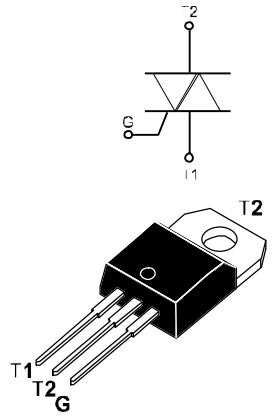


TO-220AB

MAIN FEATURES

Symbol	Value	Unit
$I_{T(RMS)}$	4	A
V_{DRM}/V_{RRM}	600	V
$I_{G(Q1)}$	2 to 10	mA

Description 4A TRIACs

Planar passivated very sensitive gate four quadrant triac in a TO-220AB plastic package intended for use in general purpose bidirectional switching and phase control applications, where high sensitivity is required in all four quadrants. This very sensitive gate "series D" triac is intended to be interfaced directly to microcontrollers, logic integrated circuits and other low power gate trigger circuits.

Absolute Maximum Rating

Symbol	Parameter	Conditions	Value	Unit
V_{DRM}	repetitive peak off-state voltage		600	V
I_{TSM}	non-repetitive peak on-state current	full sine wave; Tj(init) = 25 °C; tp = 20 ms; (see Fig.4,Fig.5)	25	A
		full sine wave; $T_{j(init)}$ = 25 °C; t_p = 16.7 ms	27	A
$I_{T(RMS)}$	RMS on-state current	full sine wave; Tmb ≤ 107 °C (see Fig.1, Fig.2, Fig.3)	4	A
I^2t	I^2T for fusing	t_p = 10 ms; sine-wave pulse	3.1	A^2s
dI_T/dt	rate of rise of on-state current	I_T = 6 A; I_G = 0.2 A; dI_G/dt = 0.2 A/µs; T2+ G+	50	A/µs
		I_T = 6 A; I_G = 0.2 A; dI_G/dt = 0.2 A/µs; T2+ G-	50	A/µs
		I_T = 6 A; I_G = 0.2 A; dI_G/dt = 0.2 A/µs; T2- G-	50	A/µs
		I_T = 6 A; I_G = 0.2 A; dI_G/dt = 0.2 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	°C
T_j	junction temperature		125	°C

Static Characteristics (Tj = 25°C, unless otherwise specified)						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Unit**
I_{GT}	Gate trigger current	V_D = 12 V; I_T = 0.1 A; T2+ G+;(see Fig.7)	-	2	5	mA
		V_D = 12 V; I_T = 0.1 A; T2+ G-;(see Fig.7)	-	2.5	5	mA
		V_D = 12 V; I_T = 0.1 A; T2- G-; (see Fig.7)	-	2.5	5	mA
		V_D = 12 V; I_T = 0.1 A; T2- G+; (see Fig.7)	-	5	10	mA
I_L	latching current	V_D = 12 V; I_G = 0.1 A; T2+ G+;(see Fig.8)	-	1.6	10	mA
		V_D = 12 V; I_G = 0.1 A; T2+ G-; see Fig.8)	-	4.5	15	mA
		V_D = 12 V; I_G = 0.1 A; T2- G-; (see Fig.8)	-	1.2	10	mA
		V_D = 12 V; I_G = 0.1 A; T2- G+; (see Fig.8)	-	2.2	15	mA
I_H	holding current	V_D = 12 V; Tj = 25 °C; (see Fig.9)	-	1.2	10	mA
V_T	on-state voltage	I_T = 5 A; Tj = 25 °C; (see Fig.10)	-	1.4	1.7	V
V_{GT}	gate trigger voltage	V_D = 12 V; I_T = 0.1 A; Tj = 25°C (See Fig.11)	-	0.7	1.5	V
		V_D = 400 V; I_T = 0.1 A; Tj =125°C (see Fig.11)	0.25	0.4	-	V
I_D	off-state current	V_D = 600 V; Tj = 125 °C	-	0.1	0.5	mA

Dynamic Characteristics (Tj = 25°C, unless otherwise specified)						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Unit**
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 402 V; Tj = 125 °C; R_{GT1} = 1 kΩ; exponential waveform; gate open circuit		5		V/μs
t_{gt}	gate-controlled turn-on time	I_{TM} = 6 A; V_D = 600 V; I_G = 0.1 A; dI_G/dt = 5 A/μs		2		μs

Thermal Resistances						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Unit**
Rth(j-L)	thermal resistance from junction to mounting base	half cycle (see Fig.6)			3.7	K/W
		full cycle (see Fig.6)			3	K/W
Rth(j-a)	thermal resistance from junction to ambient	in free air		60		K/W

