

THYRISTORS
AC12DSMA, AC12FSMA

12 A RESIN INSULATION TYPE TRIAC

DESCRIPTION

The AC12DSMA and AC12FSMA are resin insulation type TRIACs with an effective current of 12 A ($T_c = 74^\circ\text{C}$).

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.

These products features ratings and electrical characteristics equal to TO-220AB package TRIAC and a high reliability design.

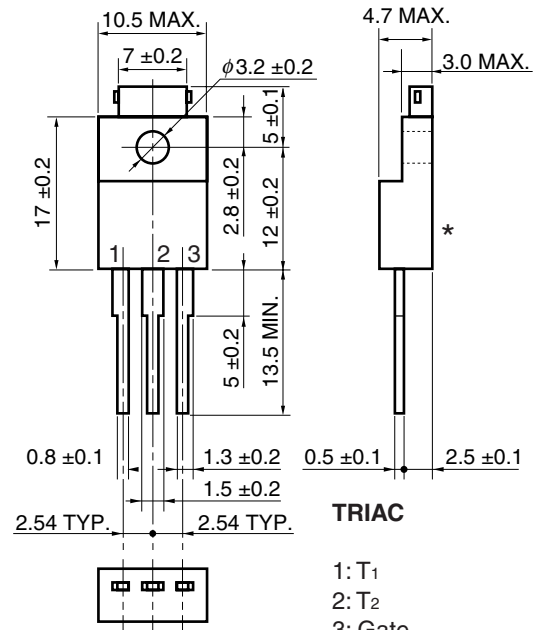
FEATURES

- 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
- Can be replaced with TO-220AB package
- High allowable on-current when using a single unit

APPLICATIONS

Non-contact switches of motor speed control, heater temperature control, lamp light control

★ **PACKAGE DRAWING (Unit: mm)**



★: T_c test bench-mark

Standard weight: 2 g

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MAXIMUM RATINGS

Parameter	Symbol	AC12DSMA	AC12FSMA	Unit	Remarks
Non-repetitive Peak Off-state Voltage	V _{DSM}	500	700	V	–
Repetitive Peak Off-state Voltage	V _{DRM}	400	600	V	–
Effective On-state Current	I _{T(RMS)}	12 (T _c = 74°C)		A	Refer to Figure 11 and 12 .
Surge On-state Current	I _{TSM}	100 (50 Hz 1 cycle) 110 (60 Hz 1 cycle)		A	Refer to Figure 2 .
Fusing Current	$\int i_T^2 dt$	45 (1 ms ≤ t ≤ 10 ms)		A ² s	–
Critical Rate Rise of On-state Current	di _T /dt	50		A/μs	–
Peak Gate Power Dissipation	P _{GM}	5.0 (f ≥ 50 Hz, Duty ≤ 10%)		W	–
Average Gate Power Dissipation	P _{G(AV)}	0.5		W	–
Peak Gate Current	I _{GM}	±3 (f ≥ 50 Hz, Duty ≤ 10%)		A	–
Junction Temperature	T _j	–40~+125		°C	–
Storage Temperature	T _{stg}	–55~+150		°C	–

ELECTRICAL CHARACTERISTICS (T_j = 25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	Remarks	
Repetitive Peak Off-state Current		I _{DRM}	V _{DM} = V _{DRM}	T _j = 25°C	–	–	100	μA	–
				T _j = 125°C	–	–	2	mA	–
On-state Voltage		V _{TM}	I _{TM} = 10 A	–	–	1.3	V	Refer to Figure 1 .	
Gate Trigger Current	Mode I	I _{GT}	V _{DM} = 12 V, R _L = 30 Ω	T ₂₊ , G+	–	–	20	mA	Refer to Figure 4 .
	II			T _{2–} , G+	–	–	–		
	III			T _{2–} , G–	–	–	20		
	IV			T ₂₊ , G–	–	–	20		
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}	0.3	–	–	V	–	
Holding Current		I _H	V _{DM} = 24 V, I _{TM} = 10 A	–	30	–	mA	–	
Critical Rate Rise of Off-state Voltage		dv/dt	T _j = 125°C, V _{DM} = $\frac{2}{3}$ V _{DRM}	–	100	–	V/μs	–	
Commutating Critical Rate Rise of Off-state Voltage		(dv/dt) _c	T _j = 125°C, (di _T /dt) _c = –6 A/ms, V _D = 400 V	10	–	–	V/μs	–	
Thermal Resistance ^{Note}		R _{th(j-c)}	Junction-to-case AC	–	–	3.5	°C/W	Refer to Figure 13 .	

