

# TLP141G

Programmable Controllers

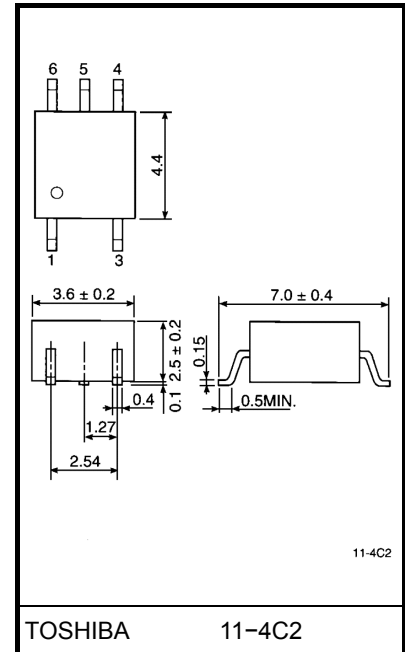
AC-Output Module

Solid State Relay

The TOSHIBA mini flat coupler TLP141G is a small outline coupler, suitable for surface mount assembly. The TLP141G consists of a photo thyristor, optically coupled to a gallium arsenide infrared emitting diode.

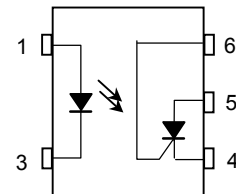
- Peak off-state voltage: 400 V (min.)
- Trigger LED current: 10 mA (max.)
- On-state current: 150 mA (max.)
- Isolation voltage: 2500 Vrms (min.)
- UL recognized: UL1577, file no. E67349

Unit in mm



Weight: 0.09 g

## Pin Connections



- 1 : Anode
- 3 : Cathode
- 4 : Cathode
- 5 : Anode.
- 6 : Gate

## Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	$I_F$	50	mA
	Forward current derating (Ta ≥ 53°C)	$\Delta I_F / ^\circ\text{C}$	-0.7	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	Peak forward voltage( $R_{GK} = 27\text{k}\Omega$ )	$V_{DRM}$	400	V
	Peak reverse voltage( $R_{GK} = 27\text{k}\Omega$ )	$V_{DRM}$	400	V
	On-state current	$I_T(\text{RMS})$	150	mA
	On-state current derating (Ta ≥ 25°C)	$\Delta I_T / ^\circ\text{C}$	-2.0	mA / °C
	Peak one cycle surge current	$I_{TSM}$	2	A
	Peak reverse gate voltage	$V_{GM}$	5	V
	Junction temperature	$T_j$	100	°C
Storage temperature range		$T_{stg}$	-55~125	°C
Operating temperature range		$T_{opr}$	-55~100	°C
Lead soldering temperature (10 s)		$T_{sol}$	260	°C
Isolation voltage (AC, 1 min., RH ≤ 60%) (Note 1)		$BV_S$	2500	Vrms

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) Device considered a two terminal device: pins 1 and 3 shorted together and pins 4, 5 and 6 shorted together.

## Recommended Operating Conditions

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	$V_{AC}$	—	—	120	Vac
Forward current	$I_F$	15	20	25	mA
Operating temperature	$T_{opr}$	-25	—	85	°C
Gate to cathode resistance	$R_{GK}$	—	27	33	kΩ
Gate to cathode capacitance	$C_{GK}$	—	0.01	0.1	μF

