

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.

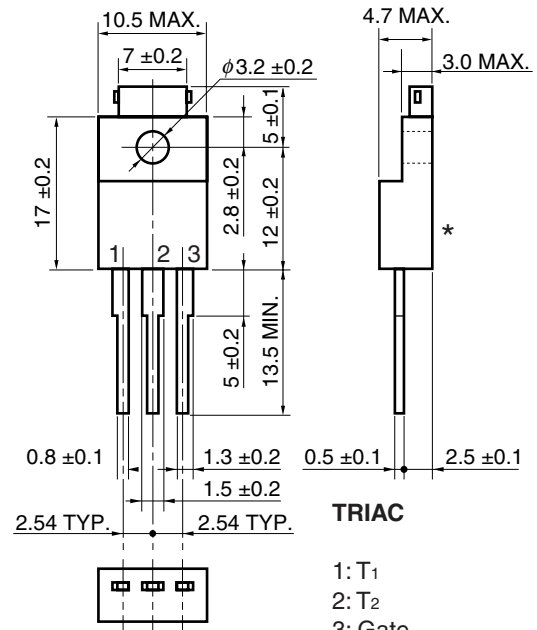
FEATURES

- 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)



TRIAC

1: T₁
2: T₂
3: Gate

*: 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 ($T_C = 74^\circ\text{C}$)		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 ($1\text{ ms} \leq t \leq 10\text{ ms}$)		A^2s	–
Critical Rate Rise of On-state Current	di_T/dt	50		$\text{A}/\mu\text{s}$	–
Peak Gate Power Dissipation	P_{GM}	5.0 ($f \geq 50\text{ Hz}$, Duty $\leq 10\%$)		W	–
Average Gate Power Dissipation	$P_{G(AV)}$	0.5		W	–
Peak Gate Current	I_{GM}	± 3 ($f \geq 50\text{ Hz}$, Duty $\leq 10\%$)		A	–
Junction Temperature	T_j	$-40 \sim +125$		$^\circ\text{C}$	–
Storage Temperature	T_{stg}	$-55 \sim +150$		$^\circ\text{C}$	–

ELECTRICAL CHARACTERISTICS ($T_j = 25^\circ\text{C}$)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	Remarks	
Repetitive Peak Off-state Current		I_{DRM}	$V_{DM} = V_{DRM}$	$T_j = 25^\circ\text{C}$	–	–	100	μA	–
				$T_j = 125^\circ\text{C}$	–	–	2	mA	–
On-state Voltage		V_{TM}	$I_{TM} = 10\text{ A}$	–	–	1.3	V	Refer to Figure 1 .	
Gate Trigger Current	Mode I	I_{GT}	$V_{DM} = 12\text{ V}$, $R_L = 30\ \Omega$	$T_{2+}, G+$	–	–	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}	$V_{DM} = 12\text{ V}$, $R_L = 30\ \Omega$	$T_{2+}, G+$	–	–	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}	$T_j = 125^\circ\text{C}$, $V_{DM} = \frac{1}{2} V_{DRM}$	0.3	–	–	V	–	
Holding Current		I_H	$V_{DM} = 24\text{ V}$, $I_{TM} = 10\text{ A}$	–	30	–	mA	–	
Critical Rate Rise of Off-state Voltage		dv/dt	$T_j = 125^\circ\text{C}$, $V_{DM} = \frac{2}{3} V_{DRM}$	–	100	–	$\text{V}/\mu\text{s}$	–	
Commutating Critical Rate Rise of Off-state Voltage		$(dv/dt)_c$	$T_j = 125^\circ\text{C}$, $(di_T/dt)_c = -6\text{ A/ms}$, $V_D = 400\text{ V}$	10	–	–	$\text{V}/\mu\text{s}$	–	
Thermal Resistance ^{Note}		$R_{th(j-c)}$	Junction-to-case AC	–	–	3.5	$^\circ\text{C}/\text{W}$	Refer to Figure 13 .	