Note 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

TYPICAL CHARACTERISTICS

Figure 1. i_T vs. v_T CHARACTERISTIC

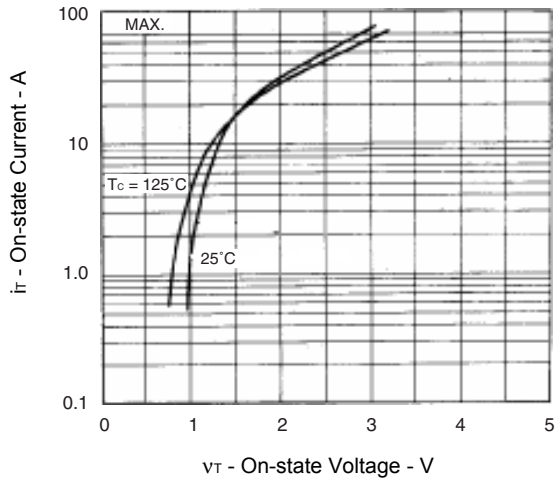


Figure 2. I_{TSM} RATING

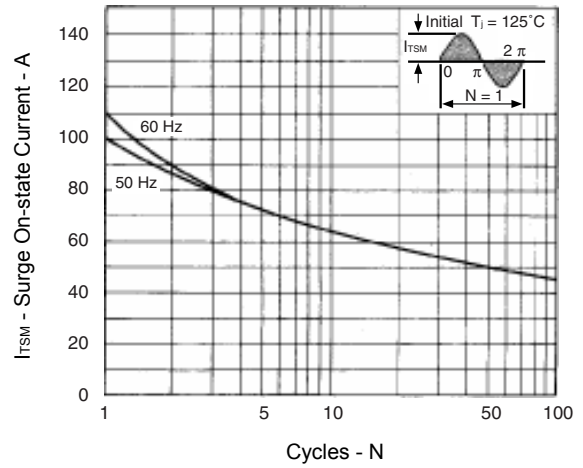


Figure 3. GATE RATING

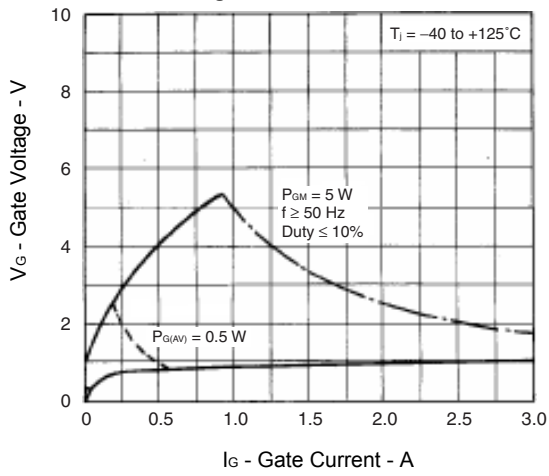


Figure 4. GATE CHARACTERISTIC

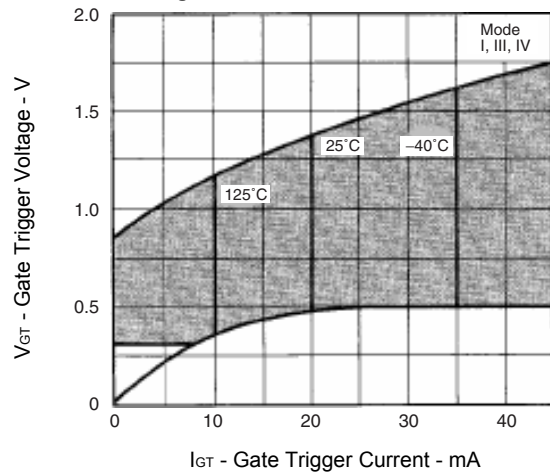


Figure 5. I_{GT} vs. T_A CHARACTERISTIC

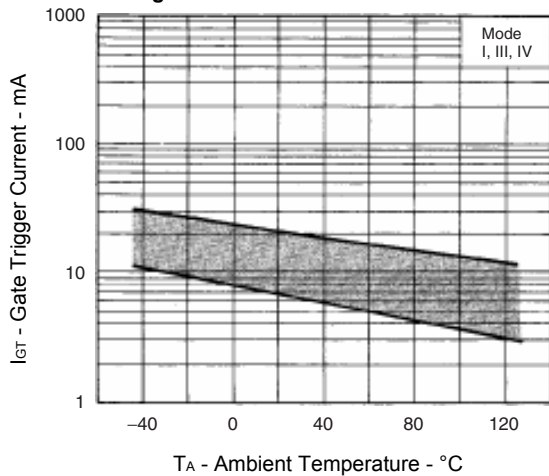
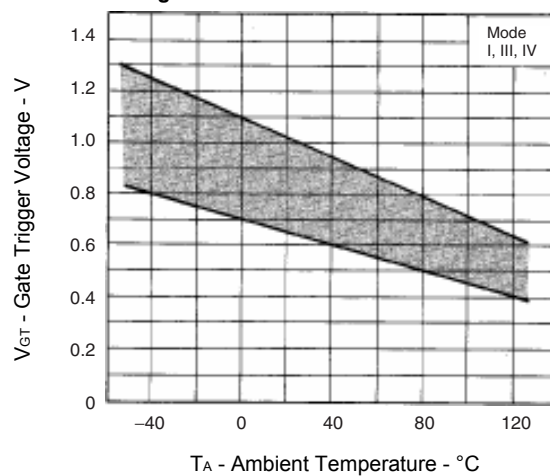


