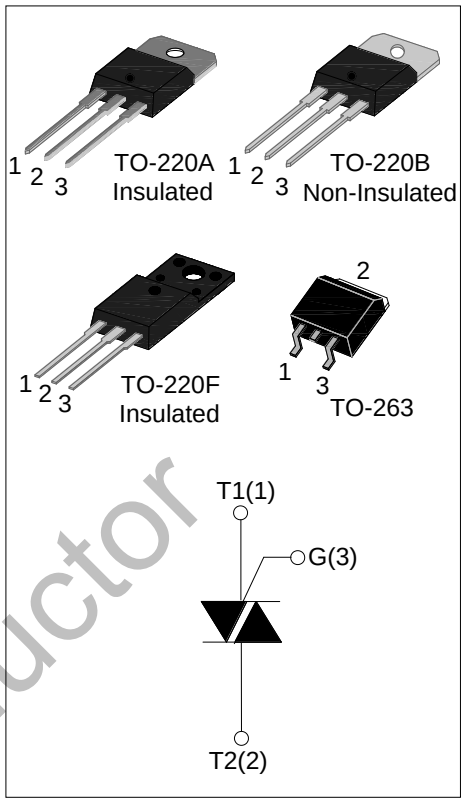
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BTA12 Series 12A TRIACs

DESCRIPTION:

BTA12 series triacs, with high ability to withstand the shock loading of large current, provide high dv/dt rate with strong resistance to electromagnetic interface. With high commutation performances, 3 quadrants products especially recommended for use on inductive load. BTA12A provides insulation voltage rated at 2500V RMS and BTA12F provides insulation voltage rated at 2000V RMS from all three terminals to external heatsink complying with UL standards .



MAIN FEATURES

Symbol	Value	Unit
$I_{T(RMS)}$	12	A
V_{DRM}/V_{RRM}	600 and 800 and 1200	V

ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Storage junction temperature range		T_{stg}	-40-150	℃
Operating junction temperature range		T_j	-40-125	℃
Repetitive peak off-state voltage (T_j=25℃)		V_{DRM}	600/800/1200	V
Repetitive peak reverse voltage (T_j=25℃)		V_{RRM}	600/800/1200	V
Non repetitive surge peak Off-state voltage		V_{DSM}	V_{DRM} +100	V
Non repetitive peak reverse voltage		V_{RSM}	V_{RRM} +100	V
RMS on-state current	TO-220A(Ins) (T_C=86℃)	$I_{T(RMS)}$	12	A
	TO-220B(Non-Ins) (T_C=107℃)			
	TO-220F(Ins) (T_C=90℃)			
	TO-263 (T_C=115℃)			
Non repetitive surge peak on-state current (full cycle, F=50Hz)		I_{TSM}	120	A

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I^2t value for fusing (tp=10ms)	I^2t	128	A^2s
Critical rate of rise of on-state current (I_G =2×I_{GT})	dI/dt	50	A/μs
Peak gate current	I_{GM}	4	A
Average gate power dissipation	$P_{G(AV)}$	1	W
Peak gate power	P_{GM}	5	W

ELECTRICAL CHARACTERISTICS (T_j=25℃ unless otherwise specified)

3 Quadrants (V_{DRM} /V_{RRM}: 600/800V)

Symbol	Test Condition	Quadrant		BTA12-600/800V				Unit
				BW	CW	SW	TW	
I_{GT}	V_D =12V R_L =33Ω	Ⅰ-Ⅱ-Ⅲ	MAX	50	35	10	5	mA
V_{GT}		Ⅰ-Ⅱ-Ⅲ	MAX	1.5				V
V_{GD}	V_D =V_{DRM} T_j =125℃ R_L =3.3KΩ	Ⅰ-Ⅱ-Ⅲ	MIN	0.2				V
I_L	I_G =1.2I_{GT}	Ⅰ-Ⅲ	MAX	70	50	25	15	mA
		Ⅱ		80	60	30	20	
I_H	I_T =100mA		MAX	60	40	25	15	mA
dV/dt	V_D=2/3V_{DRM} Gate Open T_j =125℃		MIN	1000	500	100	50	V/μs
(dV/dt)c	(dI/dt)c=1.7A/ms T_j=125℃		MIN	14	8.5	6	5	V/μs

