

BTA12-600xW



THREE-QUADRANTS TRIAC

VOLTAGE: 600 Volts

CURRENT: 12.0 Amperes

Package: TO-220A

FEATURES

- Highly di/dt For High Reliability
- Low Thermal Resistance Insulation Ceramic For Insulated Package
- Very High Commutation Capability
- Packages Are RoHS (2011/65/EU) Compliant

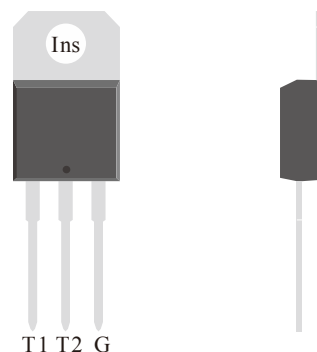
TYPICAL APPLICATIONS

- Phase Control Operation Of Light Dimmers And Motor Speed Controllers
- ON/OFF Control Operation Of Heating Regulation And Induction Motor

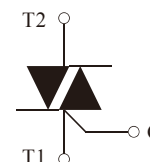
PRODUCT SUMMARY

Gear	TW	SW	CW	BW	Unit
$I_{GT(I-II-III)} \text{ Max.}$	5	10	35	50	mA
$V_{DRM}/V_{RRM} \text{ Min.}$	600				V
$I_{T(RMS)}$	12.0				A

Diagram:



Polarity:



Absolute Maximum Ratings (Ta=25°C Unless otherwise specified)

Parameter	Test Conditions	Symbol	Ratings	Unit
Repetitive Peak Off-State Voltage		V_{DRM}	600	V
Repetitive Peak Reverse Voltage		V_{RRM}	600	V
RMS On-State Current	$T_c \leq 86^\circ\text{C}$	$I_{T(RMS)}$	12.0	A
Non Repetitive Surge Peak On-State Current	F= 50 Hz, $T_p= 20 \text{ ms}$	I_{TSM}	120	A
	F= 60 Hz, $T_p= 16.6 \text{ ms}$		132	
I^2T Value For Fusing	$T_p= 10 \text{ ms}$	I^2t	72	A
Critical Rate Of Rise Of On-State Current	$IG=2*IGT, tr \leq 100\text{ns}$	di/dt	50	A/ μs
	F= 100 Hz, $T_j= 125^\circ\text{C}$			
Peak Gate Current	$T_p= 20 \mu\text{s}, T_j= 125^\circ\text{C}$	I_{GM}	4.0	A
Average Gate Power Dissipation	$T_j= 125^\circ\text{C}$	$P_{G(AV)}$	1.0	W
Peak Gate Power Dissipation		P_{GM}	10.0	W
Maximum Mounting Torque	M3 screw	T_{MM}	1.1	N.m

Thermal Characteristics (Ta=25°C Unless otherwise specified)

Parameter	Test Conditions	Symbol	Typ.	Unit
Operating Junction Temperature Range		T_j	-40 to 125	$^\circ\text{C}$
Storage Temperature Range		T_{STD}	-40 to 150	
Thermal Resistance Junction To Ambient With Steady-State	Still Air Environment With $T_a=25^\circ\text{C}$	$R_{\theta JA}$	60.0	$^\circ\text{C/W}$
Thermal Resistance Junction-Case With Steady-State	Device Mounted On 75mm x 45mm x 2.5mm Alu. Heat.	$R_{\theta JC}$	2.3	

BTA12-600xW



THREE-QUADRANTS TRIAC

Electrical Characteristics (Ta=25°C Unless otherwise specified)

Parameter	Test Conditions	Symbol	Quadrant	Value					Unit
					TW	SW	CW	BW	
Gate Trigger Current	$V_D=12V, R_L=33\Omega$	I_{GT}	I - II - III	Max.	5	10	35	50	mA
Max. Gate Trigger Voltage	$V_D=12V, R_L=33\Omega$	V_{GT}	I - II - III	Max.	1.3				V
Min. Gate Trigger Voltage	$V_D=V_{DRM}, T_j=125^\circ C, R_L=3.3K\Omega$	V_{GD}	I - II - III	Min.	0.2				V
Holding Current	$I_T=100\text{ mA}$	I_H		Max.	10	15	35	50	mA
Latching Current	$I_G=1.2 \cdot I_{GT}$	I_L	I - III	Max.	10	25	50	70	mA
			II	Max.	15	30	60	90	
Rise Of Off- State Voltage	$V_D=V_{DRM}, T_j=125^\circ C, \text{Gate Open}$	dv/dt		Min.	80	400	500	1000	V/us

Static Characteristics (Ta=25°C Unless otherwise specified)

