

DATA SHEET

MAC223 series **Triacs**

Product specification

July 2001



Triacs

MAC223 series

GENERAL DESCRIPTION

Passivated triacs in a plastic envelope, intended for use in applications requiring high bidirectional transient and blocking voltage capability and high thermal cycling performance. Typical applications include motor control, industrial and domestic lighting, heating and static switching.

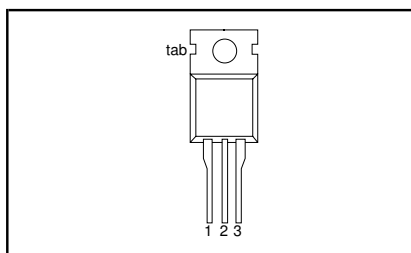
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX	MAX.	UNIT
	MAC223	A6	A8	
V_{DRM}	Repetitive peak off-state voltages	400	600	V
$I_{\text{T(RMS)}}$	RMS on-state current	25	25	A
I_{TSM}	Non-repetitive peak on-state current	230	230	A

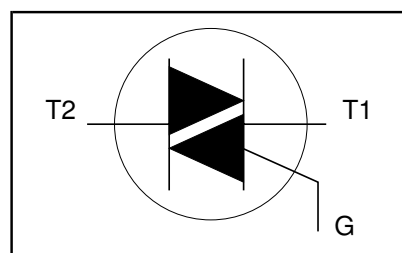
PINNING - TO220AB

PIN	DESCRIPTION
1	main terminal 1
2	main terminal 2
3	gate
tab	main terminal 2

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		MAC223		A6	A8	
V_{DRM}	Repetitive peak off-state voltages		-	400 ¹	600 ¹	V
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{mb}} \leq 91^\circ\text{C}$	-	25		A
I_{TSM}	Non-repetitive peak on-state current	full sine wave; $T_{\text{j}} = 25^\circ\text{C}$ prior to surge	-	230		A
		$t = 20\text{ ms}$	-	190		A
		$t = 16.7\text{ ms}$	-	230		A
		$t = 10\text{ ms}$	-	180		A ² s
I^2t	I^2t for fusing		-	180		A ² s
dI_{T}/dt	Repetitive rate of rise of on-state current after triggering	$I_{\text{TM}} = 30\text{ A}$; $I_{\text{G}} = 0.2\text{ A}$; $dI_{\text{G}}/dt = 0.2\text{ A}/\mu\text{s}$	-	50		A/ μs
		T2+ G+	-	50		A/ μs
		T2+ G-	-	50		A/ μs
		T2- G-	-	50		A/ μs
		T2- G+	-	10		A/ μs
I_{GM}	Peak gate current		-	2		A
V_{GM}	Peak gate voltage		-	5		V
P_{GM}	Peak gate power		-	5		W
$P_{\text{G(AV)}}$	Average gate power	over any 20 ms period	-	0.5		W
T_{stg}	Storage temperature		-40	150		$^\circ\text{C}$
T_{j}	Operating junction temperature		-	125		$^\circ\text{C}$

¹ Although not recommended, off-state voltages up to 800V may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed 15 A/ μs .

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MAC223 series

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base	full cycle	-	-	1.0	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	half cycle	-	-	1.4	K/W
		in free air	-	60	-	K/W

STATIC CHARACTERISTICS

$T_j = 25\text{ °C}$ unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{GT}	Gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$	-	-	-	-
		T2+ G+	-	6	50	mA
		T2+ G-	-	10	50	mA
		T2- G-	-	11	50	mA
		T2- G+	-	23	75	mA
I_L	Latching current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$	-	-	-	-
		T2+ G+	-	8	40	mA
		T2+ G-	-	30	60	mA
		T2- G-	-	18	40	mA
		T2- G+	-	15	60	mA
I_H	Holding current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$	-	-	-	-
		T2+	-	7	30	mA
		T2-	-	12	30	mA
V_T	On-state voltage	$I_T = 30\text{ A}$	-	1.3	1.55	V
V_{GT}	Gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$	-	0.7	1.5	V
		$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ °C}$	0.25	0.4	-	V
I_D	Off-state leakage current	$V_D = V_{DRM(max)}$; $T_j = 125\text{ °C}$	-	0.1	0.5	mA

