

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.

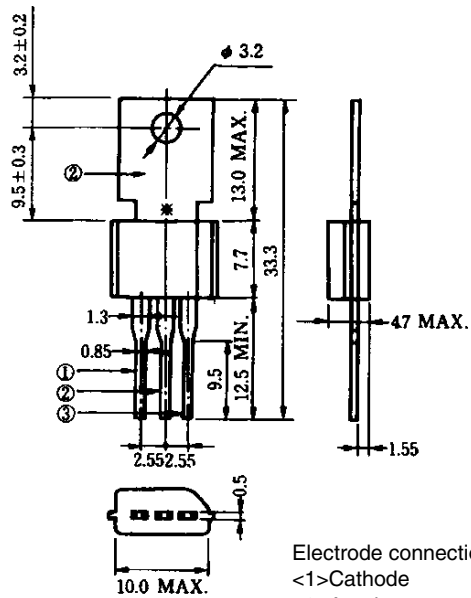
FEATURES

- This transistor is designed for high-speed switching and is ideal 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 equipments, ignitors of devices for light industry, 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	$R_{GK} = 1 \text{ k}\Omega$
Non-repetitive peak off-state voltage	$V_{DSM}$	300	500	V	$R_{GK} = 1 \text{ k}\Omega$
Repetitive peak reverse voltage	$V_{RRM}$	200	400	V	$R_{GK} = 1 \text{ k}\Omega$
Repetitive peak off-voltage	$V_{DRM}$	200	400	V	$R_{GK} = 1 \text{ k}\Omega$
Average on-state current	$I_{T(AV)}$	2 (Tc = 77°C, Single half-wave, $\theta = 180^\circ$ )		A	Refer to Figure 6 and 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, $t_p = 10 \mu\text{s}$ )		A	—
Fusing current	$\int i^2 dt$	1.6 (1 ms ≤ t ≤ 10 ms)		A <sup>2</sup> s	—
Critical rate of rise of on-state current	$di_T/dt$	50		A/ $\mu\text{s}$	—
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 to +150		°C	—

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**ELECTRICAL CHARACTERISTICS (T<sub>j</sub> = 25°C, R<sub>GK</sub> = 1 kΩ)**

Parameter	Symbol	Conditions	Specifications			Unit	Remarks
			MIN.	TYP.	MAX.		
Repeat peak off-state current	I <sub>DRM</sub>	V <sub>DM</sub> = V <sub>DRM</sub>	T <sub>j</sub> = 25°C		10	μA	-
			T <sub>j</sub> = 125°C		200		
Repetitive peak reverse current	I <sub>RRM</sub>	V <sub>RM</sub> = V <sub>RRM</sub>	T <sub>j</sub> = 25°C		10	μA	-
			T <sub>j</sub> = 125°C		200		
On voltage	V <sub>TM</sub>	T <sub>j</sub> = 25°C, I <sub>TM</sub> = 4 A	-	-	2.2	V	Refer to Figure 9.
Gate trigger voltage	V <sub>GT</sub>	V <sub>DM</sub> = 6 V, R <sub>L</sub> = 100 Ω	-	-	0.8	μA	Refer to Figure 8.
Gate trigger current	I <sub>GT</sub>	V <sub>DM</sub> = 6 V, R <sub>L</sub> = 100 Ω	-	-	300	V	-
Gate non-trigger voltage	V <sub>GD</sub>	T <sub>j</sub> = 125°C, V <sub>DM</sub> = 1/2 V <sub>DRM</sub>	0.2	-	-	V	-
Critical rate of-rise of off-state voltage	dv/dt	T <sub>j</sub> = 125°C, V <sub>DM</sub> = 2/3 V <sub>DRM</sub>	10	-	-	V/μs	-
Holding current	I <sub>H</sub>	T <sub>j</sub> = 25°C, V <sub>D</sub> = 24 V	-	-	10	mA	-
Commutating turn-off time	T <sub>q</sub>	T <sub>j</sub> = 125°C, I <sub>T</sub> = 2 A V <sub>DM</sub> = 2/3 V <sub>DRM</sub> , V <sub>R</sub> = 50 V dv/dt = 10 V/μs	-	-	15	μs	-
Turn-on time	T <sub>gt</sub>	T <sub>j</sub> = 125°C, V <sub>DM</sub> = 2/3 V <sub>DRM</sub> I <sub>TM</sub> = 30 A I <sub>G</sub> = 5 mA, t <sub>IG</sub> = 5 μs	-	-	2	μs	-
Thermal resistance	R <sub>th(j-c)</sub>	Junction-to-case DC	-	-	10	°C/W	Refer to Figure 13.
	R <sub>th(j-a)</sub>	Junction-to-ambient DC	-	-	75		

