

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRIAC

TLP3020, TLP3021, TLP3022, TLP3023

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 VDE0884 / 08.87,
Certificate No. 68329

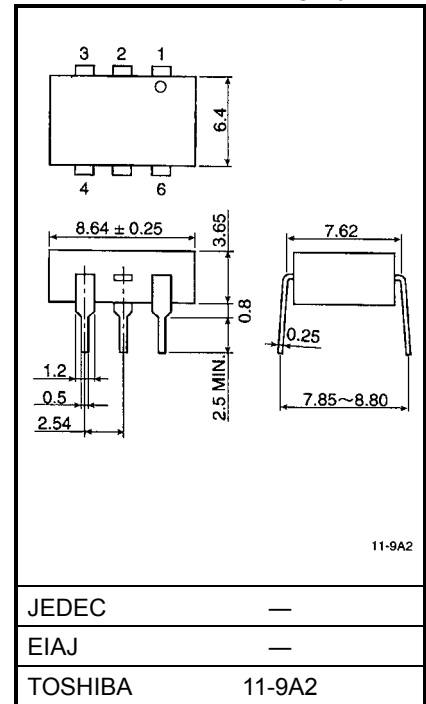
Maximum Operating Insulation Voltage: 630 VPK

Highest Permissible Over Voltage: 6000 VPK

Note: When a VDE0884 approved type is needed, please designate the " Option (D4) "

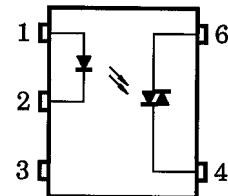
	7.62mm pitch standard type	10.16 mm pitch (LF2) type
● Creepage Distance :	7.0 mm (Min.)	8.0 mm (Min.)
Clearance :	7.0 mm (Min.)	8.0 mm (Min.)
Insulation Thickness :	0.5 mm (Min.)	0.5 mm (Min.)

Unit: mm



Weight: 0.44g

PIN CONFIGURATION (TOP VIEW)



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

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 (100μs pulse, 100pps)	I_{FP}	1	A
	Power Dissipation	P_D	100	mW
	Power Dissipation Derating (Ta ≥ 25°C)	$\Delta P_D/^\circ\text{C}$	-1.0	mW/°C
	Reverse Voltage	V_R	5	V
	Junction Temperature	T_j	125	°C
DETECTOR	Off-State Output Terminal Voltage	V_{DRM}	400	V
	On-Stage RMS	$I_{T(RMS)}$	100	mA
	Current		50	
	On-State Current Derating (Ta ≥ 25°C)	$\Delta I_T/^\circ\text{C}$	-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)	$\Delta P_D/^\circ\text{C}$	-4.0	mW/°C
	Junction Temperature	T_j	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)		$\Delta P_T/^\circ\text{C}$	-4.4	mW/°C
Isolation Voltage (AC, 1 min., R.H. ≤ 60%) (Note 1)		BV_S	5000	Vrms

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

*: In the case of TLP3022

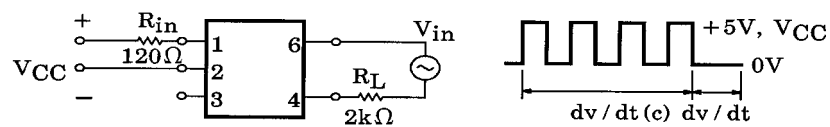
INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta=25°C)

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

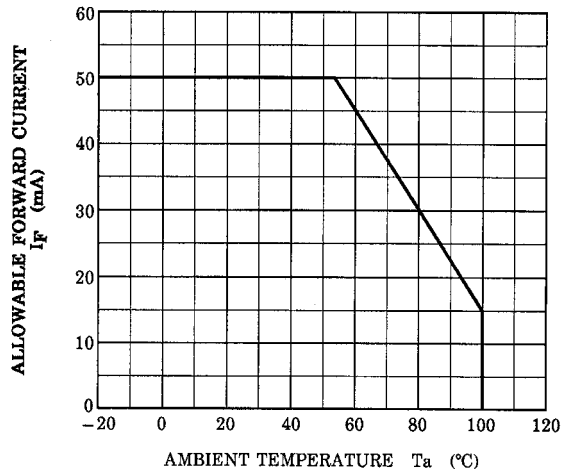
COUPLED ELECTRICAL CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Trigger LED Current	TLP3020	I_{FT}	$V_T=3\text{V}$	—	—	30	mA
	TLP3021			—	—	15	
	TLP3022			—	5	10	
	TLP3023			—	—	5	
Capacitance Input to Output		C_S	$V_S=0, f=1\text{MHz}$	—	0.8	—	pF
Isolation Resistance		R_S	$V_S=500\text{V}$ (R.H. $\leq 60\%$)	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	—	

