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

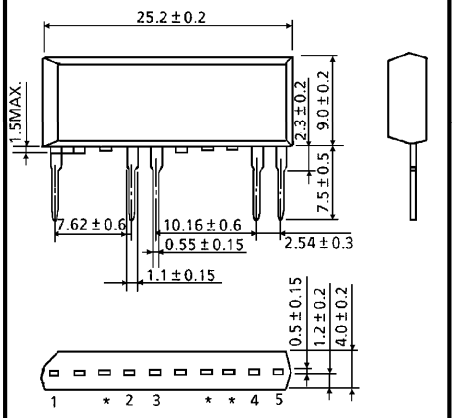
TSA3000G, TSA3000J

- R.M.S. ON-STATE CURRENT : $I_{T\,(RMS)}$ = 0.1~3A
- 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

MAXIMUM RATINGS (Ta = 25°C)

	CHARACTERISTIC		SYMBOL	RATING	UNIT
INPUT	Control Input Current		$I_{F\,(IN)}$	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
	Reverse Voltage		V_R	5	V
OUTPUT	Repetitive Peak Off-State Voltage	TSA3000G	V_{DRM}	400	V
		TSA3000J		600	
	Nominal AC Line Voltage (Note 1)	TSA3000G	V_{AC}	80~125	V
		TSA3000J		80~250	
	R.M.S On-State Current (Sine Waveform, R.M.S.)		$I_{T(RMS)}$	0.1~3	A
	Peak One Cycle Surge On-State Current (Non-Repetitive)		I_{TSM}	30 (50Hz)	A
				33 (60Hz)	
	I^2t Limit Value		I^2t	4.5	A^2s
Operating Frequency Range			f	45~65	Hz
Operating Temperature Range			T_{opr}	−40~100	°C
Storage Temperature Range			T_{stg}	−40~100	°C
Isolation Voltage (Input to Output) Note 2			BV_S	3000	V

Unit in mm

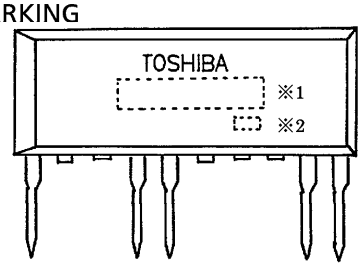


1 : AC OUTPUT (MT2) 4 : DC INPUT (+)
2 : AC OUTPUT (MT1) 5 : DC INPUT (−)
3 : GATE * : RESIN FLASH

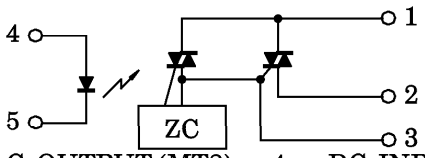
JEDEC	—
EIAJ	—
TOSHIBA	10-25A1A

Weight : 2g

MARKING



EQUIVALENT CIRCUIT



1 : AC OUTPUT (MT2) 4 : DC INPUT (+)
2 : AC OUTPUT (MT1) 5 : DC INPUT (−)
3 : GATE ZC : ZEROCROSS CIRCUIT

NUMBER	SYMBOL		MARK	
※1	TYPE	TSA3000G	TYPE	TSA3000G
		TSA3000J		TSA3000J
※2	Lot Number □□ Month (Staring from Alphabet A) Year (Last Number of the Christian era)		Example 3A : January 1993 3B : February 1993 3L : December 1993	

(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.

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

	CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
INPUT	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_T = 0V, f = 1MHz	—	20	—	pF
OUTPUT	Peak Off-State Current		I_{DRM}	V_{DRM} = Rated	—	—	10	μA
	Peak On-State Voltage		V_{TM}	I_{TM} = 4.5A	—	—	1.5	V
	Holding Current		I_H	V_D = 6V, Beginning Current = 1A	—	—	25	mA
	Critical Rate of Rise of Off-State Voltage		dv / dt	V_{DRM} = Rated	—	2000	—	V / μs
	Critical Rate of Rise of Commutating Voltage		(dv / dt) c	V_D = 400V −di / dt = 30A / ms	—	30	—	V / μs
	Thermal Resistance	Junction to Lead	$R_{th\ (j\text{-}\ell)}$	AC	—	—	20	°C / W
		Junction to Ambient	$R_{th\ (j\text{-}a)}$	AC	—	—	85	°C / W

