



BT139

GENERAL DESCRIPTION

Glass 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.

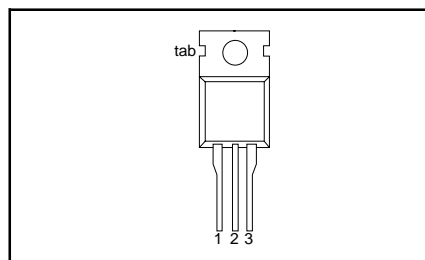
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
V_{DRM}	Repetitive peak off-state voltages	BT139-500	600	800	V
		BT139-500F	600F	800F	
		BT139-500G	600G	800G	
$I_{T(RMS)}$	RMS on-state current	16	16	16	A
I_{TSM}	Non-repetitive peak on-state current	140	140	140	A

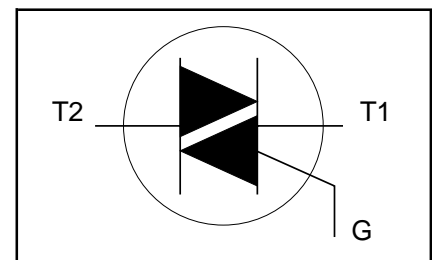
PINNING - TO220AB

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
				-500	-600	-800	
V_{DRM}	Repetitive peak off-state voltages		-	500 ¹	600 ¹	800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 99^\circ\text{C}$	-	16			A
I_{TSM}	Non-repetitive peak on-state current	full sine wave; $T_j = 25^\circ\text{C}$ prior to surge	-	140			A
I^2t	I^2t for fusing	$t = 20\text{ ms}$	-	140			A
		$t = 16.7\text{ ms}$	-	150			A
		$t = 10\text{ ms}$	-	98			A ² s
dI_T/dt	Repetitive rate of rise of on-state current after triggering	$I_{TM} = 20\text{ A}; I_G = 0.2\text{ A}; dI_G/dt = 0.2\text{ A}/\mu\text{s}$	-	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
$P_{G(AV)}$	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			$^\circ\text{C}$



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THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base	full cycle	-	-	1.2	K/W
		half cycle	-	-	1.7	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	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	BT139- $V_D = 12\text{ V}; I_T = 0.1\text{ A}$	-	-F	...G	
		T2+ G+	-	5	35	25	50	mA
		T2+ G-	-	8	35	25	50	mA
		T2- G-	-	10	35	25	50	mA
		T2- G+	-	22	70	70	100	mA
I_L	Latching current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	-	-	-	-	-	
		T2+ G+	-	7	40	40	60	mA
		T2+ G-	-	20	60	60	90	mA
		T2- G-	-	8	40	40	60	mA
		T2- G+	-	10	60	60	90	mA
I_H	Holding current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	-	6	30	30	60	mA
V_T	On-state voltage	$I_T = 20\text{ A}$	-	1.2	1.6			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	BT139- $V_{DM} = 67\% V_{DRM(max)}; T_j = 125\text{ °C};$ exponential waveform; gate open circuitF	...G	250	-	V/ μ s
dV_{com}/dt	Critical rate of change of commutating voltage	$V_{DM} = 400\text{ V}; T_j = 95\text{ °C}; I_{T(RMS)} = 16\text{ A}; dl_{com}/dt = 7.2\text{ A/ms};$ gate open circuit	-	-	10	20	-	V/ μ s
t_{gt}	Gate controlled turn-on time	$I_{TM} = 20\text{ A}; V_D = V_{DRM(max)}; I_G = 0.1\text{ A}; dl_G/dt = 5\text{ A}/\mu$ s	-	-	-	2	-	μ s

