DATA SHEET

NEC

AC05DSM, AC05FSM, AC05DSMA, AC05FSMA

5 A RESIN INSULATION TYPE TRIAC

The AS05[ ]SM, AC05[ ]SMA are resin insulation type TRIACs with an effective current of 5 A (T_C = 99 °C).

These products are covered with resin mold on the entire case and are electrically insulated with electrodes, giving them a considerable advantage over conventional TRIACs when mounting on a heatsink board or performing high-density mounting.

This series features ratings and electrical characteristics equal to NEC's TO-220AB package TRIAC and a high-reliability design.

FEATURES

- Insulation type triac fully covered with resin on the entire case other than electrode leads
- Insulation voltage and conduction equal to conventional mica and polyester film
- Insulation voltage of 1500 V for 1 minute (1800 V for 1 second) is guaranteed (only AS05[ ]SM type)
- Can be replaced with TO-220AB package
- High allowable on-current when using a single unit

APPLICATIONS

Noncontact switches of motor speed control, heater temperature control, lamp light control

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	AC05DSM AC05DSMA	AC05FSM AC05FSMA	Unit	Remarks
Non-repetitive peak off-state voltage	V_{DSM}	500	700	V	–
Repetitive peak off-voltage	V_{DRM}	400	600	V	–
Effective on-state current	$I_{T(RMS)}$	5 (T_C = 99°C)		A	Refer to Figures 11 and 12.
Surge on-state current	I_{TSM}	50 (50 Hz 1 cycle) 55 (60 Hz 1 cycle)		A	Refer to Figure 2.
Fusing current	$\int i_T^2 dt$	10 (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}	3 (f ≥ 50 Hz, Duty ≤ 10 %)		W	–
Average gate power dissipation	$P_{G(AV)}$	0.3		W	–
Peak gate current	I_{GM}	±1.5 (f ≥ 50 Hz, Duty ≤ 10 %)		A	–
Junction temperature	T_j	–40 to +125		°C	–
Storage temperature	T_{stg}	–55 to +150		°C	–
Insulation voltage	–	1500 (AC 1minute)		V	Only AC05 [ ] SM type

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ELECTRICAL CHARACTERISTICS (Tj = 25°C, RGK = 1 kΩ)

Parameter		Symbol	Conditions		MIN.	TYP.	MAX.	Unit	Remarks
Repeat peak off-current		I_{DRM}	$V_{DM} = V_{DRM}$	T_j = 25°C	–	–	100	μA	–
				T_j = 125°C	–	–	1	mA	
On-state voltage		V_{TM}	I_{TM} = 5 A		–	–	1.8	V	Refer to Figure 1.
Gate trigger current	Mode I	I_{GT}	V_{DM} = 12 V, R_L = 30 Ω	T_2 +, G+	–	–	10	mA	Refer to Figure 4.
	II			T_2 –, G+	–	–	–		
	III			T_2 –, G–	–	–	10		
	IV			T_2 +, G–	–	–	10		
Gate trigger voltage	Mode I	V_{GT}	V_{DM} = 12 V, R_L = 30 Ω	T_2 +, G+	–	–	1.5	V	Refer to Figure 4.
	II			T_2 –, G+	–	–	–		
	III			T_2 –, G–	–	–	1.5		
	IV			T_2 +, G–	–	–	1.5		
Gate non-trigger voltage		V_{GD}	T_j = 125°C, $V_{DM} = \frac{1}{2} V_{DRM}$		0.2	–	–	V	–
Holding current		I_H	V_{DM} = 24 V		–	10	–	mA	–
Critical rate of rise of off-state voltage		dv/dt	T_j = 125°C, $V_{DM} = \frac{2}{3} V_{DRM}$		–	100	–	V/μs	–
Commutating dv/dt		(dv/dt)c	T_j = 125°C $(di_T/dt)c$ = –2.7 A/ms V_D = 400 V		5	–	–	V/μs	–
Thermal resistance*		$R_{th(j-c)}$	Junction-to-case AC		–	–	4.2	°C/W	Refer to Figure 13.