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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

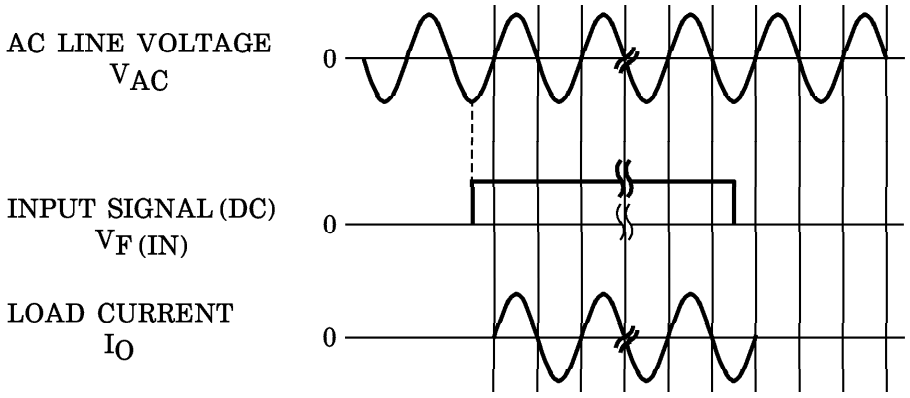
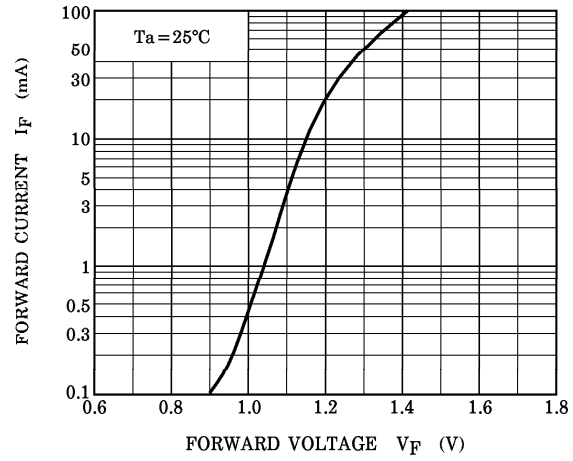
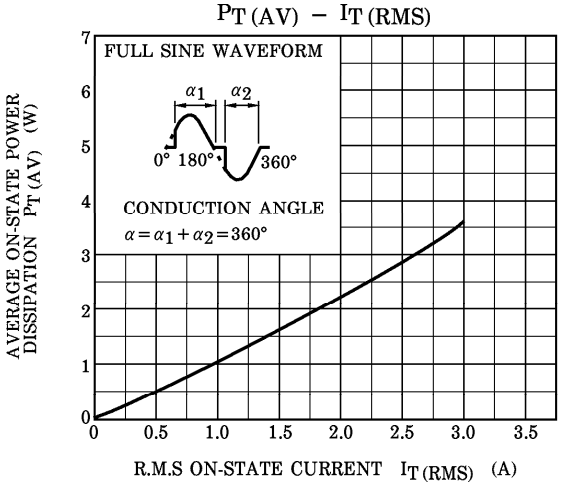


