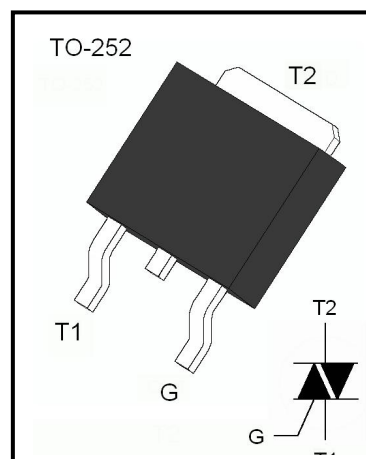


General Description

The snubberless versions BT138 are specially recommended for use on inductive loads, thanks to their high commutation performances. Logic level versions are designed to interface directly with low power drivers such as microcontrollers.



Absolute Rating (limiting values)

Parameter	Symbol	Conditions	Min	Max	Unit
Repetitive peak off-state voltage	V_{DRM} V_{RRM}		-	600 800	V
On-State RMS Current	$I_{T(RMS)}$	full sine wave	-	12	A
Non-repetitive peak on-state current	I_{TSM}	full sine wave; $t = 20$ ms $T_j = 25^\circ\text{C}$ prior to surge	-	120	A
		$t = 16.7$ ms	-	126	
I^2t for fusing	I^2t	$t_p = 10$ ms	-	78	A^2s
Critical rate of rise of on-state current	di/dt	$I_G = 2I_{GT}$ $tr \leq 100\text{ns}$ $F = 120\text{Hz}$ $T_j = 125^\circ\text{C}$	-	50	$\text{A}/\mu\text{s}$
Peak gate current	I_{GM}	$t_p = 20 \mu\text{s}$ $T_j = 125^\circ\text{C}$		4	A
Average gate power	$P_{G(AV)}$	$T_j = 125^\circ\text{C}$	-	1	W
Storage Temperature	T_{stg}		-40	150	$^\circ\text{C}$
Operating junction temperature	T_j		-40	125	$^\circ\text{C}$

Thermal resistances

Parameter	Symbol	Conditions	Value	Unit
Junction to ambient	θ_{JA}		60	$^\circ\text{C}/\text{W}$
Junction to case for AC	θ_{JC}		1.4	$^\circ\text{C}/\text{W}$

Electrical Characteristics (3 Quadrants)

(T_j = 25°C, unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Gate trigger current	I _{GT}	V _D = 12V, R _L = 30 Ω	I - II -III	-		35	mA
Gate trigger voltage	V _{GT}		I - II -III			1.3	V
Gate Non-Trigger Voltage	V _{GD}	V _D =V _{DRM} , R _L =3.3kΩ T _j =125°C	I - II -III	0.2			V
Latching Current	I _L	I _G =1.2 I _{GT}	I -III			50	mA
			II			60	
Holding current	I _H	I _T = 100mA				35	mA
On-state voltage(Note 2)	V _{TM}	I _T = 17A , t _p =380μs	T _j = 25°C			1.55	V
Repetitive Peak Off-State Current	I _{DRM}	V _{DRM} Rated V _{DRM} Rated	T _j = 25°C			5	μA
	I _{RRM}		T _j =125°C			1	mA
Critical Rate of Rise of Off-State Voltage at Commutation(Note 2)	(dV/dt) _c	Without snubber	T _j =125°C	6.5			A/ms
Critical Rate of Rise of Off-State Voltage (Note 2)	dV/dt	V _D =67%V _{DRM} , Gate Open	T _j =125°C	500			V/μs

Note 1: Minimum I_{GT} is guaranted at 5% of I_{GT} max.

2: For both polarities of T2 referenced to T1

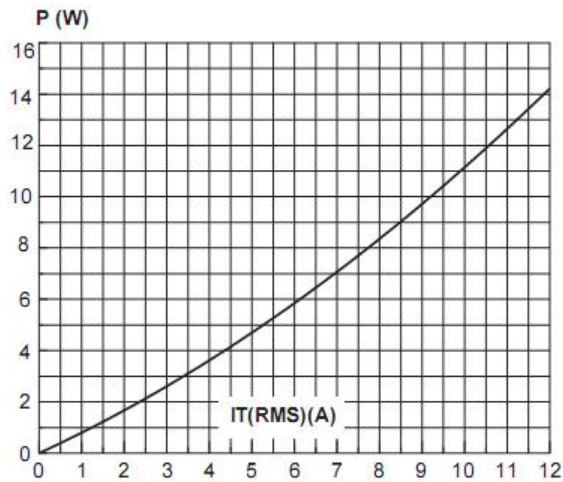
Typical Characteristics


Fig.1. Maximum power dissipation versus RMS on-state current (full cycle).

