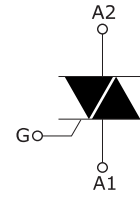


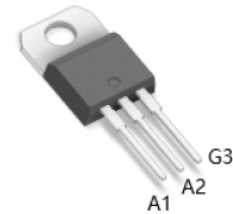
**Product features and main applications:**

NPNP five-layer structure of silicon bidirectional devices; with independent intellectual property rights of single-sided digging technology, table glass passivation process; multi-layer metallized electrodes on the back; with high blocking voltage and high temperature stability.



**Mainly used in:**

vacuum cleaners, power tools and other motor speed controllers; solid state relays; heating controllers (temperature regulation); other phase control circuits.



TO-220A/B

**Characteristics**

**Table 1. Absolute maximum ratings (Tj = 25 ° C unless otherwise stated)**

Symbol	Parameter name		value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)	BTA BTA	$T_c=80^{\circ}C$	12 A
$I_{TSM}$	Non repetitive surge peak on-state current (full cycle, Tj initial = 25 ° C)	F=50HZ tp=20ms		120 A
$I^2t$	I <sup>2</sup> t value for fusing	tp=10ms		72 A <sup>2</sup> S
di/dt	Critical rate of rise of on-state current IG = 2 x IGT, tr ≤ 100 ns	Tj=125		50 A/us

$V_{DRM}/V_{RRM}$	Off state repetitive peak voltage Reverse repetitive peak voltage	$T_j=25^{\circ}\text{C}$		600/800	V
$I_{GM}$	Peak gate current	$t_p=20\mu\text{s}$	$T_j=150^{\circ}\text{C}$	4	A
$P_{G(AV)}$	Average gate power dissipation		$T_j=150^{\circ}\text{C}$	1	W
$T_{stg}$ $T_j$	Storage junction temperature range Operating junction temperature range			-40 to+150 -40 to+125	$^{\circ}\text{C}$

**Table 2. Electrical characteristics ( $T_j = 25^{\circ}\text{C}$ , unless otherwise specified) --3 quadrants**

Symbol	Name and test conditions	Quadrant	Range	value				Unit
				BW	CW	SW	TW	
$I_{GT}$	$V_D=12\text{V}$ $R_L=100\Omega$	I II III	MAX	50	35	10	5	mA
$V_{GT}$				1.5				
$V_{GD}$	$V_D = V_{DRM}$ $R_L = 3.3\text{ k}\Omega$ , $T_j = 125^{\circ}\text{C}$		MIN	0.2				V
$I_H$	$I_T = 100\text{ mA}$		MAX	60	40	20	15	mA
$I_L$	$I_G = 1.2 \times I_{GT}$		MAX	100	60	40	30	mA
dv/dt	$V_D = 67\% V_{DRM}$ , gate open, $T_j = 125^{\circ}\text{C}$		MIN	500	500	200	100	V/us
(dv/dt) <sub>c</sub>	Critical rise rate of commutation voltage $T_J = 150^{\circ}\text{C}$		MIN	8				V/us