**TYPICAL CHARACTERISTICS (T<sub>a</sub> = 25°C)**

Figure 1. i<sub>T</sub> vs. v<sub>T</sub> Characteristics

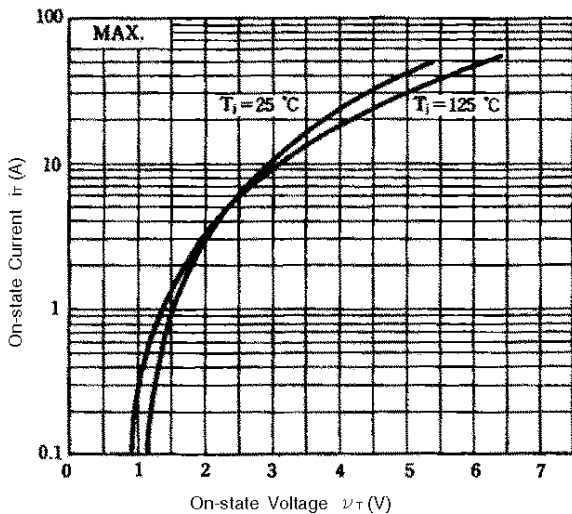


Figure 2. I<sub>TSM</sub> Rating

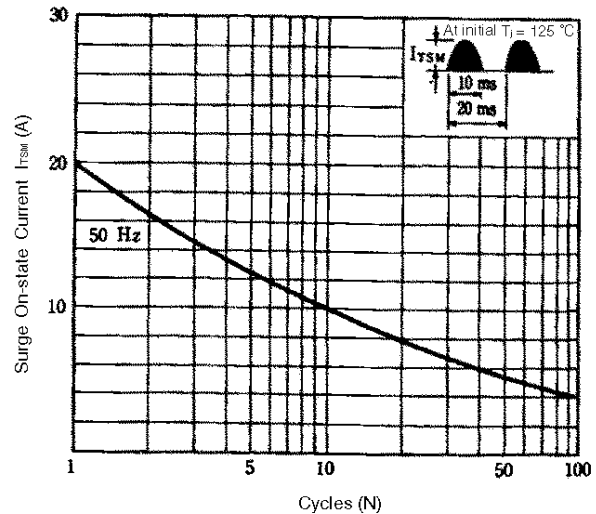


Figure 3.  $I_{TRM}$  vs.  $t_P$  Rating

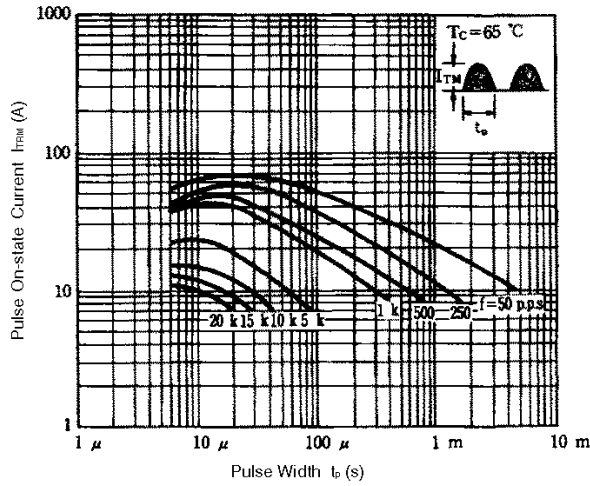