Parameter	Test Conditions	Symbol	T _j	Value		Unit
Peak On-State Voltage	$I_T=17\text{ A}, t_p=380\text{ us}$	V_{TM}	25°C	Max.	1.5	V
Threshold Voltage		V_{TO}	125°C	Max.	0.77	V
Dynamic resistance		R_D	125°C	Max.	35	mΩ
Peak Repetitive Forward Blocking Current	$V_D=V_{DRM}$	I_{DRM}	25°C	Max.	5	uA
	$V_D=V_{DRM}$		125°C		2.0	mA
Peak Repetitive Reverse Blocking Current	$V_R=V_{RRM}$	I_{RRM}	25°C	Max.	5	uA
	$V_R=V_{RRM}$		125°C		2.0	mA

Model and identification instructions

	BT	A	12	-	600	xW
Product Type	BT=Triac					
Insulation Spec.:	A=Ins.=Insulation B=No Ins.=No Insulation					
I _{T(RMS)} Spec.:	12=12A					
"-."=Connection Symbol						
Constant And Unchanging						
V _{DRM} /V _{RRM} Spec.	600=600V					
I _{GT} Spec.	TW:IGT I - II - III=5mA	SW:IGT I - II - III=10mA	CW:IGT I - II - III=35mA	BW:IGT I - II - III=50mA		