**Table 3 Electrical characteristics (Tj = 25 °C unless otherwise specified) -Standard Triac (4 quadrants)**

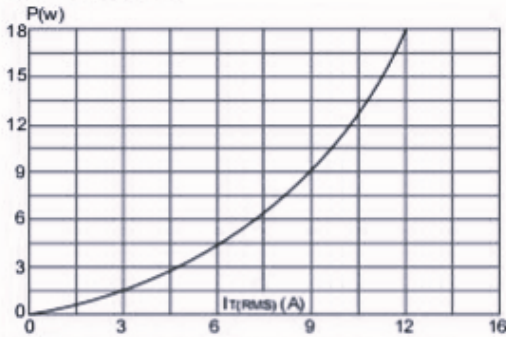
Symbol	Name and test conditions	Quadrant	Range	value		Unit
				B	C	
I <sub>GT</sub>	V <sub>D</sub> =12V R <sub>L</sub> =100Ω	I - II -III	MAX	50	20	mA
		IV		100	60	
V <sub>GT</sub>		ALL	MAX	1.5		V
V <sub>GD</sub>	V <sub>D</sub> = V <sub>DRM</sub> , R <sub>L</sub> = 3.3 kΩ, T <sub>j</sub> = 125 ° C	ALL	MIN	0.2		V
I <sub>H</sub>	I <sub>T</sub> =500mA		MAX	60	50	mA
I <sub>L</sub>	I <sub>G</sub> = 1.2 x I <sub>GT</sub>	I - II -III	MAX	60	50	mA
		IV		100	80	
dv/dt	V <sub>D</sub> = 67% V <sub>DRM</sub> , gate open, T <sub>j</sub> = 125 ° C		MIN	500		V/us
(dv/dt) <sub>c</sub>	Critical rise rate of commutation voltage T <sub>J</sub> = 150 ° C		MIN	10		V/us

### Static parameters

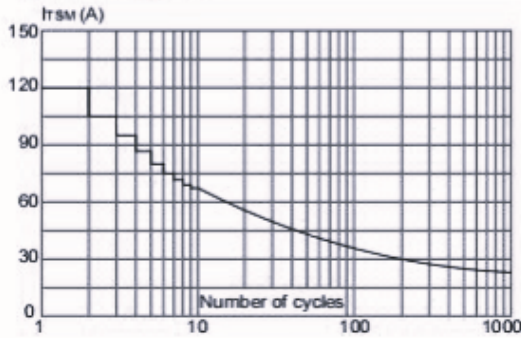
Symbol	Parameter name			value	Unit
$V_{TM}$	$I_{TM} = 24A$	$T_j = 25^{\circ}C$	MAX	1.50	V
$V_{TO}$	threshold on-state voltage	$T_j = 150^{\circ}C$	MAX	0.86	V
$R_d$	Dynamic resistance	$T_j = 150^{\circ}C$	MAX	36.6	mΩ
$I_{DRM}$ $I_{RRM}$	VDRM = VRRM	$T_j = 25$ $T_j = 150$	MAX	5	uA
				1	mA
$R_{th(j-c)}$	Junction to ambient	BTA	MAX	2.05	$^{\circ}C W$
		BTB		1.25	

### BTA12 characteristic curve

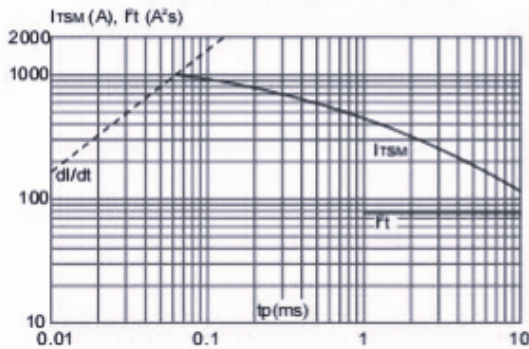
**FIG.1** Maximum power dissipation versus RMS on-state current



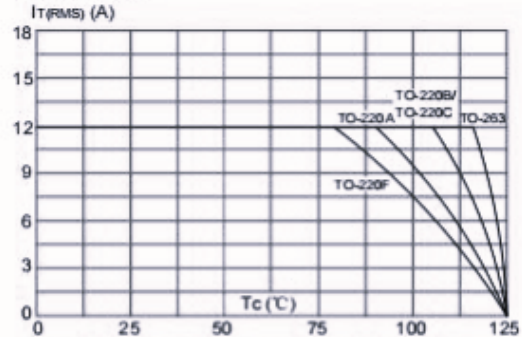
**FIG.3:** Surge peak on-state current versus number of cycles