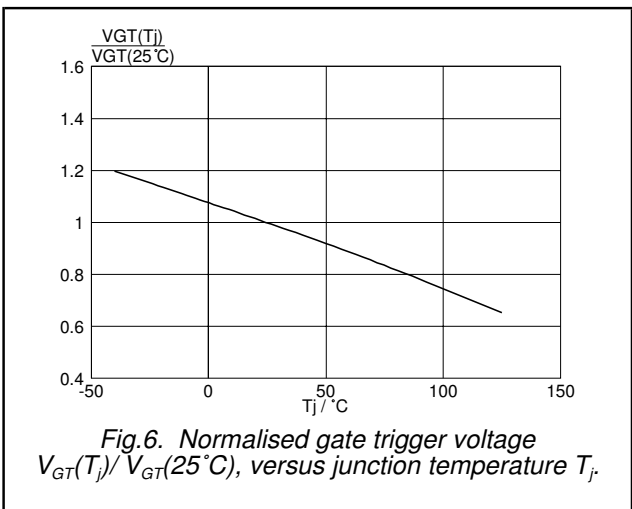
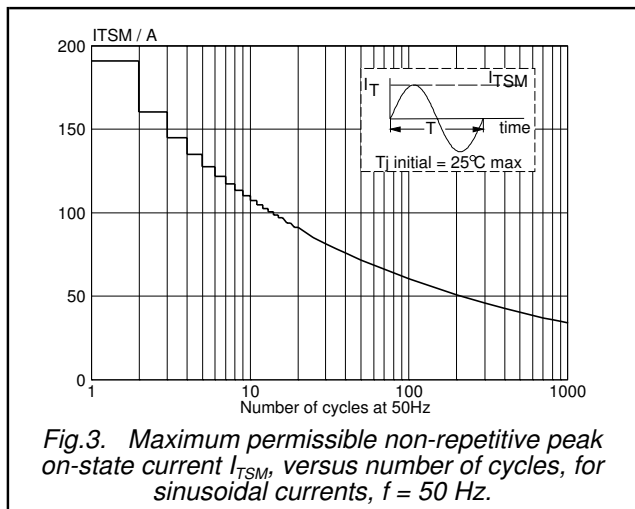
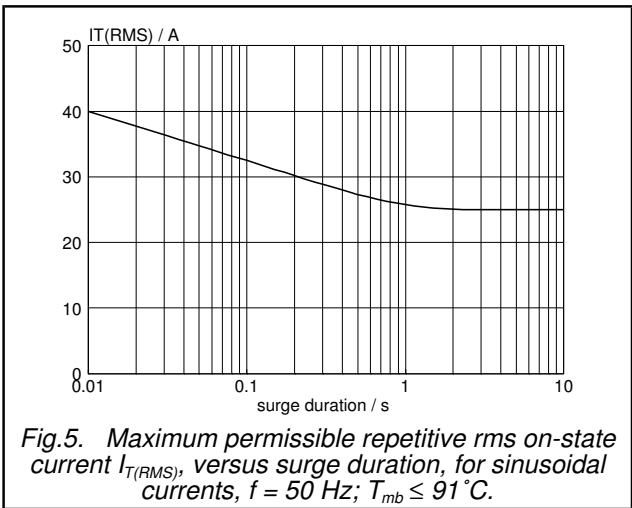
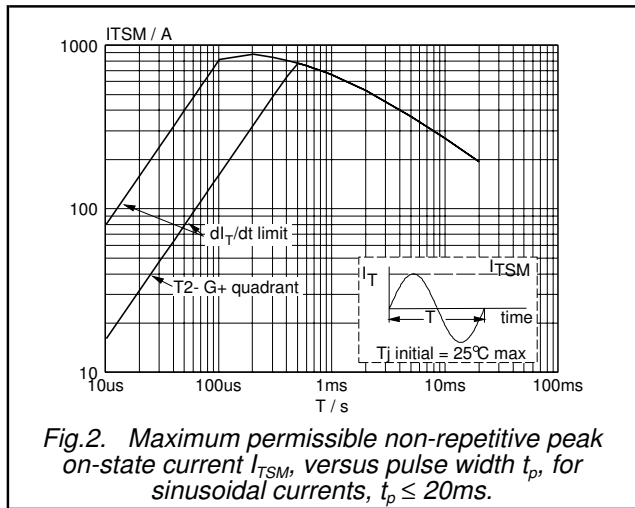
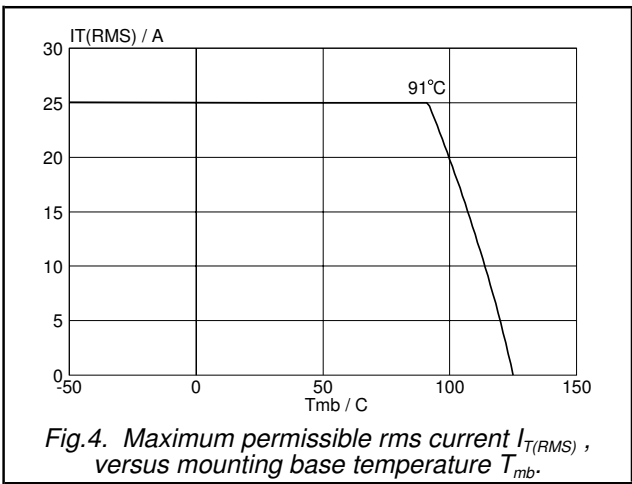
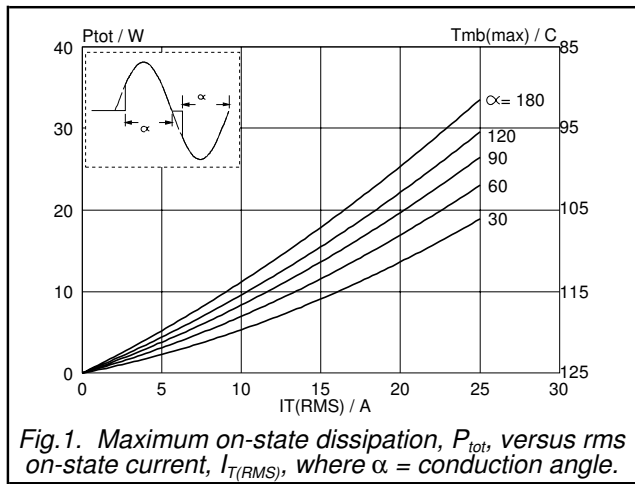
DYNAMIC CHARACTERISTICS

