TOSHIBA Photocoupler GaAs Ired & Photo−Transistor

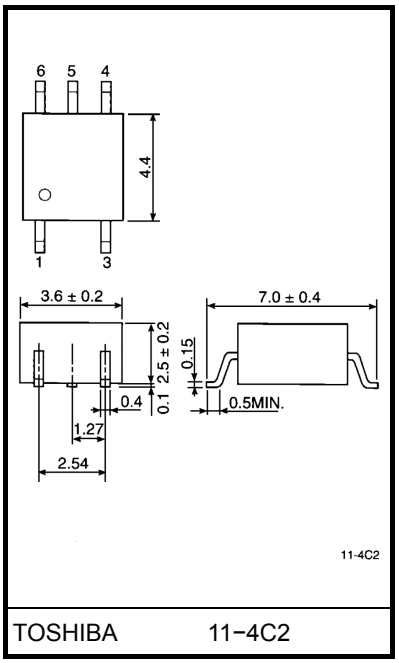
TLP141G

Programmable Controllers

AC−Output Module

Solid State Relay

Unit in mm



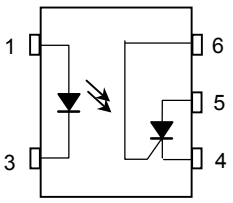
TOSHIBA 11−4C2

Weight: 0.09 g

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

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)	ΔI_F/°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} = 27kΩ)	V_{DRM}	400	V
	Peak reverse voltage(R_{GK} = 27kΩ)	V_{DRM}	400	V
	On−state current	$I_{T(RMS)}$	150	mA
	On−state current derating (Ta ≥ 25°C)	ΔI_T / °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.

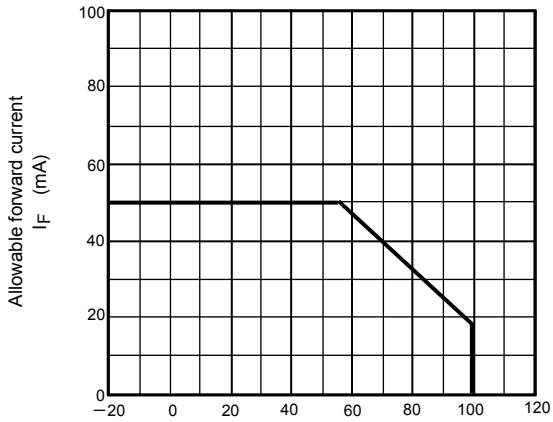
Individual Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition		Min.	Typ.	Max.	Unit
LED	Forward voltage	V_F	I_F = 10 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_{DRM}	V_{AK} = 400 V, R_{GK} = 27 kΩ	Ta = 25°C	—	10	5000	nA
				Ta = 100°C	—	1	100	μA
	Reverse current	I_{RRM}	V_{KA} = 70 mA, R_{GK} = 27 kΩ	Ta = 25°C	—	10	5000	nA
				Ta = 100°C	—	1	100	μA
	On−state voltage	V_{TM}	I_{TM} = 100 mA		—	0.9	1.3	V
	Holding current	I_H	R_{GK} = 27 kΩ		—	0.2	1	mA
	Off−state dv / dt	dv/dt	V_{AK} = 280 V, R_{GK} = 27 kΩ		5	10	—	V / μs
	Capacitance	C_j	V = 0, f = 1 MHz	Anode to gate	—	20	—	pF
				Gate to cathode	—	350	—	

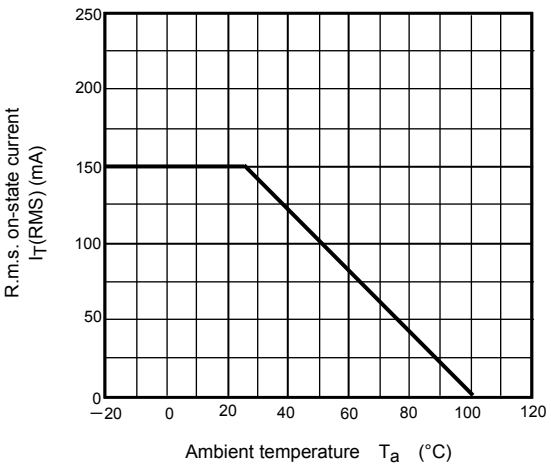
Coupled Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Trigger LED current	I_{FT}	V_{AK} = 6 V, R_{GK} = 27kΩ	—	4	10	mA
Turn−on time	t_{on}	I_F = 50mA, R_{GK} = 27kΩ	—	10	—	μs
Coupled dv / dt	dv/dt	V_S = 500 V, R_{GK} = 27kΩ	500	—	—	V / μs
Capacitance (input to output)	C_S	V_S = 0, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R_S	V_S = 500 V, R.H. ≤ 60%	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	2500	—	—	Vrms
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000	—	Vdc