* The thermal resistance with a 50 Hz or 60 Hz sine wave current, as shown in the following expression:

$$R_{th(j-c)} = \frac{T_{j(max)} - T_C}{P_{T(AV)}}$$

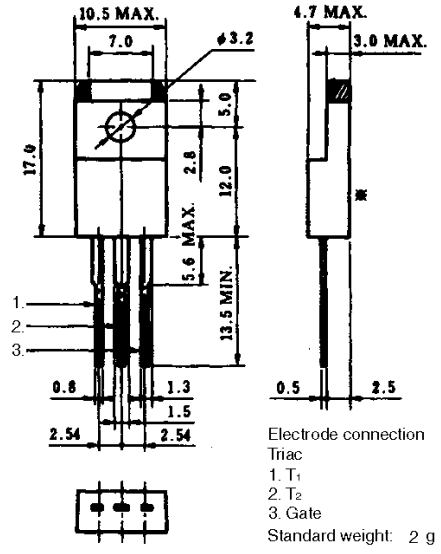
$T_{j(max)}$:Maximum junction temperature

T_C :Case temperature

$P_{T(AV)}$:Average on-dissipation

PACKAGE DRAWING (UNIT: mm)

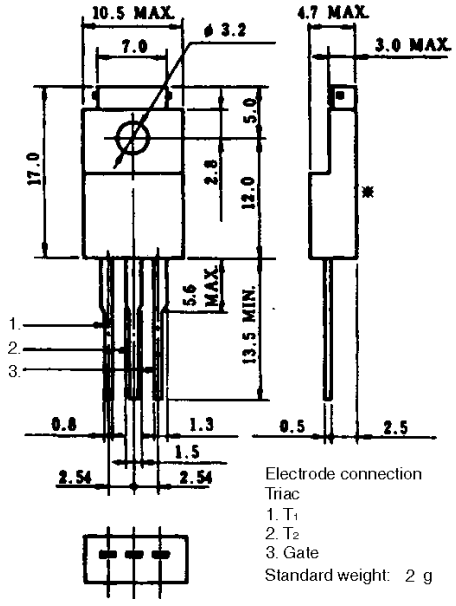
AC05 [ ] SM



Electrode connection
Triac
1. T_1
2. T_2
3. Gate