$T_j = 25\text{ °C}$ unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
dV_D/dt	Critical rate of rise of off-state voltage	$V_{DM} = 67\% V_{DRM(max)}$; $T_j = 125\text{ °C}$; exponential waveform; gate open circuit	100	300	-	V/ μ s
dV_{com}/dt	Critical rate of change of commutating voltage	$V_{DM} = 400\text{ V}$; $T_j = 95\text{ °C}$; $I_{T(RMS)} = 25\text{ A}$; $dI_{com}/dt = 9\text{ A/ms}$; gate open circuit	-	10	-	V/ μ s
t_{gt}	Gate controlled turn-on time	$I_{TM} = 30\text{ A}$; $V_D = V_{DRM(max)}$; $I_G = 0.1\text{ A}$; $dI_G/dt = 5\text{ A}/\mu$ s	-	2	-	μ s

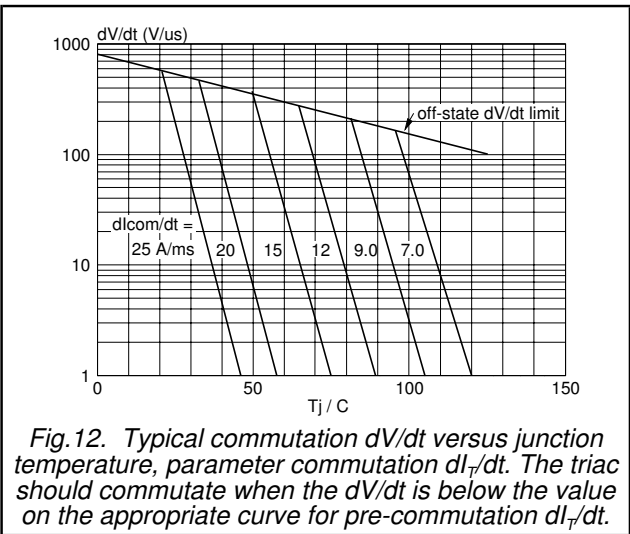
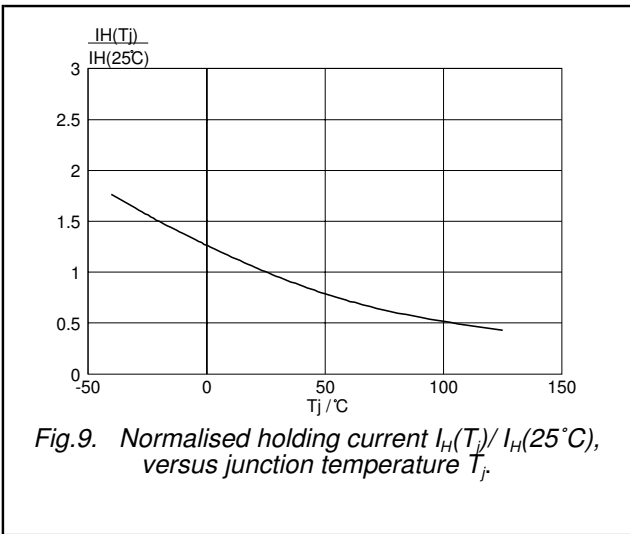
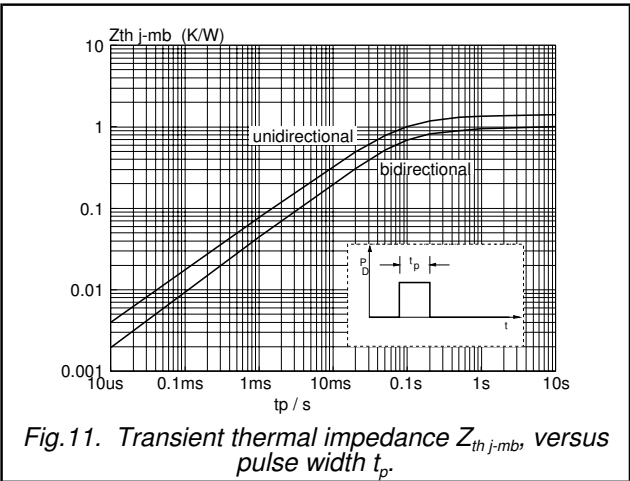
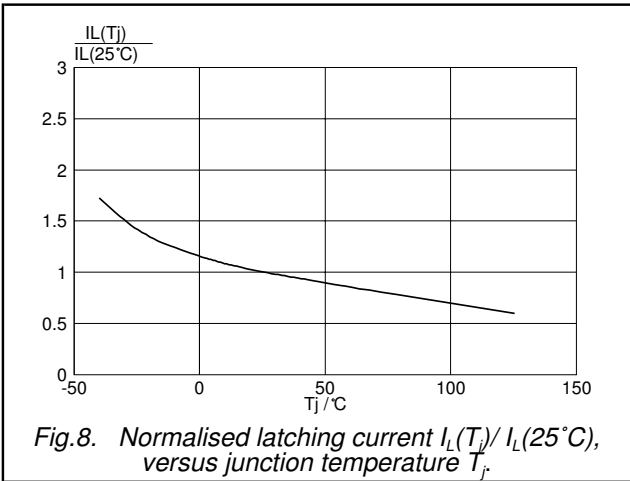
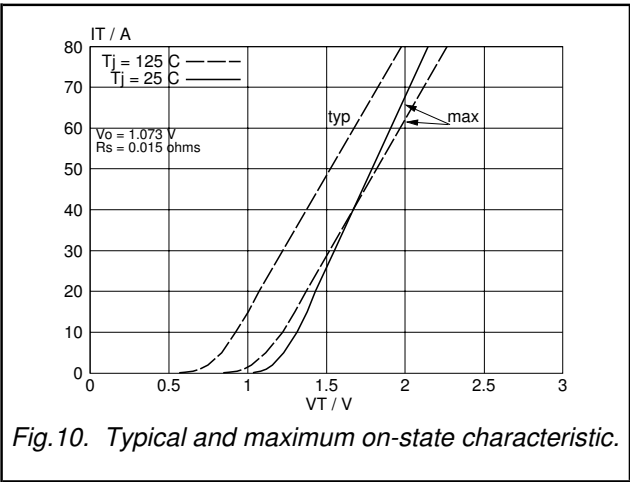
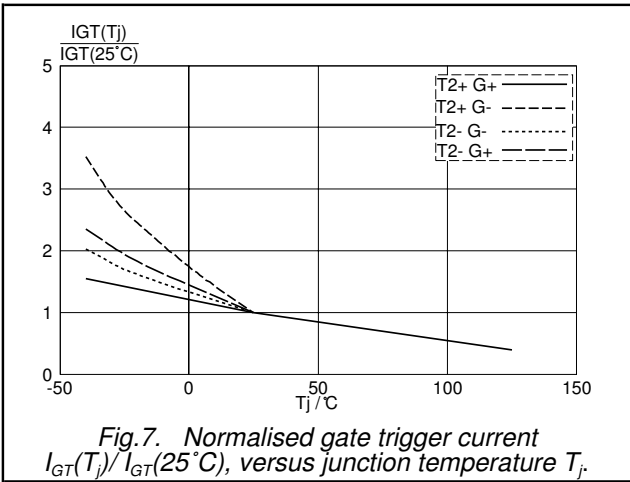
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Dimensions in mm

