

Triacs

logic level

BT137 series D

GENERAL DESCRIPTION

Glass passivated, sensitive gate triacs in a plastic envelope, intended for use in general purpose bidirectional switching and phase control applications. These devices are intended to be interfaced directly to microcontrollers, logic integrated circuits and other low power gate trigger circuits.

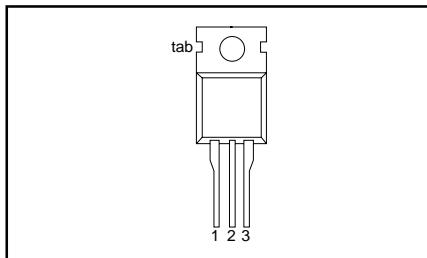
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	UNIT
V_{DRM}	BT137- Repetitive peak off-state voltages	500D	600D	V
$I_{T(RMS)}$	RMS on-state current	500	600	A
I_{TSM}	Non-repetitive peak on-state current	8	8	A
		65	65	A

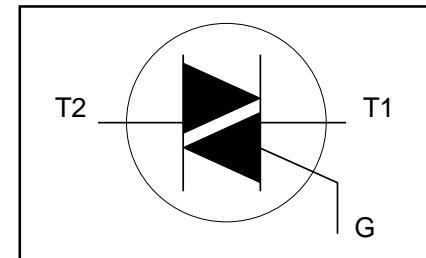
PINNING - TO220AB

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
V_{DRM}	Repetitive peak off-state voltages		-	-500 500 ¹	V
$I_{T(RMS)}$ I_{TSM}	RMS on-state current Non-repetitive peak on-state current	full sine wave; $T_{mb} \leq 102^\circ\text{C}$ full sine wave; $T_j = 25^\circ\text{C}$ prior to surge $t = 20\text{ ms}$ $t = 16.7\text{ ms}$ $t = 10\text{ ms}$ $I_{TM} = 12\text{ A}$; $I_G = 0.2\text{ A}$; $dI_G/dt = 0.2\text{ A}/\mu\text{s}$	-	8	A
I^2t dl/dt	I^2t for fusing Repetitive rate of rise of on-state current after triggering		-	65 71 21	A ² s
I_{GM} V_{GM} P_{GM} $P_{G(AV)}$ T_{stg} T_j	Peak gate current Peak gate voltage Peak gate power Average gate power Storage temperature Operating junction temperature	over any 20 ms period	T2+ G+ T2+ G- T2- G- T2- G+ - - - - - - - - -40	50 50 50 10 2 5 5 0.5 150 125	A/ μ s A/ μ s °C °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 6 A/ μ s.

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THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	full cycle	-	-	2.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	half cycle in free air	-	60	2.4	K/W

STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{GT}	Gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$	-	2.5	5	mA
		$T2+ G+$	-	3.5	5	mA
		$T2+ G-$	-	3.5	5	mA
		$T2- G-$	-	6.5	10	mA
I_L	Latching current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$	-	1.6	15	mA
		$T2+ G+$	-	8.5	20	mA
		$T2+ G-$	-	1.2	15	mA
		$T2- G-$	-	2.5	20	mA
I_H	Holding current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$	-	1.5	10	mA
		$I_T = 10\text{ A}$	-	1.3	1.65	V
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$	-	0.7	1.5	V
V_T	On-state voltage	$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125^\circ\text{C}$	0.25	0.4	-	V
		$V_D = V_{DRM(\text{max})}$; $T_j = 125^\circ\text{C}$	-	0.1	0.5	mA
I_D	Off-state leakage current					

DYNAMIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
dV_D/dt	Critical rate of rise of off-state voltage	$V_{DM} = 67\% V_{DRM(\text{max})}$; $T_j = 125^\circ\text{C}$; exponential waveform; $R_{GK} = 1\text{ k}\Omega$	-	5	-	V/ μ s
t_{gt}	Gate controlled turn-on time	$I_{TM} = 12\text{ A}$; $V_D = V_{DRM(\text{max})}$; $I_G = 0.1\text{ A}$; $dI_G/dt = 5\text{ A}/\mu\text{s}$	-	2	-	μ s

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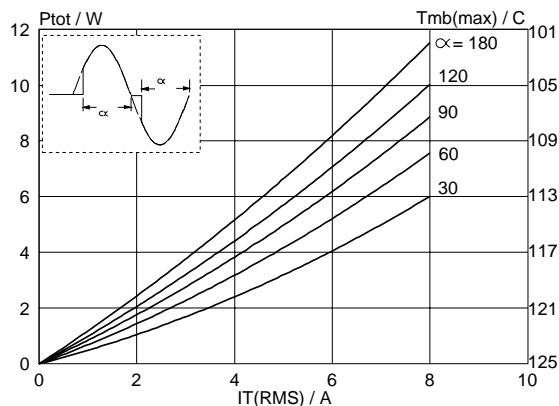