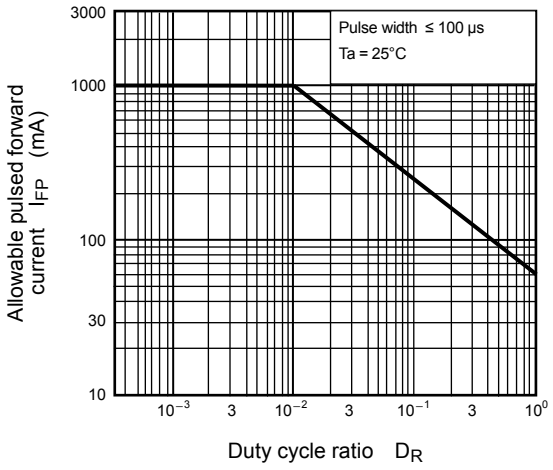
$I_F - T_a$



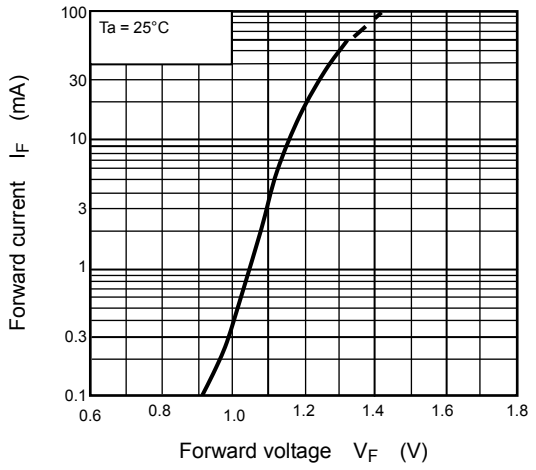
$I_{T(RMS)} - T_a$



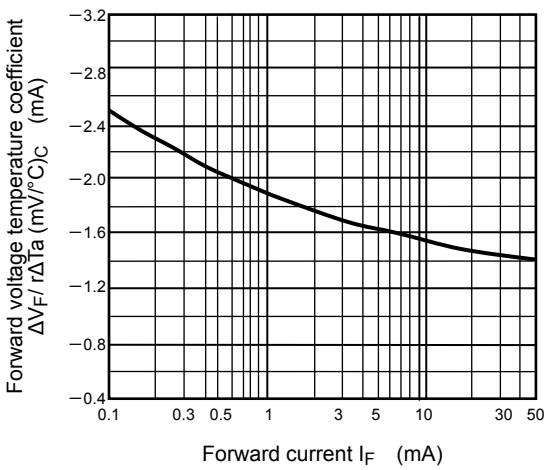
$I_{FP} - D_R$



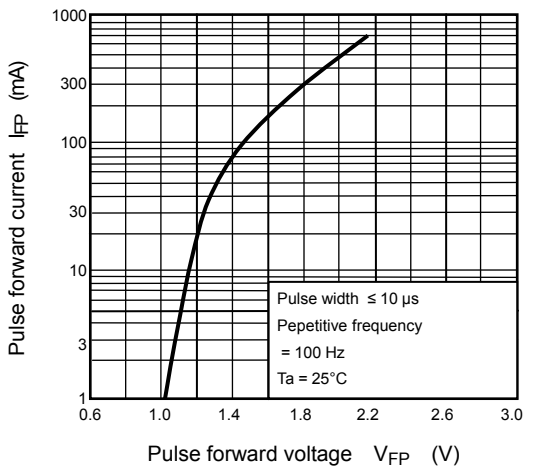
$I_F - V_F$



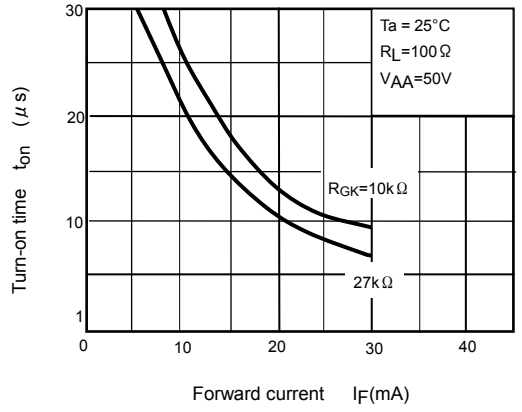
$\Delta V_F/\Delta T_a$ - I_F



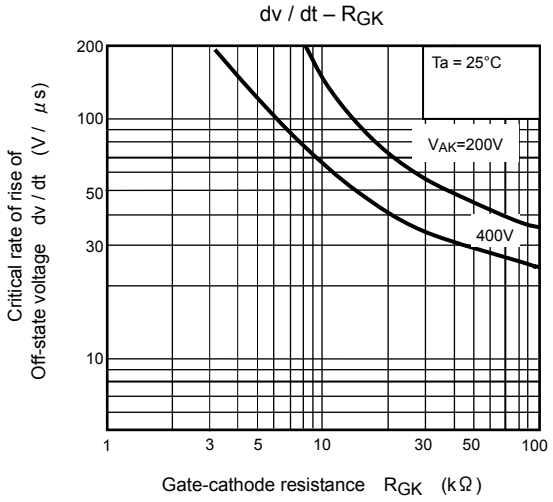
$I_{FP} - V_{FP}$