Standard weight: 2 g

*T_C test bench-mark ▨Resin coating unit

AC05 [ ] SMA



Electrode connection
Triac
1. T_1
2. T_2
3. Gate
Standard weight: 2 g

Figure 1. i_T vs. ν_T Characteristics

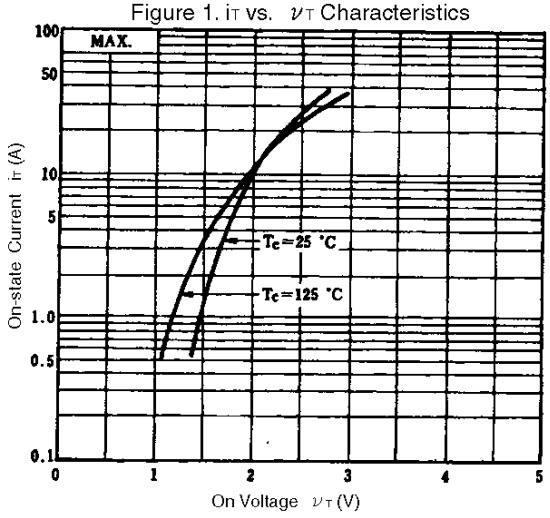


Figure 2. I_{TSM} Rating

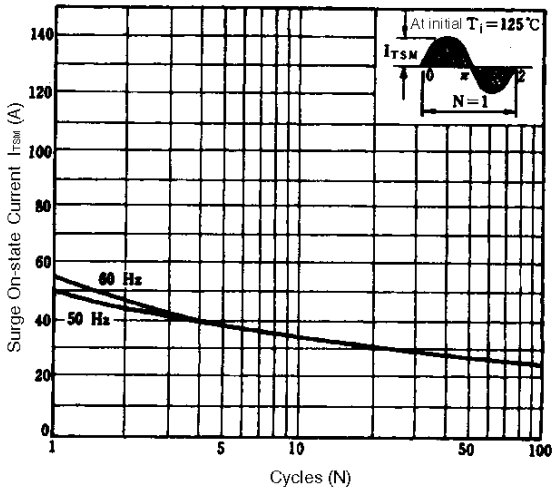


Figure 3. Gate Rating

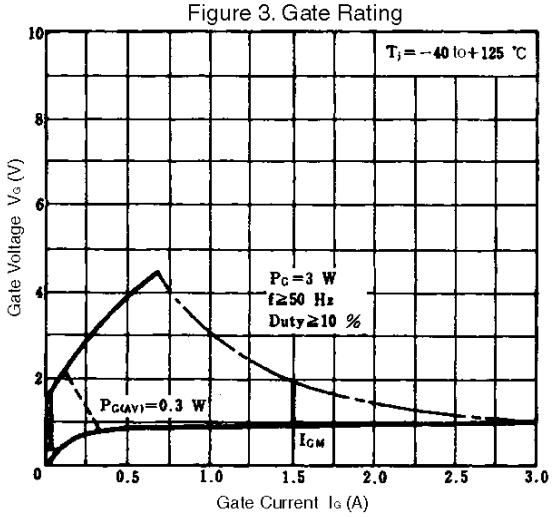


Figure 4. Example of Gate Characteristics

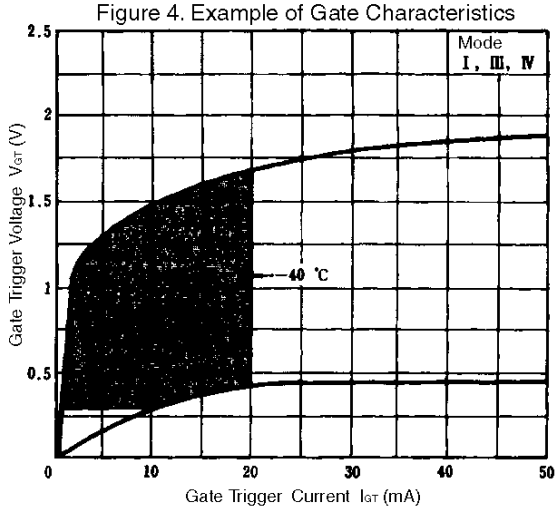