Figure 4.  $I_{TRM}$  vs.  $t_P$  Rating

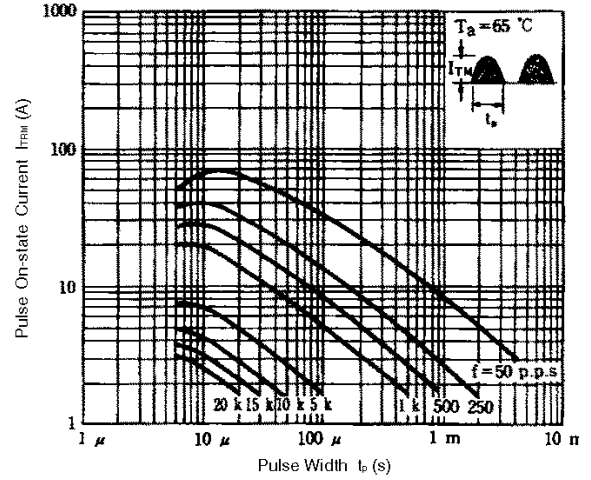


Figure 5.  $P_{T(AV)}$  vs.  $I_{T(AV)}$  Characteristics

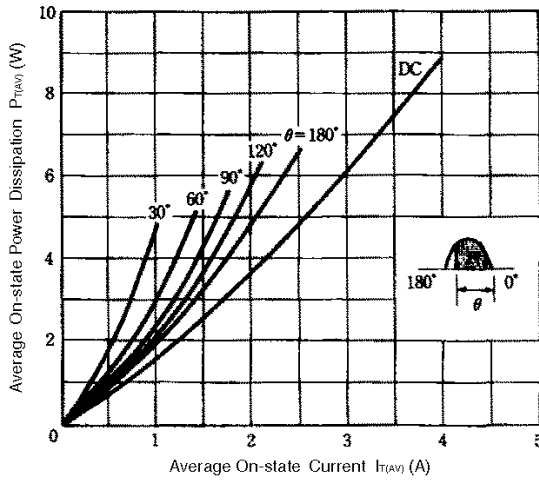


Figure 6.  $T_C$  vs.  $I_{T(AV)}$  Rating

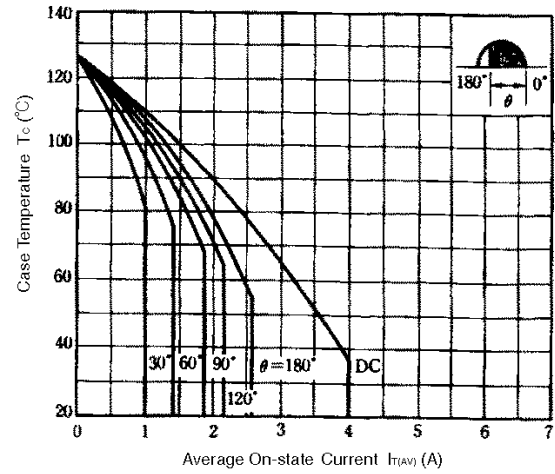


Figure 7.  $T_A$  vs.  $I_{T(AV)}$  Rating

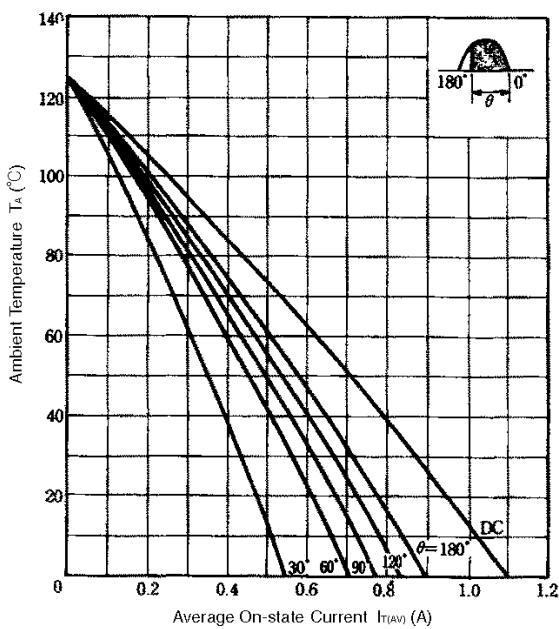