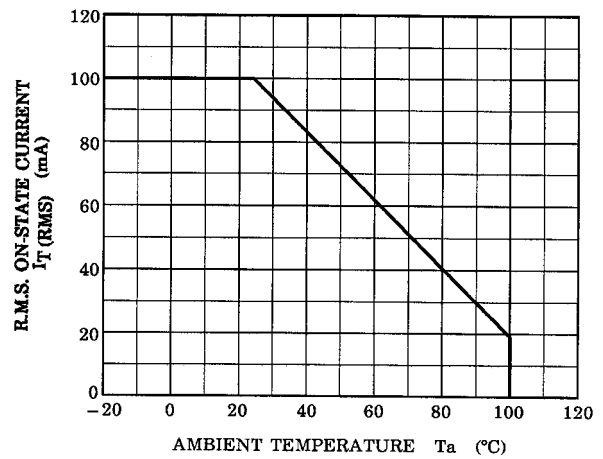
Fig. 1 dv/dt TEST CIRCUIT



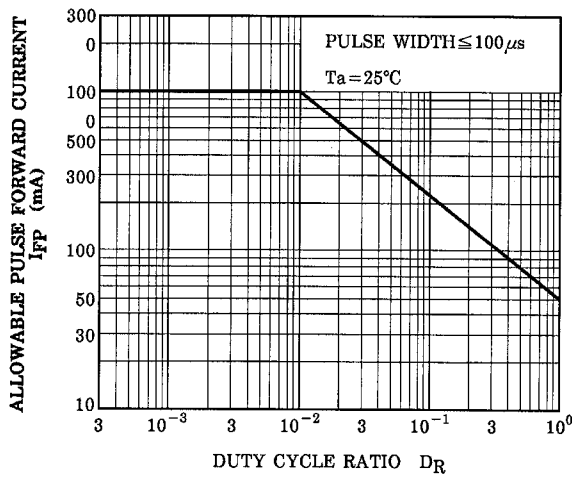
$I_F - T_a$



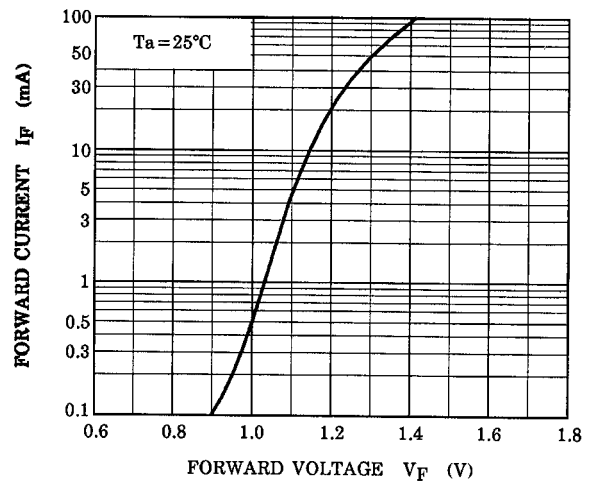
$I_T (RMS) - T_a$



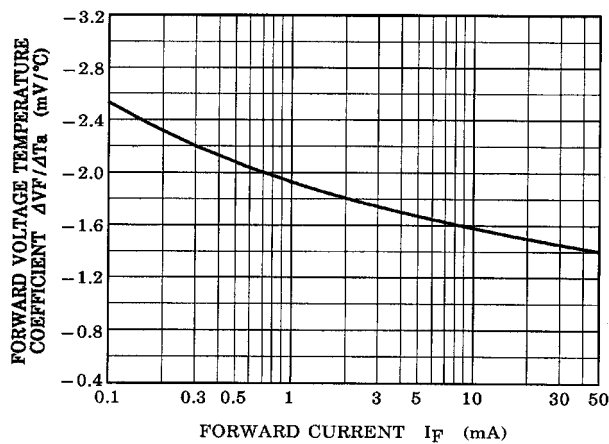
$I_{FP} - D_R$



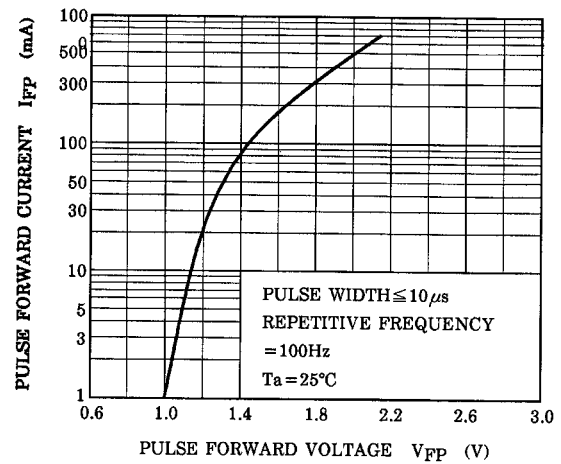
$I_F - V_F$



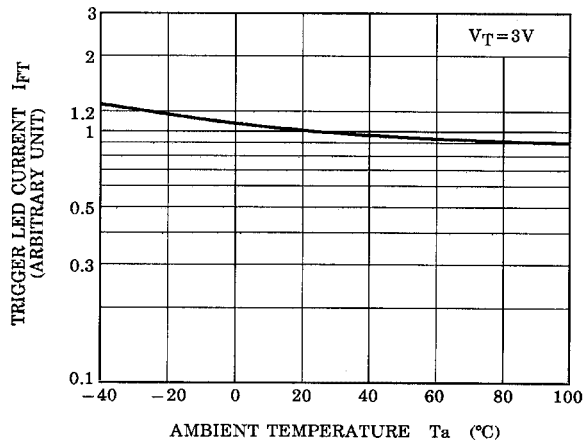
$\Delta V_F / \Delta T_a - I_F$



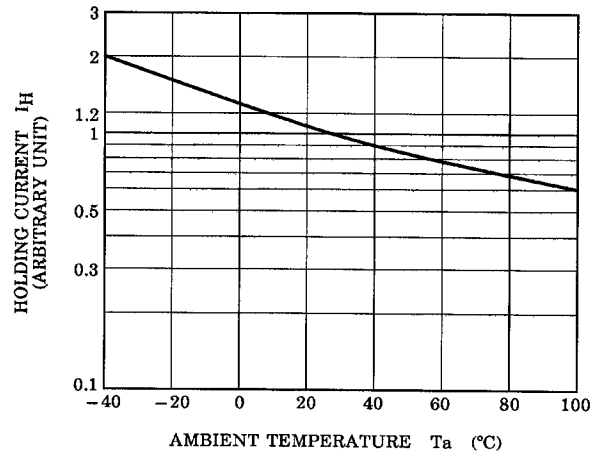