BTA12-600xW



THREE-QUADRANTS TRIAC

Typical Characteristics Curves

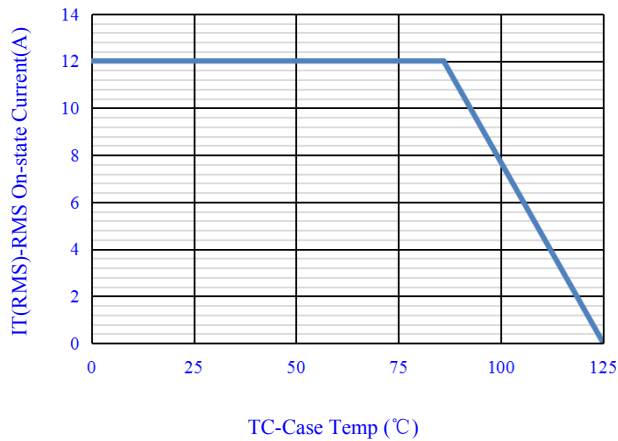


Fig.1-RMS on-state current vs. case temperature

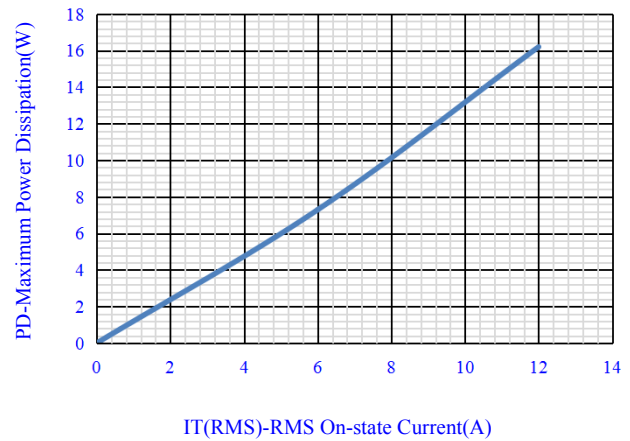


Fig.2- Maximum Power Dissipation Vs. on-state current

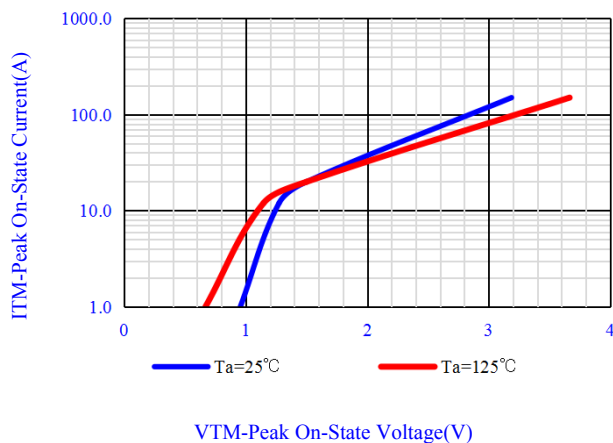


Fig.3-On-State Characteristics

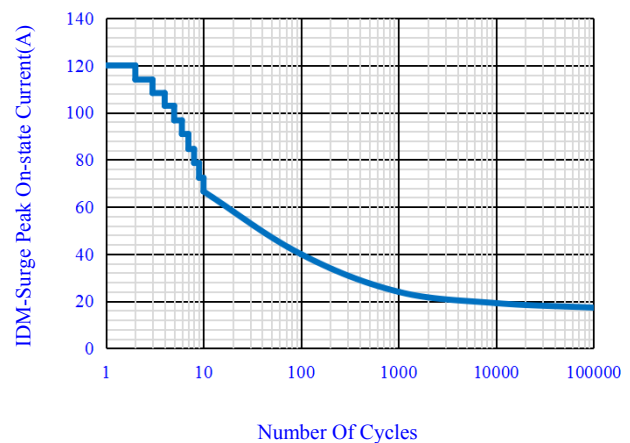


Fig.4- Surge Peak On-state Current Vs. Number Cycles

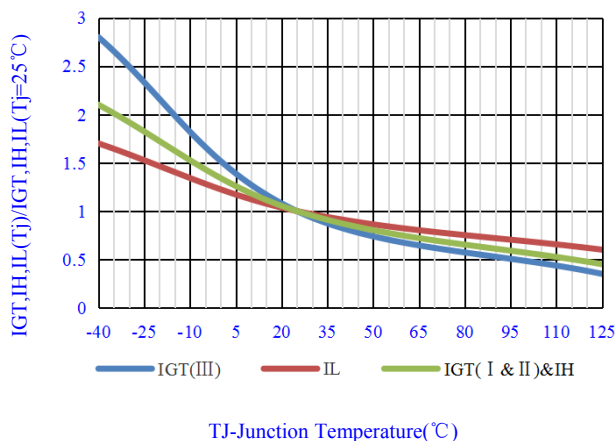


Fig.5- Relative Variation Of Gate Trigger Current , Holding Current And Latching Current Versus Junction Temperature (Typical Value)

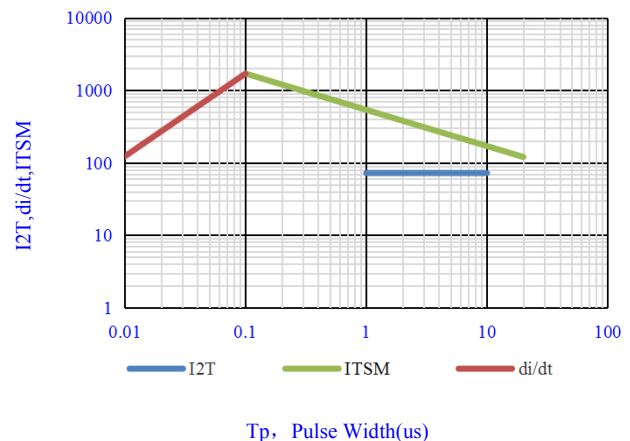


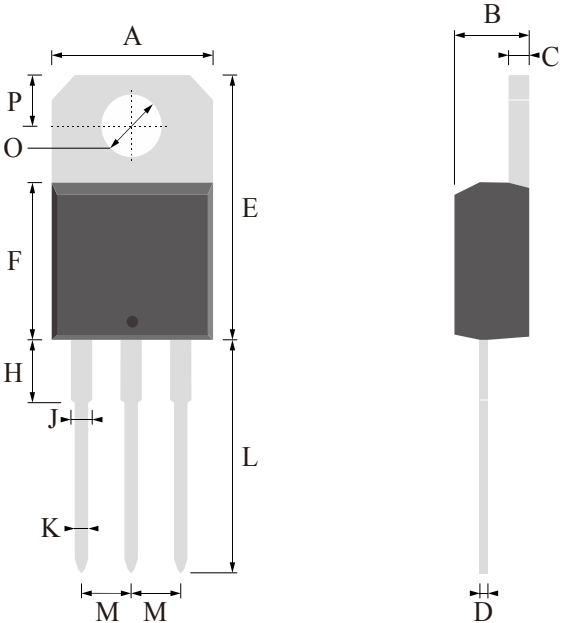
Fig.6- Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 20\text{ms}$, and corresponding value of I_2t ($dI/dt < 50\text{A}/\mu\text{s}$)

BTA12-600xW
THREE-QUADRANTS TRIAC



OUTLINE DRAWINGS

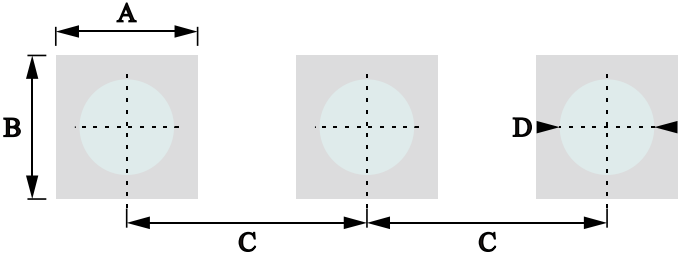
TO-220A



OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.25	-	10.75	0.3642	-	0.4232
B	4.20	-	4.70	0.1654	-	0.1850
C	1.15	-	1.45	0.0453	-	0.0571
D	0.45	-	0.65	0.0177	-	0.0256
E	14.70	-	16.70	0.5787	-	0.6575
F	8.55	-	10.05	0.3366	-	0.3957
L	12.50	-	14.50	0.4921	-	0.5709
H	3.00	-	4.00	0.1181	-	0.1575
J	1.20	-	1.40	0.0472	-	0.0551
K	0.70	-	1.00	0.0276	-	0.0394
M	2.20	-	3.00	0.0866	-	0.1181
O	3.45	-	4.15	0.1358	-	0.1634
P	2.40	-	3.40	0.0945	-	0.1339