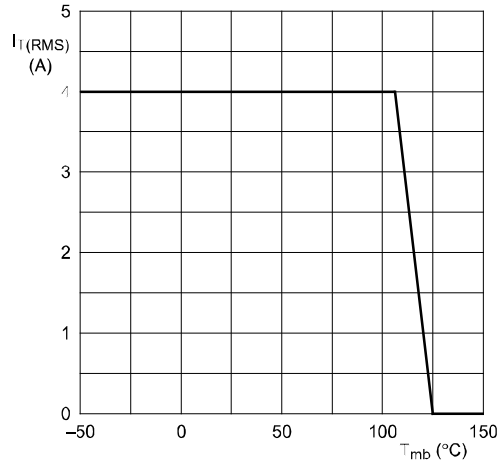
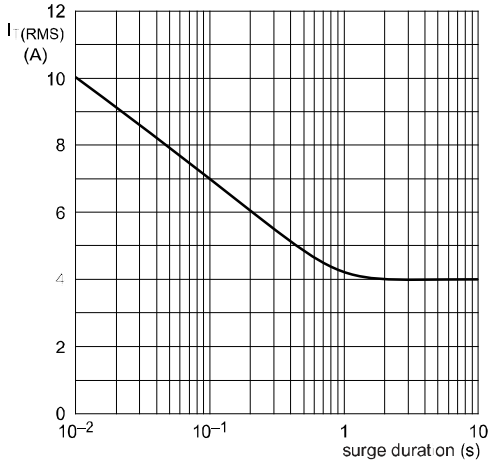


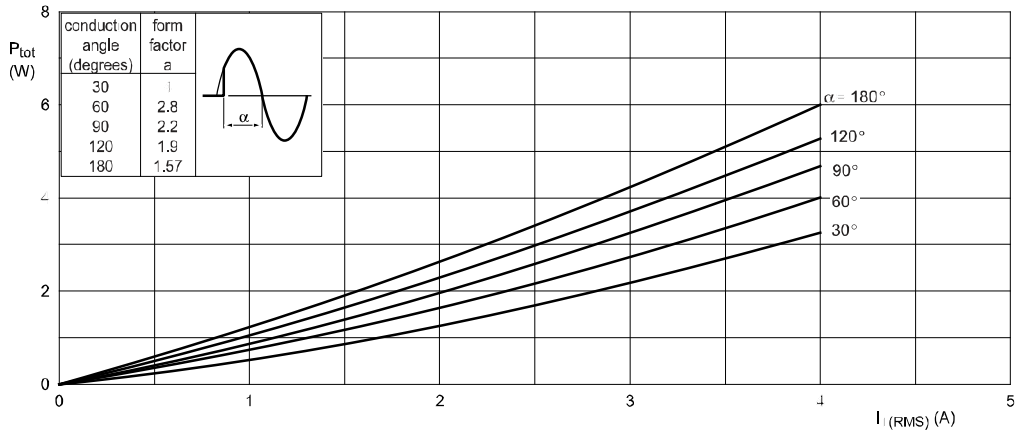
Fig 1. **RMS on-state current as a function of mounting base temperature; maximum values**



