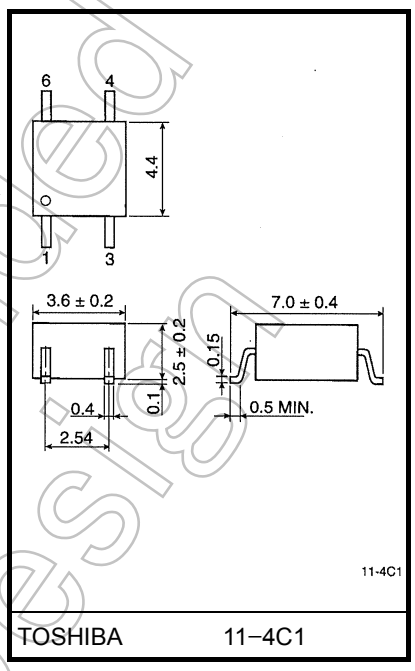
TOSHIBA Photocoupler GaAs IRED + Photo−Triac

TLP261J

Triac Drivers
Programmable Controllers
AC-Output Modules
Solid-State Relays

Unit: mm



TOSHIBA 11−4C1

Weight: 0.09 g (typ.)

The TOSHIBA mini-flat coupler TLP261J is housed in a small-outline package and suitable for surface-mount assembly.

The TLP261J consists of a gallium arsenide infrared emitting diode optically coupled to a triac-output photocoupler.

- Peak off−state voltage: 600 V (min)
- Trigger LED current: 10 mA (max)
- On−state current: 70 mA (max)
- Isolation voltage: 3000 Vrms (min)
- Zero-crossing function
- UL-recognized: UL1577, file no. E67349
- Option (V4) type
  VDE-approved: EN60747-5-2 satisfied
  Maximum operating insulation voltage: 565 VpK
  Maximum permissible overvoltage: 6000 Vpk

Note: When an EN60747-5-2 approved type is needed, be sure to specify “Option (V4)”.

- Construction Mechanical Rating
  Creepage distance: 4.0 mm (min)
  Clearance: 4.0 mm (min)
  Insulation thickness: 0.4 mm (min)

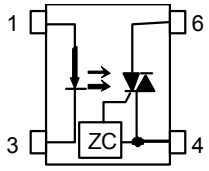
Trigger LED Current

Classification*	Trigger LED Current (mA) V_T =3 V, Ta = 25°C		Product Classification Marking
	Min	Max	
(IFT7)	—	7	T7
Standard	—	10	T7, blank

*E.g. (IFT7): TLP261J (IFT7)

Note: Be sure to use standard product type names when submitting type names for safety certification testing, i.e., TLP261J (IFT7): TLP261J.

Pin Configuration



1 : Anode
3 : Cathode
4 : Terminal 1
6 : Terminal 2

Start of commercial production
2003/07

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	Off−state output terminal voltage		V_{DRM}	600	V
	On−state RMS current	Ta = 25°C	$I_{T(RMS)}$	70	mA
		Ta = 70°C		40	
	On−state current derating (Ta ≥ 25°C)		ΔI_T / °C	−0.67	mA / °C
	Peak on−state current (100 μs pulse, 120 pps)		I_{TP}	2	A
	Peak nonrepetitive surge current (PW = 10 ms)		I_{TSM}	1.2	A
	Junction temperature		T_j	100	°C
Storage temperature range			T_{stg}	−55 to 125	°C
Operating temperature range			T_{opr}	−40 to 100	°C
Lead soldering temperature (10 s)			T_{sol}	260	°C
Isolation voltage (AC, 1 minute, R.H ≤ 60%)		(Note 1)	BV_S	3000	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 as a two-terminal device: Pins 1 and 3 shorted together and pins 4 and 6 shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{AC}	—	—	240	V_{ac}
Forward current	I_F	15	20	25	mA
Peak on−state current	I_{TP}	—	—	1	A
Operating temperature	T_{opr}	−25	—	85	°C

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the devices. Each item also has its own independent guideline document. In developing designs using these products, please confirm the specified characteristics shown in these documents.

