

## TO-220AK Plastic-Encapsulate Thyristors

### BTA12 3Q TRIACs

#### MAIN CHARACTERISTICS

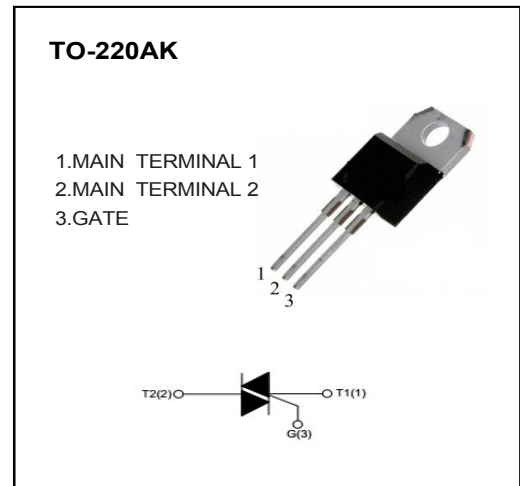
$I_{T(RMS)}$		<b>12A</b>
$V_{DRM}/V_{RRM}$	BTA12-600(T/S/C)W	<b>600V</b>
	BTA12-800(T/S/C)W	<b>800V</b>
$V_{TM}$		<b>1.55V</b>

#### FEATURES

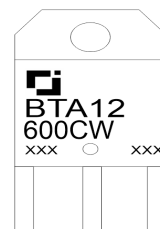
- NPNPN 5-layer Structure TRIACs
- Mesa Glass Passivated Technology
- Multi Layers Metal Electrodes
- High Junction Temperature
- Good Commutation Performance
- High  $dV/dt$  and  $dI/dt$
- Insulating Voltage=2500V<sub>(RMS)</sub>

#### APPLICATIONS

- Heater Control
- Motor Speed Controller
- Mixer



#### MARKING



BTA12:Series Code  
600CW:Depends on  $V_{DRM}$   
and  $I_{GT}$   
XXX:Internal Code

#### ABSOLUTE RATINGS ( $T_a=25^\circ\text{C}$ unless otherwise noted )

Symbol	Parameter	Test condition	Value	Unit	
$V_{DRM}/V_{RRM}$	Repetitive peak off-state voltage	$T_j=25^\circ\text{C}$	BTA12-600(T/S/C)W	600	V
			BTA12-800(T/S/C)W	800	V
$I_{T(RMS)}$	RMS on-state current	TO-220AK( $T_c \leq 90^\circ\text{C}$ ), Fig. 1,2	12	A	
$I_{TSM}$	Non repetitive surge peak on-state current	Full sine wave , $T_j(\text{init})=25^\circ\text{C}$ , $t_p=20\text{ms}$ ; Fig. 3,5	120	A	
$I^2t$	$I^2t$ value	$t_p=10\text{ms}$	78	A <sup>2</sup> s	
$dI_T/dt$	Critical rate of rise of on-state current	$I_G=2 \cdot I_{GT}$ , $t_r \leq 10\text{ns}$ , $F=120\text{Hz}$ , $T_j=125^\circ\text{C}$	I - II -III	50	A/ $\mu\text{s}$
$I_{GM}$	Peak gate current	$t_p=20\mu\text{s}$ , $T_j=125^\circ\text{C}$	4	A	
$P_{G(AV)}$	Average gate power	$T_j=125^\circ\text{C}$	1	W	
$T_{STG}$	Storage temperature		-40~+150	°C	
$T_j$	Operating junction temperature		-40~+125		