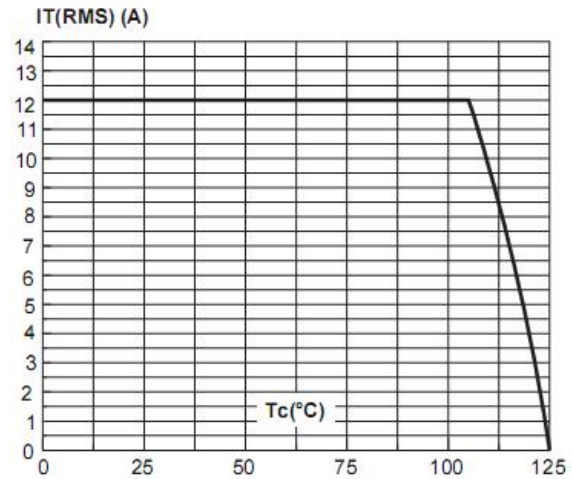


Fig.2. RMS on-state current versus case temperature (full cycle).

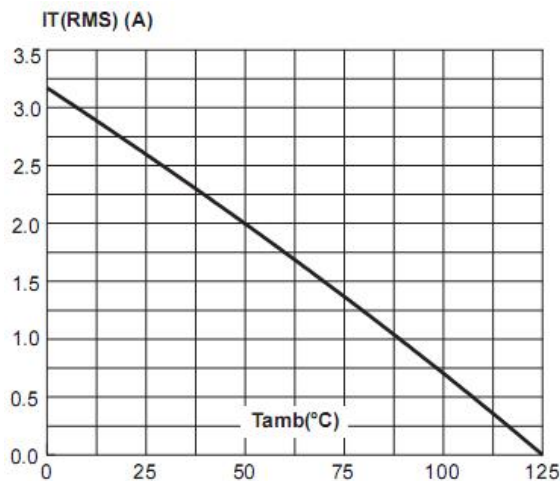


Fig.3. RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness: 35µm), full cycle.

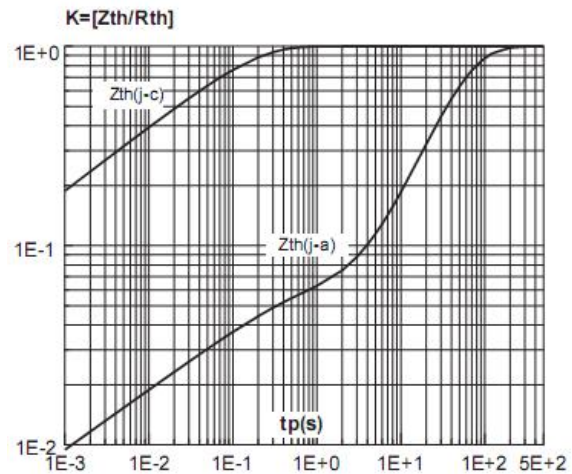


Fig.4. Relative variation of thermal impedance versus pulse duration.

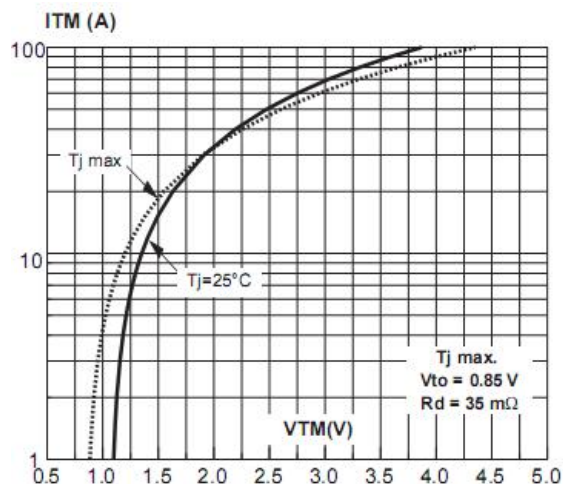


Fig.5. On-state characteristics (maximum values).

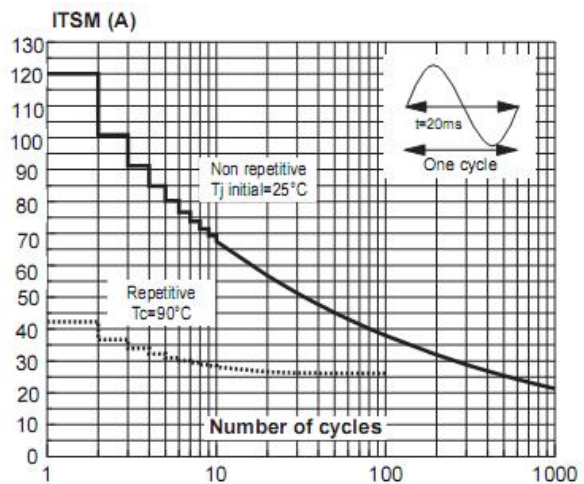


Fig.6. Surge peak on-state current versus number of cycles.