$I_{FP} - V_{FP}$



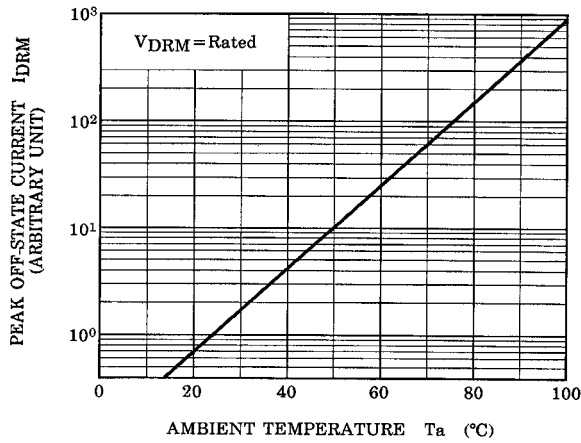
NORMALIZED I_{FT} - T_a



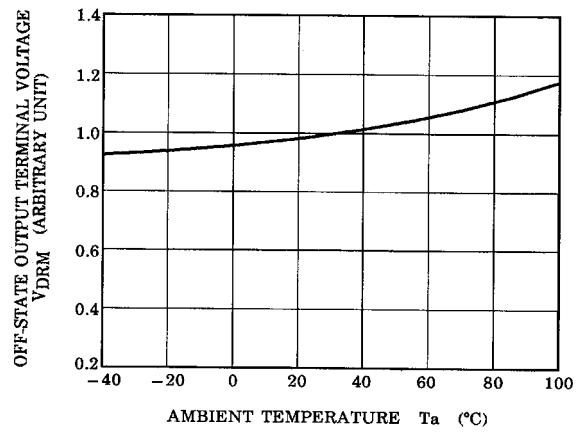
NORMALIZED I_H - T_a



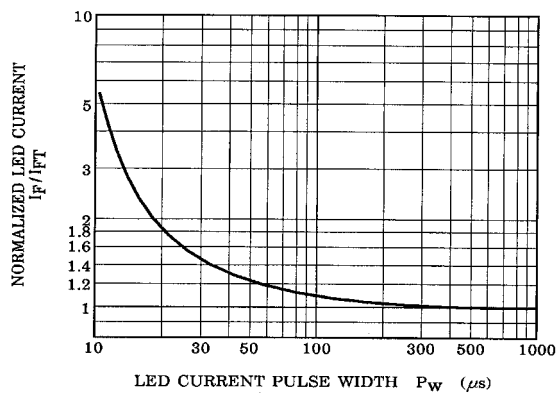
NORMALIZED I_{DRM} - T_a



NORMALIZED V_{DRM} - T_a



NORMALIZED LED CURRENT
- LED CURRENT PULSE WIDTH



RESTRICTIONS ON PRODUCT USE

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