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	Peak off−state current	I_{DRM}	V_{DRM} = 600 V	—	10	1000	nA
	Peak on−state voltage	V_{TM}	I_{TM} = 70 mA	—	1.7	2.8	V
	Holding current	I_H	—	—	0.6	—	mA
	Critical rate of rise of off−state voltage	dv / dt	V_{in} = 240 Vrms, Ta = 85°C (Fig. 1)	200	500	—	V/μs
	Critical rate of rise of commutating voltage	dv / dt(c)	V_{in} = 60 Vrms, I_T = 15 mA (Fig. 1)	—	0.2	—	V/μs

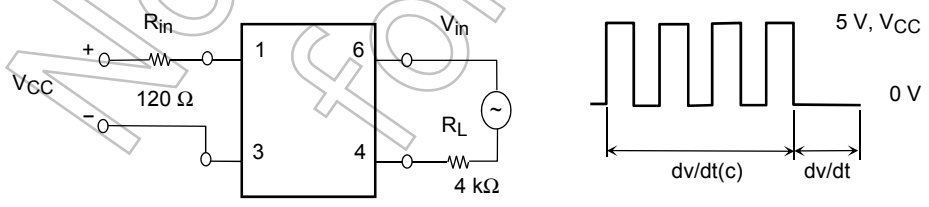
Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}	V_T = 3 V	—	—	10	mA
Inhibit voltage	V_{IH}	I_F = Rated I_{FT}	—	—	20	V
Leakage in inhibited state	I_{IH}	I_F = Rated I_{FT} V_T = Rated V_{DRM}	—	200	600	μA
Turn-on time	t_{ON}	V_D = 3 → 1.5 V, R_L = 20 Ω I_F = rated I_{FT} × 1.5	—	30	100	μs

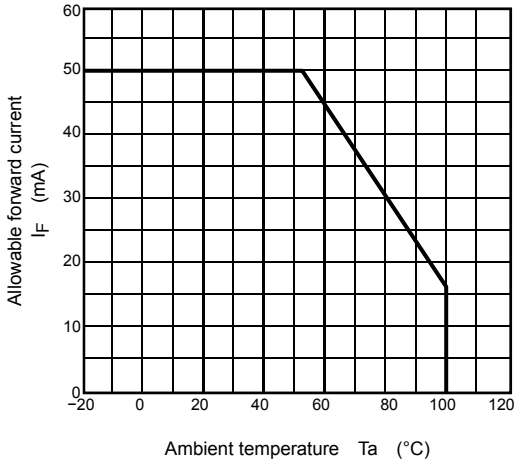
Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
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	3000	—	—	V_{rms}
		AC, 1 second, in oil	—	5000	—	
		AC, 1 minute, in oil	—	5000	—	Vdc

