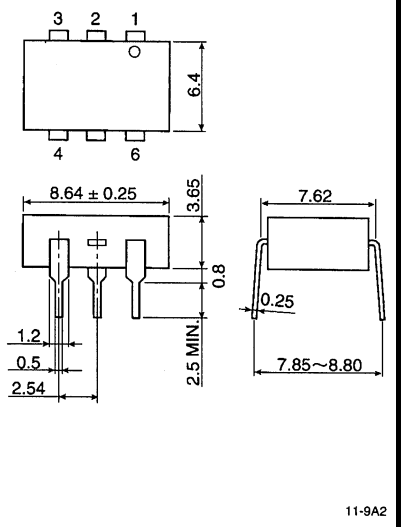
TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRIAC

TLP3020,TLP3021,TLP3022,TLP3023

Unit: mm



JEDEC	—
EIAJ	—
TOSHIBA	11-9A2

Weight: 0.44g

OFFICE MACHINE
HOUSEHOLD USE EQUIPMENT
TRIAC DRIVER
SOLID STATE RELAY

The TOSHIBA TLP3020, TLP3021, TLP3022 and TLP3023 consist of a photo-triac optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP package.

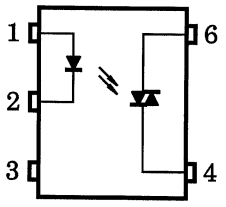
- Peak Off-State Voltage : 400 V (Min.)
- Trigger LED Current : 30mA (Max.) (TLP3020)
  15 mA (Max.) (TLP3021)
  10 mA (Max.) (TLP3022)
  5 mA (Max.) (TLP3023)
- On-State Current : 100 mA (Max.)
- UL Recognized : UL1577, File No. E67349
- Isolation Voltage : 5000 Vrms (Min.)
- Option (D4) Type
- VDE Approved : DIN EN 60747-5-2,
  Certificate No. 40009302

  Maximum Operating Insulation Voltage: 630 VPK
  Highest Permissible Over Voltage: 6000 VPK

Note: When a EN 60747-5-2 approved type is needed, please designate the "Option (D4) "

		7.62mm pich standard type	10.16 mm pich (LF2) type
Creepage Distance	:	7.0 mm (Min.)	8.0 mm (Min.)
Clearance	:	7.0 mm (Min.)	8.0 mm (Min.)
Insulation Thickness	:	0.5 mm (Min.)	0.5 mm (Min.)

PIN CONFIGURATION (TOP VIEW)



1: ANODE
2: CATHODE
3: N.C.
4: TERMINAL 1
6: TERMINAL 2

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 (100μs pulse, 100pps)		I_{FP}	1	A
	Power Dissipation		P_D	100	mW
	Power Dissipation Derating (Ta ≥ 25°C)		ΔP_D/°C	−1.0	mW/°C
	Reverse Voltage		V_R	5	V
	Junction Temperature		Tj	125	°C
DETECTOR	Off-State Output Terminal Voltage		V_{DRM}	400	V
	On-Stage RMS Current	Ta=25°C	$I_{T(RMS)}$	100	mA
		Ta=70°C		50	
	On-State Current Derating (Ta ≥ 25°C)		ΔI_T/°C	−1.1	mA/°C
	Peak On-Stage Current (100μs pulse, 120pps)		I_{TP}	2	A
	Peak Nonrepetitive Surge Current (P_W=10ms, DC=10%)		I_{TSM}	1.2	A
	Power Dissipation		P_D	300	mW
	Power Dissipation Derating (Ta ≥ 25°C)		ΔP_D/°C	−4.0	mW/°C
	Junction Temperature		Tj	115	°C
Storage Temperature Range			T_{stg}	−55 ~ 150	°C
Operating Temperature Range			T_{opr}	−40 ~ 100	°C
Lead Soldering Temperature (10s)			T_{sol}	260	°C
Total Package Power Dissipation			P_T	330	mW
Total Package Power Dissipation Derating (Ta ≥ 25°C)			ΔP_T/°C	−4.4	mW/°C
Isolation Voltage (AC, 1 min., R.H. ≤ 60%) (Note 1)			BV_S	5000	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, 2 and 3 shorted together and pins 4 and 6 shorted together.

