

BTA12-600XW

THREE-QUADRANT TRIAC



VOLTAGE: 600 Volts

CURRENT: 12 Ampers

Package: TO-220A

Marking and Polarity

FEATURES

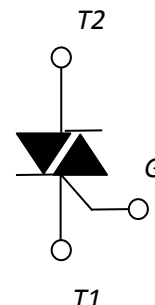
- Highly di/dt For High Reliability
- Low On-State Voltage For Low Power Consumption
- Ceramic Pad For Internal Insulation
- RoHS Compliant

TYPICAL APPLICATIONS

- Phase Control Operation Of Light Dimmers And Motor Speed Controllers
- ON/OFF Control Operation Of Heating Regulation And Induction Motor
- **Weight: App. 2.057 Grams (0.07255 Ounce)**

PRODUCT SUMMARY

Item	TW	SW	CW	BW	Unit
$I_{T(RMS)}$	12				A
V_{DRM}/V_{RRM} Min.	600				V
$I_{GT(I-II-III)}$ Max.	5	10	35	50	mA



Remark:

- ①. NH=Nihang Trademark
- ②. FF=Product Line Code, According To Actual Changes
YWW=Date Code, According To Actual Changes
LLWWF=Internal Code, According To Actual Changes
- ③. BTA12-600XW=Model, XW=TW, SW, CW, BW

Absolute Maximum Ratings (Ta=25℃ Unless otherwise specified)

Parameter	Test Conditions	Symbol	BTA12-600XW	Unit
Repetitive Peak Off-State Voltage		V_{DRM}	600	V
Repetitive Peak Reverse Voltage		V_{RRM}	600	V
RMS On-State Current	$T_c \leq 80\text{ }^{\circ}\text{C}$	$I_{T(RMS)}$	12	A
Non Repetitive Surge Peak On-State Current	$F = 50\text{ Hz}, T_p = 20\text{ ms}$	I_{TSM}	120	A
I^2T Value For Fusing	$T_p = 10\text{ ms}$	I^2t	72	A
Critical Rate Of Rise Of On-State Current	$I_G = 2 \cdot I_{GT}, t_r \leq 10\text{ ns}$ $F = 100\text{ Hz}, T_j = 150\text{ }^{\circ}\text{C}$	di/dt	50	A/ μs
Peak Gate Current	$T_p = 20\text{ }\mu\text{s}, T_j = 150\text{ }^{\circ}\text{C}$	I_{GM}	4.0	A
Average Gate Power Dissipation	$T_j = 150\text{ }^{\circ}\text{C}$	$P_{G(AV)}$	1.0	W
Maximum Mounting Torque	M3 screw	T_{MM}	1.1	N.m

Thermal Characteristics (Ta=25℃ Unless otherwise specified)

Parameter	Symbol	BTA12-600XW	Unit
Operating Junction Temperature Range	T_J	-40 to 150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STD}	-40 to 150	
Typical Thermal Resistance	$R_{\theta JA}$	60.0	$^{\circ}\text{C/W}$
	$R_{\theta JC}$	2.7	

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

Parameter	Test Conditions	Symbol	Quadrants	Value				Unit
				TW	SW	CW	BW	
Gate Trigger Current	VD=12V,IT=0.1A	I_{GT}	I - II -III	≤5	≤10	≤35	≤50	mA
Gate Trigger Voltage	VD=12V,IT=0.1A	V_{GT}	I - II -III	≤ 1.5				V
Holding Current	IT=100mA	I_H		≤20	≤35	≤80	≤100	mA
Latching Current	IG=1.2*IGT	I_L	I -III	≤20	≤45	≤85	≤115	mA
			II	≤40	≤60	≤100	≤120	
Rise Of Off- State Voltage	VD=2/3*VDRM, Gate open, Tj =150°C	dv/dt		≥20	≥40	≥500	≥1000	V/us
Peak On-State Voltage	IT= 12 A, Tj =25°C	V_{TM}		≤ 1.70				V
Peak Repetitive Forward Blocking Current	$V_D=V_{DRM}$, Tj =25°C	I_{DRM}		≤ 5.0				uA
	$V_D=V_{DRM}$, Tj =125°C			≤ 1.00				mA
Peak Repetitive Reverse Blocking Current	$V_R=V_{RRM}$, Tj =25°C	I_{RRM}		≤ 5.0				uA
	$V_R=V_{RRM}$, Tj =125°C			≤ 1.00				mA