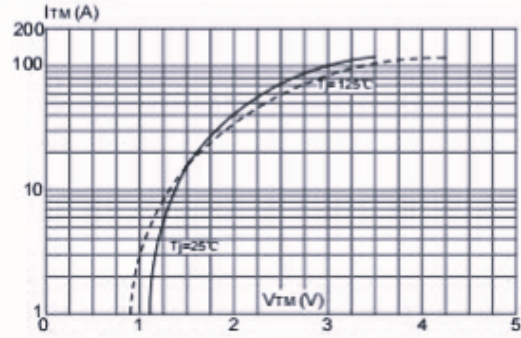
**FIG.5:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10\text{ms}$ , and corresponding value of  $I^2 t$  ( $di/dt < 50\text{A}/\mu\text{s}$ )



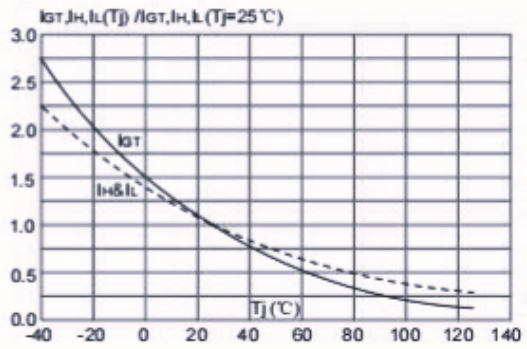
**FIG.2:** RMS on-state current versus case temperature



**FIG.4:** On-state characteristics (maximum values)

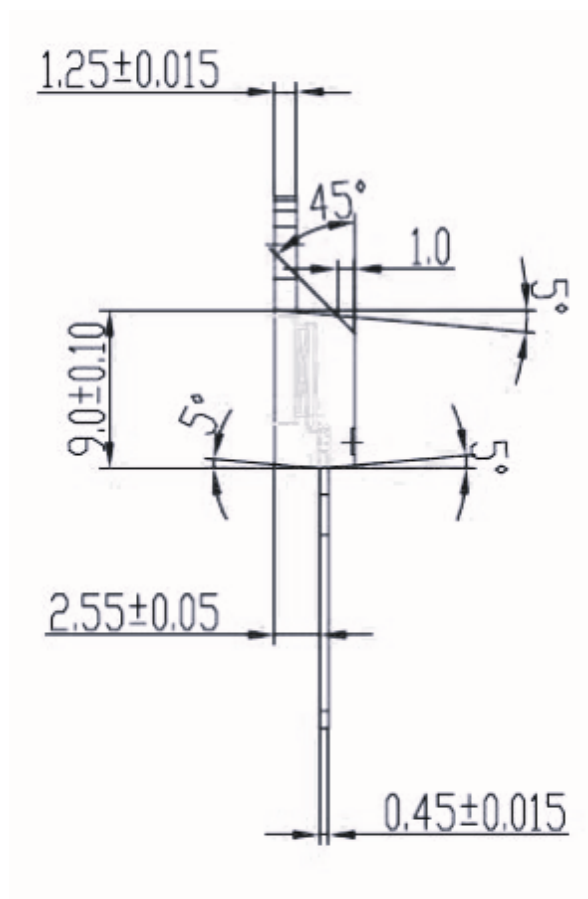
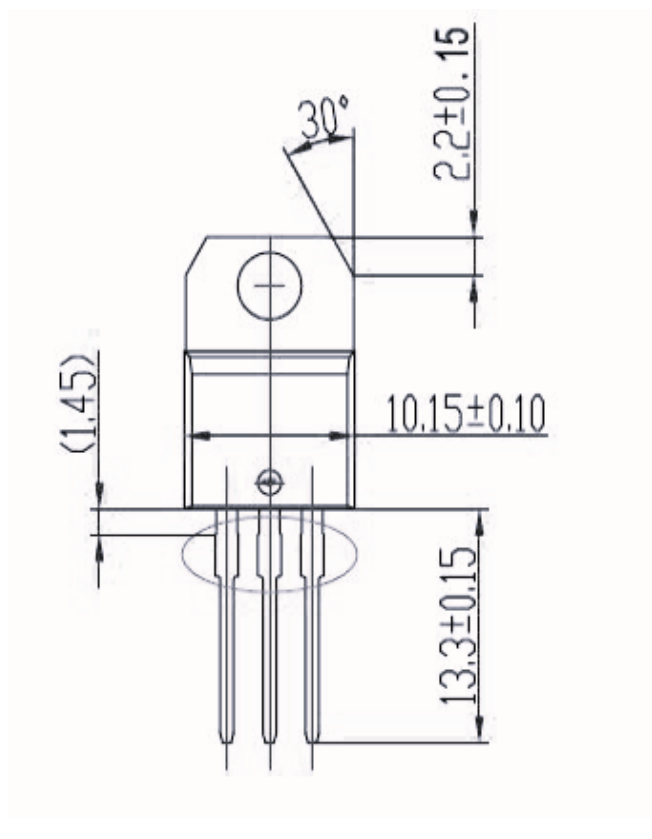