Recommended Operating Conditions

CHARACTERISTICS	SYMBOL	MIN	TYP.	MAX	UNIT
Supply Voltage	V_{AC}	—	—	120	Vac
Forward Current	I_F*	15	20	25	mA
Peak On-Stage 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 device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

*: In the case of TLP3022

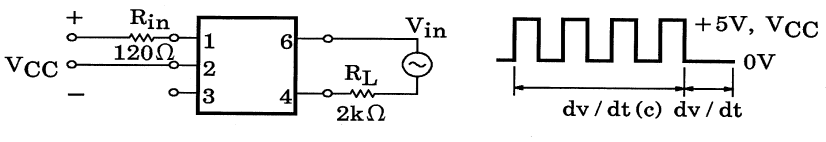
Individual Electrical Characteristics (Ta=25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
LED	Forward Voltage	V_F	I_F=10mA	1.0	1.15	1.3	V
	Reverse Current	I_R	V_R=5V	—	—	10	μA
	Capacitance	C_T	V=0, f=1MHz	—	10	—	pF
DETECTOR	Peak Off-State Current	I_{DRM}	V_{DRM}=400V	—	10	100	nA
	Peak On-Stage Voltage	V_{TM}	I_{TM}=100mA	—	1.7	3.0	V
	Holding Current	I_H	—	—	0.6	—	mA
	Critical Rate of Rise of Off-State Voltage	dv / dt	V_{in}=120Vrms, Ta=85°C (Fig.1)	200	500	—	V/μs
	Critical Rate of Rise of Commutating Voltage	dv / dt(c)	V_{in}=30Vrms, IF=15mA (Fig.1)	—	0.2	—	V/μs

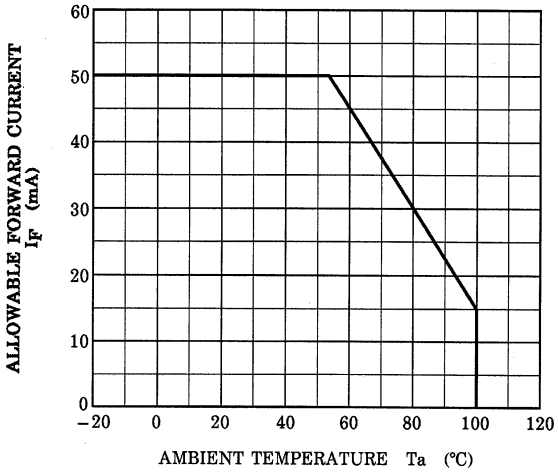
Coupled Electrical Characteristics (Ta=25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Trigger LED Current	TLP3020	I_{FT}	V_T=3V	—	—	30	mA
	TLP3021			—	—	15	
	TLP3022			—	5	10	
	TLP3023			—	—	5	
Capacitance Input to Output		C_S	V_S=0, f=1MHz	—	0.8	—	pF
Isolation Resistance		R_S	V_S=500V (R.H. ≤ 60%)	5×10^{10}	10^{14}	—	Ω
Isolation Voltage		B_{VS}	AC, 1 minute		—	—	V_{rms}
			AC, 1 second (in oil)	—	10000	—	V_{dc}
			DC, 1 minute (in oil)	—	10000	—	