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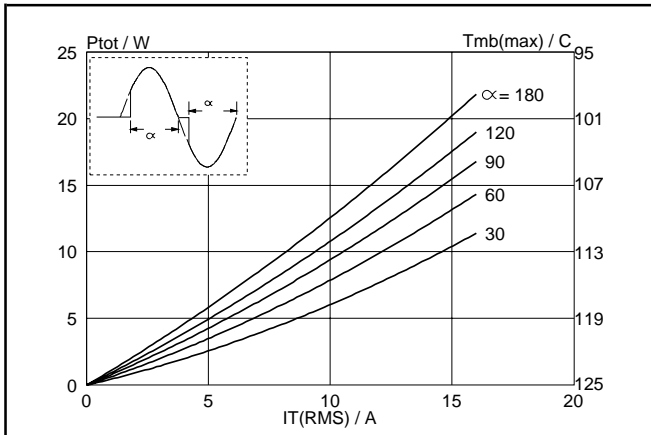


Fig. 1. Maximum on-state dissipation, P_{tot} , versus rms on-state current, $I_{T(RMS)}$, where $\alpha =$ conduction angle.

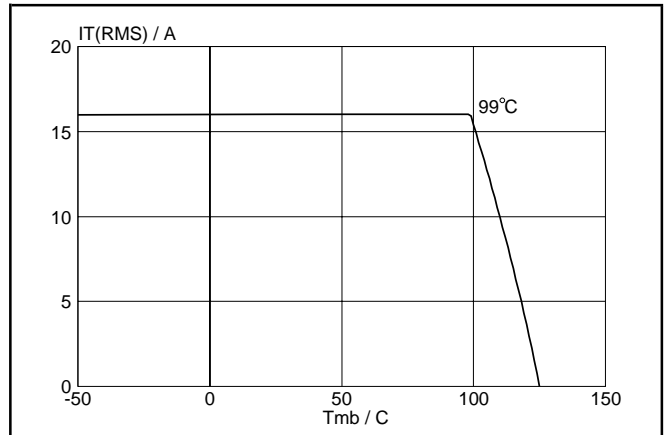


Fig. 4. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb} .

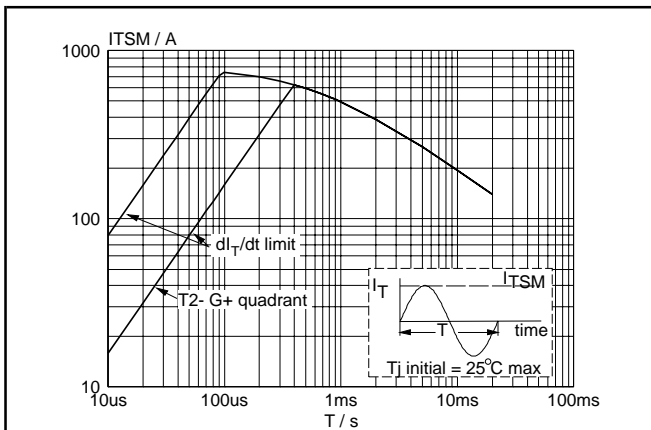


Fig. 2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 20$ ms.

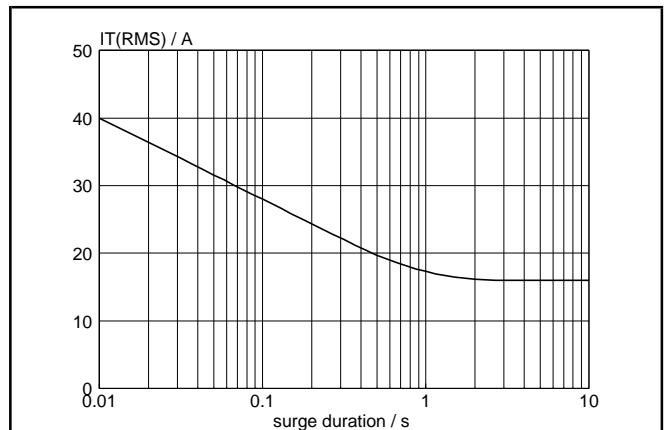


Fig. 5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50$ Hz; $T_{mb} \leq 99^\circ\text{C}$.

