NEC

THYRISTORS
2S2M, 2S4M

2 A HIGH-SPEED SWITCHING SCR

The 2S2M and 2S4M are P-gate fully diffused mold SCRs with an average on-current of 2 A. The repeat peak off-voltages (and reverse voltages) are 200 V and 400 V.

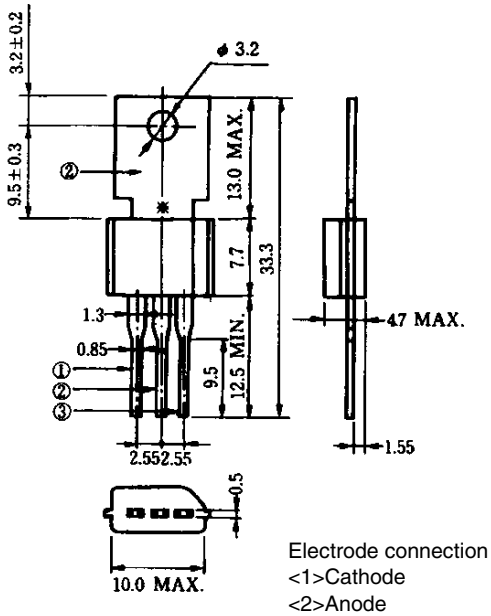
FEATURES

- This transistor is designed for high-speed switching and is deal for use in commercial frequencies, high-frequency pulse applications, and inverter applications.
- This transistor features a small and lightweight package and is easy to handle even on the mounting surface due to its TO-202AA dimensions. Processing of lead wires and heatsink (tablet) using jigs is also possible.
- Employs flame-retardant epoxy resin (UL94V-0).

APPLICATIONS

Consumer electronic euipments, ignitors of devices for light indutry, inverter, and solenoid valve drives

PACKAGE DRAWING (UNIT: mm)



Electrode connection
<1>Cathode
<2>Anode
<3>Gate
Standard weight: 1.4

*TC test bench-mark

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	2S2M	2S4M	Ratings	Unit
Non-repetitive peak reverse voltage	V_{RSM}	300	500	V	R_{GK} = 1 kΩ
Non-repetitive peak off-state voltage	V_{DSM}	300	500	V	R_{GK} = 1 kΩ
Repetitive peak reverse voltage	V_{RRM}	200	400	V	R_{GK} = 1 kΩ
Repetitive peak off-voltage	V_{DRM}	200	400	V	R_{GK} = 1 kΩ
Average on-state current	$I_{T(AV)}$	2 (Tc = 77°C, Single half-wave, θ = 180°)		A	Refer to Figure 6 snd 7.
Surge on-state current	I_{TSM}	20 (f = 50 Hz, Sine half-wave, 1 cycle)		A	Refer to Figure 2.
High-frequency peak on-state current	I_{TRM}	15 (Tc = 65°C, f = 10 kp.p.s, t_p = 10 μs)		A	–
Fusing current	$\int i_t^2 dt$	1.6 (1 ms≤t≤10 ms)		A^2s	–
Critical rate of rise of on-state current	dI_T/dt	50		A/μs	–
Peak gate power dissipation	P_{GM}	0.5 (f≥50 Hz, Duty≤10%)		W	–
Average gate power dissipation	$P_{G(AV)}$	0.1		W	
Peak gate forward current	I_{FGM}	0.2 (f≥50 Hz, Duty≤10%)		A	–
Peak gate reverse voltage	V_{RGM}	6		V	–
Junction temperature	T_j	–40 to +125		°C	–
Storage temperature	T_{stg}	–55 tp +150		°C	–

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ELECTRICAL CHARACTERISTICS (T_j = 25°C, R_{GK} = 1 kΩ)