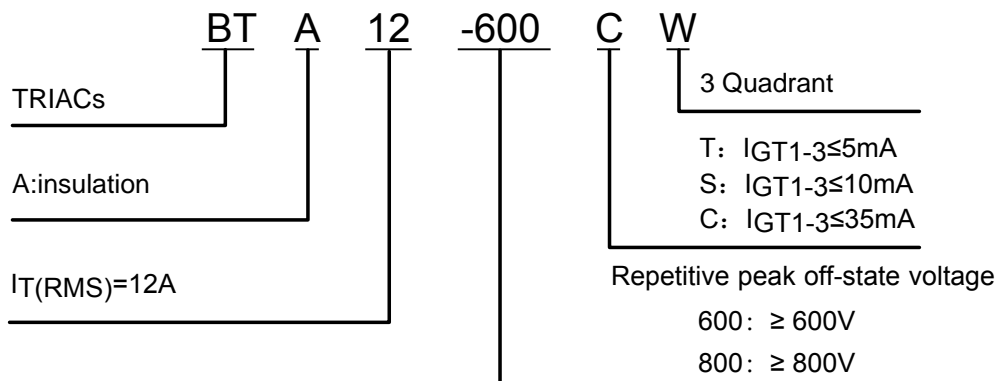
## ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C unless otherwise specified)

Symbol	Parameter	Test condition	Value			Unit
			TW	SW	CW	
I <sub>GT</sub>	Gate trigger current	V <sub>D</sub> =12V, R <sub>L</sub> =30Ω, I - II - III	≤5	≤10	≤35	mA
V <sub>GT</sub>	Gate trigger voltage	T <sub>j</sub> =25°C, Fig. 6 I - II - III	≤1.3			V
V <sub>GD</sub>	Non-triggering gate voltage	V <sub>D</sub> =V <sub>DRM</sub> , T <sub>j</sub> =125°C	≥0.2			V
I <sub>H</sub>	Holding current	I <sub>T</sub> =100mA, Fig. 6	≤10	≤15	≤35	mA
I <sub>L</sub>	Latching current	I <sub>G</sub> =1.2I <sub>GT</sub> , Fig. 6 I - III	≤10	≤25	≤50	mA
			II	≤15	≤30	≤60
dV <sub>D</sub> /dt	Critical rate of rise of off-state	V <sub>D</sub> =67%V <sub>DRM</sub> , Gate Open T <sub>j</sub> =125°C	≥20	≥40	≥500	V/μs
V <sub>TM</sub>	On-state Voltage	I <sub>TM</sub> =17A, t <sub>p</sub> =380μs, Fig. 4	≤1.55			V
I <sub>DRM</sub> / I <sub>RPM</sub>	Repetitive peak off-state current	V <sub>D</sub> =V <sub>DRM</sub> /V <sub>RPM</sub> , T <sub>j</sub> =25°C	≤5	≤5	≤5	μA
		V <sub>D</sub> =V <sub>DRM</sub> /V <sub>RPM</sub> , T <sub>j</sub> =125°C	≤1.0	≤1.0	≤1.0	mA

## THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
R <sub>th</sub> (j-c)	Junction to case (AC)	TO-220AK	2.3 °C/W
R <sub>th</sub> (j-a)	Junction to ambient	TO-220AK	60 °C/W

## PART NUMBER



# CHARACTERISTICS CURVES

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

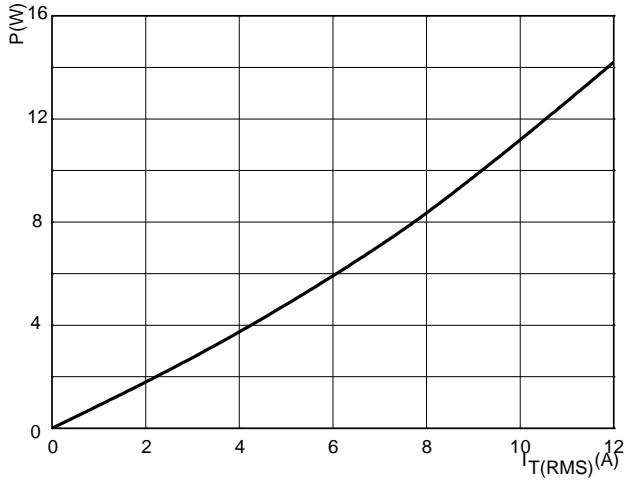


FIG.2: RMS on-state current versus case temperature (full cycle)