Model and identification instructions

BT	1	12	A	-	600	xW
Product Type BT=TRIAC						
Insulation Spec.: A=Insulation B=No insulation						
IT(RMS) Spec.: 12 = 12A						
Package Spec.: A= TO-220A						
"-"=Connector constant						
VDRM/VRRM Spec. 600 = 600V						
IGT Spec. TW:IGT I -III≤5mA SW:IGT I -III≤10mA CW:IGT I -III≤35mA BW:IGT I -III≤50mA						

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Typical Characteristics Curves

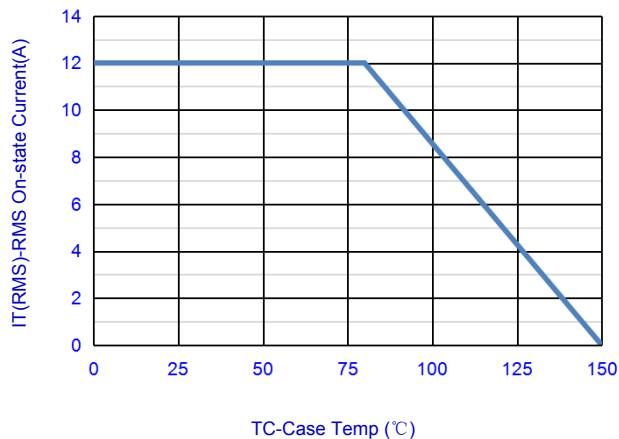


Fig.1-RMS on-state current vs. case temperature

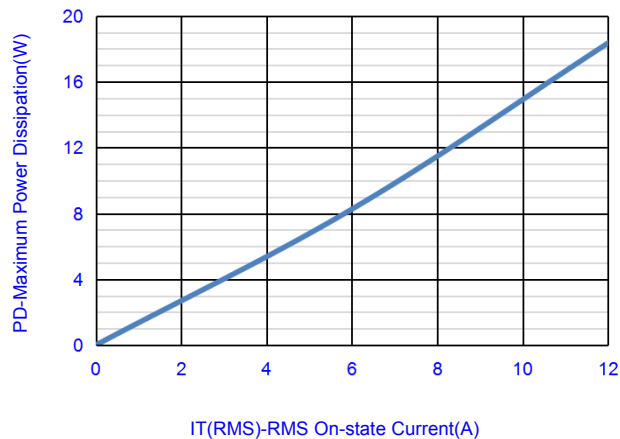


Fig.2- Maximum Power Dissipation Vs. on-state current

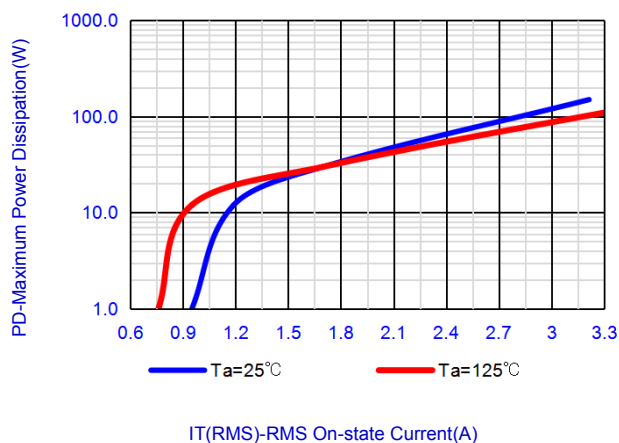


Fig.3- Maximum Power Dissipation Vs. on-state current

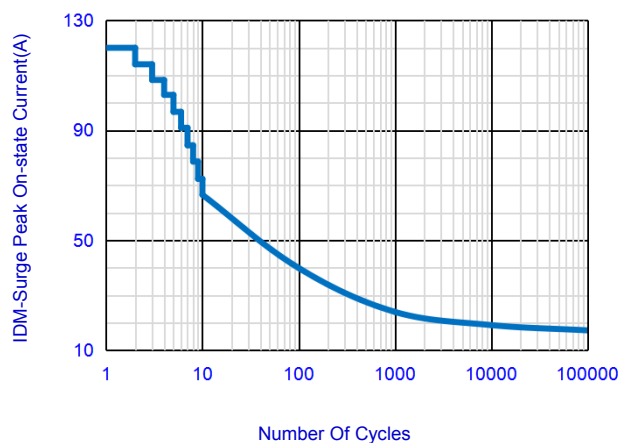


Fig.4- Surge Peak On-state Current Vs. Number Cycles

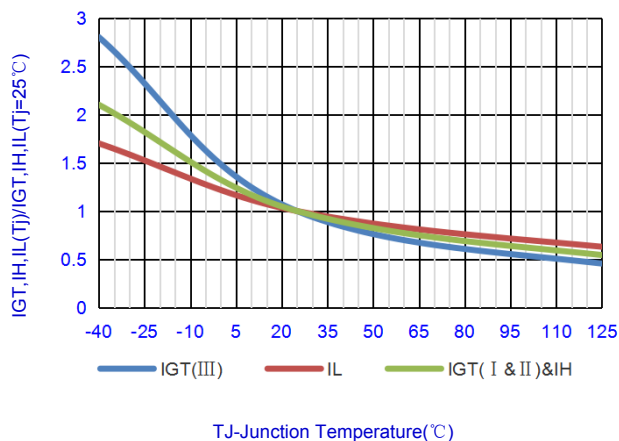


Fig.5- Relative Variation Of Gate Trigger Current , Holding Current And Latching Current Versus Junction Temperature (Typical Value)

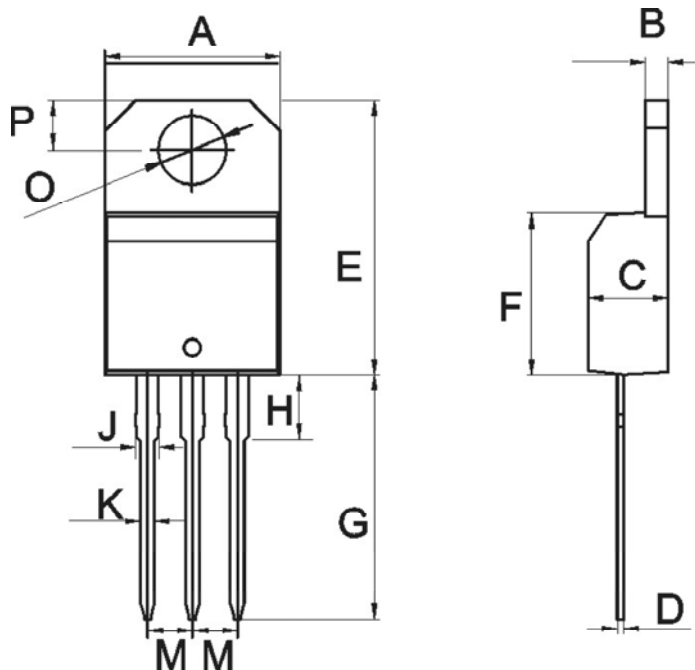
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OUTLINE DRAWINGS