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

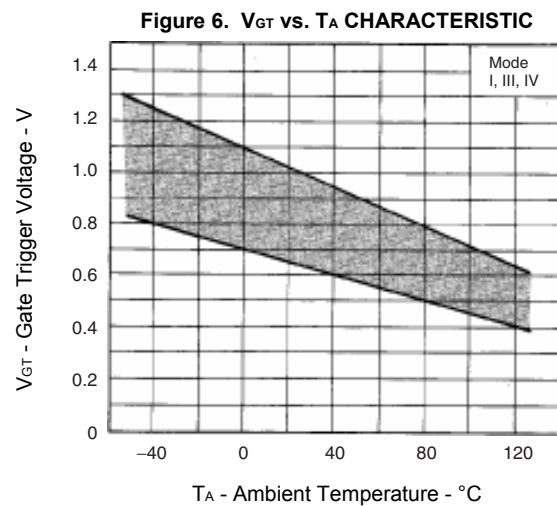
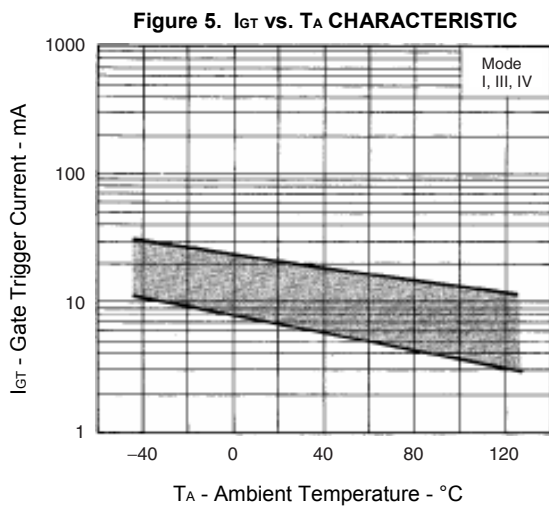
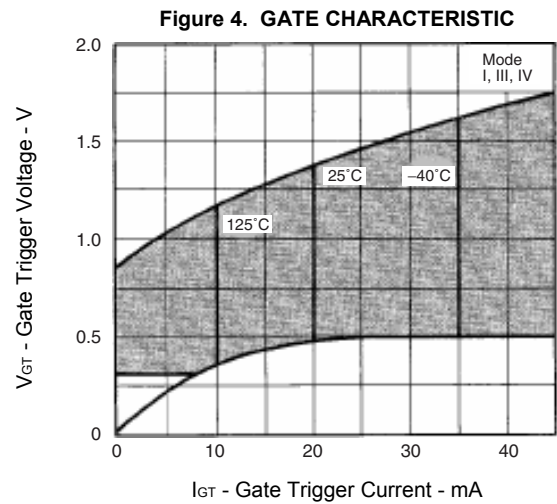
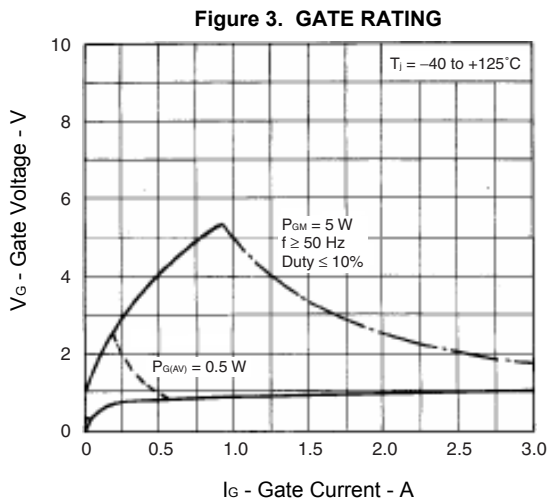
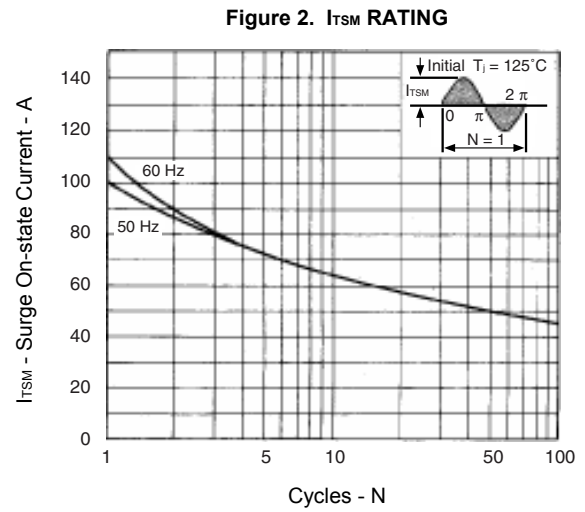
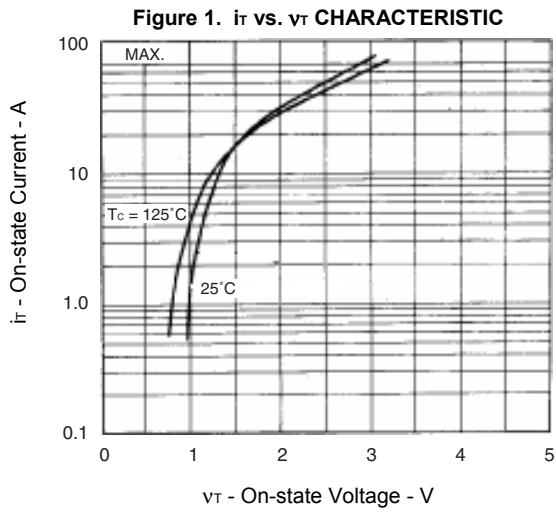
$$R_{th(j-c)} = \frac{T_{j(max)} - T_C}{P_{T(AV)}}$$