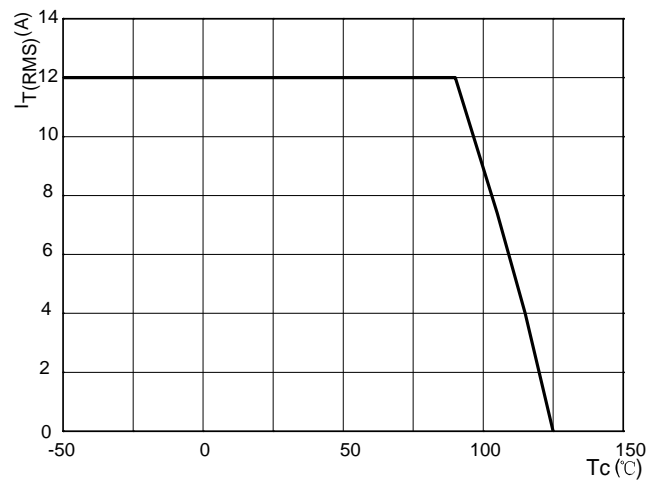


FIG.3: Surge peak on-state current versus number of cycles

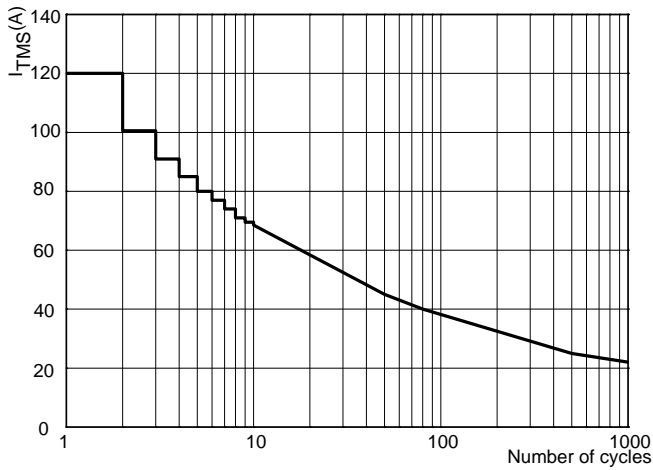


FIG.4: On-state characteristics (maximum values)

