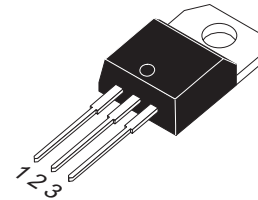


Simplified outline TO-220AB

Description

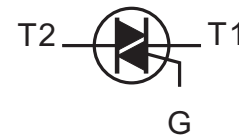
Passivated, sensitive gate triacs in a plastic envelope, intended for use in general purpose bidirectional switching and phase control applications, where high sensitivity is required in all four quadrants.



Features

- Blocking voltage to 600 V
- On-state RMS current to 12 A

Symbol



Applications

- Motor control
- Industrial and domestic lighting
- Heating
- Static switching

Pin	Description
1	Main terminal 1 (T1)
2	Main terminal 2 (T2)
3	gate (G)
TAB	Main terminal 2 (T2)

SYMBOL	PARAMETER	Value	Unit
V_{DRM}	Repetitive peak off-state voltages	600	V
$I_T (RMS)$	RMS on-state current	12	A
I_{TSM}	Non-repetitive peak on-state current	95	A

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
$R_{th j-mb}$	Thermal resistance Junction to mounting base	Full cycle	-	-	1.5	K/W
		Half cycle	-	-	2.0	K/W
$R_{th j-a}$	Thermal resistance Junction to ambient	In free air	-	60	-	K/W

Limiting values in accordance with the Maximum system(IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN	Value	UNIT	
V_{DRM}	Repetitive peak off-state Voltages		-	600	V	
$I_{T(RMS)}$	RMS on-state current	Full sine wave; $T_{mb} \leq 99^{\circ}C$	-	12	A	
I_{TSM}	Non-repetitive surge peak on-state current	full sine wave;, $T_j=25^{\circ}C$ prior to surge	t=20ms	-	95	A
			t=16.7ms	-	105	A
I^2t	I^2t for fusing	T=10ms	-	45	A ² S	
di_T/dt	Repetitive rate of rise of on-state current after triggering	$I_{TM}=20A; I_G=0.2A;$ $DI_G/dt=0.2A/\mu s$	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	$^{\circ}C$	
T_j	Operating junction Temperature		-	125	$^{\circ}C$	

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

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT	
Static characteristics							
I_{GT1}	Gate trigger current	$V_D=12V; I_T=0.1A$	T2+G+	-	1.3	5	mA
			T2+G-	-	2.8	5	mA
			T2-G-	-	3.2	5	mA
			T2-G+	-	5.5	10	mA
I_L	Latching current	$V_D=12V; I_{GT}=0.1A$	T2+G+	-	-	15	mA
			T2+G-	-	-	20	mA
			T2-G-	-	-	15	mA
			T2-G+	-	-	20	mA
I_H	Holding current	$V_D=12V; I_{GT}=0.1A$	-	-	10	mA	
V_T	On-state voltage	$I_T=15A$	-	1.4	1.65	V	
V_{GT}	Gate trigger voltage	$V_D=12V; I_T=0.1A$ $V_D=V_{DRM}; I_T=0.1A; T_j=125^{\circ}C$	-	0.7	1.5	V	
			0.25	0.4	-	V	
I_D	Off-state leakage current	$V_D=V_{DRM(max)}; T_j=125^{\circ}C$	-	0.1	0.5	mA	

Dynamic Characteristics

dV_D/dt	Critical rate of rise of Off-state voltage	$V_{DM}=67\% V_{DRM(max)}; T_j=110^{\circ}C;$ Exponential wave form; gate open circuit	-	50	-	V/ μs
t_{gt}	Gate controlled turn-on time	$I_{TM}=16A; V_D=V_{DRM(max)}; I_G=0.1A;$ $DI_G/dt=5A/\mu s$	-	2	-	μs

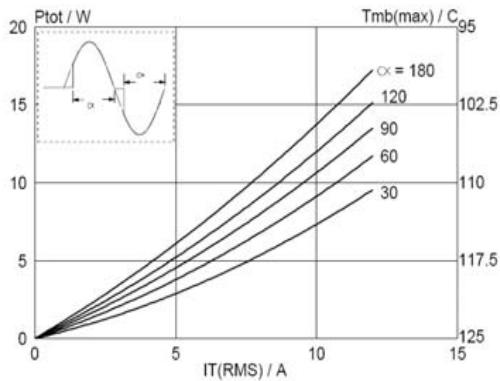
Description


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

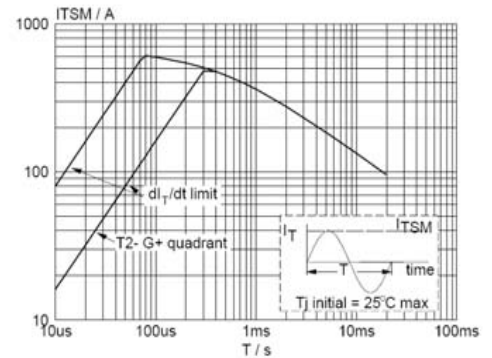


Fig. 2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 20ms$.