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

T_C : Case temperature

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

TYPICAL CHARACTERISTICS



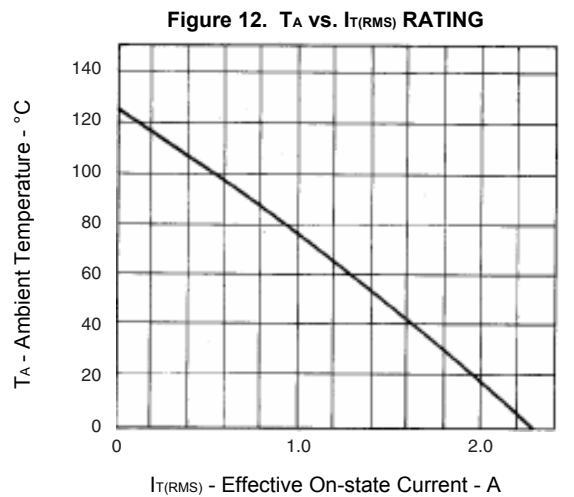
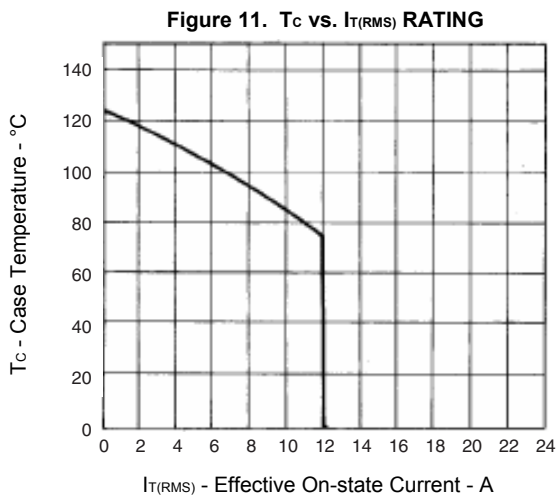
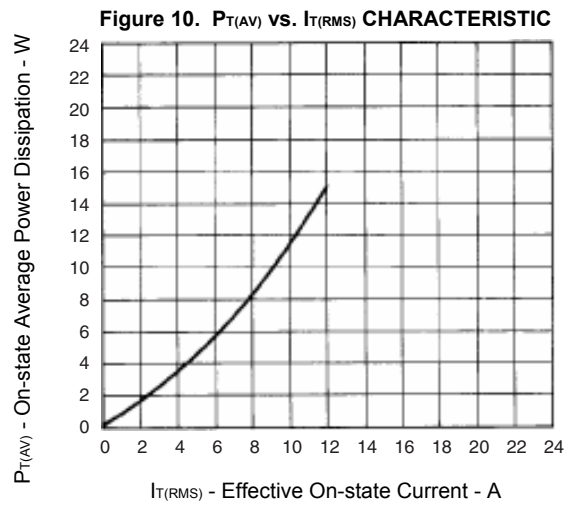