4 Quadrants (V_{DRM} /V_{RRM}: 600/800V)

Symbol	Test Condition	Quadrant		BTA12-600/800V		Unit
				B	C	
I_{GT}	V_D =12V R_L =33Ω	Ⅰ-Ⅱ-Ⅲ	MAX	50	25	mA
		Ⅳ		70	50	
V_{GT}		ALL	MAX	1.5		V
V_{GD}	V_D =V_{DRM} T_j =125℃ R_L =3.3KΩ	ALL	MIN	0.2		V
I_L	I_G =1.2I_{GT}	Ⅰ-Ⅲ-Ⅳ	MAX	70	50	mA
		Ⅱ		100	80	
I_H	I_T =100mA		MAX	60	40	mA

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dV/dt	V_D=2/3V_{DRM} Gate Open T_j=125℃	MIN	500	200	V/μs
(dV/dt)c	(dI/dt)c=1.7A/ms T_j =125℃	MIN	8.5	6	V/μs

3 Quadrants (V_{DRM} /V_{RRM}: 1200V)

Symbol	Test Condition	Quadrant		BTA12-1200V	Unit
I_{GT}	V_D =12V R_L=33Ω	Ⅰ - Ⅱ -Ⅲ	MAX	50	mA
V_{GT}		Ⅰ - Ⅱ -Ⅲ	MAX	1.5	V
V_{GD}	V_D =V_{DRM} T_j =125℃ R_L =3.3KΩ	Ⅰ - Ⅱ -Ⅲ	MIN	0.25	V
I_L	I_G =1.2I_{GT}	Ⅰ -Ⅲ	MAX	70	mA
		Ⅱ		80	
I_H	I_T =100mA		MAX	60	mA
dV/dt	V_D=2/3V_{DRM} Gate Open T_j=125℃		MIN	1500	V/μs
(dV/dt)c	(dI/dt)c=1.7A/ms T_j=125℃		MIN	14	V/μs

STATIC CHARACTERISTICS

Symbol	Parameter		Value(MAX)			Unit
			-600V	-800V	-1200V	
V_{TM}	I_{TM} =22.5A tp=380μs	T_j=25℃	1.55			V
I_{DRM}	V_D =V_{DRM} V_R =V_{RRM}	T_j=25℃	5	5	10	μA
I_{RRM}		T_j=125℃	2	2	1	mA

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	junction to case(AC)	TO-220A(Ins)	3.9	℃/W
		TO-220B(Non-Ins)	1.2	
		TO-220F(Ins)	3.3	
		TO-263	0.85	

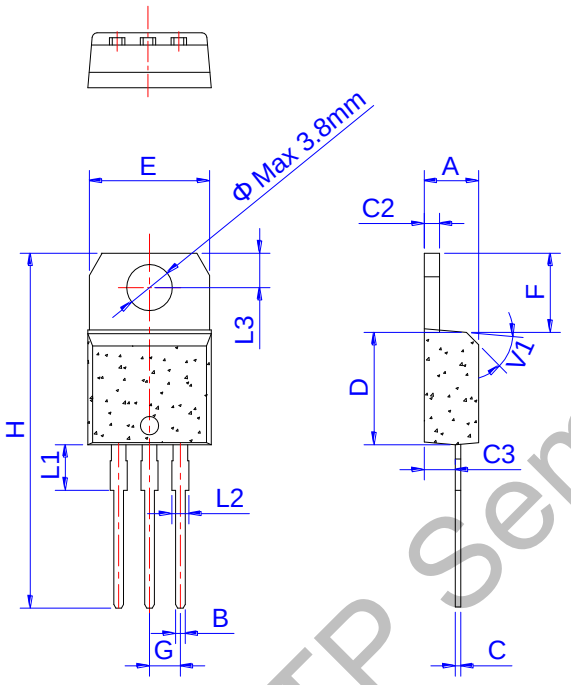
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ORDERING INFORMATION