f = 50 Hz

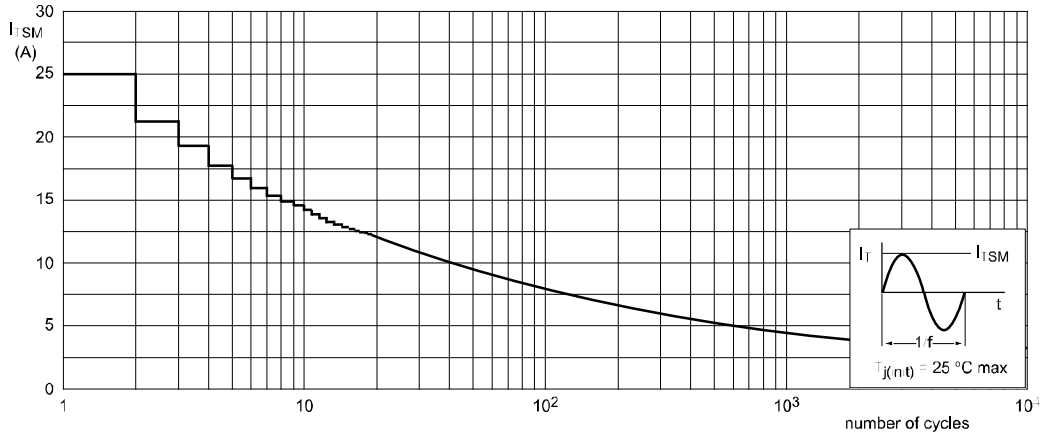
$T_{mb} \leq 107$ °C

Fig 2. **RMS on-state current as a function of surge duration; maximum values**



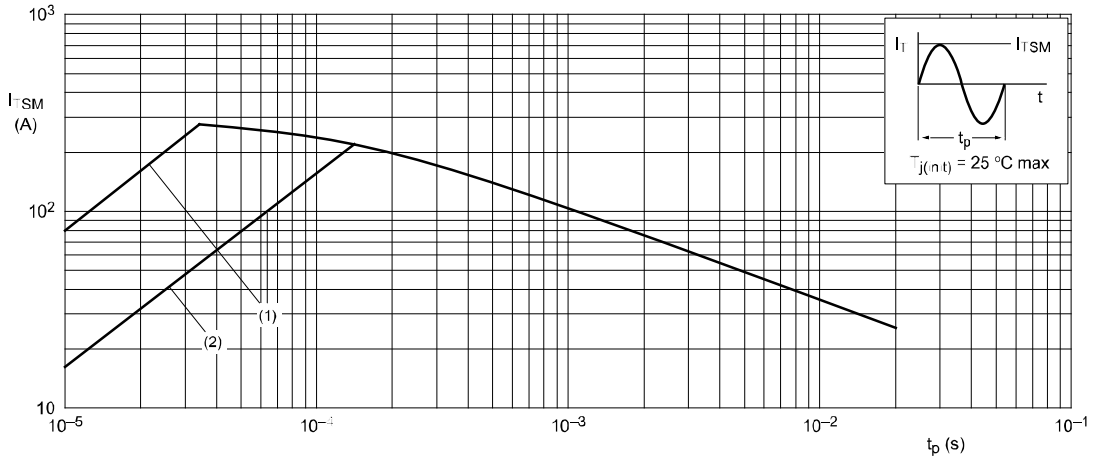
α = conduction angle

Fig 3. Total power dissipation as a function of RMS on-state current; maximum values



f = 50 Hz

Fig 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



$t_p \leq 20$ ms

(1) dI_T/dt limit

(2) T2- G− quadrant limit

Fig 5. Non-repetitive peak on-state current as a function of pulse width; maximum values

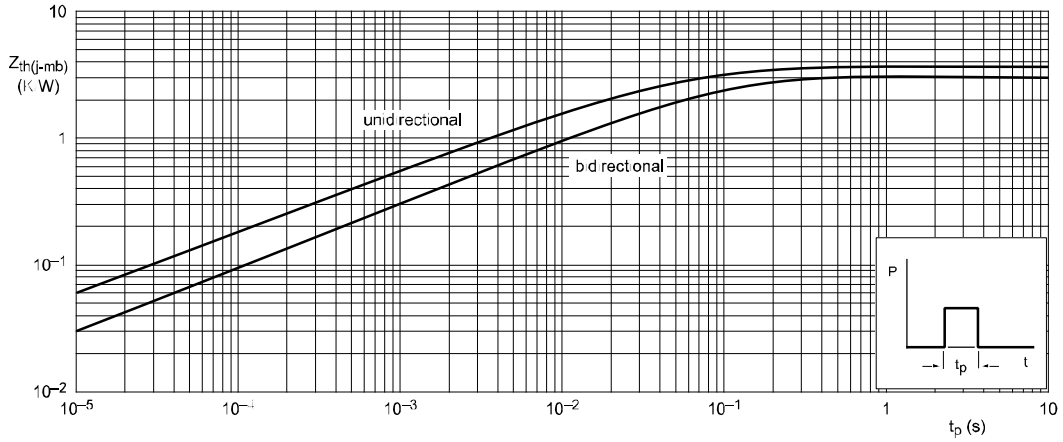
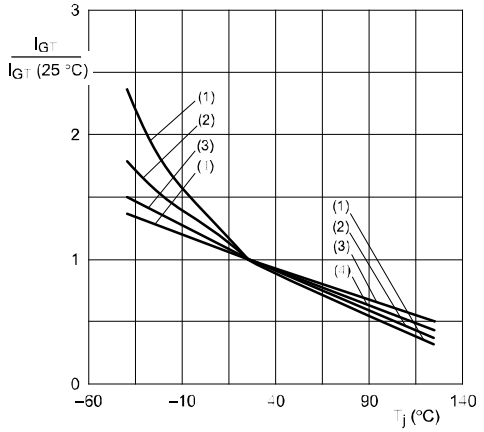


Fig 6. Transient thermal impedance from junction to mounting base as a function of pulse width