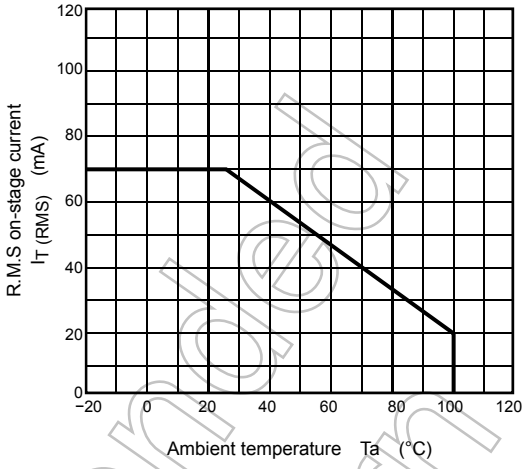
Fig. 1: dv / dt test circuit



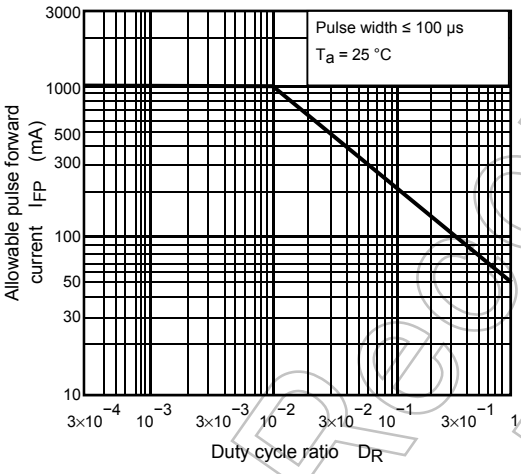
I_F – Ta



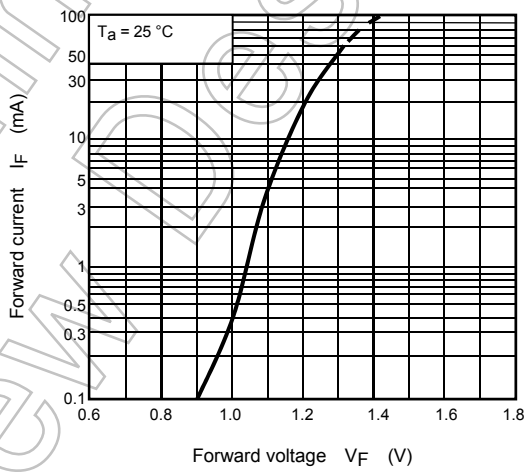
$I_{T(RMS)}$ – Ta



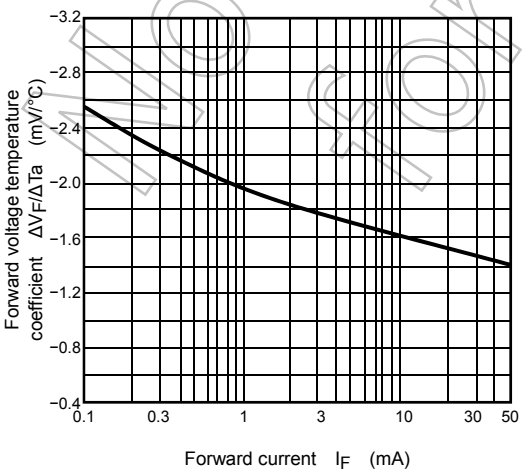
I_{FP} – D_R



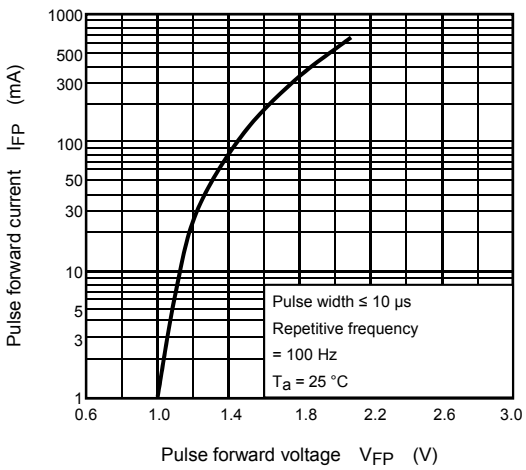
I_F – V_F



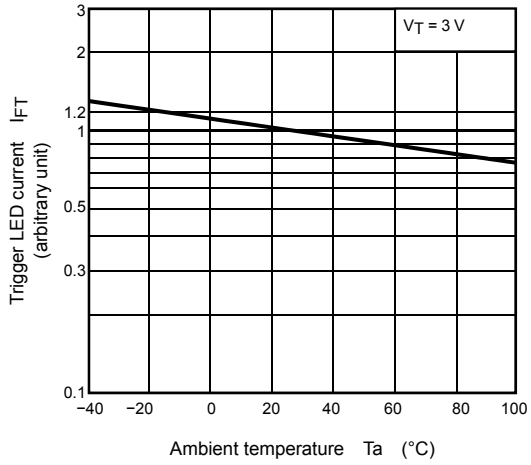
$\Delta V_F/\Delta Ta$ – I_F



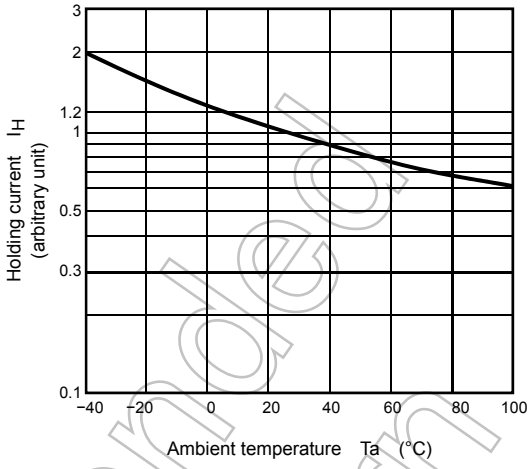