BTA 12 - 600 BW

- BTA: Triacs
- 12: $I_{T(RMS)}$:12A
- 600: V_{DRM} /V_{RRM} ≥600V
- 800: V_{DRM} /V_{RRM} ≥800V
- 1200: V_{DRM} /V_{RRM} ≥1200V
- BW: I_{GT3} ≤50mA
- CW: I_{GT3} ≤35mA
- SW: I_{GT3} ≤10mA
- TW: I_{GT3} ≤5mA
- B: I_{GT3} ≤50mA I_{GT4} ≤70mA
- C: I_{GT3} ≤25mA I_{GT4} ≤50mA

PACKAGE MECHANICAL DATA

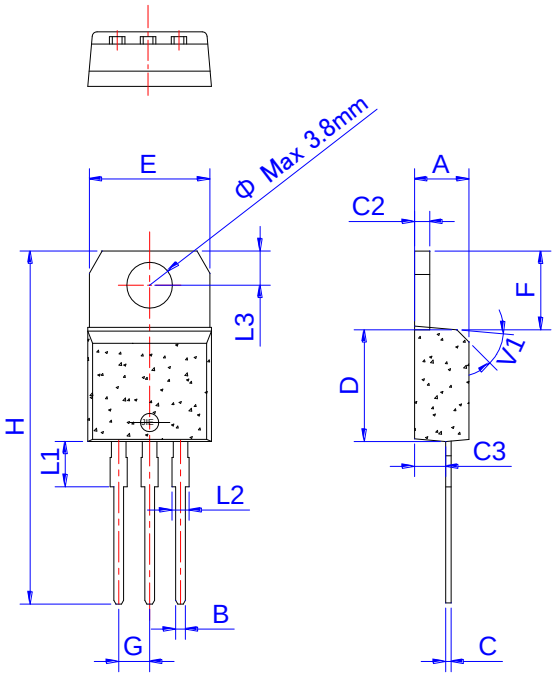


TO-220A Ins

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	0.61		0.88	0.024		0.035
C	0.46		0.70	0.018		0.028
C2	1.21		1.32	0.048		0.052
C3	2.40		2.72	0.094		0.107
D	8.60		9.70	0.339		0.382
E	9.80		10.4	0.386		0.409
F	6.55		6.95	0.258		0.274
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.75			0.148	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
V1		45°			45°	

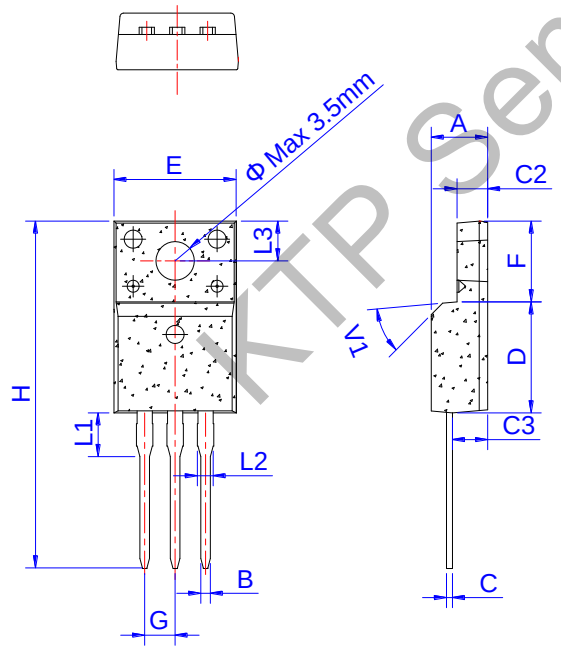
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PACKAGE MECHANICAL DATA