Fig.1. Maximum on-state dissipation, P_{tot} , versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

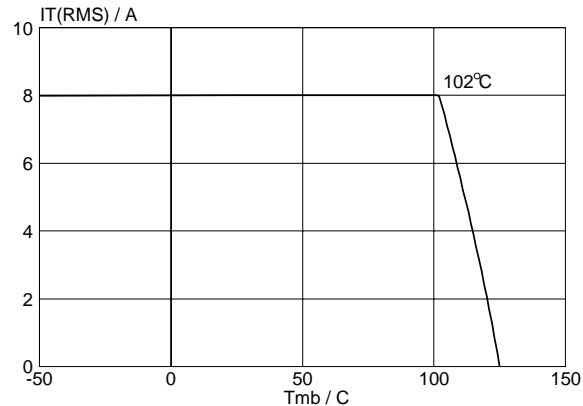


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb} .

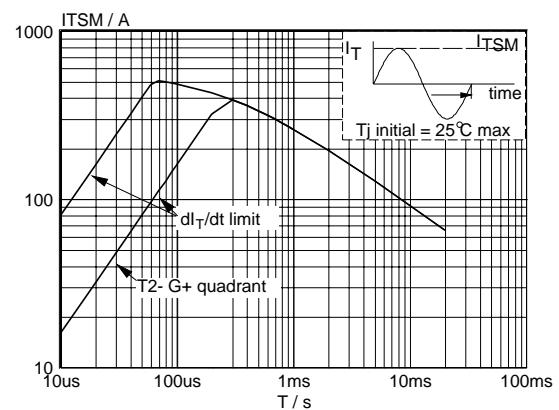


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 20\text{ms}$.

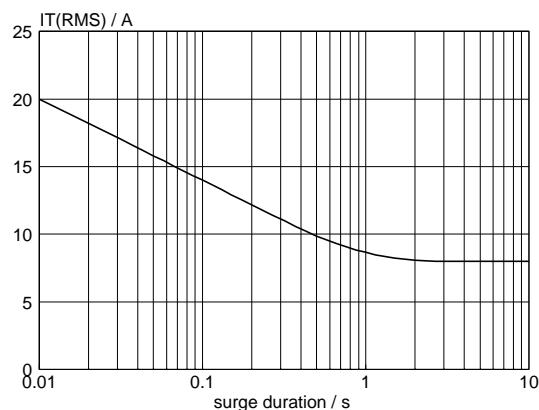


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50\text{ Hz}$; $T_{mb} \leq 102^\circ\text{C}$.

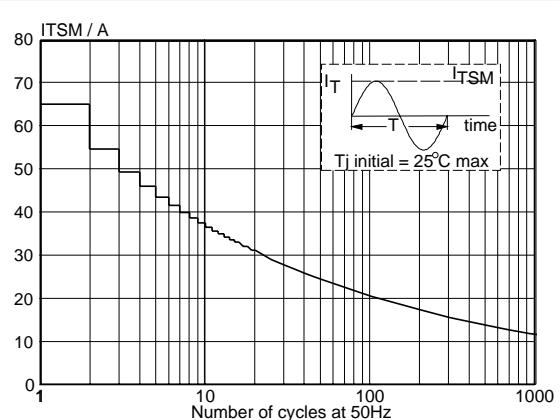


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50\text{ Hz}$.

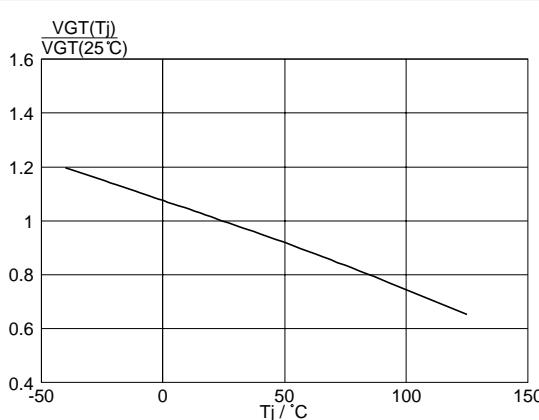


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j)/V_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

