

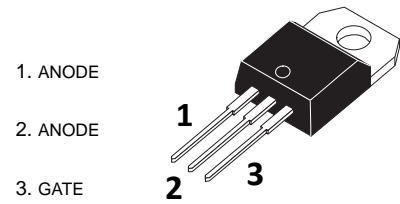


## Description

The BTA16 Triac series are suitable for general purpose mains power AC switching. They can be used as ON/OFF function in applications such as static relays, heating regulation or induction motor starting circuit. They are also recommended for phase control operations in light dimmers and appliance motors speed controllers.

## Main Features

Symbol	value	unit
$I_{T(RMS)}$	16	A
$V_{DRM}/V_{RRM}$	600	V
$I_{TSM}$	160	A



TO-220A  
(TO-220)



## Absolute maximum ratings

Symbol	Parameters			Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)		$T_c = 100\text{ }^\circ\text{C}$	16	A
$I_{TSM}$	Non repetitive surge peak on-state current (full cycle, $T_j$ initial = $25\text{ }^\circ\text{C}$ )	$F = 50\text{ Hz}$	$t_p = 20\text{ ms}$	160	A
		$F = 60\text{ Hz}$	$t_p = 16.7\text{ ms}$	168	
$I^2t$	$I^2t$ value for fusing	$t_p = 10\text{ ms}$		144	$\text{A}^2\text{s}$
$di/dt$	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$ , $t_r \leq 100\text{ ns}$	$F = 120\text{ Hz}$	$T_j = 125\text{ }^\circ\text{C}$	50	$\text{A}/\mu\text{s}$
$V_{DSM}/V_{RSM}$	Non repetitive surge peak off-state voltage	$t_p = 10\text{ ms}$	$T_j = 25\text{ }^\circ\text{C}$	$V_{DRM}/V_{RRM} + 100$	V
$I_{GM}$	Peak gate current	$t_p = 20\text{ }\mu\text{s}$	$T_j = 125\text{ }^\circ\text{C}$	4	A
$P_{G(AV)}$	Average gate power dissipation		$T_j = 125\text{ }^\circ\text{C}$	1	W
$T_{stg}$	Storage junction temperature range			-40 to +150	$^\circ\text{C}$
$T_j$	Operating junction temperature range			-40 to +125	$^\circ\text{C}$



### Static Electrical Characteristics

Symbol	Test conditions	$T_j$		Value	Unit
$V_T^{(1)}$	$I_{TM} = 22.5 \text{ A}$ , $t_p = 380 \mu\text{s}$	25 °C	Max.	1.55	V
$V_{TO}^{(1)}$	threshold on-state voltage	125 °C	Max.	0.85	V
$R_D^{(1)}$	Dynamic resistance	125 °C	Max.	25	mΩ
$I_{DRM}/I_{RRM}$	$V_{DRM} = V_{RRM}$	25 °C	Max.	5	μA
		125 °C		2	mA

1. For both polarities of A2 referenced to A1

### Electrical Characteristics

( $T_j = 25 \text{ °C}$ , unless otherwise specified) - standard (4 quadrants)

Symbol	Parameters	Quadrant		BTA16	Unit
$I_{GT}^{(1)}$	$V_D = 12 \text{ V}$ , $R_L = 33 \Omega$	I - II - III	Max.	25	mA
		IV		50	
$V_{GT}$		All	Max.	1.3	V
$V_{GD}$	$V_D = V_{DRM}$ , $R_L = 3.3 \text{ k}\Omega$ , $T_j = 125 \text{ °C}$	All	Min.	0.2	V
$I_H^{(2)}$	$I_T = 500 \text{ mA}$		Max.	25	mA
$I_L$	$I_G = 1.2 I_{GT}$	I - III - IV	Max.	40	mA
		II	Max.	80	

Symbol	Parameters	Quadrant		BTA16	Unit
$dV/dt^{(2)}$	$V_D = 67 \% V_{DRM}$ gate open, $T_j = 125 \text{ °C}$		Min.	200	V/μs
$(dI/dt)_c^{(2)}$	$(dI/dt)_c = 7 \text{ A/ms}$ , $T_j = 125 \text{ °C}$		Min.	5	V/μs

1. Minimum  $I_{GT}$  is guaranteed at 5 % of  $I_{GT}$  max.

2. For both polarities of A2 referenced to A1



## Electrical Characteristics

( $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified) - Snubberless and logic level (3quadrants)

