TOSHIBA Photocoupler GaAs Ired & Photo-Thyristor

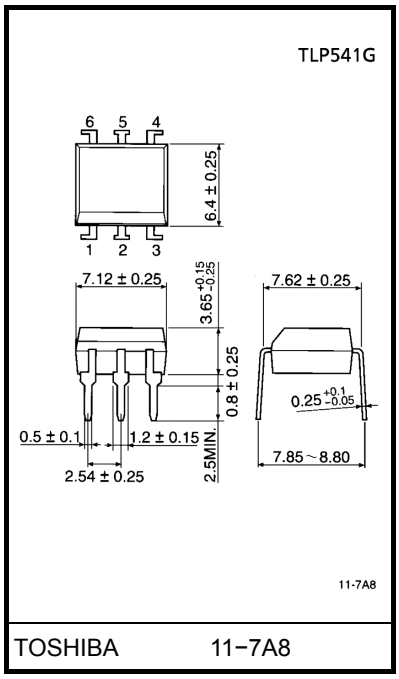
TLP541G,TLP542G

Programmable Controllers

AC−Output Module

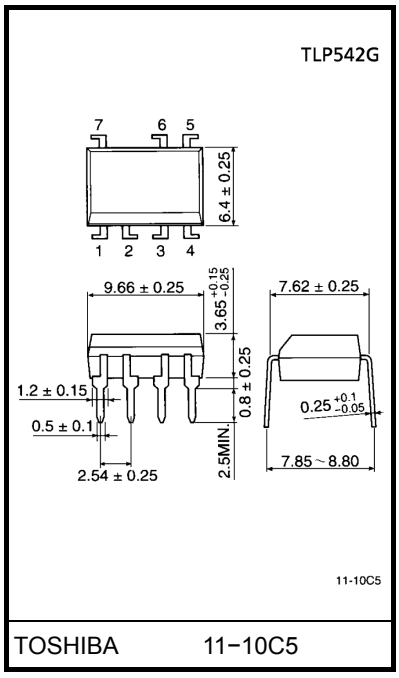
Solid State Relay

Unit in mm



TOSHIBA 11−7A8

Weight: 0.4 g



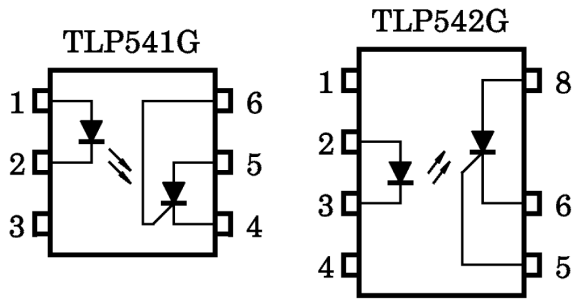
TOSHIBA 11−10C5

Weight: 0.53 g

The TOSHIBA TLP541G consists of a photo−thyristor optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP package.
The TOSHIBA TLP542G consists of a photo−thyristor optically coupled to a gallium arsenide infrared emitting diode in a seven lead plastic DIP package.

- Peak off-state voltage: 400 V (min.)
- Trigger LED current: 7 mA (max.)
- On-state current: 150 mA (max.)
- Isolation voltage: 2500 V_{rms} (min.)
- UL recognized: UL1577, file no. E67349

Pin Configuration (top view)



TLP541G	TLP542G
1 : ANODE	1 : N.C.
2 : CATHODE	2 : ANODE
3 : N.C.	3 : CATHODE
4 : CATHODE	4 : N.C.
5 : ANODE	5 : GATE
6 : GATE	6 : CATHODE
	7 : ANODE

Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	I_F	70	mA
	Forward current derating (Ta ≥ 25°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_{RRM}	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}	−30~100	°C
Lead soldering temperature (10 s)		T_{sol}	260	°C
Isolation voltage (AC, 1 min., R.H. ≤ 60%) (Note)		BV_S	2500	V_{rms}