Parameter	Symbol	Conditions		Specifications			Unit	Remarks
				MIN.	TYP.	MAX.		
Repeat peak off-state current	I_{DRM}	$V_{DM} = V_{DRM}$	T_j = 25°C			10	μA	–
			T_j = 125°C			200		–
Repetitive peak reverse current	I_{RRM}	$V_{RM} = V_{RRM}$	T_j = 25°C			10	μA	–
			T_j = 125°C			200	V	Refer to Figure 1.
On voltage	V_{TM}	T_j = 25°C, I_{TM} = 4 A		–	–	2.2	V	Refer to Figure 9.
Gate trigger voltage	V_{GT}	V_{DM} = 6 V, R_L = 100 Ω		–	–	0.8	μA	Refer to Figure 8.
Gate trigger current	I_{GT}	V_{DM} = 6 V, R_L = 100 Ω		–	–	300	V	–
Gate non-trigger voltage	V_{GD}	T_j = 125°C, $V_{DM} = \frac{1}{2}V_{DRM}$		0.2	–	–	V	–
Critical rate of-rise of off-state voltage	dv/dt	T_j = 125°C, $V_{DM} = \frac{2}{3}V_{DRM}$		10	–	–	V/μs	–
Holding current	I_H	T_j = 25°C, V_D = 24 V		–	–	10	mA	–
Commutating turn-off time	T_q	T_j = 125°C, I_T = 2 A $V_{DM} = \frac{2}{3}V_{DRM}$, V_R = 50 V dv/dt = 10 V/μs		–		15	μs	
Turn-on time	T_{gt}	T_j = 125°C, $V_{DM} = \frac{2}{3}V_{DRM}$ I_{TM} = 30 A I_G = 5 mA, t_{1G} = 5 μs		–	–	2	μs	–
Thermal resistance	$R_{th(j-c)}$	Junction-to-case DC		–	–	10	°C/W	Refer to Figure 13.
	$R_{th(j-a)}$	Junction-to-ambient DC		–	–	75		

TYPICAL CHARACTERISTICS (Ta = 25°C)