Typical Characteristics

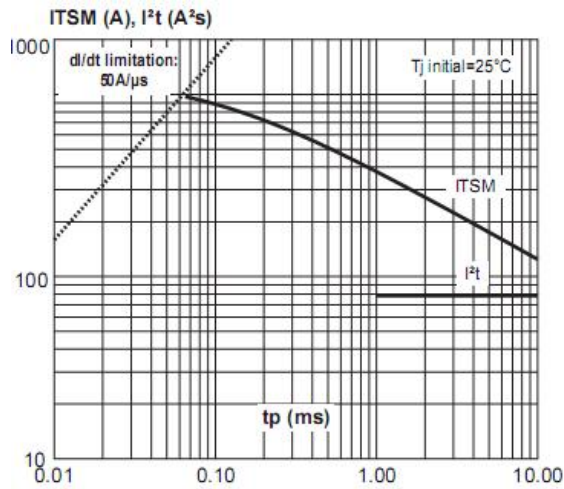


Fig.7. Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 10\text{ms}$, and corresponding value of I^2t .

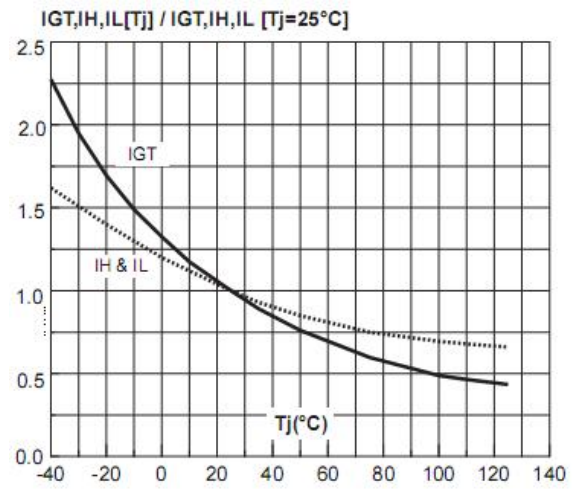
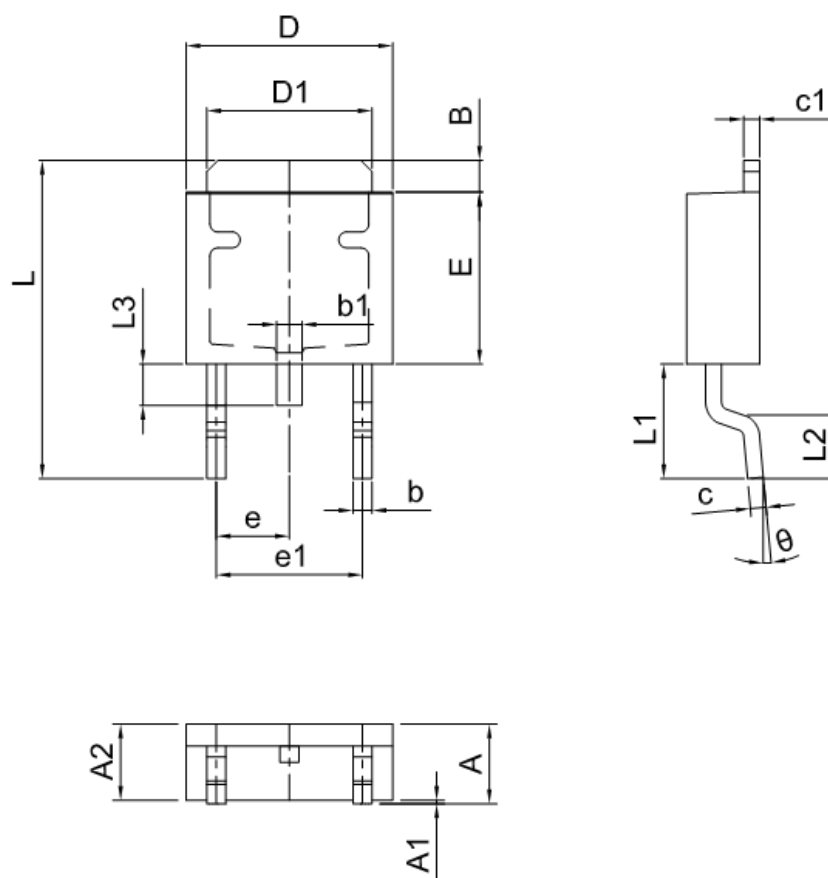


Fig.8. Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values).

Package Dimensions (Unit:mm)


Symbol	TO-252		
	Min.	Typ	Max.
A	2.20	2.35	2.50
A1	0.00	0.05	0.12
A2	2.20	2.30	2.40
B	1.20	1.40	1.60
b	0.50	0.60	0.70
b1	0.70	0.80	0.90
c	0.40	0.50	0.60
c1	0.40	0.50	0.60
D	6.35	6.50	6.65
D1	5.20	5.30	5.40
E	5.40	5.50	5.70
e	2.20	2.30	2.40
e1	4.40	4.60	4.80
L	9.60	9.90	10.20
L1	2.70	2.90	3.10
L2	1.40	1.60	1.80
L3	0.90	1.20	1.50
θ	0°C	4°C	8°C