

TOSHIBA Photocoupler Photorelay

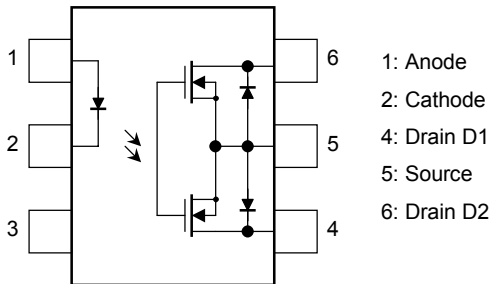
# TLP4192G

Telecommunication  
 Measurement Equipment  
 Security Equipment  
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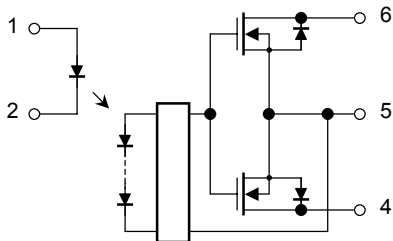
The Toshiba TLP4192G consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a SOP package. This 1-form-B (NC) photorelay features a withstanding voltage of 350 V.

- 6-pin SOP (2.54SOP6): Height = 2.1 mm, pitch = 2.54 mm
- Normally closed (1-form-B) device
- Peak off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 90 mA (max)
- On-state resistance: 50 Ω (max)
- Isolation voltage: 1500 Vrms (min)

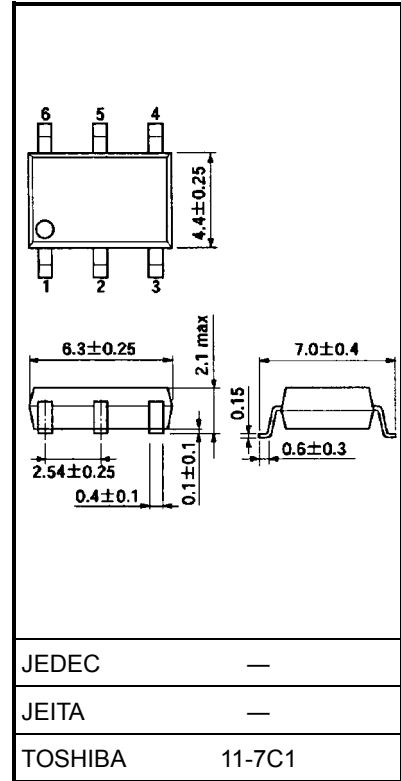
### Pin Configuration (top view)



### Schematic



Unit: mm



Weight: 0.13 g (typ.)

## Maximum Ratings (Ta = 25°C)

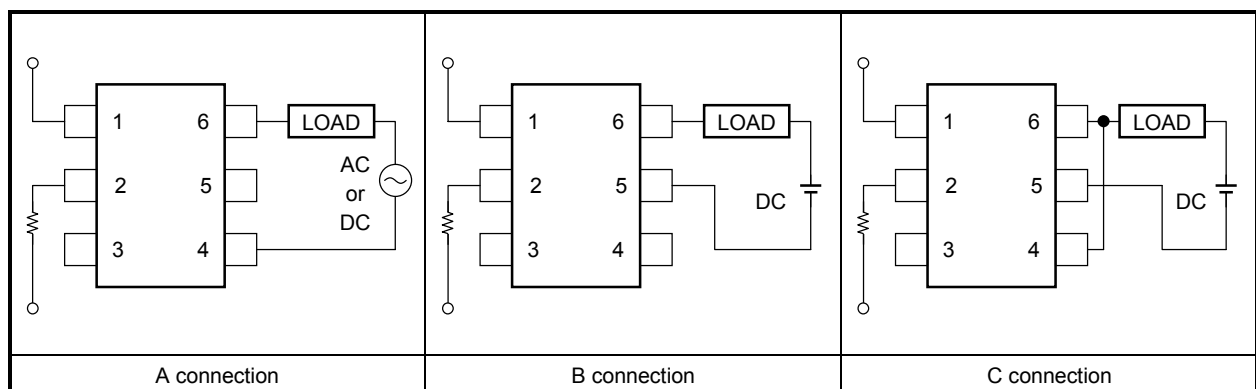
Characteristics		Symbol	Rating	Unit	
LED	Forward current	$I_F$	50	mA	
	Forward current derating (Ta ≥ 25°C)	$\Delta I_F/^\circ\text{C}$	-0.5	mA/°C	
	Peak forward current (100 μs pulse, 100 pps)	$I_{FP}$	1	A	
	Reverse voltage	$V_R$	5	V	
	Junction temperature	$T_j$	125	°C	
Detector	Off-state output terminal voltage	$V_{OFF}$	350	V	
	On-state current	A connection	$I_{ON}$	90	mA
		B connection		90	
		C connection		180	
	On-state current derating (Ta ≥ 25°C)	A connection	$\Delta I_{ON}/^\circ\text{C}$	-0.9	mA/°C
		B connection		-0.9	
		C connection		-1.8	
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 1)	$BV_S$	1500	Vrms		

