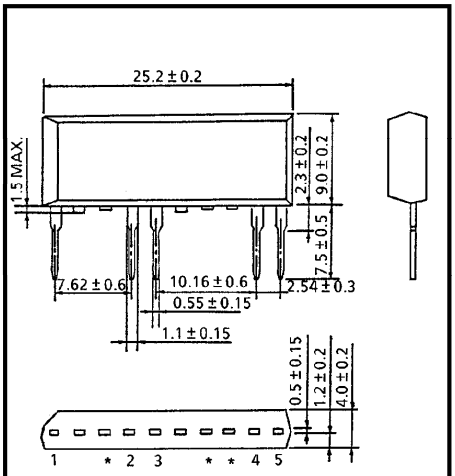
TOSHIBA AC SWITCH OPTICALLY ISOLATED AC SWITCH

TSA3101G

- R.M.S. On-State Current : $I_{T(RMS)}$ = 0.2~3A
- 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

Unit in mm

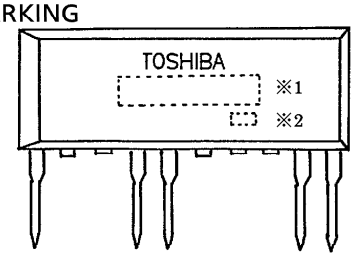


1 : AC OUTPUT (MT2) 4 : DC INPUT (+)
2 : AC OUTPUT (MT1) 5 : DC INPUT (−)
3 : GATE * : RESIN FLASH

JEDEC	—
EIAJ	—
TOSHIBA	10-25A1A

Weight : 2g (TYP.)

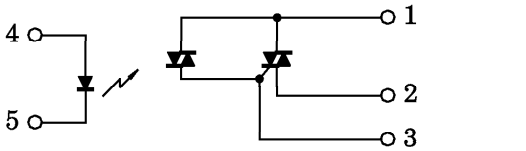
MARKING



MAXIMUM RATINGS (Ta = 25°C)

	CHARACTERISTIC	SYMBOL	RATING	UNIT
INPUT	Forward 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	V_{DRM}	400	V
	Nominal AC Line Voltage (Note 1)	V_{AC}	80~125	V
	R.M.S On-State Current (Sine Waveform, R.M.S.)	$I_{T(RMS)}$	0.2~3	A
	Peak One Cycle Surge On-State Current (Non-Repetitive)	I_{TSM}	80 (50Hz) / 88 (60Hz)	A
	I^2t Limit Value	I^2t	32	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

EQUIVALENT CIRCUIT



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

NUMBER	SYMBOL		MARK	
※1	TYPE	TSA3101G	TYPE	TSA3101G
※2	Lot Number □□ Month (Staring from Alphabet A) Year (Last Number of the Christian era)		Example 7A : January 1997 7B : February 1997 7L : December 1997	

(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 10s.

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} = 12A	—	—	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	$R_{th(j-\ell)}$	AC	—	—	20	°C / W
		Junction to Ambient	$R_{th(j-a)}$	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
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