TO-220A



OUTLINE DIMENSIONS

Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.25	--	10.75	0.3642	--	0.4232
B	1.15	--	1.45	0.0453	--	0.0571
C	4.20	--	4.70	0.1654	--	0.1850
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
G	12.50	--	14.50	0.4921	--	0.5709
H	3.00	--	4.00	0.118	--	0.157
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

PACKING INFORMATION

Package Code	Package Method	Box Size L×W×H (mm)	Quantity (pcs/box)	Carton Size L×W×H (mm)	Quantity (pcs/carton)
TO-220A	Tube Packaging	570*153*47	1000	580*250*180	5000

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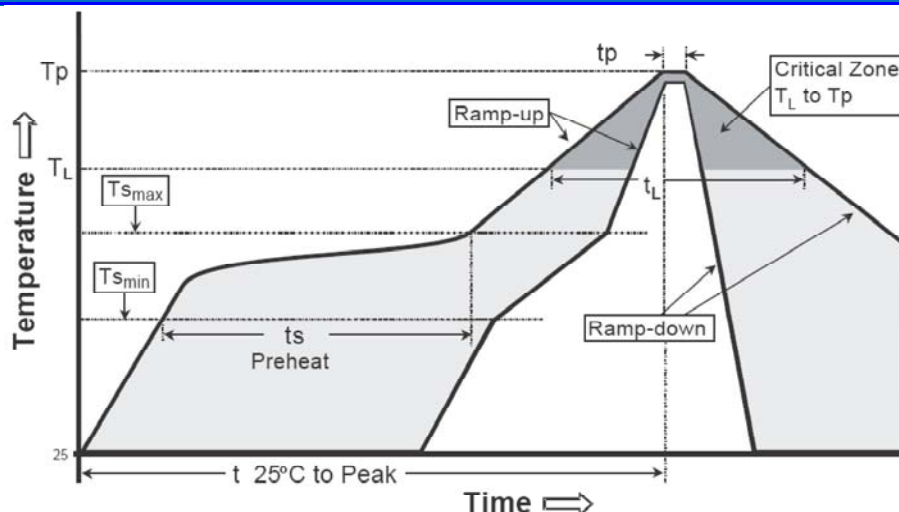
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Recommended wave soldering condition

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(T _s min) -Temperature Max(T _s max) -Time(t _s min to t _s max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: -Temperature (T _L) - Time (t _L)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(T _P)	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.

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