Note 1: Pins 1, 2 and 3 are shorted together, and pins 4, 5 and 6 are shorted together.

## Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	$V_{DD}$	—	—	280	V
Forward current	$I_F$	5	—	25	mA
On-state current	$I_{ON}$	—	—	90	mA
Operating temperature	$T_{opr}$	-20	—	65	°C

## Circuit Connections



## 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	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Off-state current	$I_{OFF}$	$V_{OFF} = 350 \text{ V}, I_F = 5 \text{ mA}$	—	—	1	$\mu\text{A}$
	Capacitance	$C_{OFF}$	$V = 0, f = 1 \text{ MHz}, I_F = 5 \text{ mA}$	—	30	—	pF

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current		$I_{FC}$	$I_{OFF} = 10 \mu\text{A}$	—	1	3	mA
Return LED current		$I_{FT}$	$I_{ON} = 90 \text{ mA}$	0.1	—	—	mA
On-state resistance	A connection	$R_{ON}$	$I_{ON} = 90 \text{ mA}$	—	27	50	$\Omega$
	B connection		$I_{ON} = 90 \text{ mA}$	—	20	43	
	C connection		$I_{ON} = 180 \text{ mA}$	—	10	—	

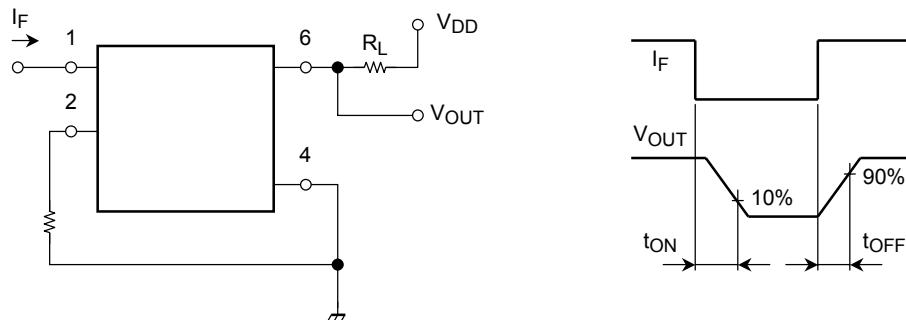
## Isolation Characteristics (Ta = 25°C)

