

(TLP3020)

- 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.

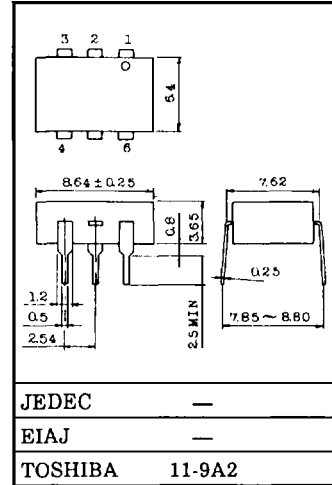
- Peak Off-State Voltage : 400V Min.
- Trigger LED Current : 30mA Max. (TLP3020)  
15mA Max. (TLP3021)  
10mA Max. (TLP3022)  
5mA Max. (TLP3023)
- On-State Current : 100mA Max.
- UL Recognized : UL1577, File No. E67349  
Isolation Voltage : 5000Vrms (Min)
- Option (D4) type VDE Approved : DIN VDE0884/08.87,  
Certificate No. 68329

Maximum Operating Insulation Voltage : 630V<sub>PK</sub>  
Highest Permissible Over Voltage : 6000V<sub>PK</sub>

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

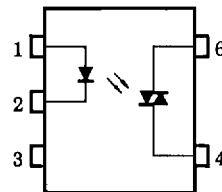
- |                          | 7.62mm pitch<br>standard type | 10.16mm pitch<br>(LF2) type |
|--------------------------|-------------------------------|-----------------------------|
| • Creepage Distance :    | 7.0mm (Min)                   | 8.0mm (Min)                 |
| • Clearance :            | 7.0mm (Min)                   | 8.0mm (Min)                 |
| • Insulation Thickness : | 0.5mm (Min)                   | 0.5mm (Min)                 |

Unit in mm



Weight : 0.44g

PIN CONFIGURATION (TOP VIEW)



- 1 : ANODE
- 2 : CATHODE
- 3 : NC
- 4 : TERMINAL 1
- 6 : TERMINAL 2

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MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I <sub>F</sub>	50	mA
	Forward Current Derating (Ta ≥ 53°C)	ΔI <sub>F</sub> /°C	-0.7	mA/°C
	Peak Forward Current (100μs pulse, 100pps)	I <sub>FP</sub>	1	A
	Power Dissipation	P <sub>D</sub>	100	mW
	Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>D</sub> /°C	-1.0	mW/°C
	Reverse Voltage	V <sub>R</sub>	5	V
	Junction Temperature	T <sub>j</sub>	125	°C
DETECTOR	Off-State Output Terminal Voltage	V <sub>DRM</sub>	400	V
	On-State RMS Current	Ta = 25°C	100	mA
		Ta = 70°C	50	
	On-State Current Derating (Ta ≥ 25°C)	ΔI <sub>T</sub> /°C	-1.1	mA/°C
	Peak On-State Current (100μs pulse, 120pps)	I <sub>TP</sub>	2	A
	Peak Nonrepetitive Surge Current (P <sub>w</sub> = 10ms, DC = 10%)	I <sub>TSM</sub>	1.2	A
	Power Dissipation	P <sub>D</sub>	300	mW
	Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>D</sub> /°C	-4.0	mW/°C
Junction Temperature	T <sub>j</sub>	100	°C	
Storage Temperature Range	T <sub>stg</sub>	-55~150	°C	
Operating Temperature Range	T <sub>opr</sub>	-40~100	°C	
Lead Soldering Temperature (10 sec.)	T <sub>sol</sub>	260	°C	
Total Package Power Dissipation	P <sub>T</sub>	330	mW	
Total Package Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>T</sub> /°C	-4.4	mW/°C	
Isolation Voltage (AC, 1 min., R.H. ≤ 60%) (Note 1)	BV <sub>S</sub>	5000	V <sub>rms</sub>	

Note 1 : Device considered a two terminal device : Pins 1, 2 and 3 shorted together and pins 4 and 6 shorted together.

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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	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0, f = 1\text{MHz}$	—	10	—	pF
DETECTOR	Peak Off-State Current	$I_{DRM}$	$V_{DRM} = 400\text{V}$	—	10	100	nA
	Peak On-State Voltage	$V_{TM}$	$I_{TM} = 100\text{mA}$	—	1.7	3.0	V
	Holding Current	$I_H$	—	—	0.2	—	mA
	Critical Rate of Rise of Off-State Voltage	$dv/dt$	$V_{in} = 120\text{Vrms}, T_a = 85^\circ\text{C}$ (Fig. 1)	200	500	—	$\text{V}/\mu\text{s}$
	Critical Rate of Rise of Commutating Voltage	$dv/dt(c)$	$V_{in} = 30\text{Vrms}, I_F = 15\text{mA}$ (Fig. 1)	—	0.2	—	$\text{V}/\mu\text{s}$

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

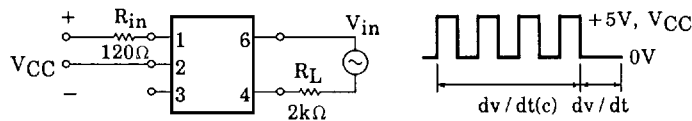
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Trigger LED Current	TLP3020	$I_{FT}$	$V_T = 3\text{V}$	—	—	30	mA
	TLP3021			—	—	15	
	TLP3022			—	5	10	
	TLP3023			—	—	5	
Capacitance Input to Output	$C_S$	$V_S = 0, f = 1\text{MHz}$	—	0.8	—	pF	
Isolation Resistance	$R_S$	$V_S = 500\text{V (R.H.} \leq 60\%)$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$	
Isolation Voltage	$B_{VS}$	AC, 1 minute	5000	—	—	Vrms	
		AC, 1 second (in oil)	—	10000	—		
		DC, 1 minute (in oil)	—	10000	—	$V_{dc}$	

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V_{AC}$	—	—	120	Vac
Forward Current	$I_F^*$	15	20	25	mA
Peak On-State Current	$I_{TP}$	—	—	1	A
Operating Temperature	$T_{opr}$	-25	—	85	$^\circ\text{C}$

※ In the case of TLP3022

Fig. 1  $dv/dt$  TEST CIRCUIT



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