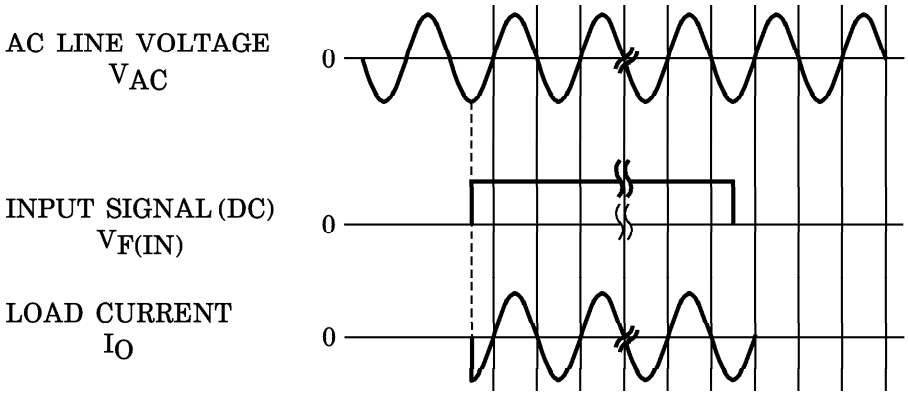
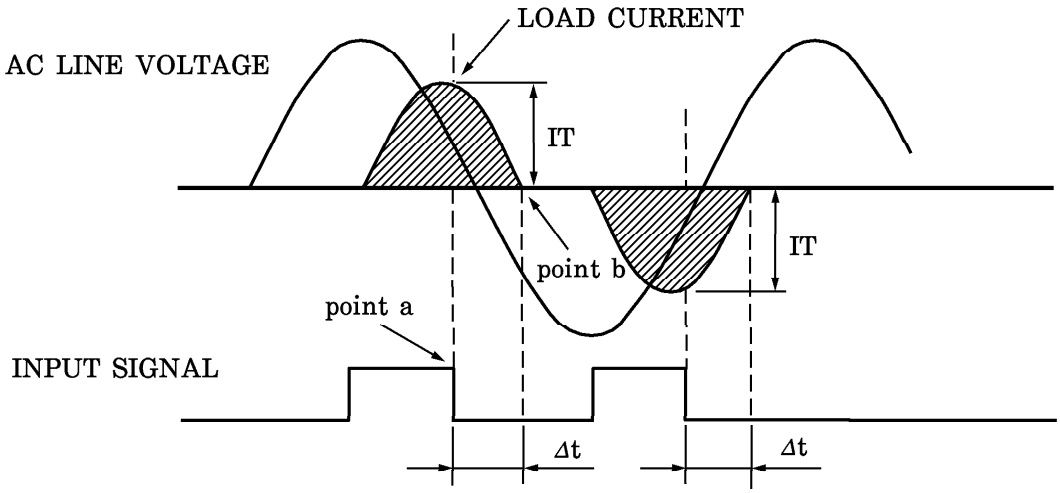


Fig.1 SWITCHING WAVEFORM

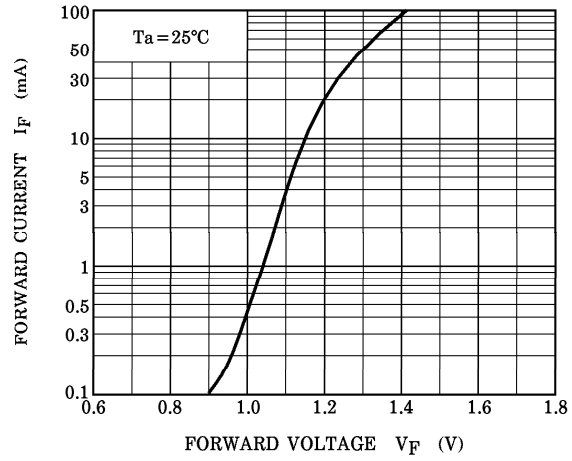
<REMARK>

PHASE CONTROL APPLICATION

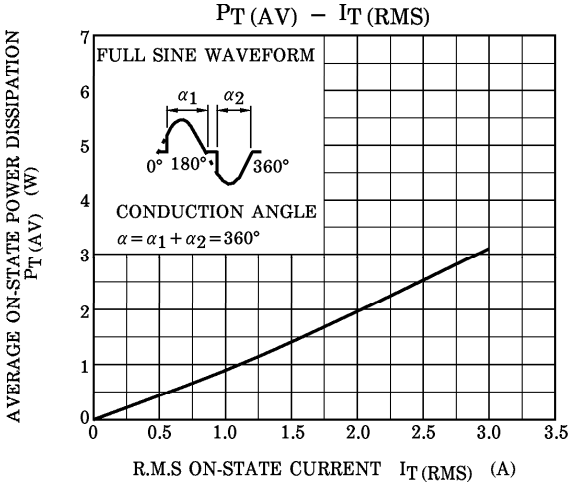
In case of using in phase control application. Δt must be at least 1ms (Δt : The time starting from the end of INPUT SIGNAL "point a" to the point at which load current become ZERO "point b"). And, Load current "IT" at "point a" must be at least double the maximum Holding Current (IH) specification in each operating temperature.