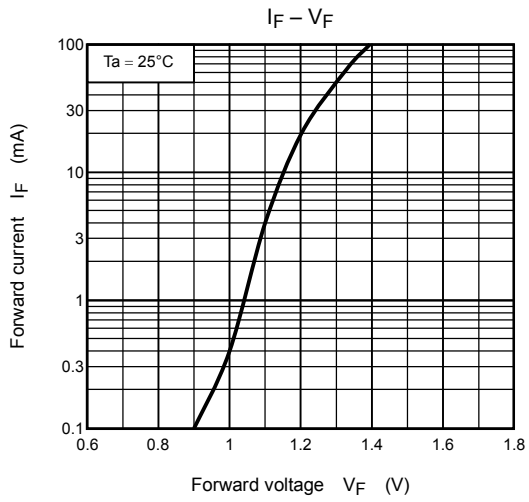
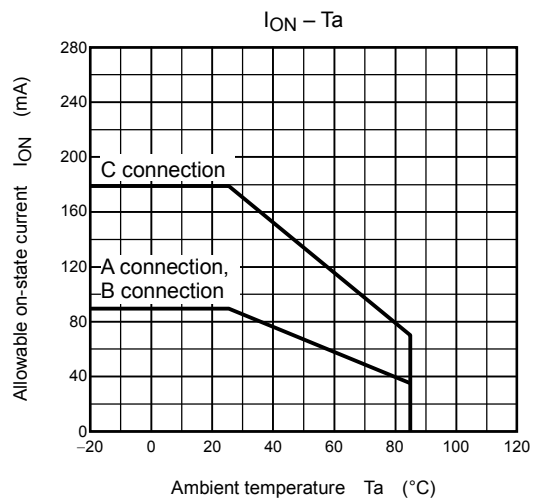
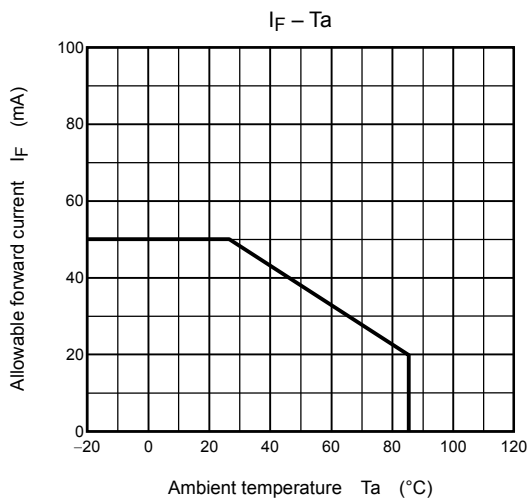
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output		$C_S$	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance		$R_S$	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation voltage		$BV_S$	AC, 1 min	1500	—	—	Vrms
			AC, 1 s, in oil	—	3000	—	
			DC, 1 min, in oil	—	3000	—	Vdc