Net Mass: 2 g

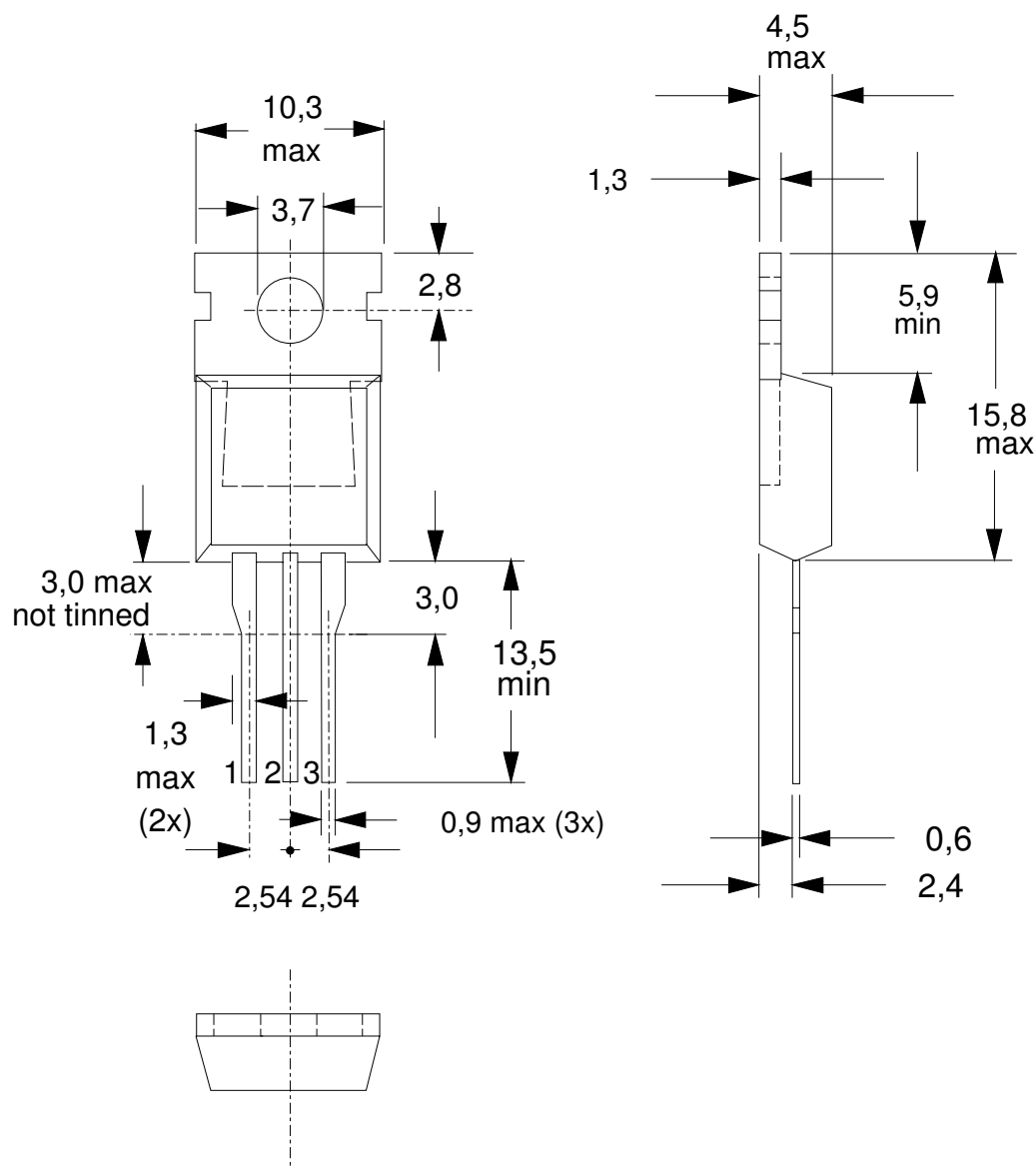


Fig.13. SOT78 (TO220AB). pin 2 connected to mounting base.

Notes

1. Refer to mounting instructions for SOT78 (TO220) envelopes.
2. Epoxy meets UL94 V0 at 1/8".

Legal information

DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
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Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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