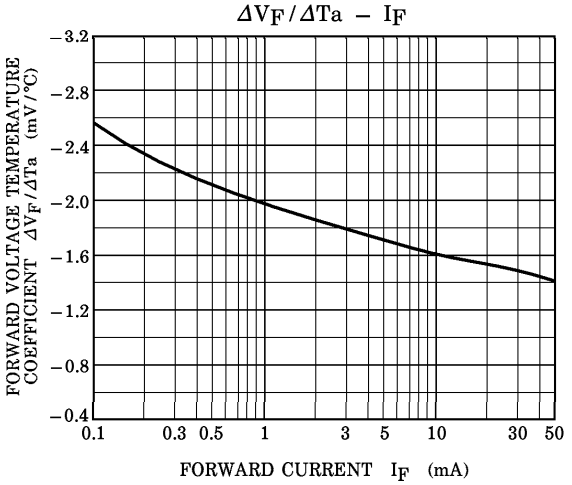
$I_F - V_F$



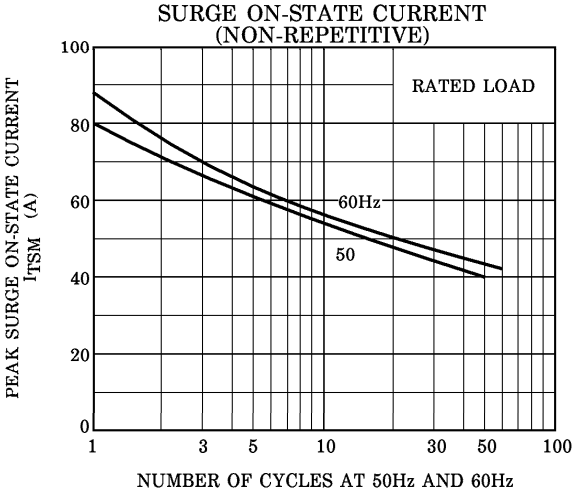
$P_{T(AV)} - I_{T(RMS)}$



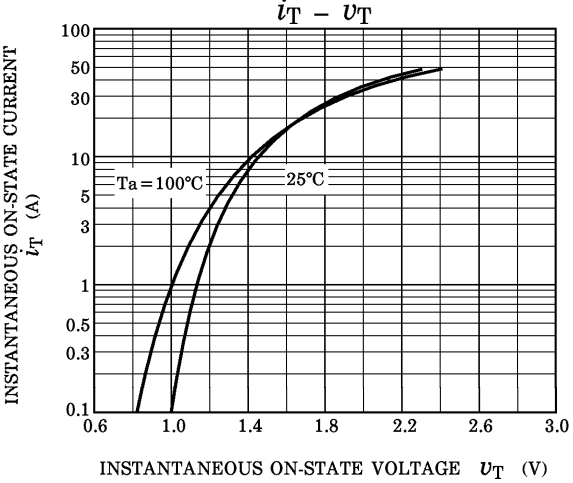
$\Delta V_F / \Delta Ta - I_F$



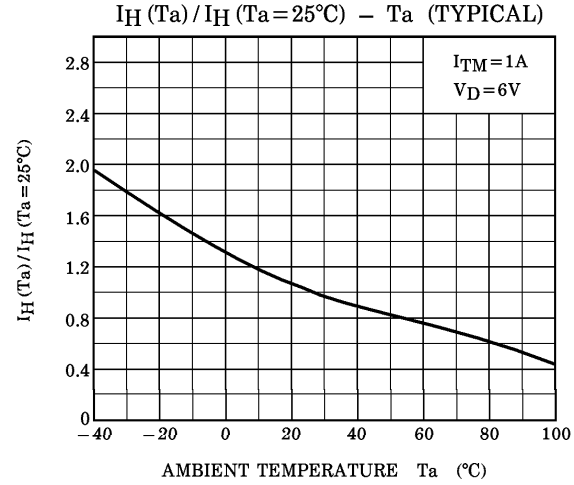
SURGE ON-STATE CURRENT (NON-REPETITIVE)