Figure 6. V_{GT} vs. T_A CHARACTERISTIC



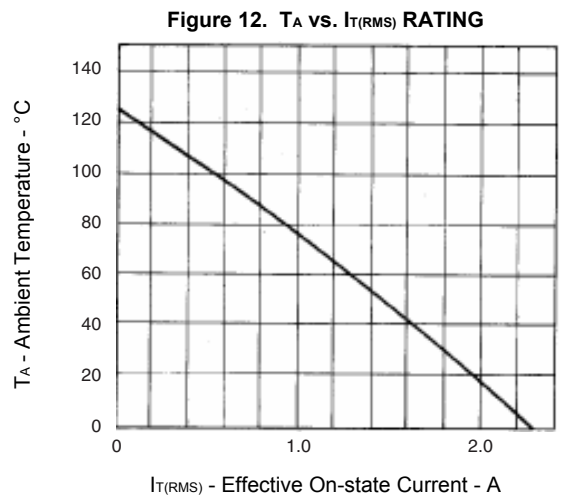
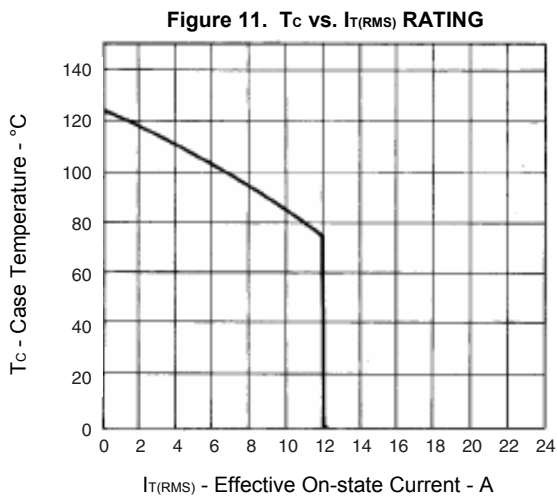
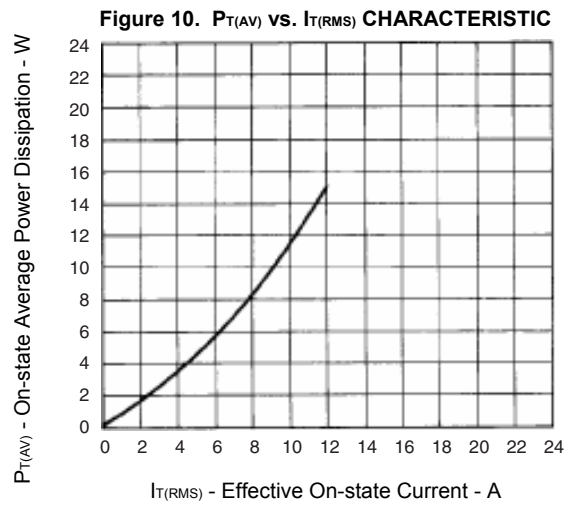
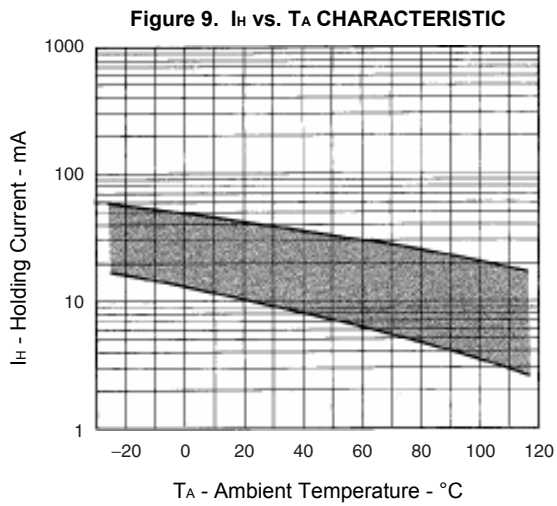