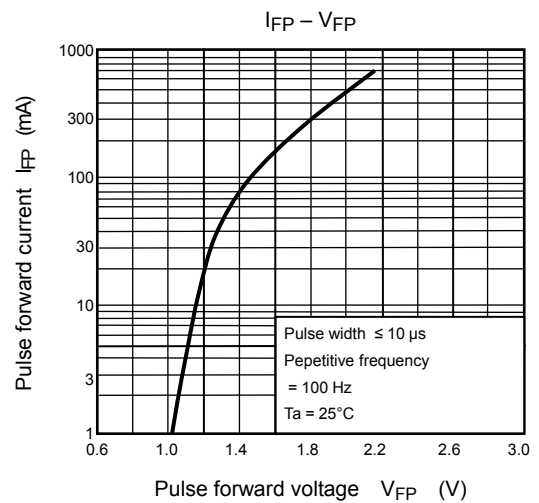
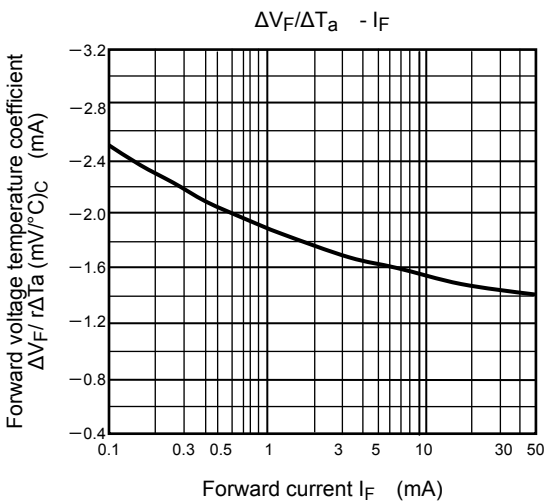
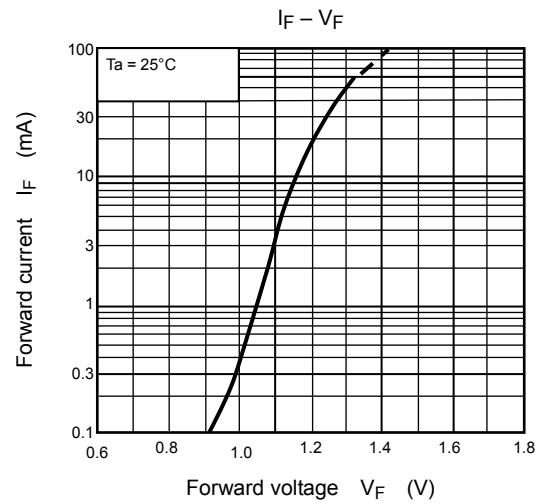
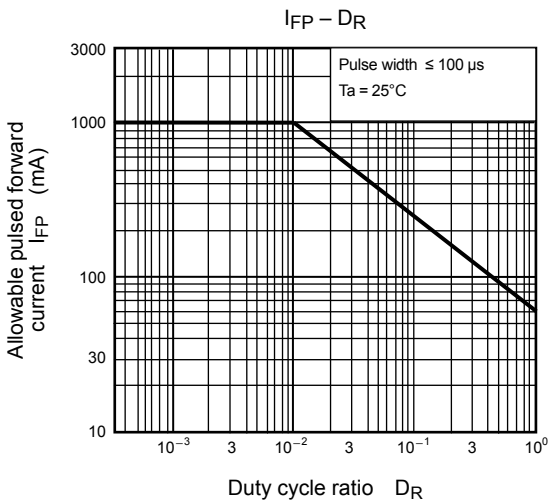
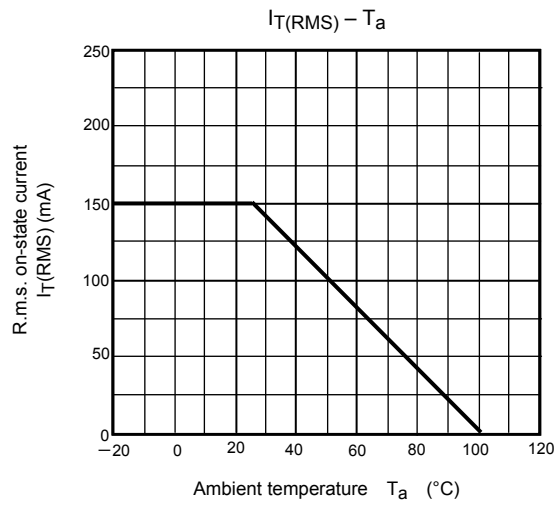
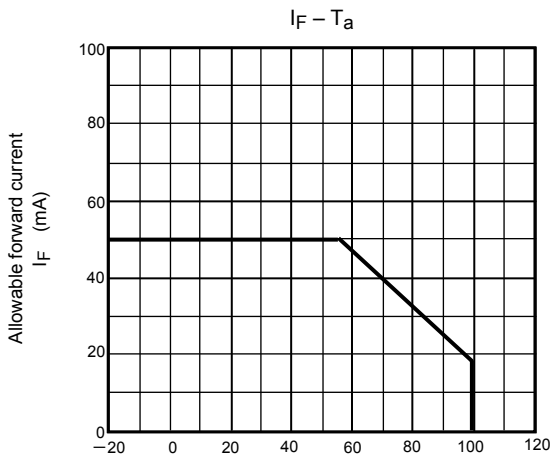
Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