Figure 1. i_T vs. v_T Characteristics

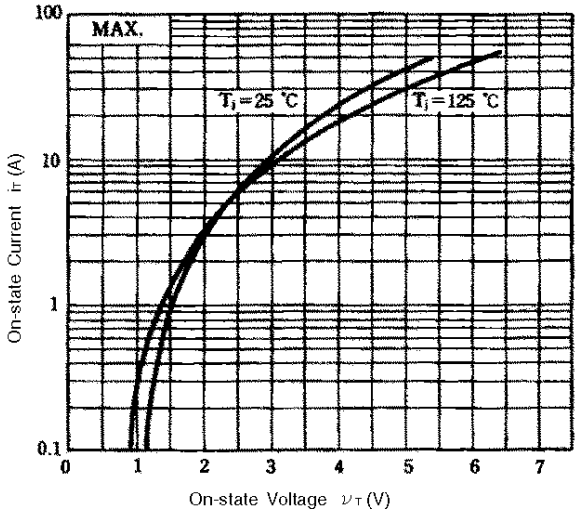


Figure 2. I_{TSM} Rating

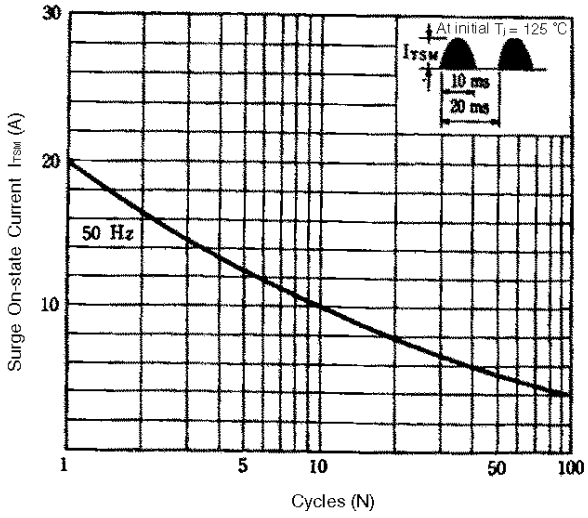


Figure 3. I_{TRM} vs. t_P Rating

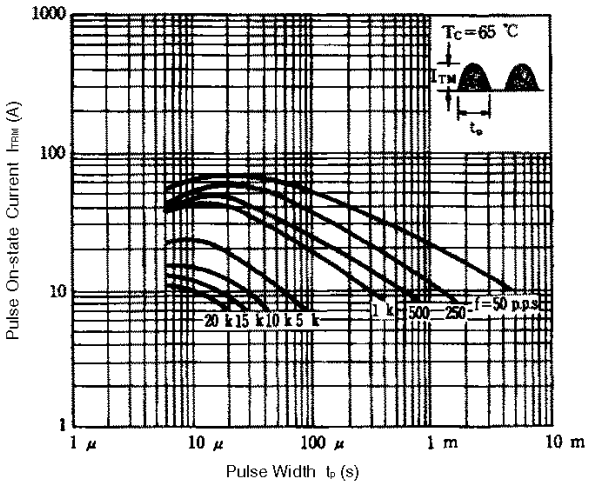


Figure 4. I_{TRM} vs. t_P Rating

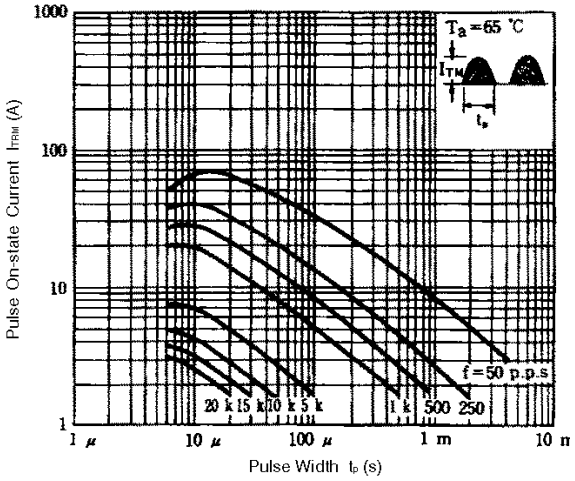


Figure 5. $P_{T(AV)}$ vs. $I_{T(AV)}$ Characteristics

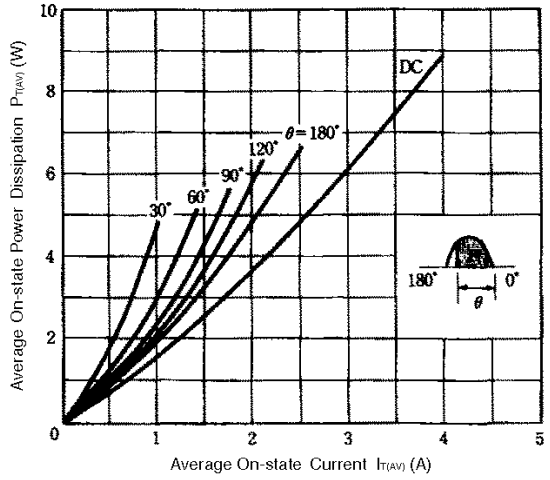