**FIG.6:** Relative variations of gate trigger current, holding current and latching current versus junction temperature

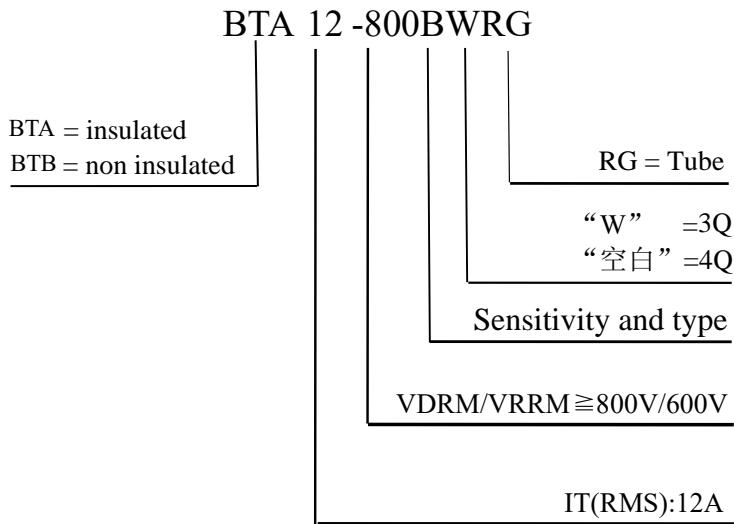


**TO-220A/TO-220B Dimensional drawing:**

Unit: mm ( $\pm 0.1$ )



### Product Naming System



### Ordering information

Order code	Package	Base qty	Delivery mode
UMW BTA12-600BRG	TO-220A	1000	Tube and box
UMW BTA12-600CRG	TO-220A	1000	Tube and box
UMW BTA12-800BRG	TO-220A	1000	Tube and box
UMW BTA12-800CRG	TO-220A	1000	Tube and box
UMW BTA12-600BWRG	TO-220A	1000	Tube and box
UMW BTA12-600CWRG	TO-220A	1000	Tube and box
UMW BTA12-800BWRG	TO-220A	1000	Tube and box
UMW BTA12-800CWRG	TO-220A	1000	Tube and box
UMW BTA12-600SWRG	TO-220A	1000	Tube and box
UMW BTA12-600TWRG	TO-220A	1000	Tube and box
UMW BTA12-800SWRG	TO-220A	1000	Tube and box
UMW BTB12-600BRG	TO-220B	1000	Tube and box
UMW BTB12-600CWRG	TO-220B	1000	Tube and box
UMW BTB12-600BWRG	TO-220B	1000	Tube and box
UMW BTB12-800CWRG	TO-220B	1000	Tube and box
UMW BTB12-800BWRG	TO-220B	1000	Tube and box