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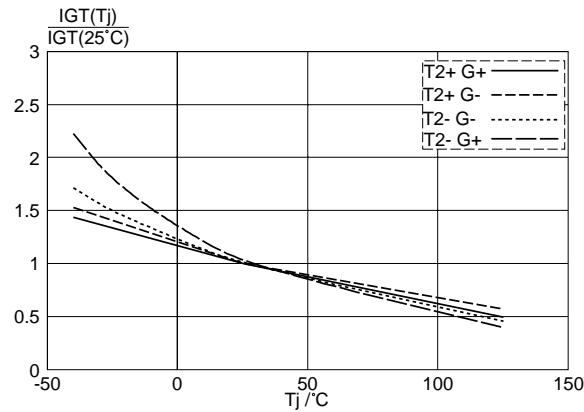


Fig.7. Normalised gate trigger current $I_{GT}(T_j)/I_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

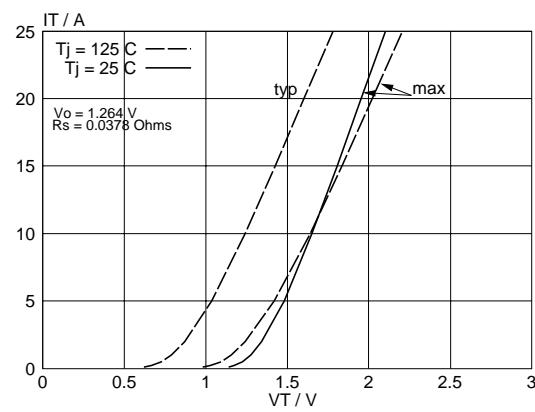


Fig.10. Typical and maximum on-state characteristic.

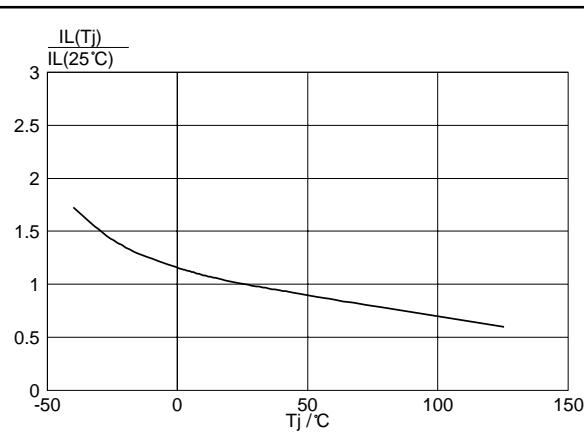


Fig.8. Normalised latching current $I_L(T_j)/I_L(25^\circ\text{C})$, versus junction temperature T_j .

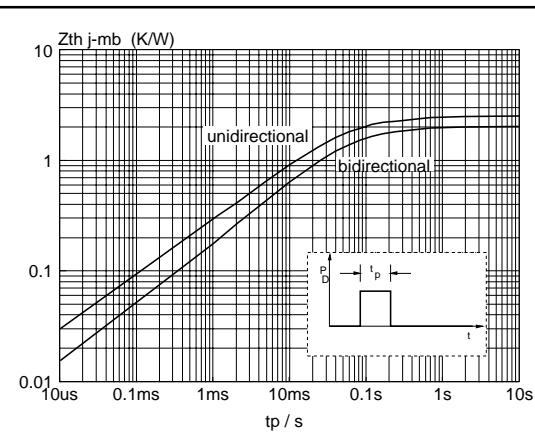


Fig.11. Transient thermal impedance $Z_{th,j-mb}$, versus pulse width t_p .

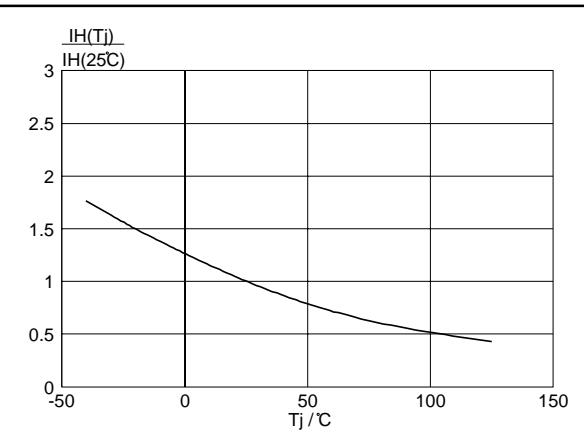


Fig.9. Normalised holding current $I_H(T_j)/I_H(25^\circ\text{C})$, versus junction temperature T_j .