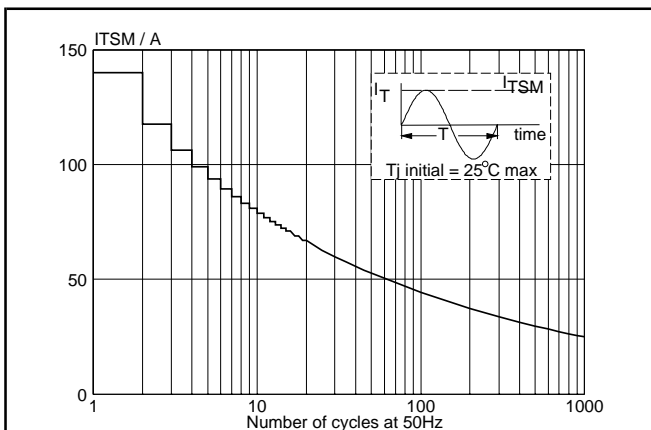


Fig. 3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50$ Hz.

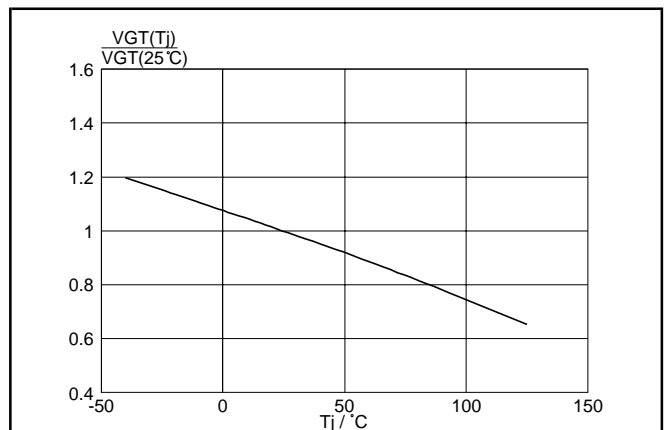
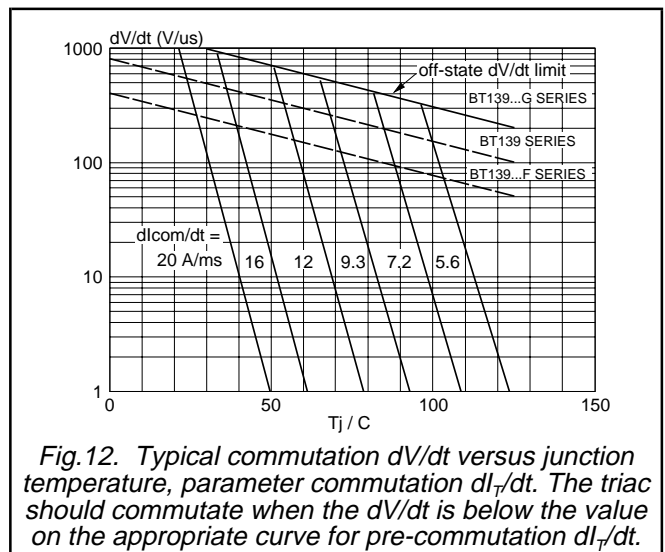
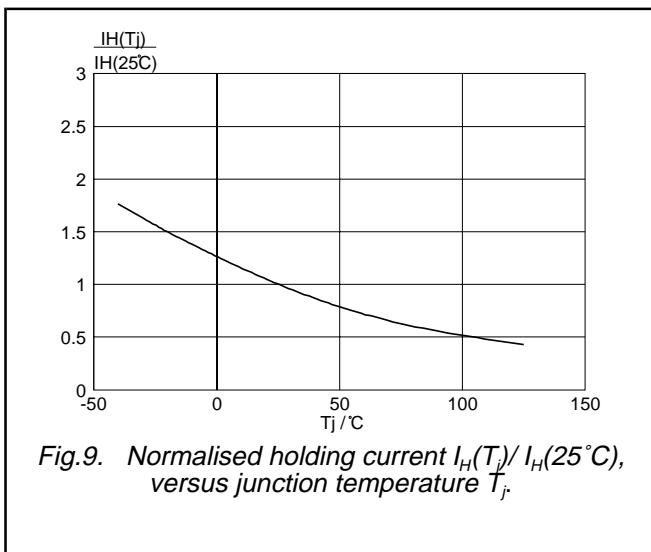
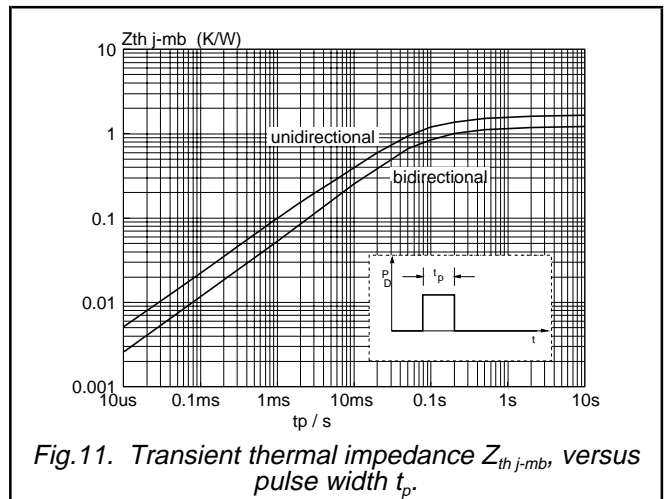