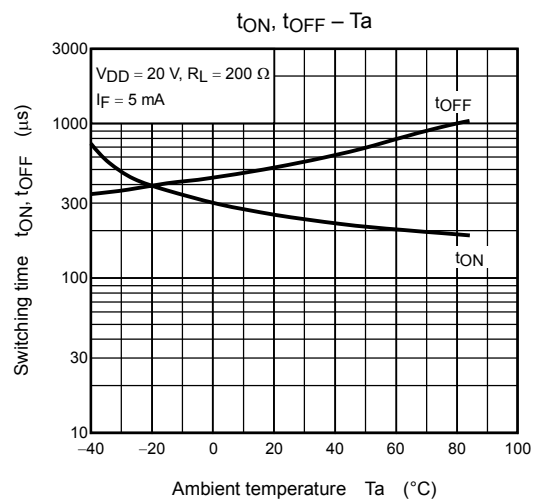
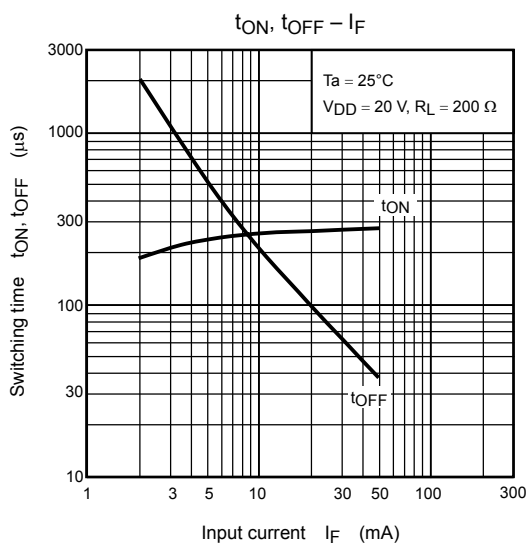
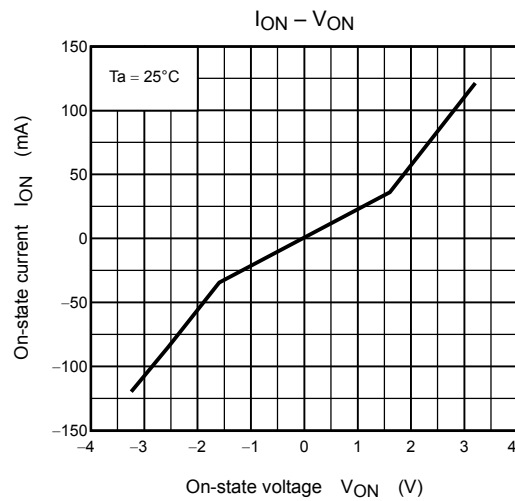
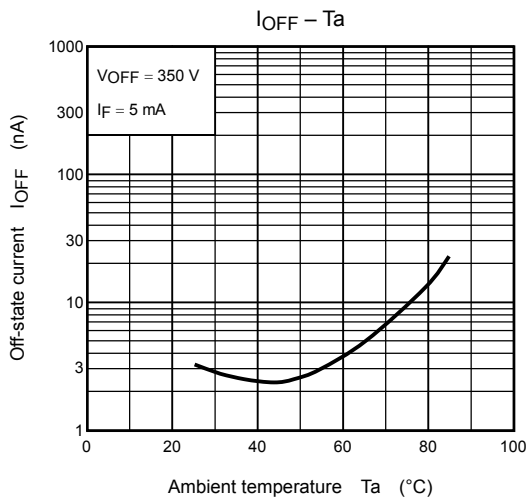
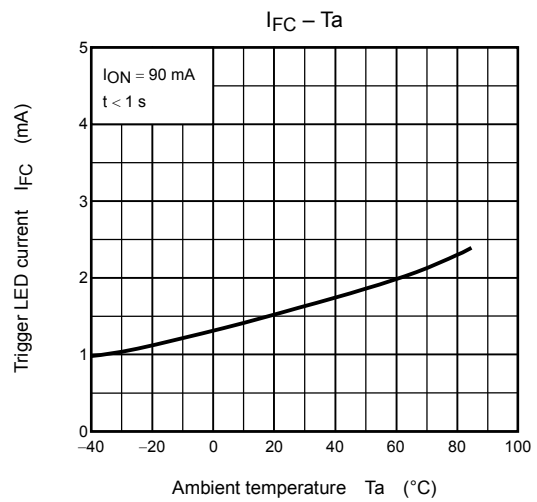
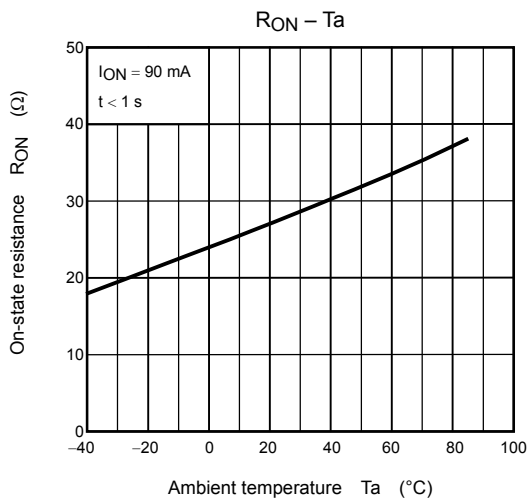
## Switching Characteristics (Ta = 25°C)

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 2)	—	0.25	0.5	ms
Turn-off time	$t_{OFF}$			—	0.5	1	ms

Note 2: Switching time test circuit







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