Figure 6. T_C vs. $I_{T(AV)}$ Rating

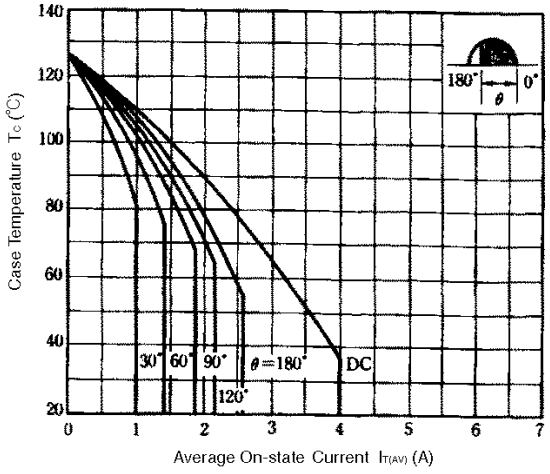


Figure 7. T_A vs. $I_{T(AV)}$ Rating

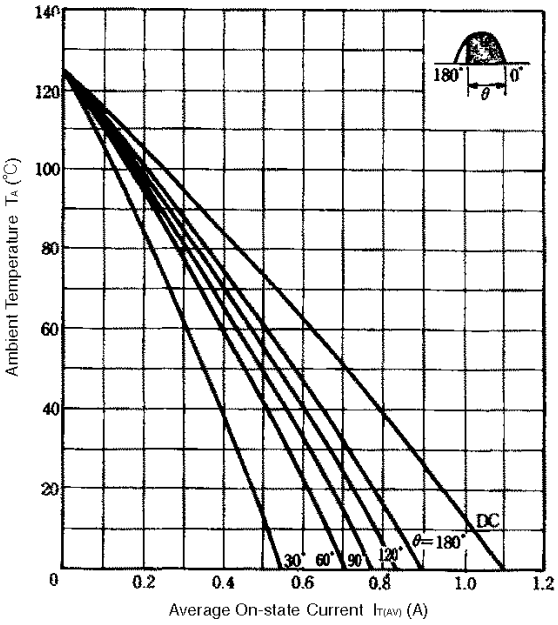


Figure 8. I_{GT} vs. T_A Example of Characteristics

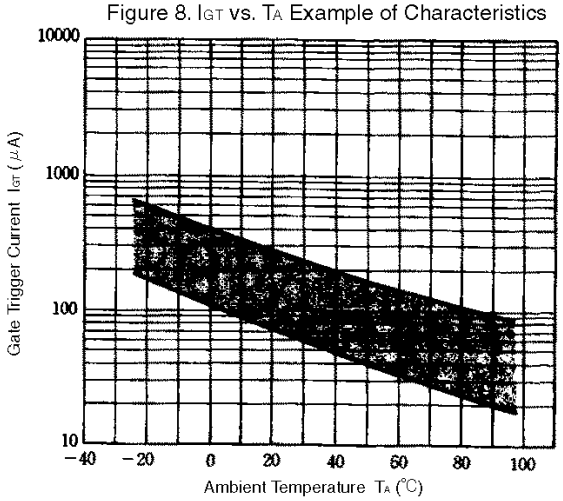


Figure 9. V_{GT} vs. T_A Example of Characteristics

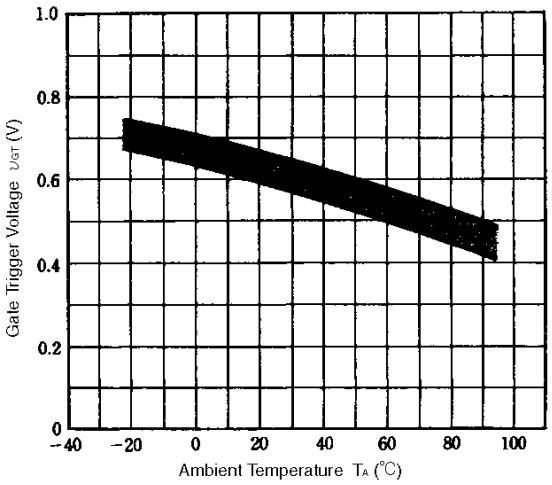


Figure 10. i_{GS} vs. τ Example of Characteristics