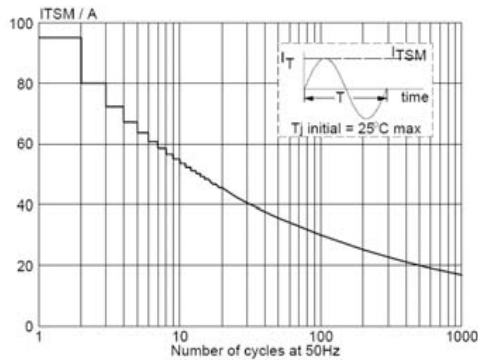


Fig. 3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50$ Hz.

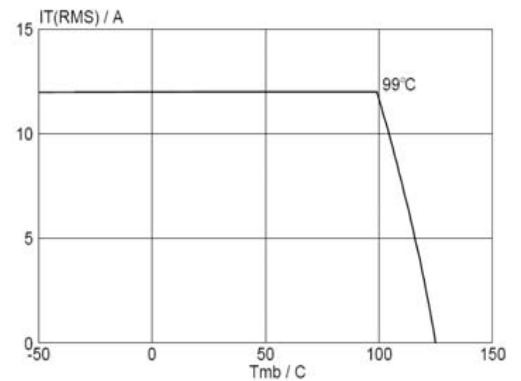


Fig. 4. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb} .

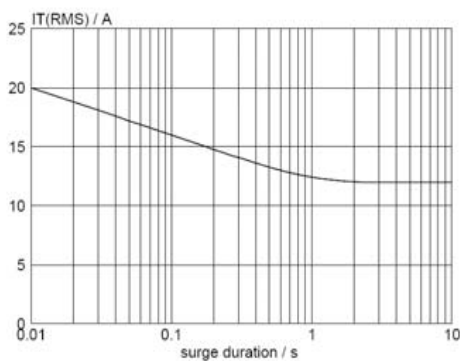


Fig. 5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50$ Hz; $T_{mb} \leq 99^\circ C$.

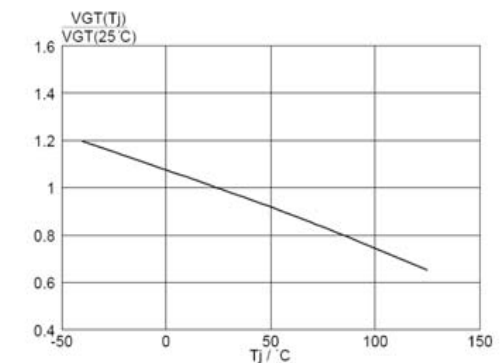


Fig. 6. Normalised gate trigger voltage $V_{GT}(T_j) / V_{GT}(25^\circ C)$, versus junction temperature T_j .

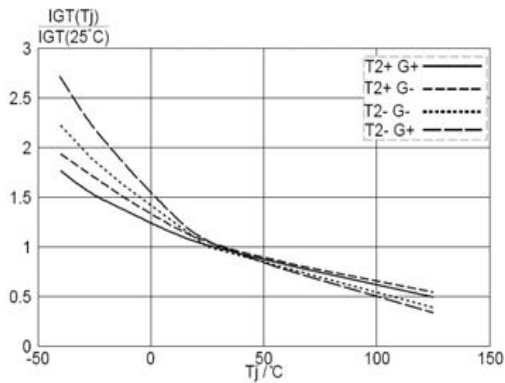
Description


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

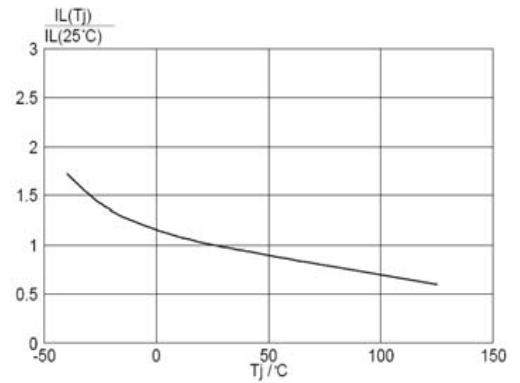


Fig. 8. Normalised latching current $I_L(T_j) / I_L(25^\circ\text{C})$, versus junction temperature T_j .