TO-220B Non-Ins

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	0.61		0.88	0.024		0.035
C	0.46		0.70	0.018		0.028
C2	1.21		1.32	0.048		0.052
C3	2.40		2.72	0.094		0.107
D	8.60		9.70	0.339		0.382
E	9.60		10.4	0.378		0.409
F	6.20		6.60	0.244		0.260
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.75			0.148	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
V1		45°			45°	

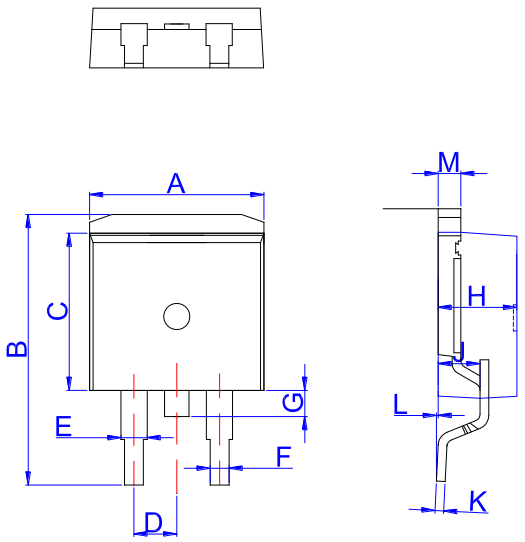


TO-220F Ins

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.80	0.173		0.189
B	0.74	0.80	0.83	0.029	0.031	0.033
C	0.48		0.75	0.019		0.030
C2	2.40		2.70	0.094		0.106
C3	2.60		3.00	0.102		0.118
D	8.80		9.30	0.346		0.366
E	9.70		10.3	0.382		0.406
F	6.40		7.00	0.252		0.276
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.63			0.143	
L2	1.14		1.70	0.045		0.067
L3		3.30			0.130	
V1		45°			45°	

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PACKAGE MECHANICAL DATA



TO-263

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.90		10.20	0.390		0.402
B	14.70		15.80	0.579		0.622
C	9.4		9.6	0.37		0.378
D		2.54			0.100	
E	1.20		1.40	0.047		0.055
F	0.75		0.85	0.029		0.033
G			1.75			0.069
H	4.40		4.70	0.173		0.185
J	2.30		2.70	0.091		0.106
K	0.38		0.55	0.015		0.022
L	0	0.10	0.25	0	0.004	0.010
M	1.25		1.35	0.049		0.053