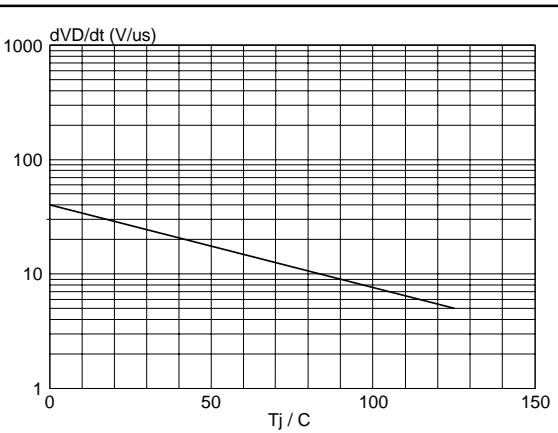


Fig.12. Typical, critical rate of rise of off-state voltage, dV_D/dt versus junction temperature T_j .

MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

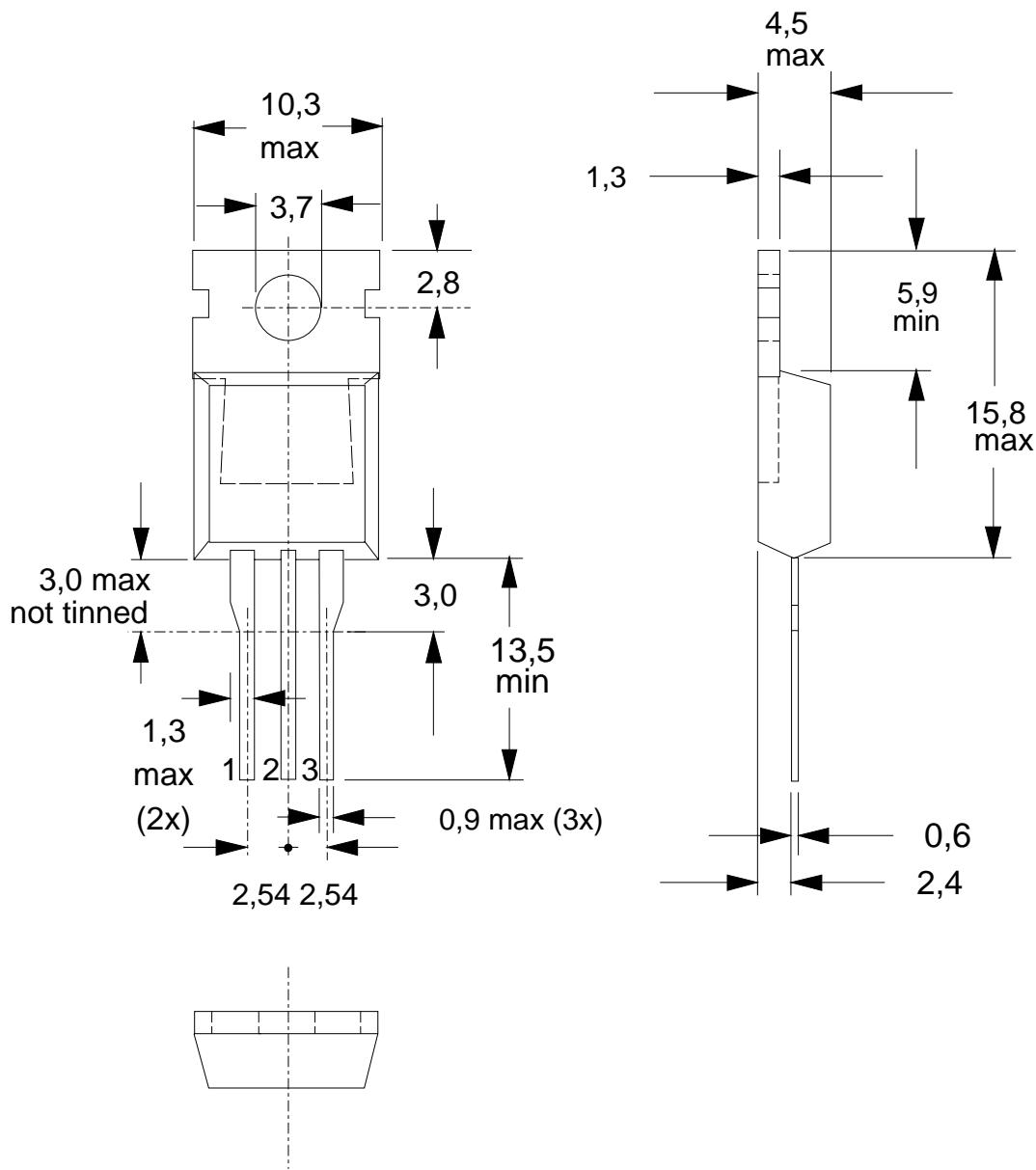


Fig.13. TO220AB; pin 2 connected to mounting base.

Notes

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

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	
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