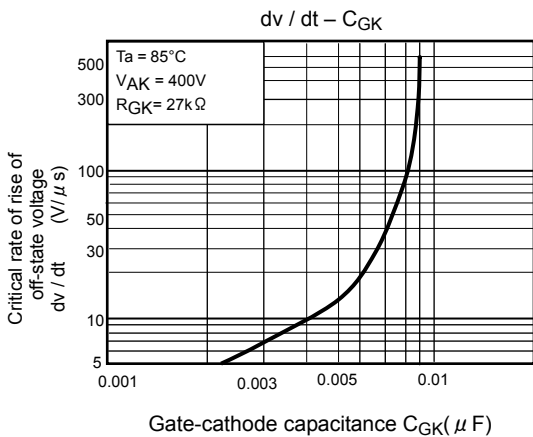
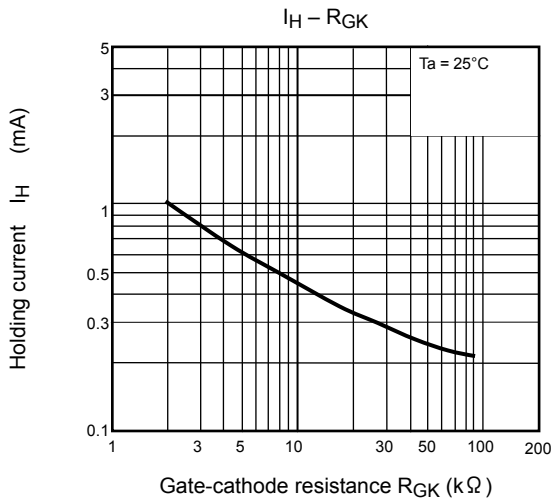
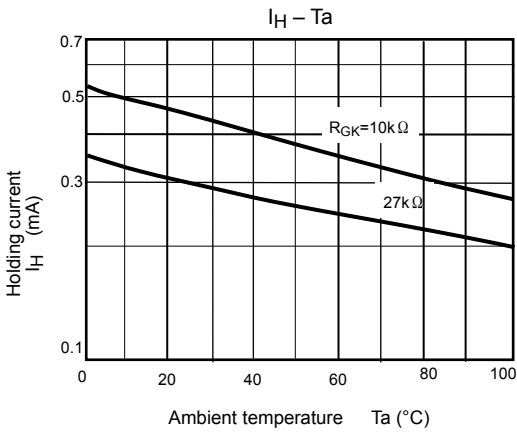
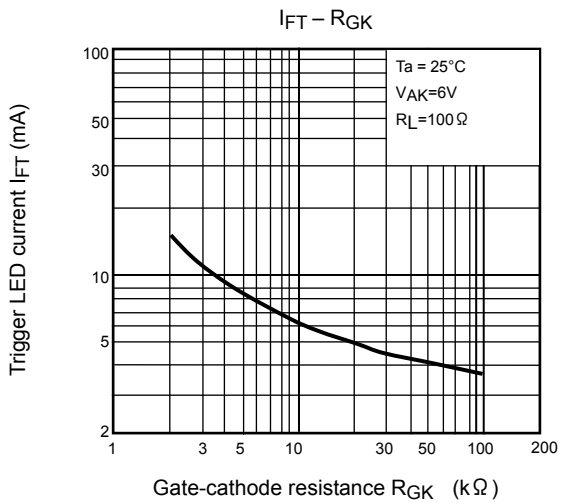
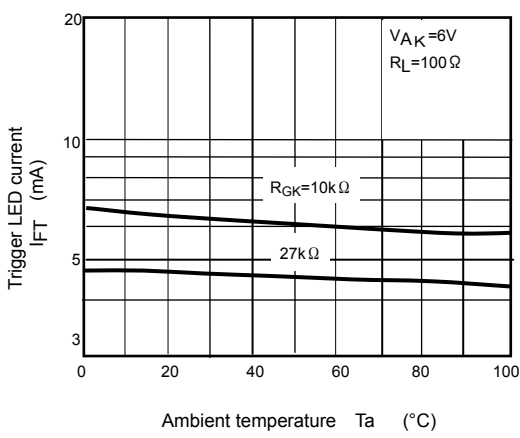
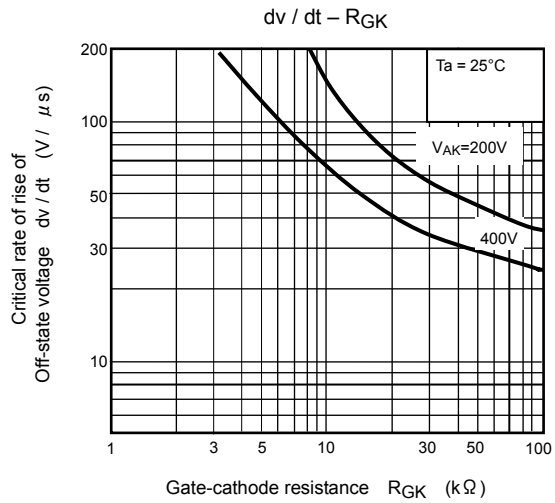
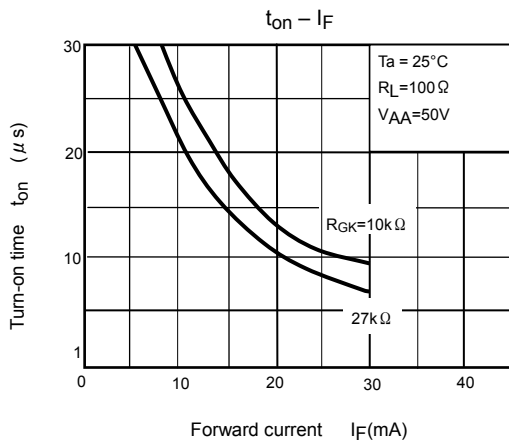
## Individual Electrical Characteristics (Ta = 25°C)