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

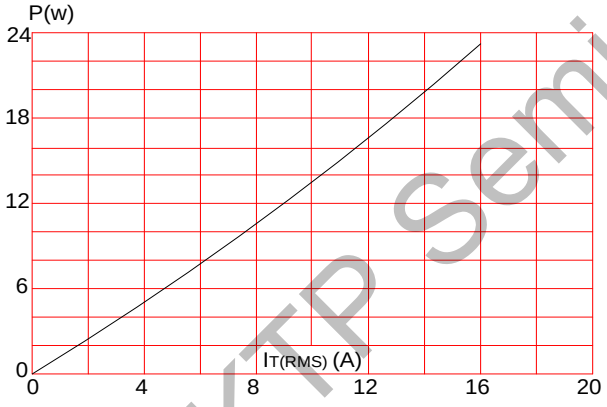


FIG.2: RMS on-state current versus case temperature

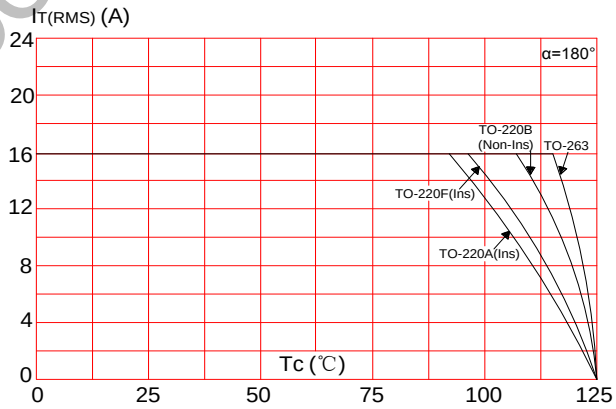


FIG.3: Surge peak on-state current versus number of cycles

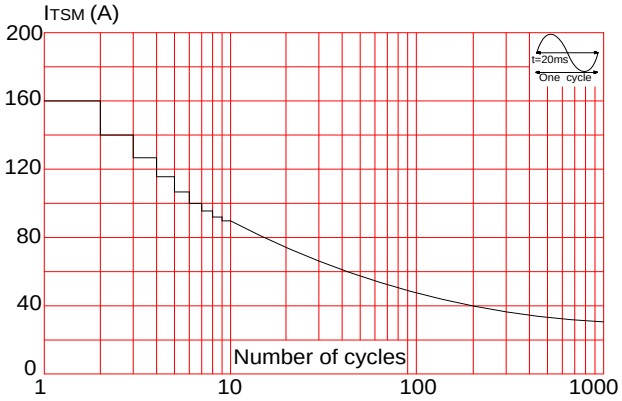
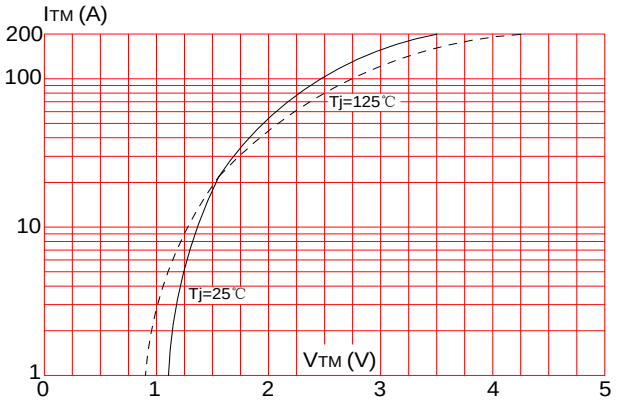


FIG.4: On-state characteristics (maximum values)



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FIG.5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp<20ms, and corresponging value of I^2t (dI/dt < 50A/μs)

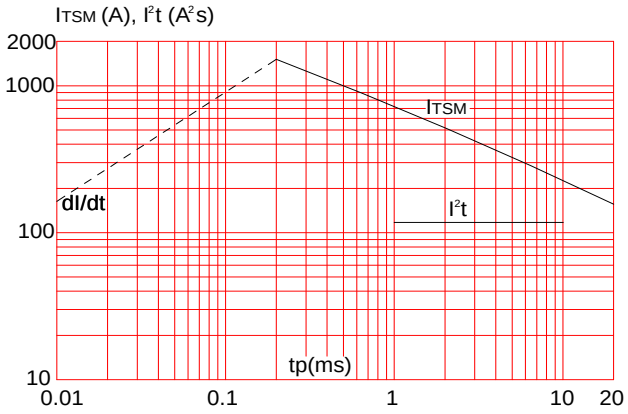
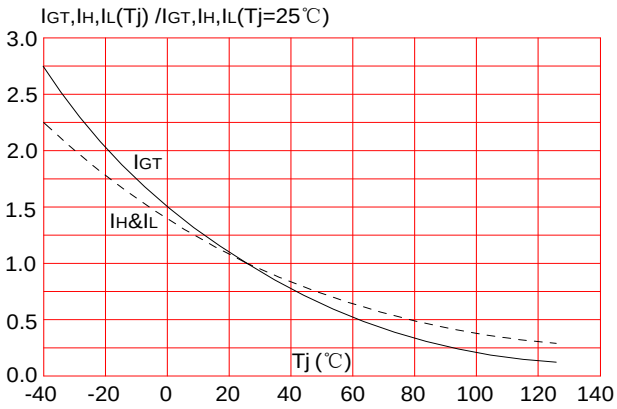


FIG.6: Relative variations of gate trigger current, holding current and latching current versus junction temperature



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