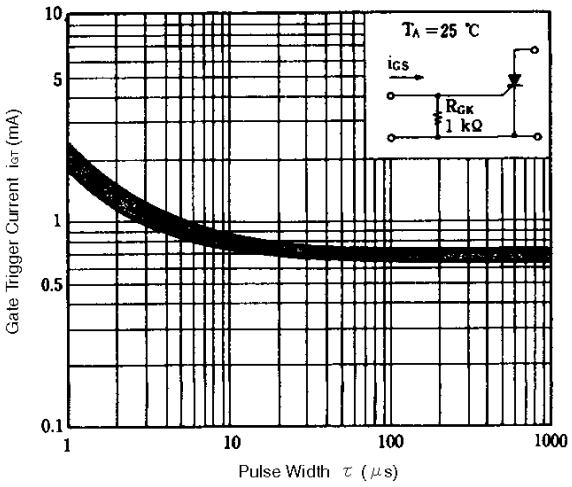


Figure 11. υ_{GT} vs. τ Example of Characteristics

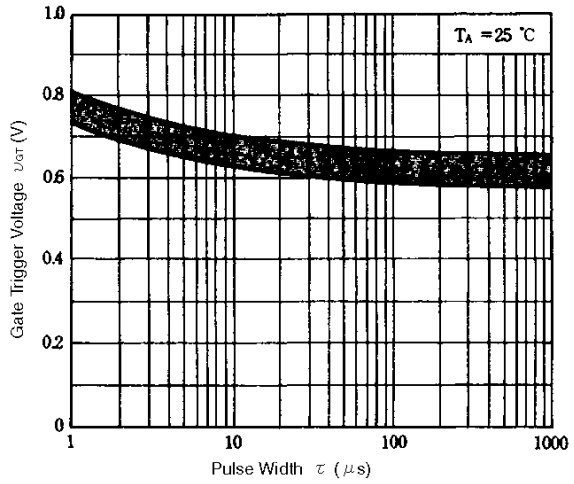


Figure 12. I_H vs. T_A Example of Characteristics

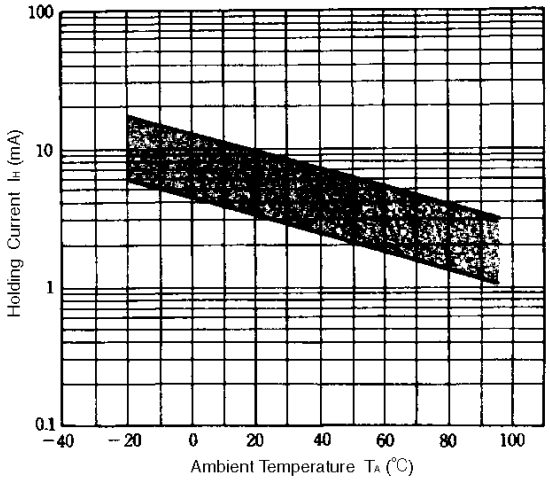
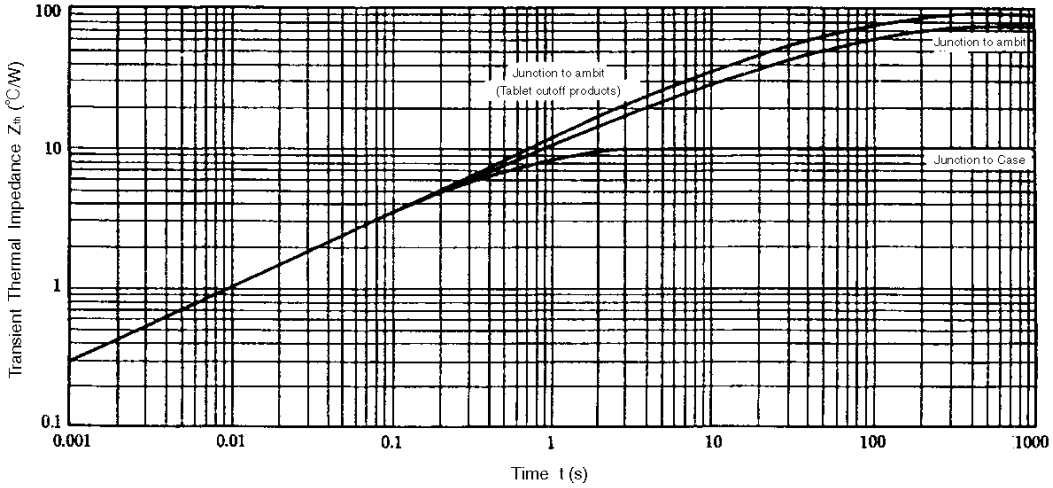


Figure 13. Z_{th} Characteristics



[MEMO]

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