

TENTATIVE-RESTRICTIVE DATA TOSHIBA AC SWITCH  
OPTICALLY ISOLATED AC SWITCH WITH ZERO VOLTAGE TURN-ON FUNCTION

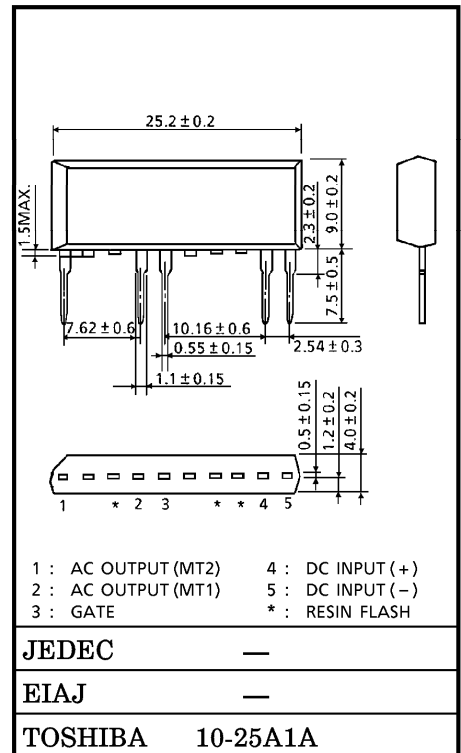
# TSA2000G, TSA2000J

- R.M.S. On-State Current :  $I_T$  (RMS) = 0.1~2A
- Repetitive Peak Off-State Voltage :  $V_{DRM}$  = 400, 600V
- Isolation Voltage between Input to Output : 3000VAC (t=1min.)
- Thickness of Inner Insulation Material : 0.8mm (Min.)
- Creepage Distances, Clearances for Insulation between Input and Output Side : 6mm (Min.)
- TTL drive is Available

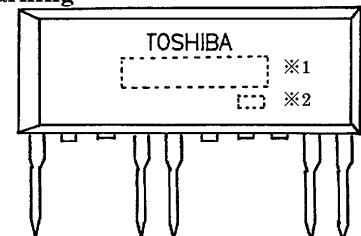
Unit in mm

MAXIMUM RATINGS (Ta = 25°C)

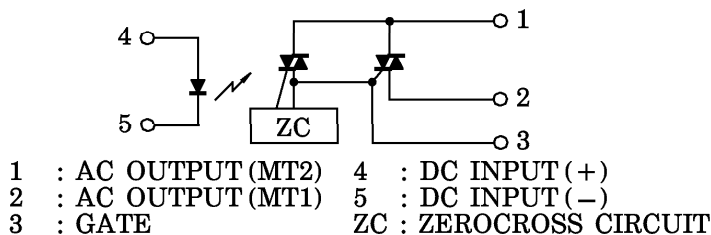
CHARACTERISTIC		SYMBOL	RATING	UNIT
INPUT	Control Input Current	$I_F$ (IN)	50	mA
	Forward Current Derating (Ta ≥ 53°C)	$\Delta I_F / ^\circ C$	-0.7	mA / °C
	Peak Forward Current (100μs pulse, 100pps)	$I_{FP}$	1	A
	Reverse Voltage	$V_R$	5	V
OUTPUT	Repetitive Peak Off-State Voltage	TSA2000G	400	V
		TSA2000J	600	
	Nominal AC Line Voltage (Note 1)	TSA2000G	80~125	V
		TSA2000J	80~250	
	R.M.S On-State Current (Sine Waveform, R.M.S.)	$I_T$ (RMS)	0.1~2	A
	Peak One Cycle Surge On-State Current (Non-Repetitive)	$I_{TSM}$	20 (50Hz)	A
22 (60Hz)				
$I^2t$ Limit Value	$I^2t$	2	A <sup>2</sup> s	
Operating Frequency Range	f	45~65	Hz	
Operating Temperature Range	T <sub>opr</sub>	-40~100	°C	
Storage Temperature Range	T <sub>stg</sub>	-40~100	°C	
Isolation Voltage (Input to Output) Note 2	$BV_S$	3000	V	



Weight : 2g  
Marking



EQUIVALENT CIRCUIT



(The cutted pins near by Pin No.1 & No.3 is connecting in electrically with output terminal)

Note 1 : When the voltage larger than applied AC voltage is applied to the device such as 2 phase motor and others, please derating for this maximum rating value.