RECOMMEDND LAYOUT DRAWINGS

TO-220A



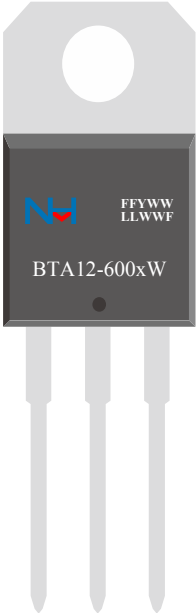
OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	1.60	-	-	0.0630	-
B	-	1.60	-	-	0.0630	-
C	-	2.54	-	-	0.1000	-
D	-	1.00	-	-	0.0394	-

BTA12-600xW

THREE-QUADRANTS TRIAC



MARKING INFORMATION



MARKING INSTRUCTIONS

NH=Niuhang Trademark
FF=Product Line Code,According To Actual Changes
YWW=Date Code,According To Actual Changes
LLWWF=Inernal Code,According To Actual Changes
BTA12-600xW=Model,x=T,S,C,B

PACKING INFORMATION

Package Type	Package Code	Product Weight Approx(g/Pcs)	Package Method	Quantity (Pcs/Min. Pack.)	Quantity (Pcs/Inner Box)	Quantity (Pcs/Carton)
TO-220A	P1	2.057	Tube	50	1000	5000

BTA12-600xW

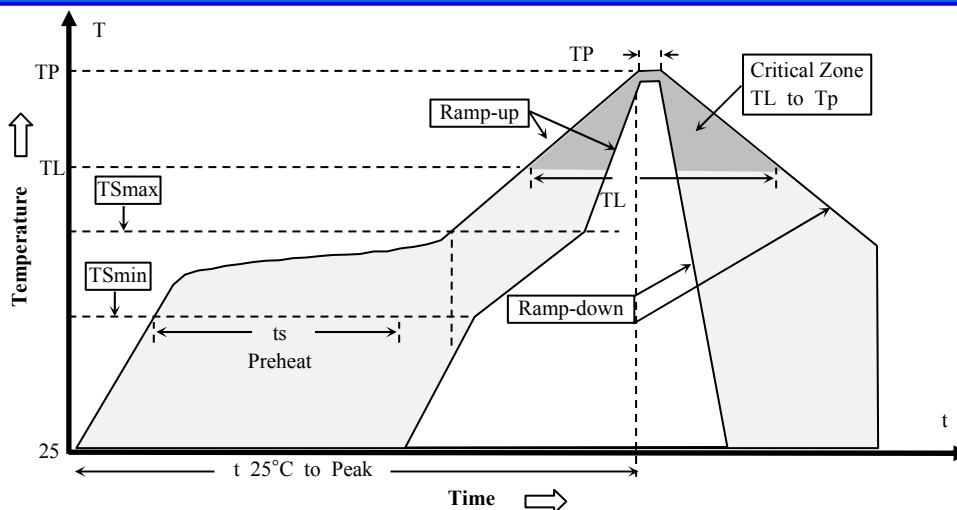
THREE-QUADRANTS TRIAC



Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T _{smax} to T _p)	3°C/second max.	3°C/second max.
Preheat -Temperature Min(TS min) -Temperature Max(TS max) -Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: -Temperature (TL) - Time (tL)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(TP)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

BTA12-600xW



THREE-QUADRANTS TRIAC

Disclaimer

- Reproducing and modifying information of the document is prohibited without permission from Niuhan Electronics Technology Co., LTD
- Niuhan Electronics Technology Co., LTD. reserves the rights to make changes of the content herein the document anytime without notification.
- Niuhan Electronics Technology Co., LTD. disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially occurred.
- Niuhan Electronics Technology Co., LTD. does not assume any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.
- Applications shown on the herein document are examples of standard use and operation. Customers are responsible in comprehending the suitable use in particular applications. Niuhan Electronics Technology Co., LTD. makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.
- The products shown herein are not designed and authorized for equipments requiring high level of reliability or relating to human life and for any applications concerning life-saving or life-sustaining, such as medical instruments, transportation equipment, aerospace machinery et cetera. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Niuhan Electronics Technology Co., LTD. for any damages resulting from such improper use or sale.
- When the appearance of the product and chip size does not change, in order to product the customer. quality, change the internal structure and the production process Niuhan can not notify