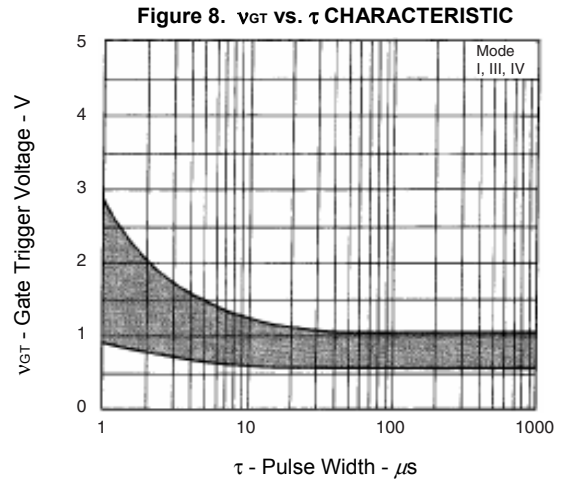
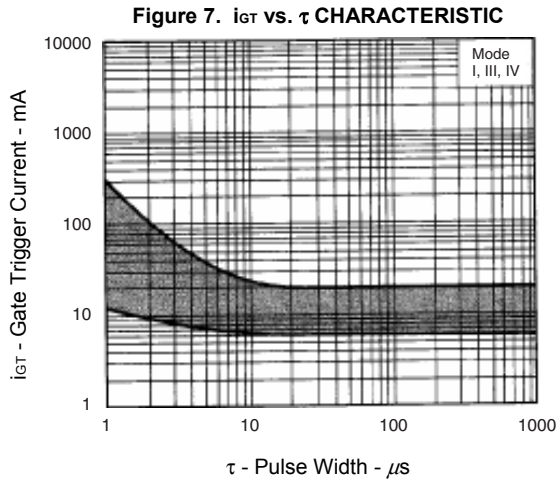
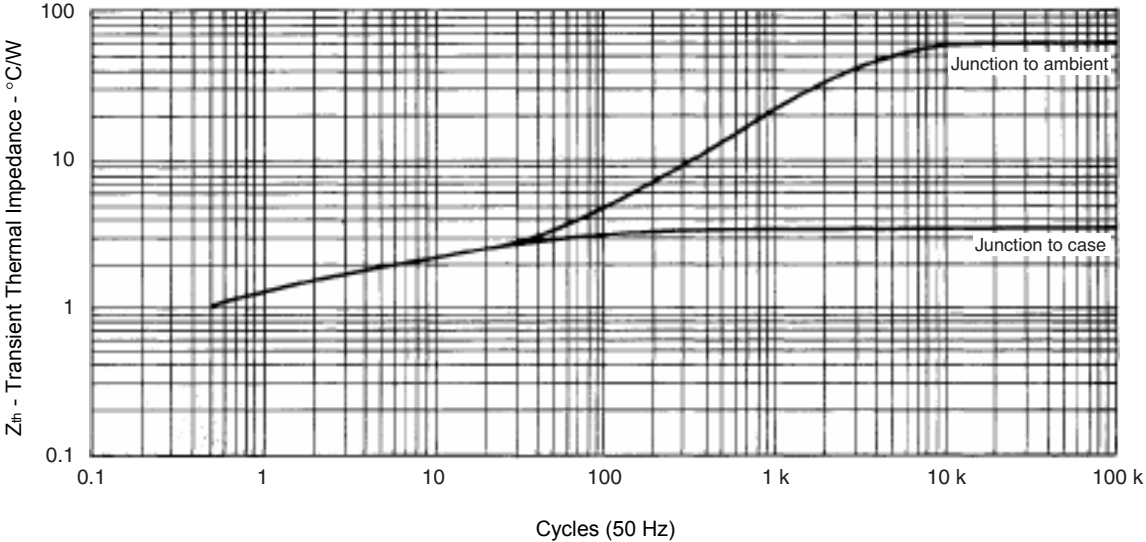


Figure 13. Z_{th} CHARACTERISTIC



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