Figure 5. I_{GT} vs. T_A Example of Characteristics

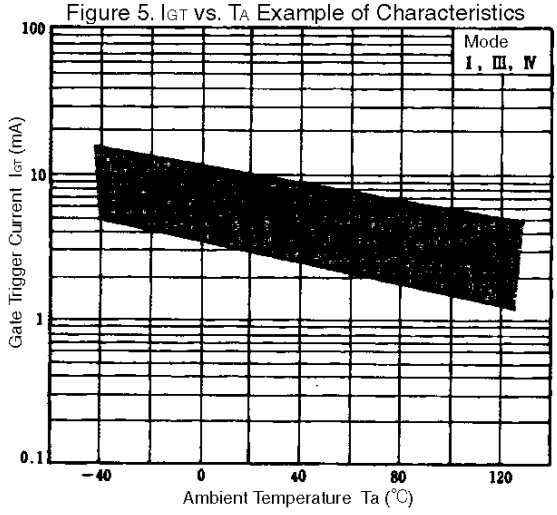


Figure 6. V_{GT} vs. T_A Example of Characteristics

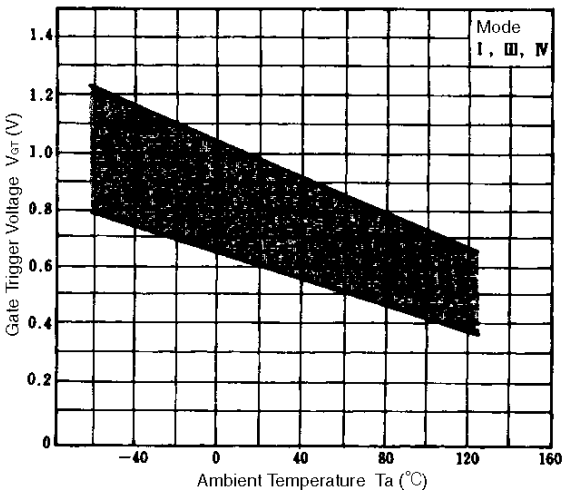


Figure 7. i_{GT} vs. τ Example of Characteristics

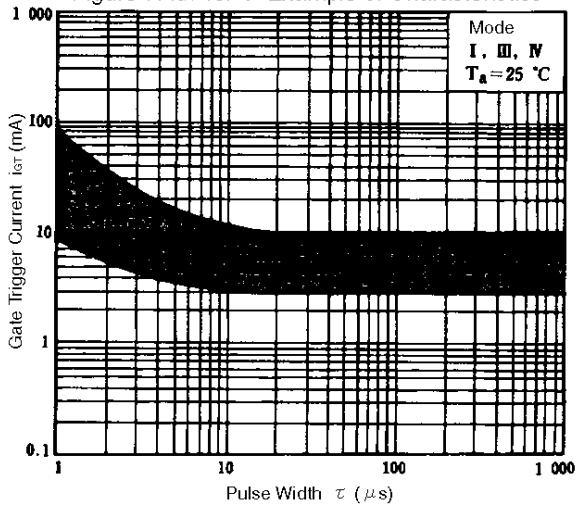


Figure 8. v_{GT} vs. τ Example of Characteristics

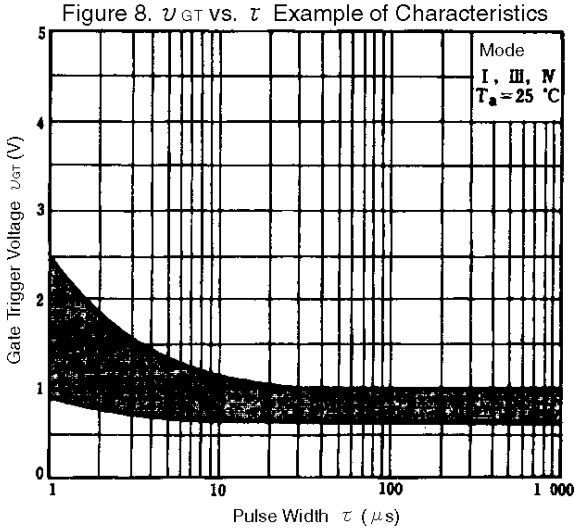


Figure 9. I_H vs. T_A Example of Characteristics