Figure 8.  $I_{GT}$  vs.  $T_A$  Example of Characteristics

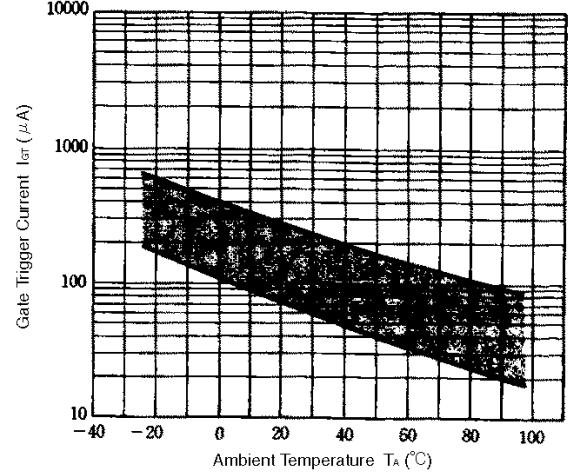


Figure 9.  $V_{GT}$  vs.  $T_A$  Example of Characteristics

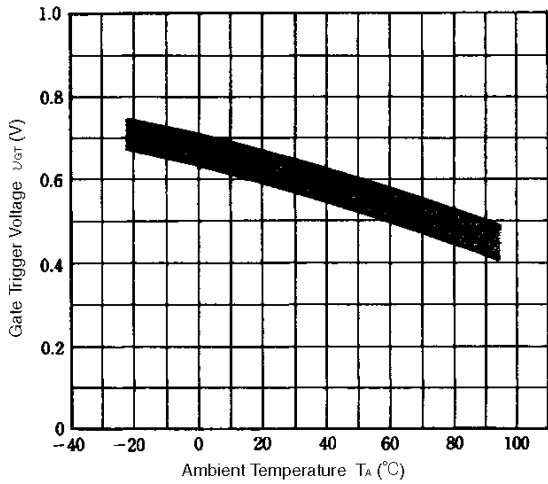


Figure 10.  $i_{GS}$  vs.  $\tau$  Example of Characteristics

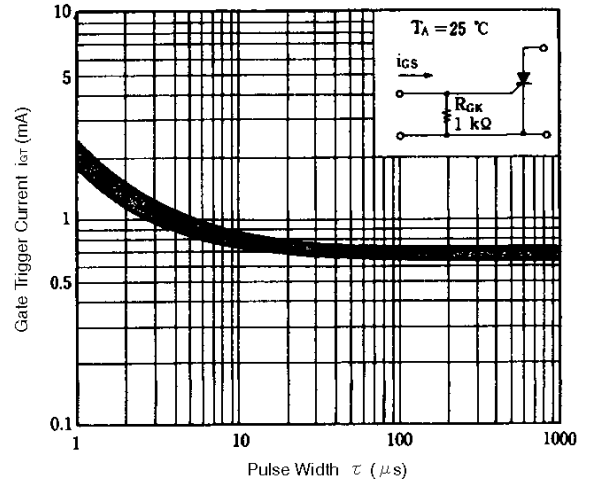