(Note) Device considered a two terminal device: LED side pins shorted together and detector side pins shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{AC}	—	—	120	V_{ac}
Forward current	I_F	10	16	25	mA
Operating temperature	T_{opr}	−30	—	85	°C
Gate to cathode resistance	R_{GK}	—	27	33	kΩ
Gate to cathode capacity	C_{GK}	—	0.01	0.1	μF

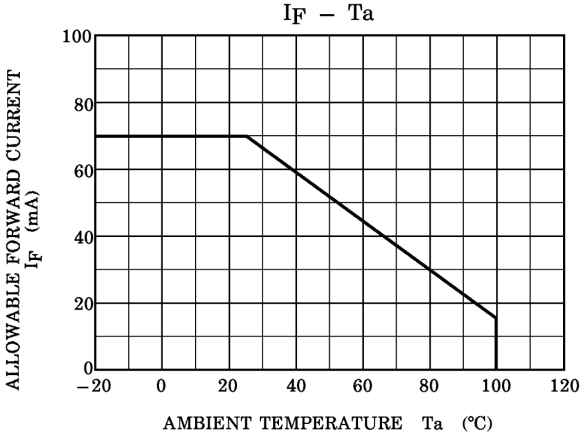
Individual Electrical Characteristics (Ta = 25°C)

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} = 400 V 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	—	

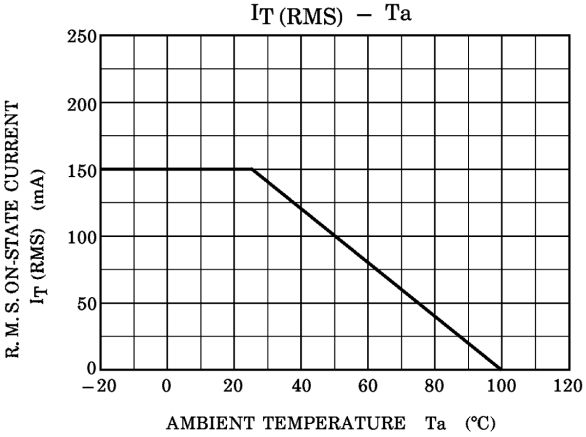
Coupled Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Trigger LED current	I_{FT}	V_{AK} = 6 V, R_{GK} = 27 kΩ	1	4	7	mA
Turn−on time	t_{on}	I_F = 50 mA, R_{GK} = 27 kΩ	—	10	—	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%	—	10^{11}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	2500	—	—	V_{rms}