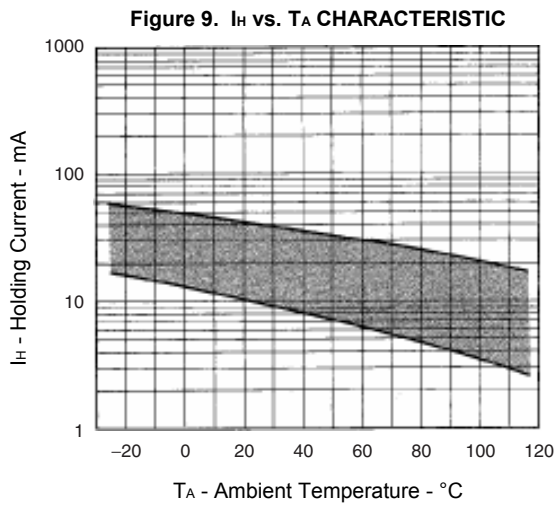
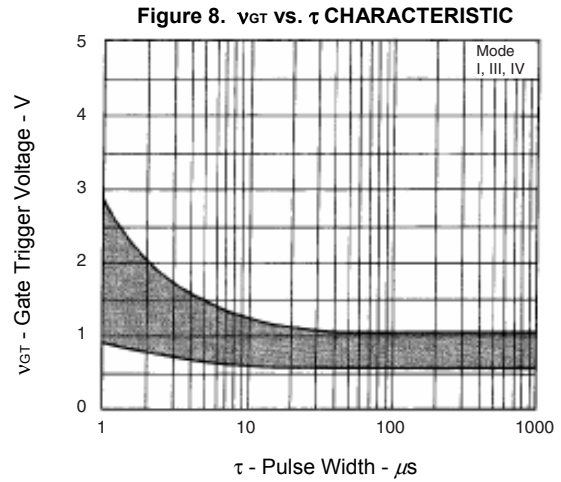
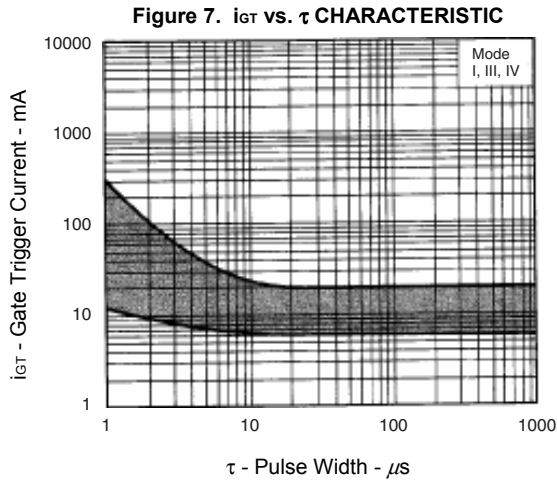
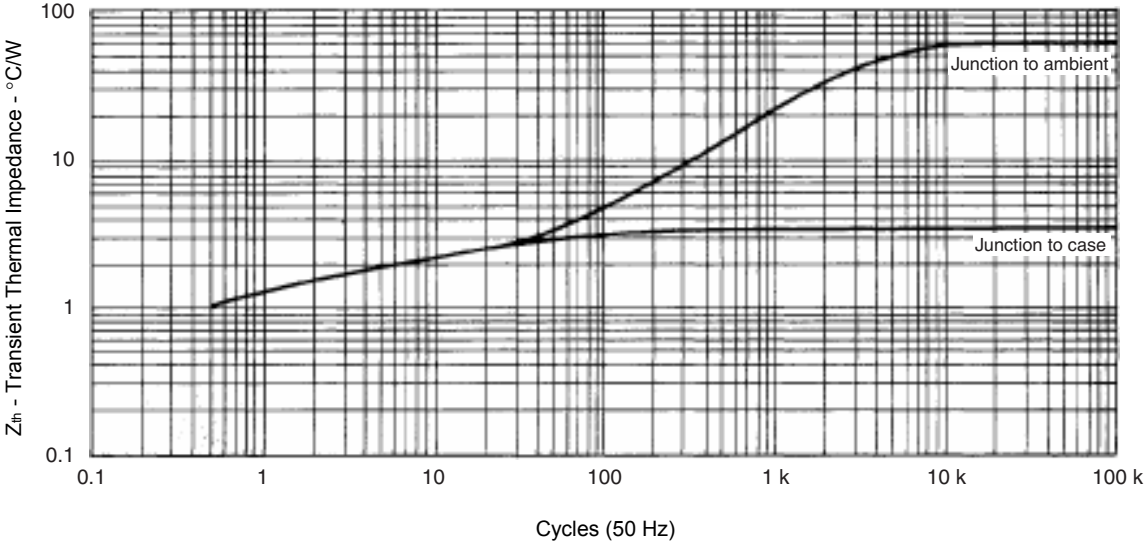


Figure 13. Z_{th} CHARACTERISTIC



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