Figure 11.  $V_{GT}$  vs.  $\tau$  Example of Characteristics

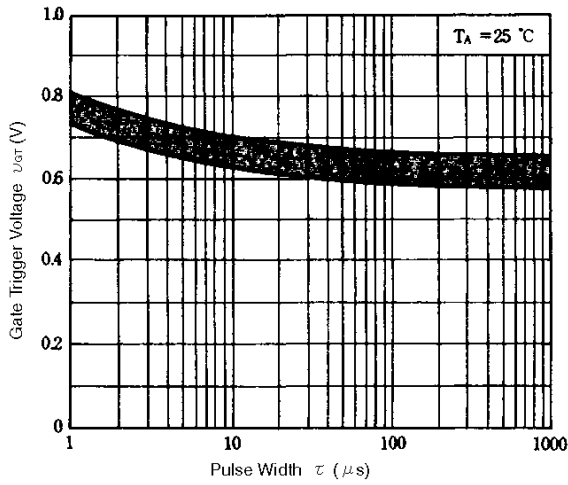


Figure 12.  $I_H$  vs.  $T_A$  Example of Characteristics

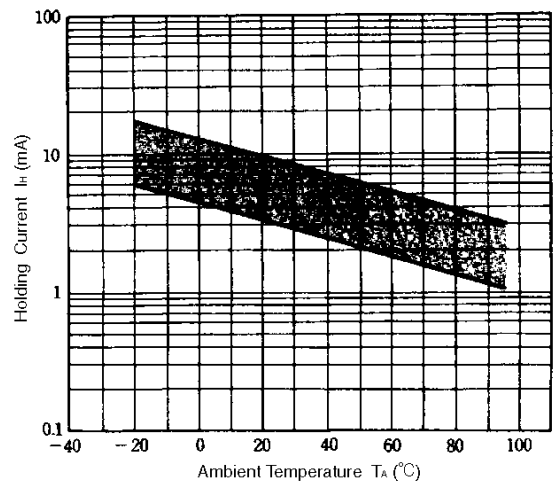
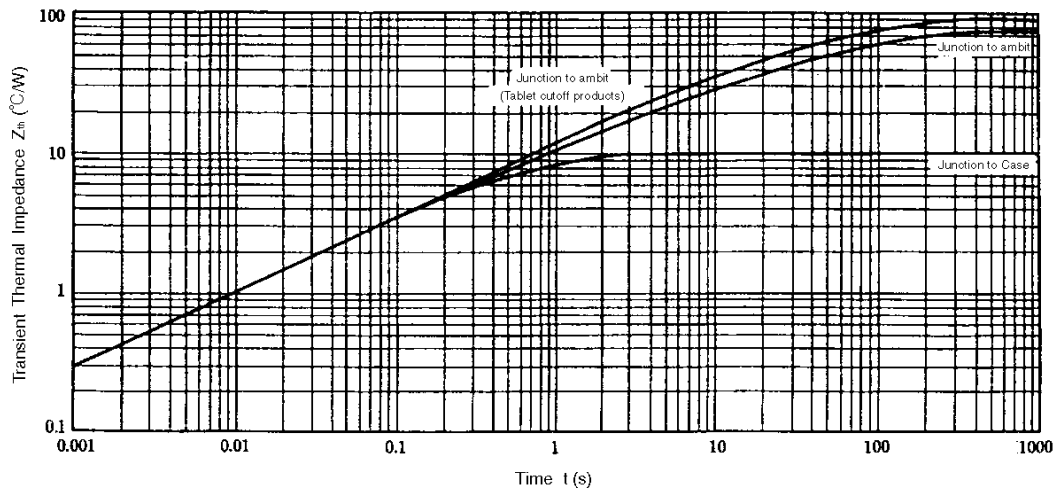


Figure 13.  $Z_{th}$  Characteristics



[MEMO]

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