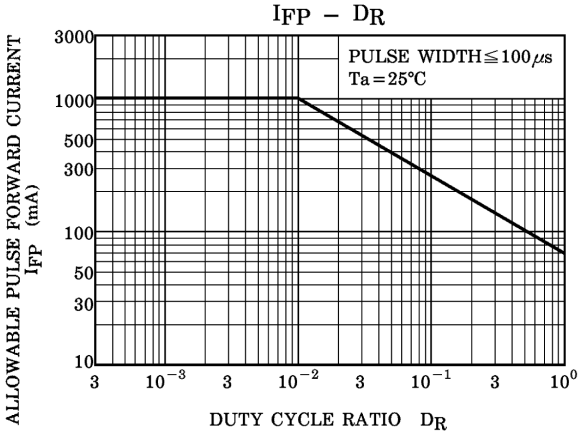
I_F – Ta



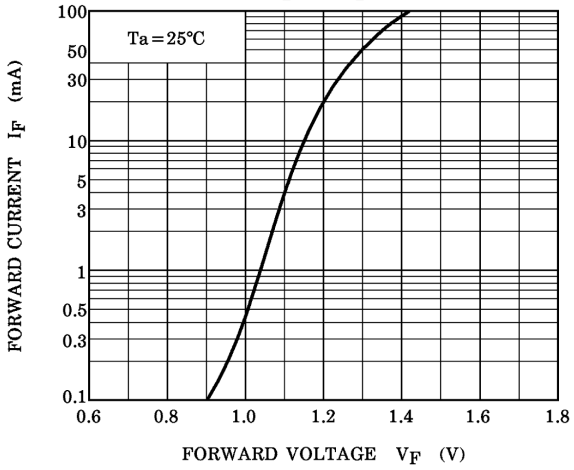
$I_{T\,(RMS)}$ – Ta



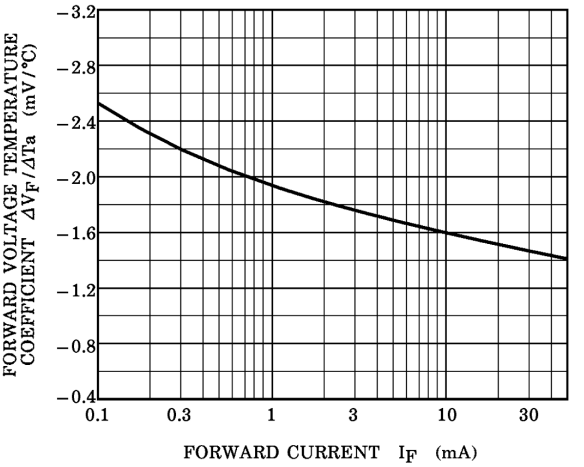
I_{FP} – D_R



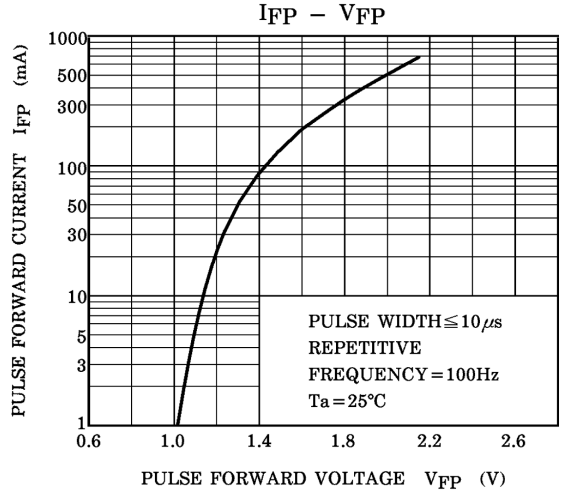
I_F – V_F



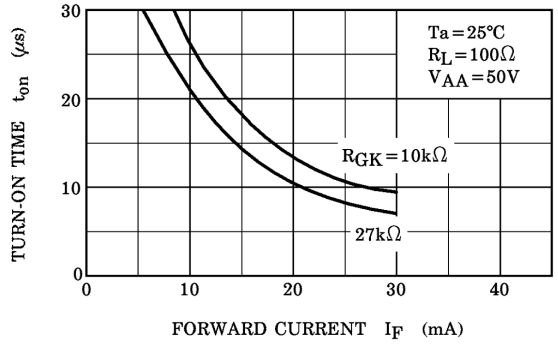
$\Delta V_F / \Delta Ta$ – I_F



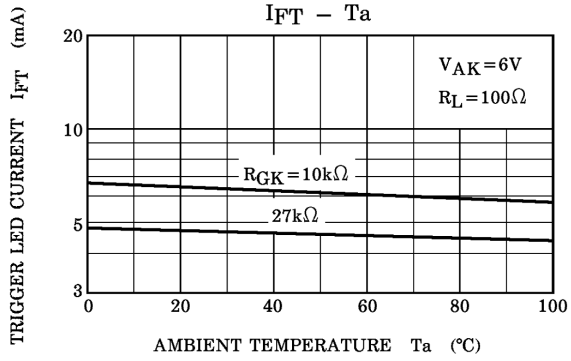
I_{FP} – V_{FP}