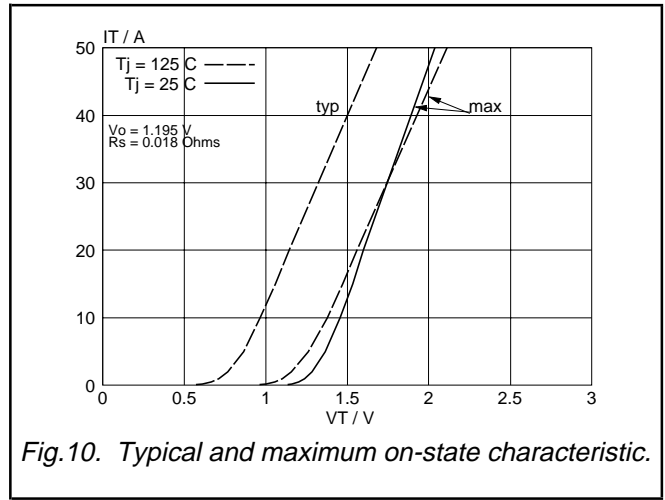
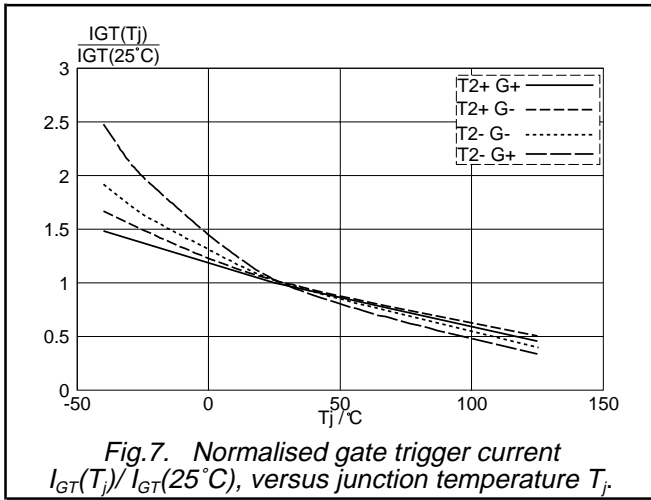


Fig. 6. Normalised gate trigger voltage $V_{GT}(T_j) / V_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

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MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