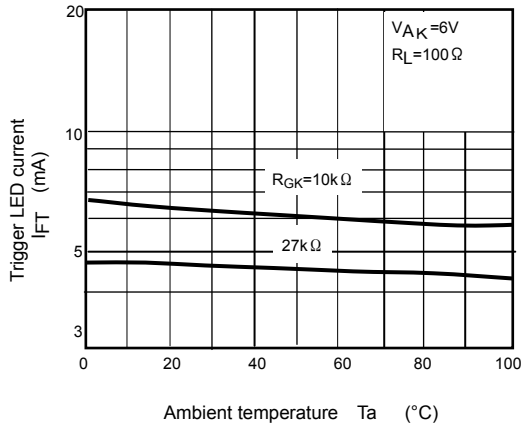
t_{on} – I_F



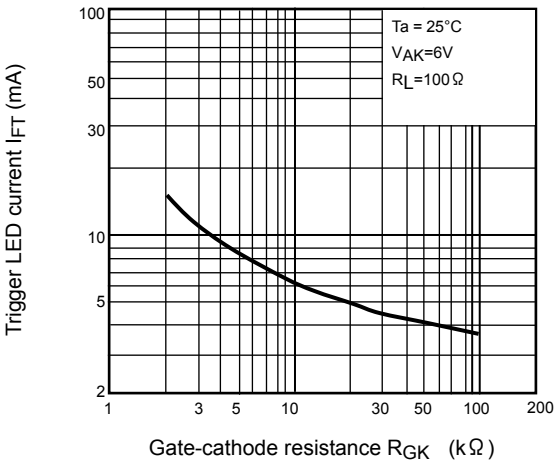
dv / dt – R_{GK}



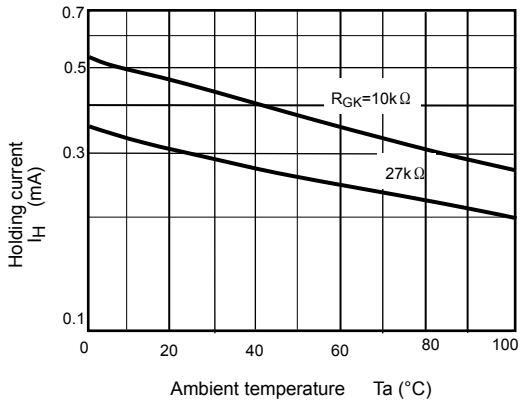
I_{FT} – Ta



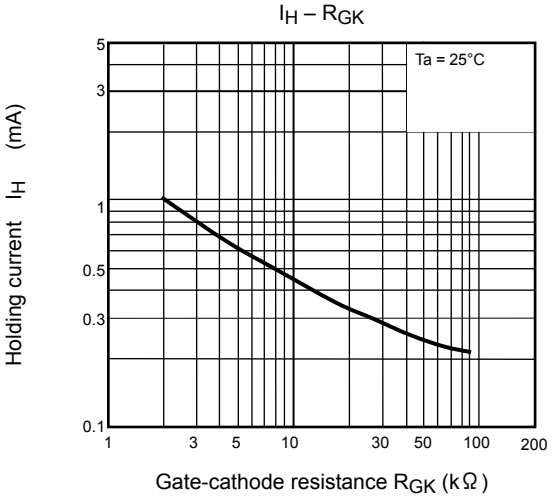
I_{FT} – R_{GK}



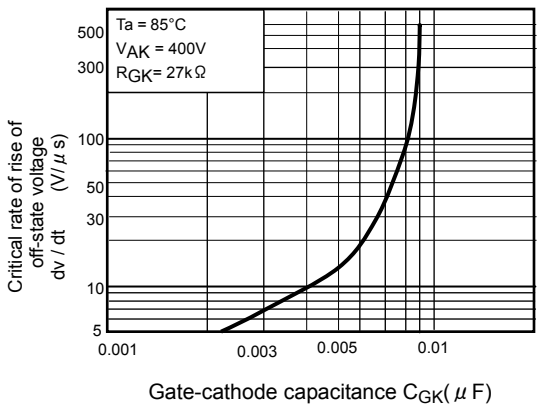
I_H – Ta



I_H – R_{GK}



dv / dt – C_{GK}



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