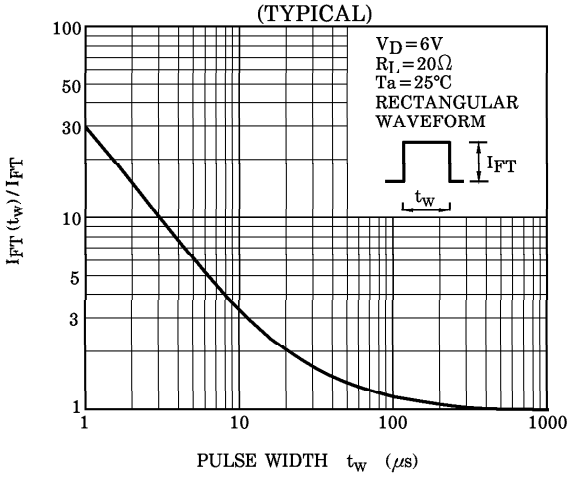
$i_T - v_T$



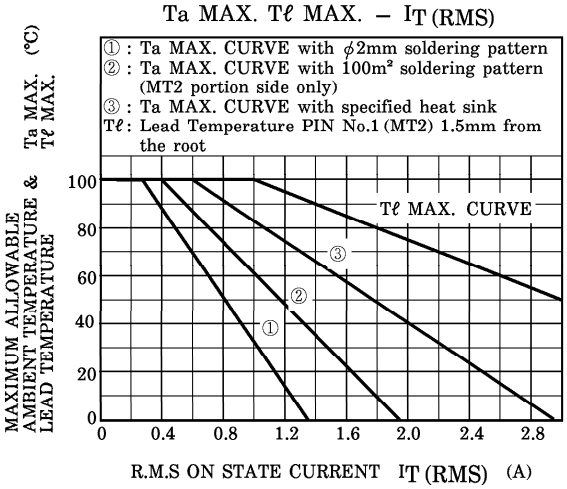
$I_H (Ta) / I_H (Ta = 25°C) - Ta$ (TYPICAL)



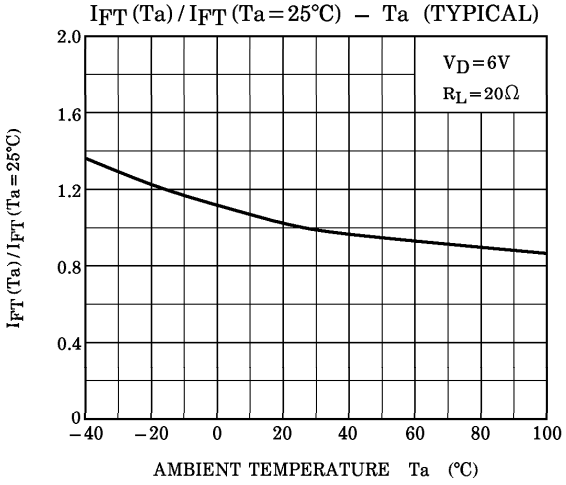
PULSE TRIGGER CHARACTERISTIC
(TYPICAL)



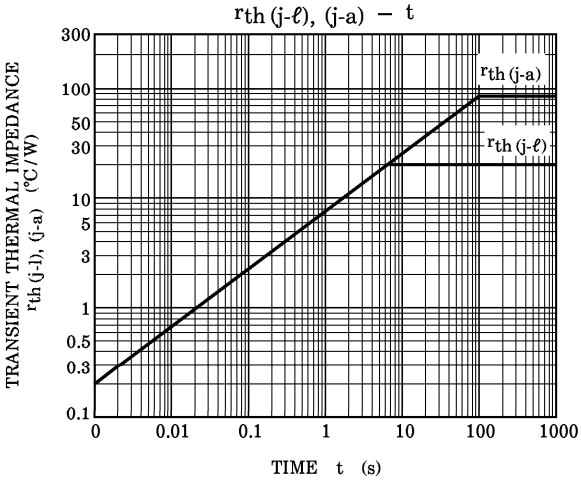
Ta MAX. Tℓ MAX. – I_T (RMS)



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



r_{th} (j-ℓ), (j-a) – t



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