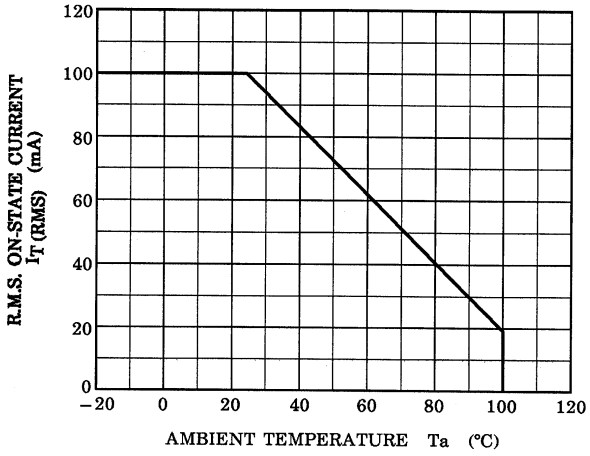
Fig. 1 dv/dt TEST CIRCUIT



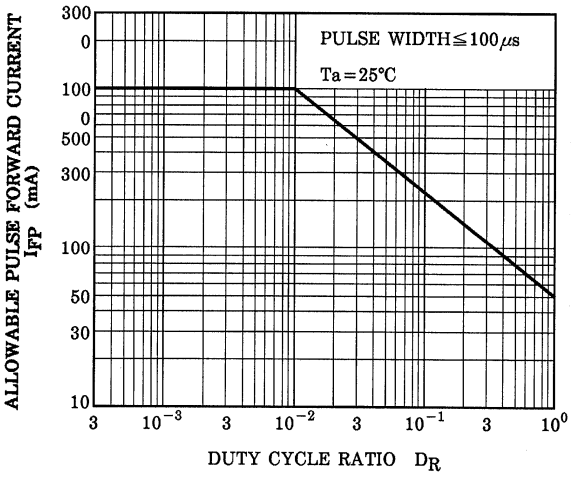
I_F – Ta



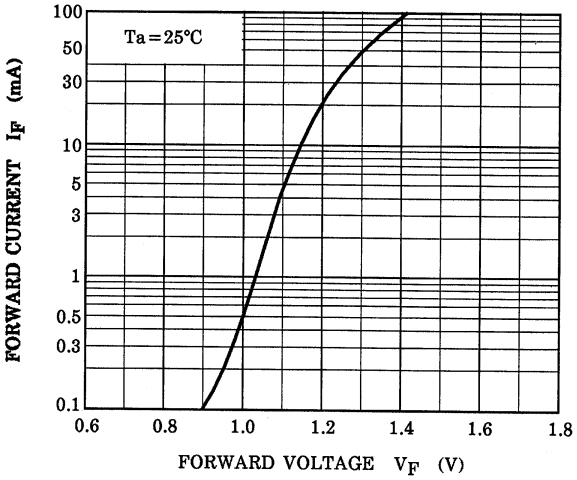
$I_{T\ (RMS)}$ – Ta



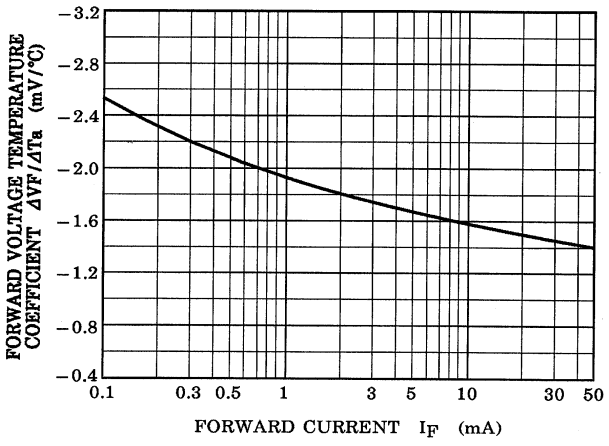
I_{FP} –D_R



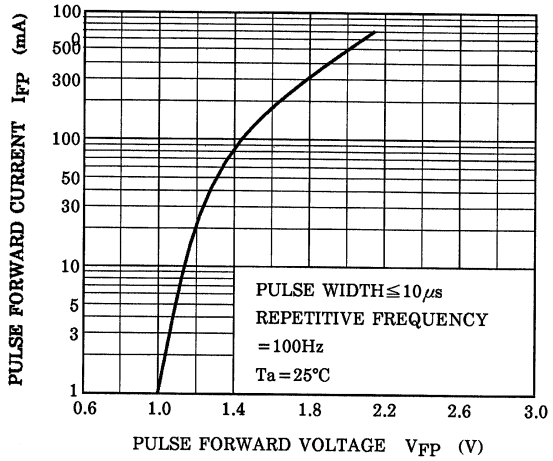
I_F – V_F



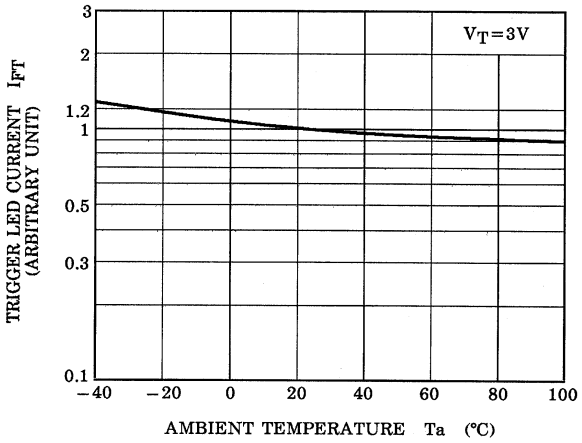
$\Delta V_F/\Delta Ta$ – I_F



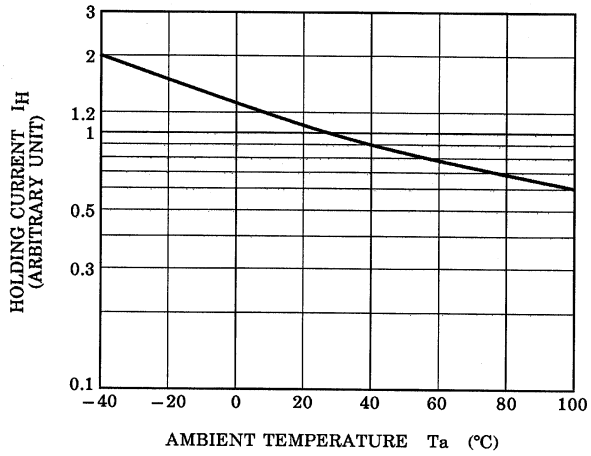