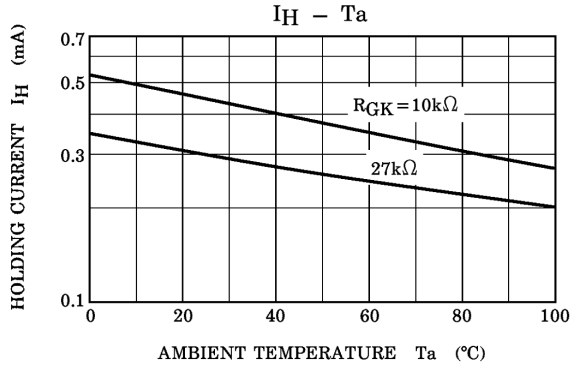
t_{on} – I_F



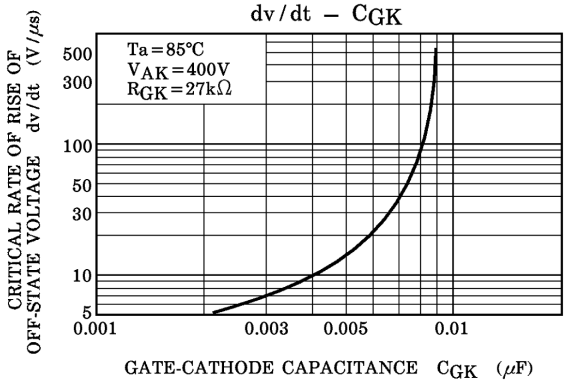
I_{FT} – Ta



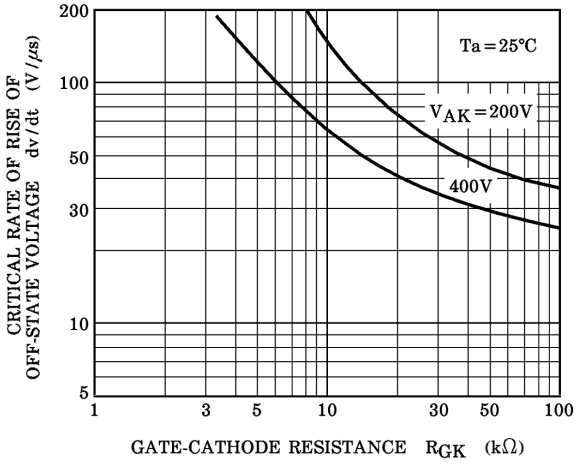
I_H – Ta



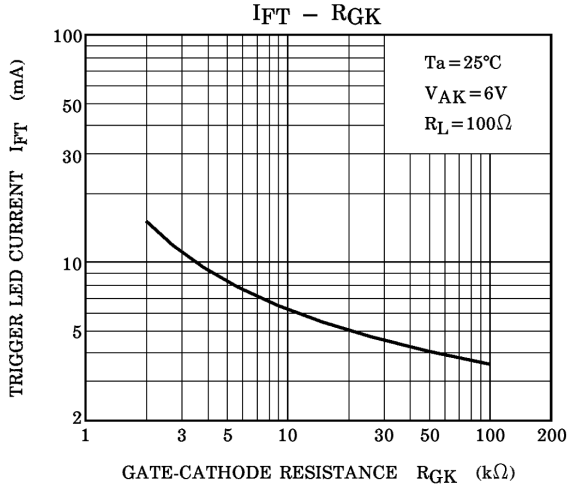
dv / dt – C_{GK}



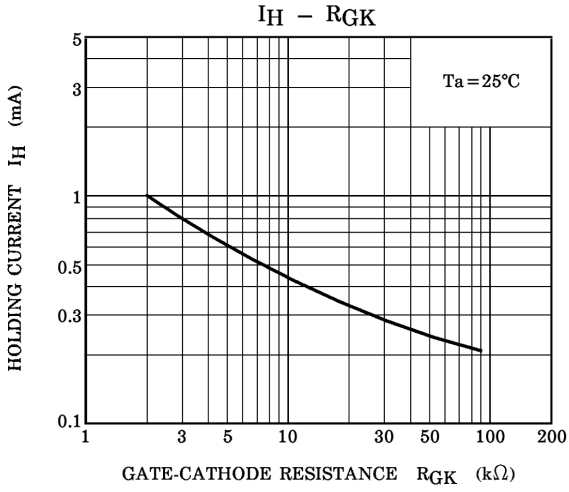
dv / dt – R_{GK}



I_{FT} – R_{GK}



I_H – R_{GK}



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