I_{FP} – V_{FP}



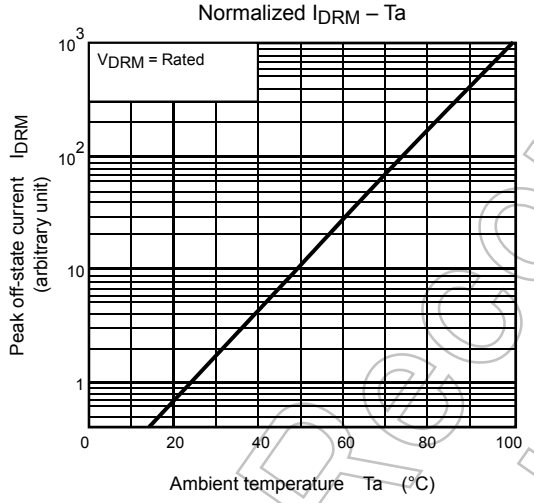
Normalized I_{FT} – Ta



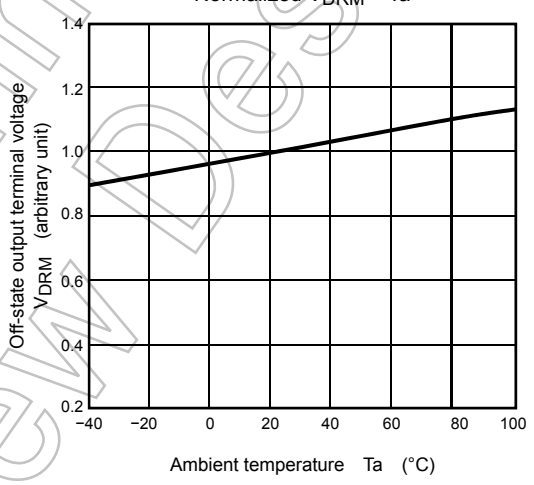
Normalized I_H – Ta



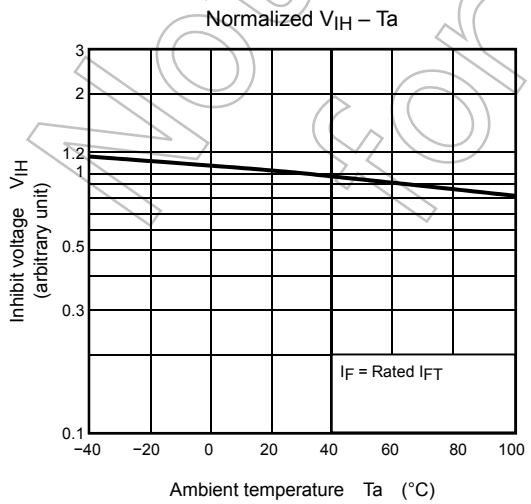
Normalized I_{DRM} – Ta



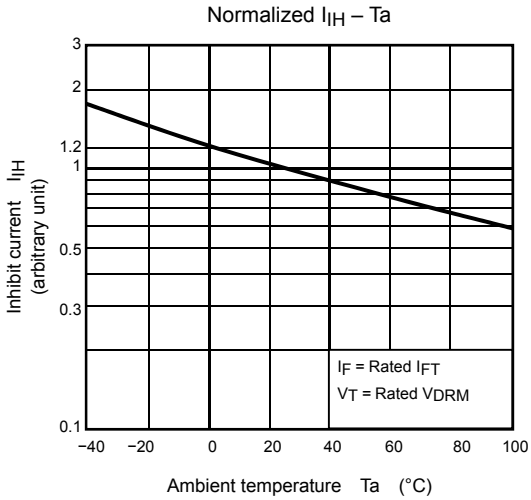
Normalized V_{DRM} – Ta



Normalized V_{IH} – Ta



Normalized I_{IH} – Ta



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