Note 2 : TEST CONDITION... AC, t=60s, RH ≤ 60%

Note 3 : Soldering of printed wiring board should be used under 260°C and 10 seconds.

NUMBER	SYMBOL		MARK	
※1	TYPE	TSA2000G	TYPE	TSA2000G
		TSA2000J		TSA2000J
※2	Lot Number		Example	
	<input type="checkbox"/> <input type="checkbox"/> ↑ Month (Starting from Alphabet A) ↑ Year (Last Number of the Christian era)			
			3A : January 1993 3B : February 1993 3L : December 1993	

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● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
INPUT	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	$C_T$	$V_T = 0\text{V}, f = 1\text{MHz}$	—	20	—	pF	
OUTPUT	Peak Off-State Current	$I_{DRM}$	$V_{DRM} = \text{Rated}$	—	—	10	$\mu\text{A}$	
	Peak On-State Voltage	$V_{TM}$	$I_{TM} = 3\text{A}$	—	—	1.5	V	
	Holding Current	$I_H$	$V_D = 6\text{V}, \text{Beginning Current} = 1\text{A}$	—	—	25	mA	
	Critical Rate of Rise of Off-State Voltage	$dv/dt$	$V_{DRM} = \text{Rated}$	—	2000	—	$\text{V} / \mu\text{s}$	
	Critical Rate of Rise of Commutating Voltage	$(dv/dt)_c$	$V_D = 400\text{V}, -di/dt = 20\text{A/ms}$	—	20	—	$\text{V} / \mu\text{s}$	
	Thermal Resistance	Junction to Lead	$R_{th(j-l)}$	AC	—	—	22	$^{\circ}\text{C} / \text{W}$
		Junction to Ambient	$R_{th(j-a)}$	AC	—	—	90	$^{\circ}\text{C} / \text{W}$

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Trigger LED Current	$I_{FT}$	$V_D = 6\text{V}, R_L = 20\Omega$	—	—	10	mA
Inhibit Voltage	$V_{IH}$	$I_F = 10\text{mA}, R_L = 20\Omega$	—	38	50	V
Capacitance (Input to output)	$C_S$	$V_S = 0\text{V}, f = 1\text{MHz}$	—	0.5	—	pF
Isolation Resistance	$R_S$	$V = 500\text{V}, RH \leq 60\%$	$10^9$	—	—	$\Omega$
Turn-off Time	$t_{off}$	OUTPUT : Sine Waveform	—	—	3/4	cycle

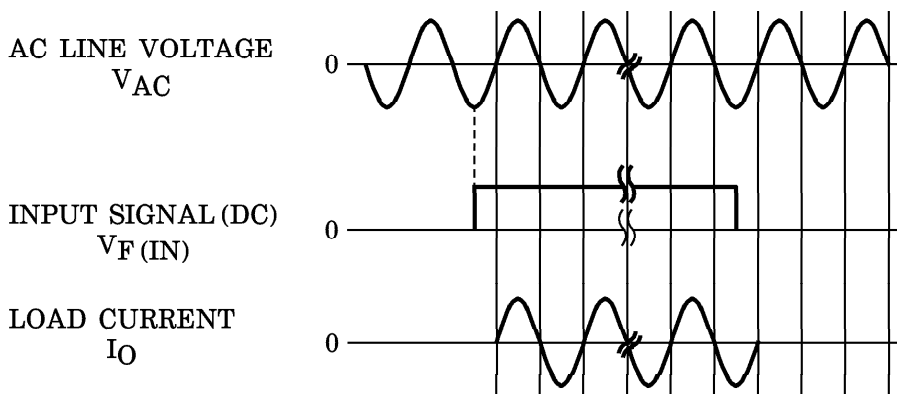


Fig.1 ZERO VOLTAGE SWITCHING WAVEFORM

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