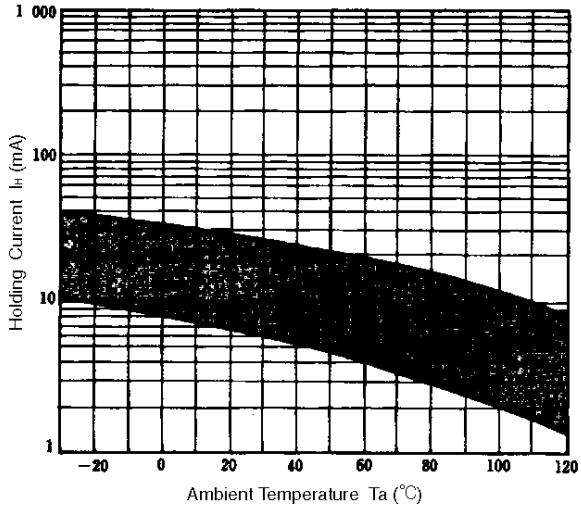


Figure 10. $P_{T(AV)}$ vs. $I_{T(RMS)}$ Characteristics

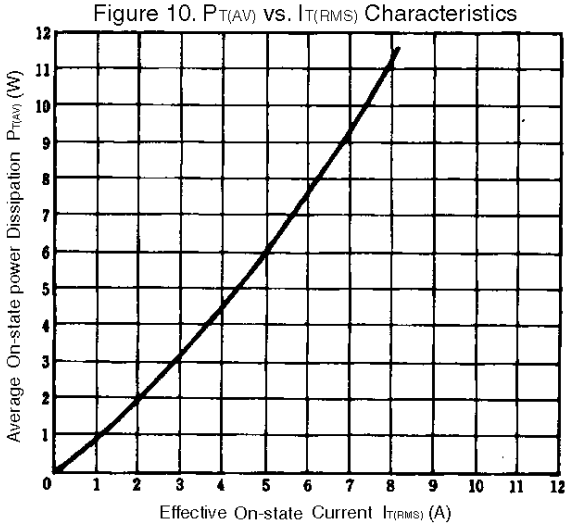


Figure 11. T_C vs. $I_{T(AV)}$ Rating

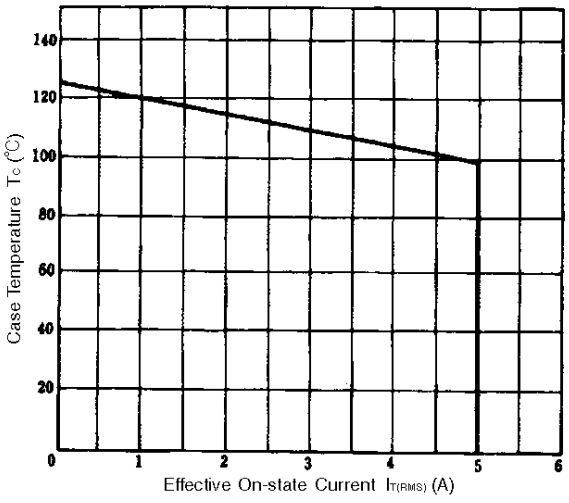


Figure 12. T_A vs. $I_{T(RMS)}$ Rating

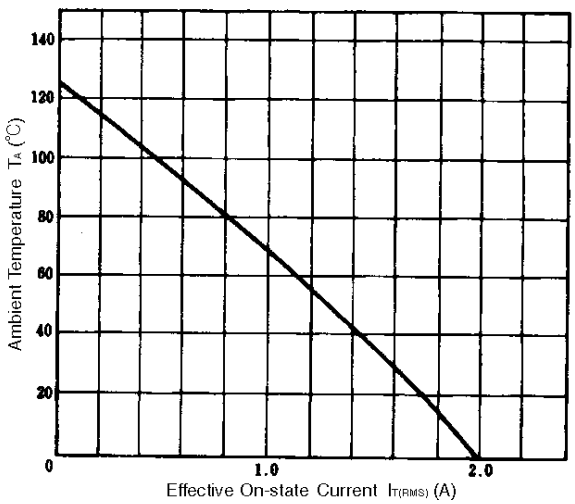
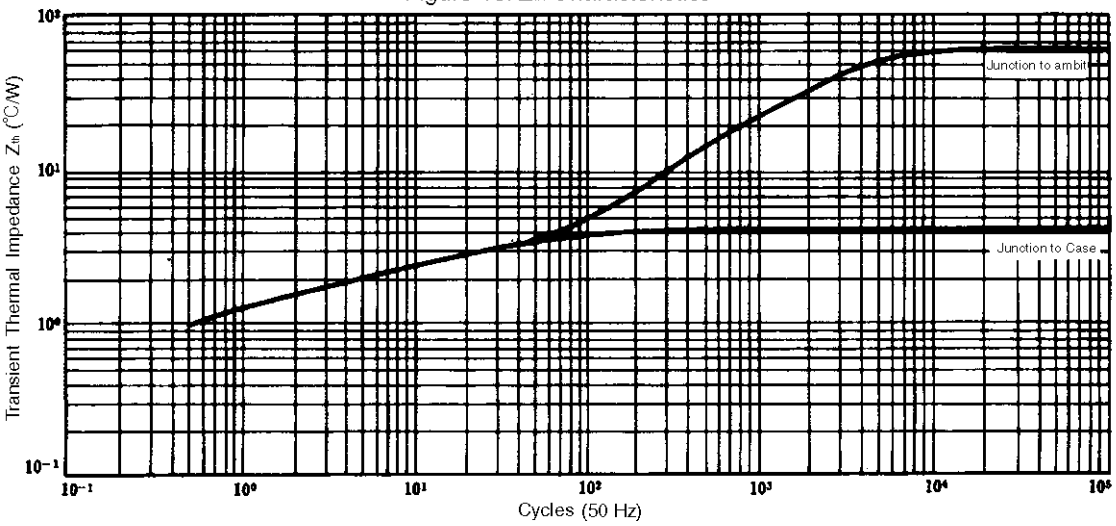


Figure 13. Z_{th} Characteristics



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