Characteristic		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	$I_{DRM}$	$V_{AK} = 400 \text{ V}$ $R_{GK} = 27 \text{ k}\Omega$	Ta = 25°C	—	10	5000	nA
				Ta = 100°C	—	1	100	$\mu\text{A}$
	Reverse current	$I_{RRM}$	$V_{KA} = 70 \text{ mA}$ $R_{GK} = 27 \text{ k}\Omega$	Ta = 25°C	—	10	5000	nA
				Ta = 100°C	—	1	100	$\mu\text{A}$
	On-state voltage	$V_{TM}$	$I_{TM} = 100 \text{ mA}$	—	0.9	1.3	V	
	Holding current	$I_H$	$R_{GK} = 27 \text{ k}\Omega$	—	0.2	1	mA	
	Off-state dv / dt	dv/dt	$V_{AK} = 280 \text{ V}, R_{GK} = 27 \text{ k}\Omega$	5	10	—	V / $\mu\text{s}$	
Capacitance	$C_j$	$V = 0, f = 1 \text{ MHz}$	Anode to gate	—	20	—	pF	
			Gate to cathode	—	350	—		

## Coupled Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Trigger LED current	$I_{FT}$	$V_{AK} = 6 \text{ V}, R_{GK} = 27\text{k}\Omega$	—	4	10	mA
Turn-on time	$t_{on}$	$I_F = 50\text{mA}, R_{GK} = 27\text{k}\Omega$	—	10	—	$\mu\text{s}$
Coupled dv / dt	dv/dt	$V_S = 500 \text{ V}, R_{GK} = 27\text{k}\Omega$	500	—	—	V / $\mu\text{s}$
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 minute	2500	—	—	Vrms
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000	—	Vdc





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