Fig.1 ZERO VOLTAGE SWITCHING WAVEFORM

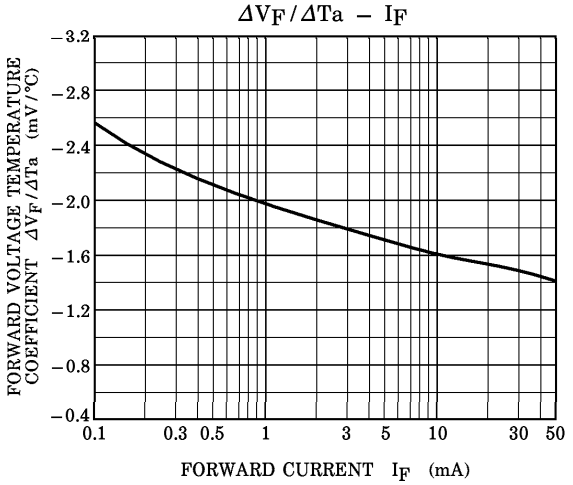
$I_F - V_F$



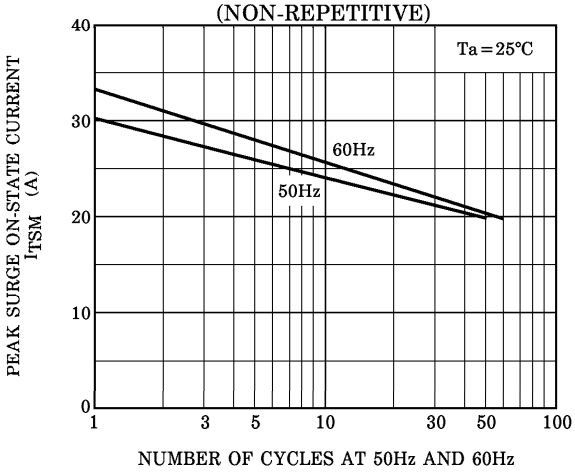
$P_{T(AV)} - I_{T(RMS)}$



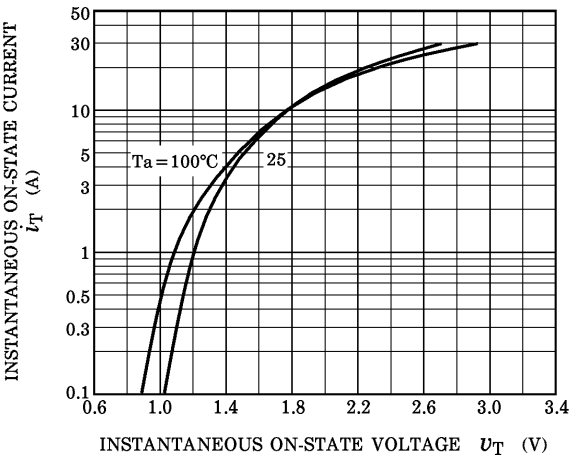
$\Delta V_F / \Delta Ta - I_F$



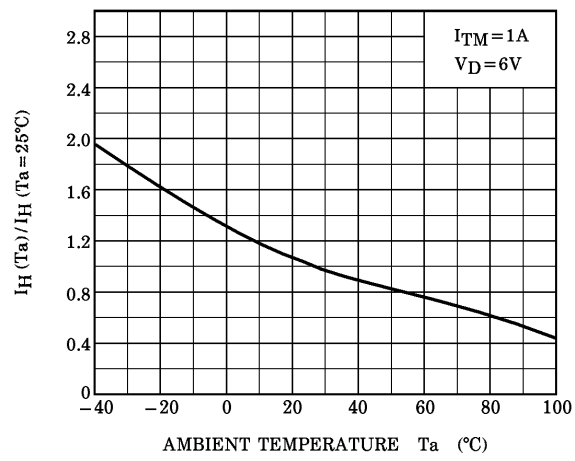
SURGE ON-STATE CURRENT (NON-REPETITIVE)



