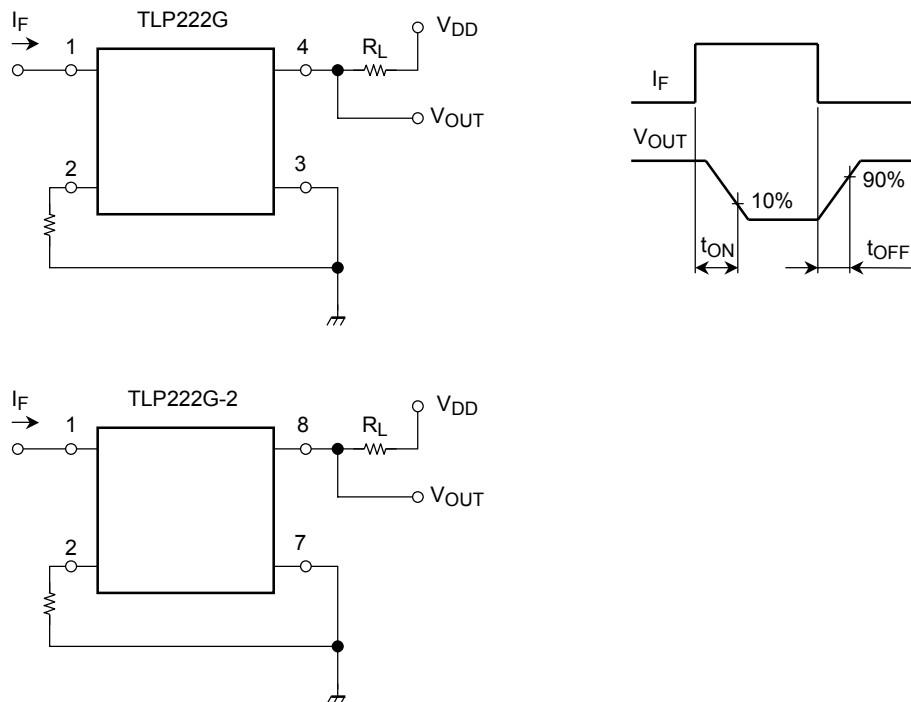
Isolation Characteristics (Ta = 25°C)

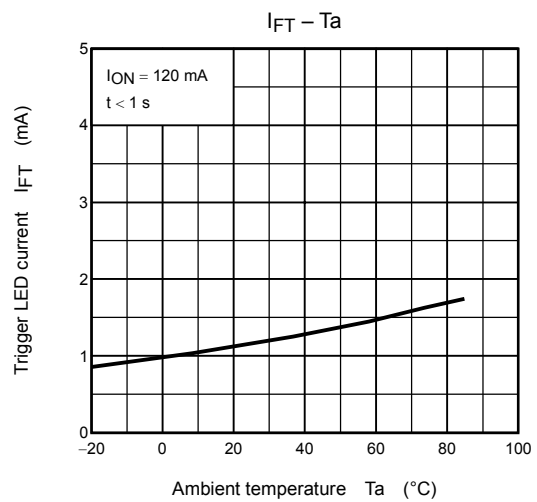
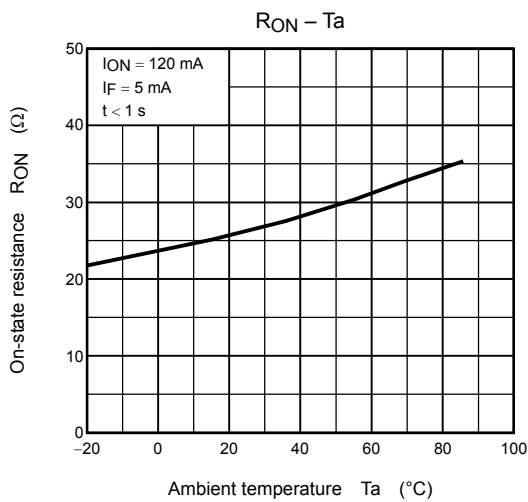
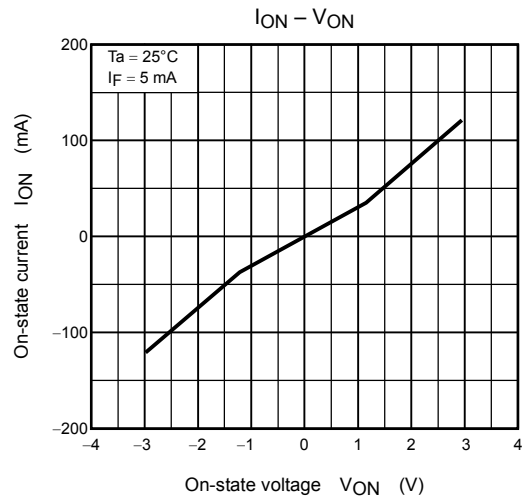
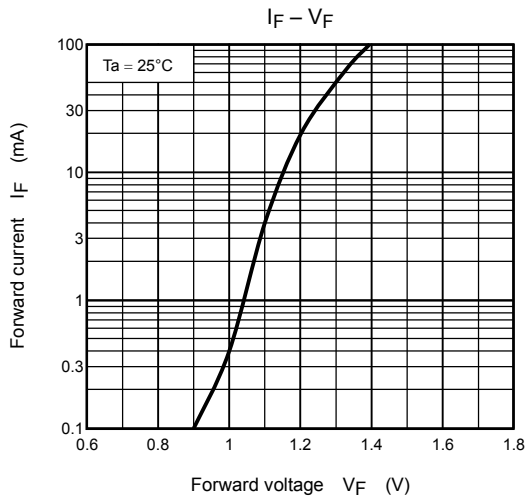
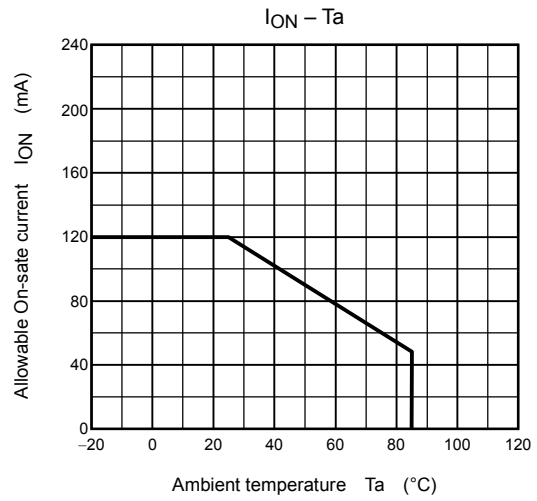
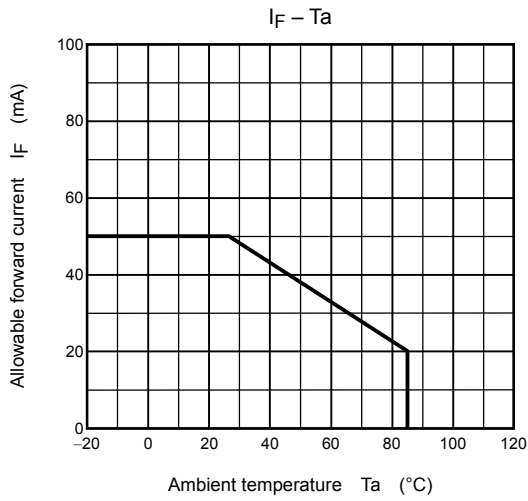
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 min	2500	—	—	Vrms
		AC, 1 s, in oil	—	5000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