(1) T2- G+ (3) T2+ G-
(2) T2- G- (4) T2+ G+

Fig 7. Normalized gate trigger current as a function of junction temperature

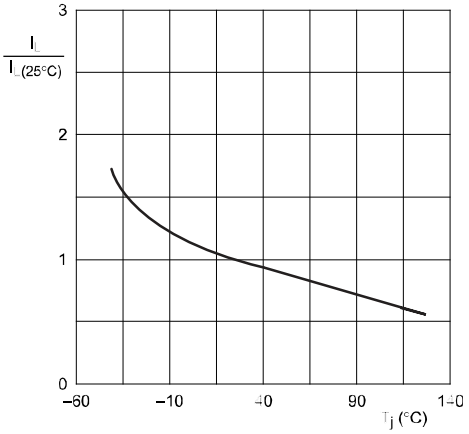


Fig 8. Normalized latching current as a function of junction temperature

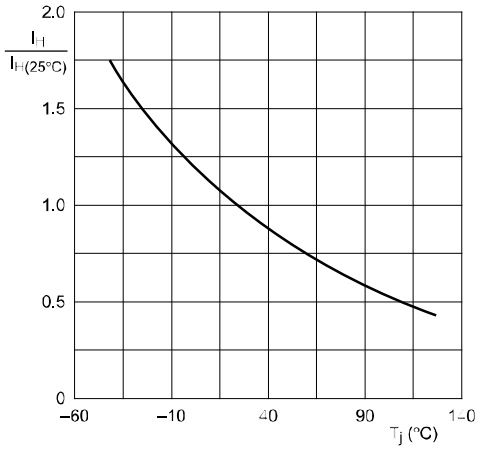
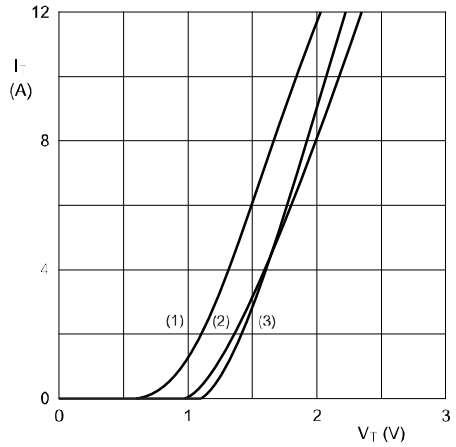


Fig 9. Normalized holding current as a function of junction temperature



V_o = 1.27 V R_s = 0.091 Ω
(1) T_j = 125 °C; typical values
(2) T_j = 125 °C; maximum values
(3) T_j = 25 °C; maximum values

Fig 10. On-state current as a function of on-state voltage

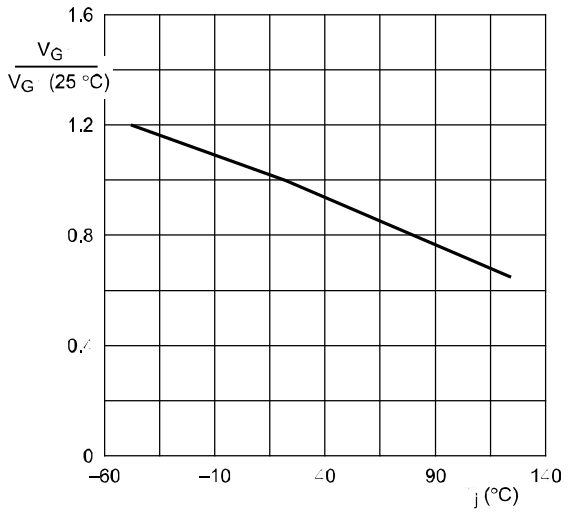
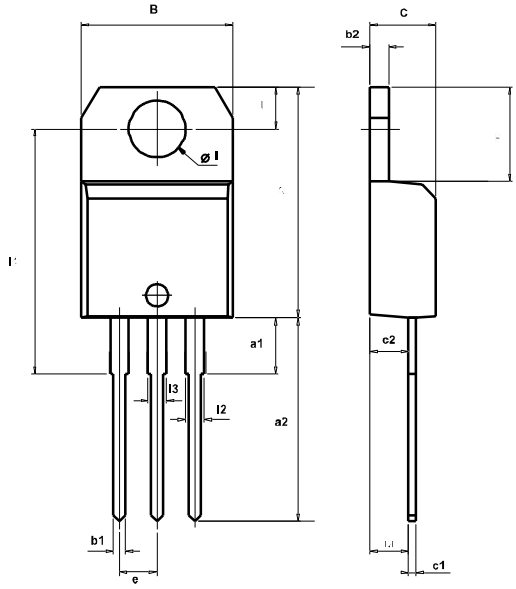


Fig 11. Normalized gate trigger voltage as a function of junction temperature

PACKAGE MECHANICAL DATA

TO-220AB



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	