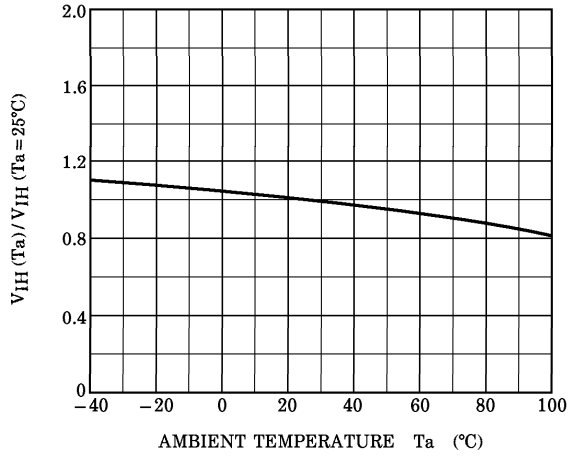
$i_T - v_T$



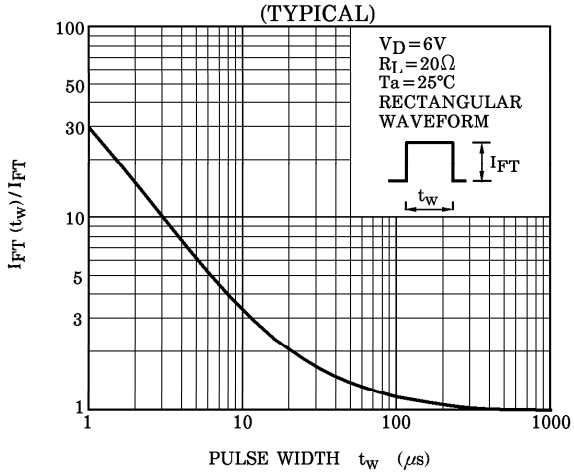
$I_H (Ta) / I_H (Ta = 25°C) - Ta$ (TYPICAL)



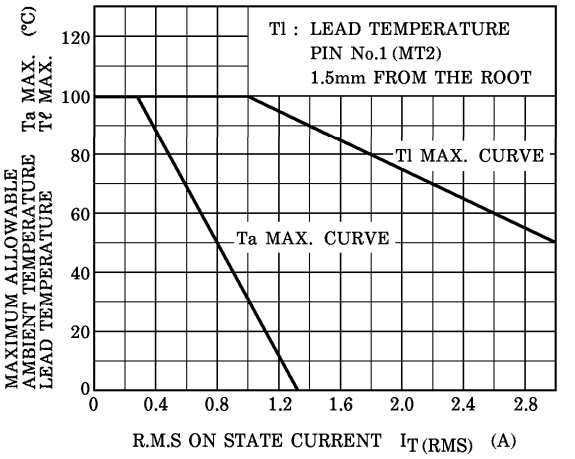
V_{IH} (Ta) / V_{IH} (Ta = 25°C) – Ta (TYPICAL)



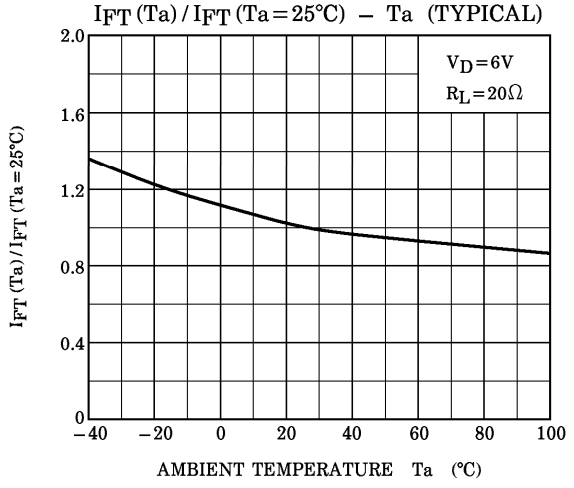
PULSE TRIGGER CHARACTERISTIC (TYPICAL)



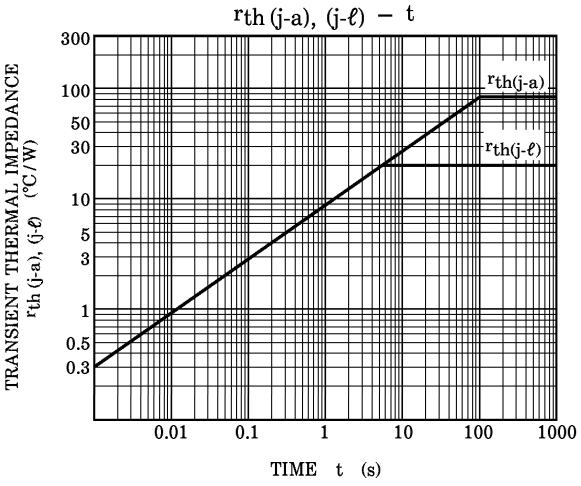
Ta MAX. Tℓ MAX. – $I_{T\,(RMS)}$



I_{FT} (Ta) / I_{FT} (Ta = 25°C) – Ta (TYPICAL)



r_{th} (j-a), (j-ℓ) – t



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