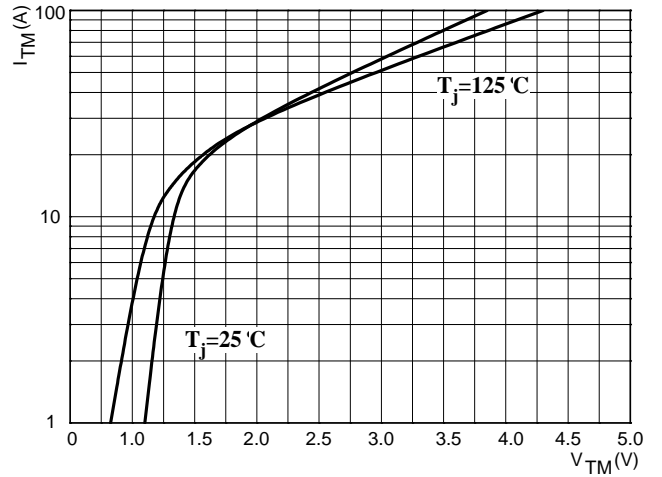


FIG.5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10\text{ms}$

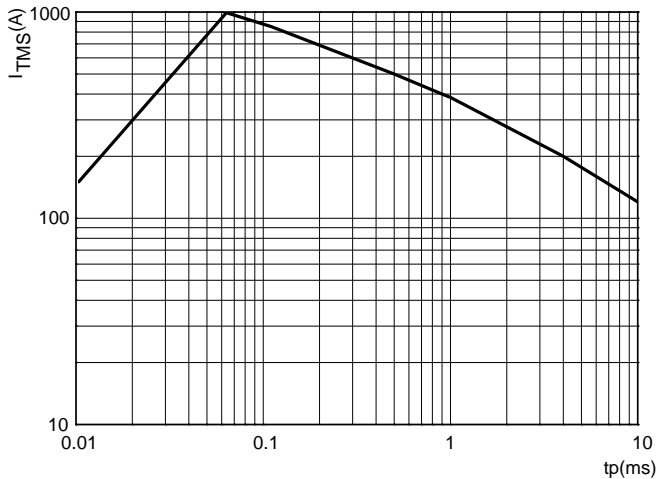
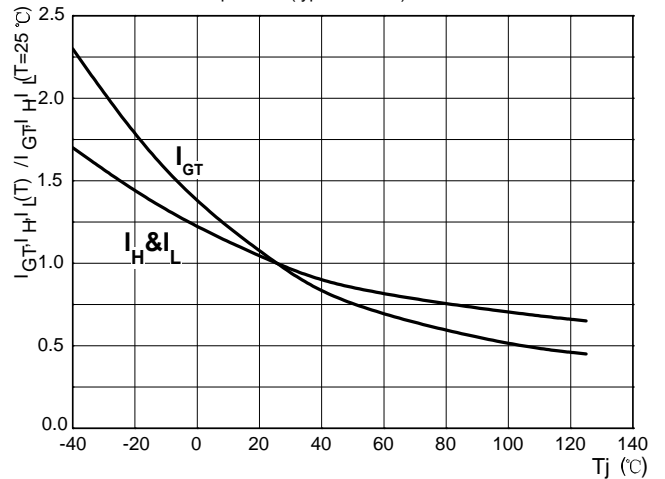
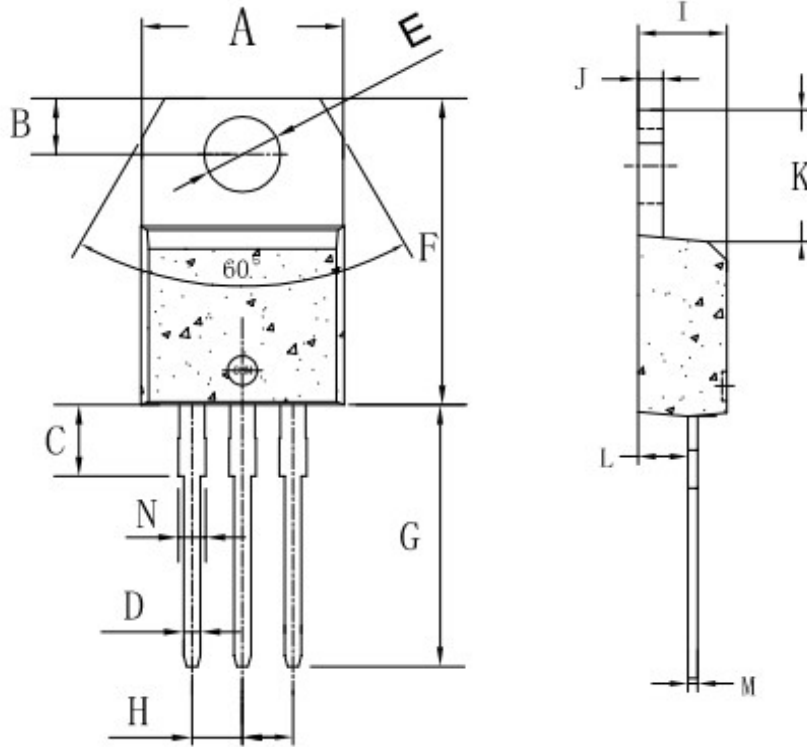


FIG.6: Relative variations of gate trigger current, holding current and latching current versus junction temperature (typical values)



# TO-220AK PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	9.8	10.4	0.385	0.409
B	2.65	3.1	0.104	0.122
C	2.8	4.2	0.110	0.165
D	0.7	0.92	0.027	0.036
E	3.75	3.95	0.147	0.155
F	14.8	16.1	0.582	0.633
G	13.05	13.6	0.513	0.535
H	2.4	2.7	0.094	0.106
I	4.38	4.61	0.172	0.181
J	1.15	1.36	0.045	0.053
K	5.85	6.82	0.230	0.268
L	2.35	2.75	0.092	0.108
M	0.35	0.65	0.013	0.025
N	1.18	1.42	0.046	0.055

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