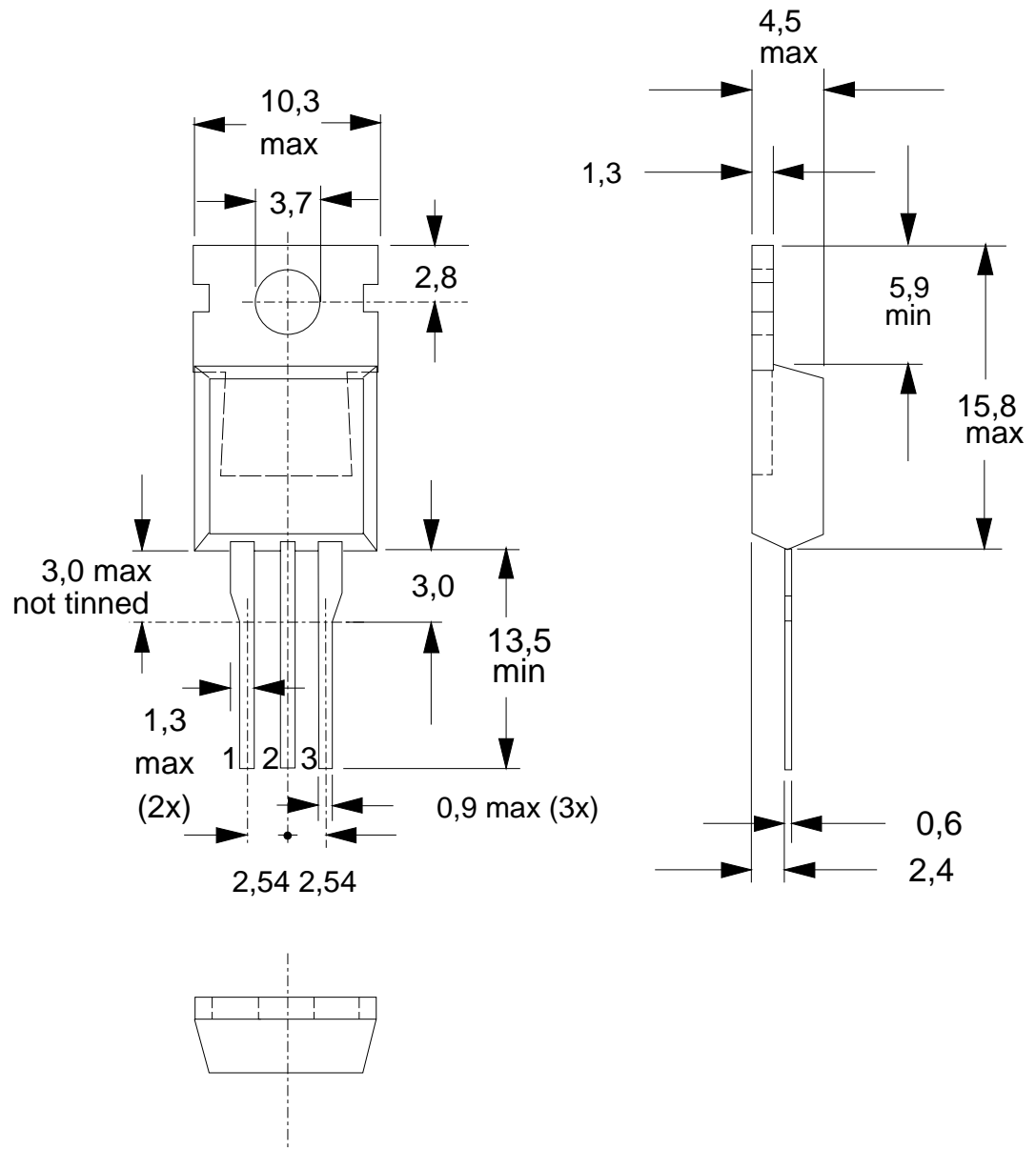


Fig.13. TO220AB; pin 2 connected to mounting base.

Notes

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