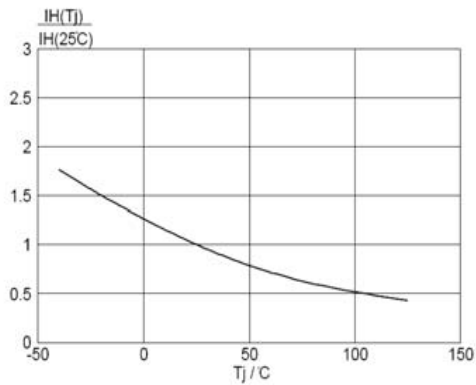


Fig. 9. Normalised holding current $I_H(T_j) / I_H(25^\circ\text{C})$, versus junction temperature T_j .

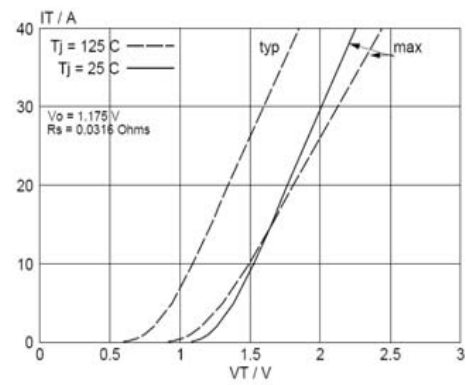


Fig. 10. Typical and maximum on-state characteristic.

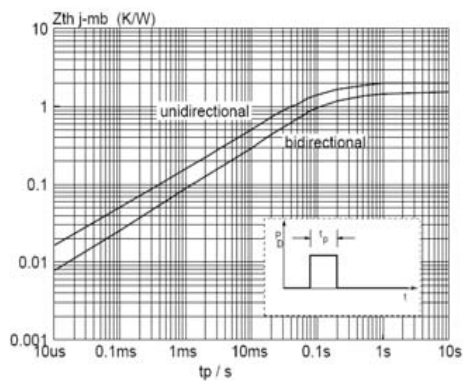


Fig. 11. Transient thermal impedance $Z_{th(j-mb)}$ versus pulse width t_p .

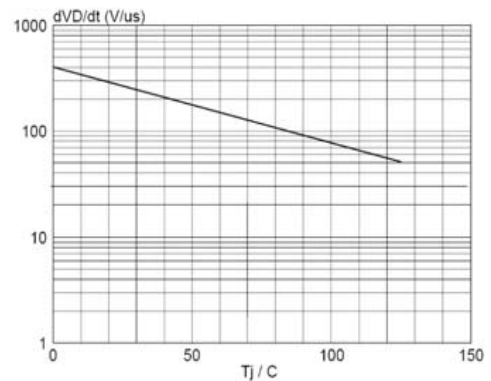
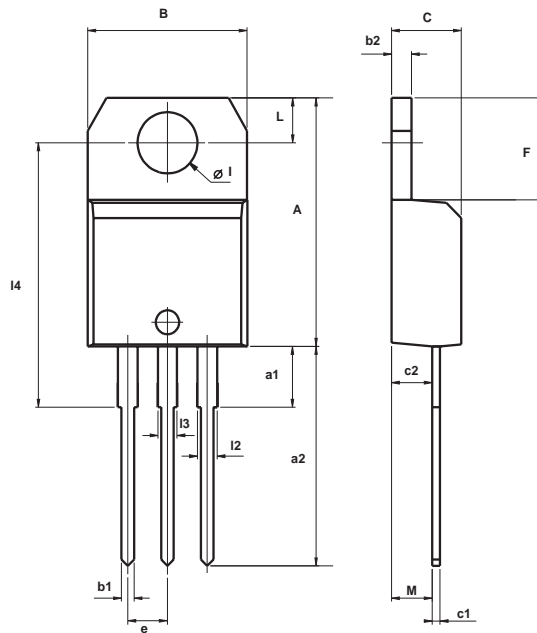


Fig. 12. Typical, critical rate of rise of off-state voltage, dV_D/dt versus junction temperature T_j .

Package Mechanical Data
TO-220AB (Plastic)


REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	2.40		2.70	0.094		0.106
F	6.20		6.60	0.244		0.259
I	3.75		3.85	0.147		0.151
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
I2	1.14		1.70	0.044		0.066
I3	1.14		1.70	0.044		0.066
M		2.60			0.102	