I_{FP} – V_{FP}



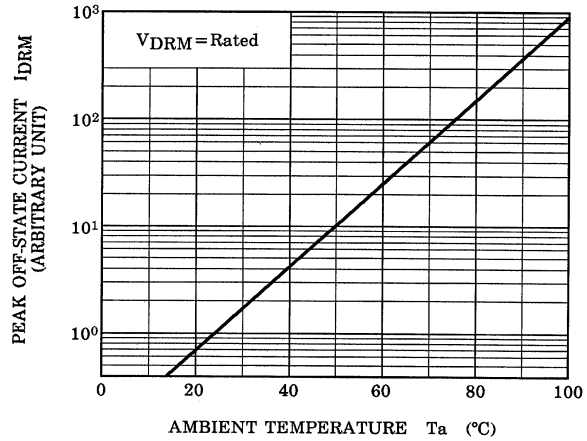
NORMALIZED I_{FT} – Ta



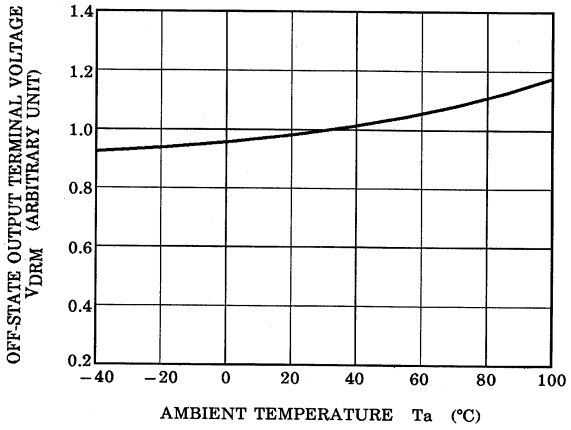
NORMALIZED I_H – Ta



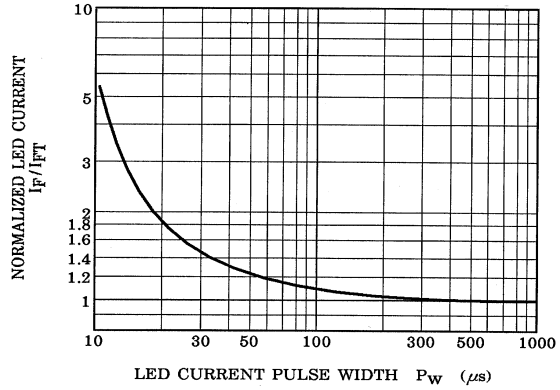
NORMALIZED I_{DRM} – Ta



NORMALIZED V_{DRM} – Ta



NORMALIZED LED CURRENT
– LED CURRENT PULSE WIDTH



RESTRICTIONS ON PRODUCT USE

20070701-EN

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