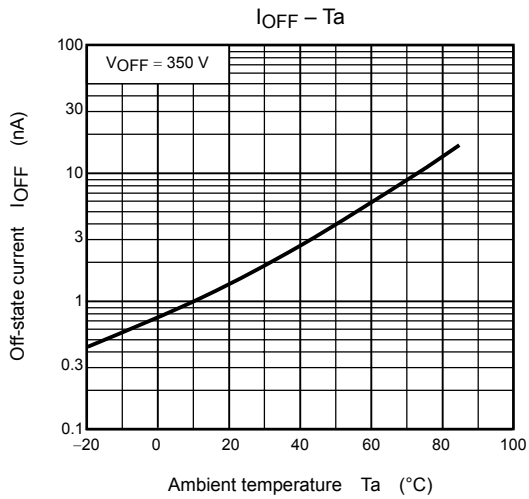
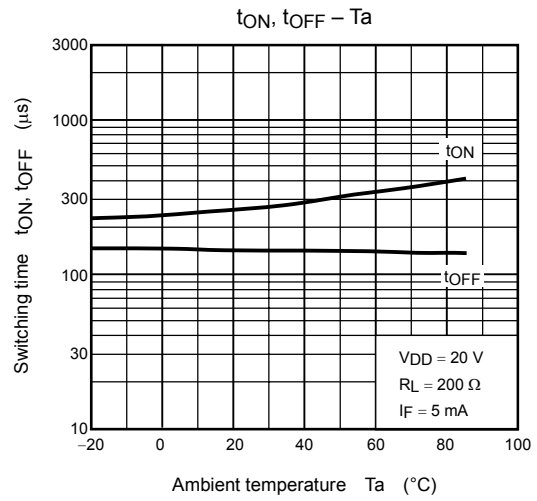
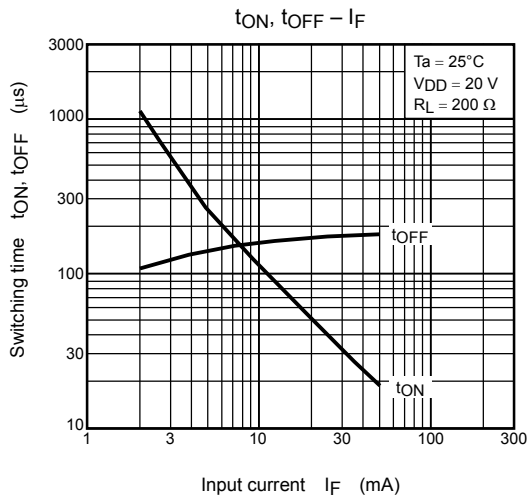
Switching Characteristics (Ta = 25°C)

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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