Symbol	Parameters	Quadrant		BTA16	Unit
$I_{GT}^{(1)}$	$V_D = 12\text{ V}$ , $R_L = 30\ \Omega$	I - II - III	Max.	35	mA
$V_{GT}$			Max.	1.3	V
$V_{GD}$			Min.	0.2	V
$I_H^{(2)}$	$I_T = 500\text{ mA}$		Max.	35	mA
$I_L$	$I_G = 1.2 I_{GT}$	I - III	Max.	50	mA
		II	Max.	60	
$(dV/dt)^{(2)}$	$V_D = 67\% V_{DRM}$ gate open, $T_j = 125\text{ }^\circ\text{C}$		Min.	500	V/ $\mu\text{s}$
$(dI/dt)^{(2)}$	$(dV/dt)_c = 0.1\text{ V}/\mu\text{s}$ , $T_j = 125\text{ }^\circ\text{C}$		Min.	8.5	A/ms
	$(dV/dt)_c = 10\text{ V}/\mu\text{s}$ , $T_j = 125\text{ }^\circ\text{C}$			3.0	
	Without snubber, $T_j = 125\text{ }^\circ\text{C}$			8.5	

1. Minimum  $I_{GT}$  is guaranteed at 5 % of  $I_{GT}$  max.
2. For both polarities of A2 referenced to A1

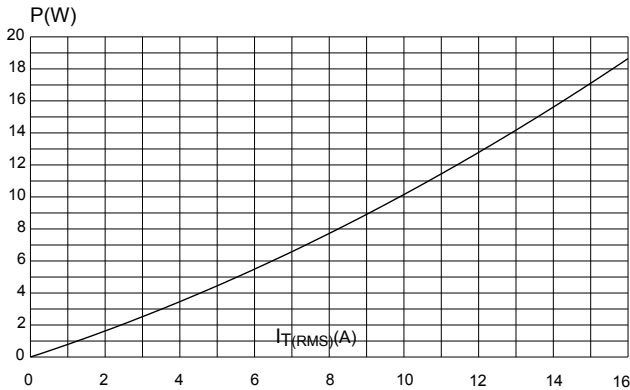
## Thermal resistance

Symbol	Parameters	Value	Unit
$R_{th(j-c)}$	Max. junction to case (AC)	2.1	$^\circ\text{C}/\text{W}$
$R_{th(j-a)}$	Junction to ambient	60	

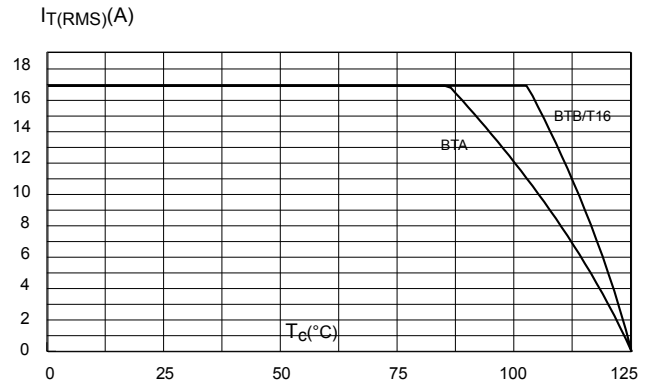


### Characteristics (curves)

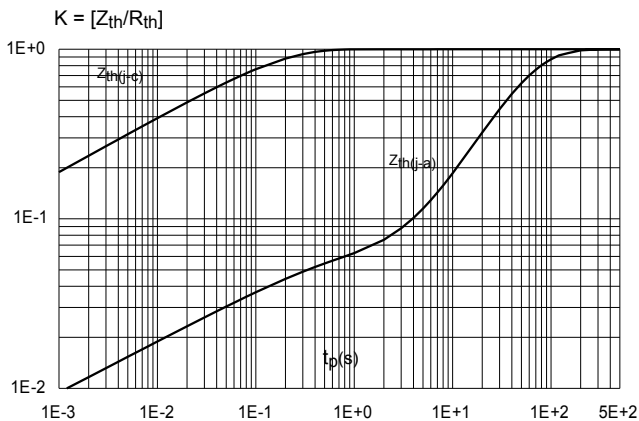
Maximum power dissipation versus on-state RMS current (full cycle)



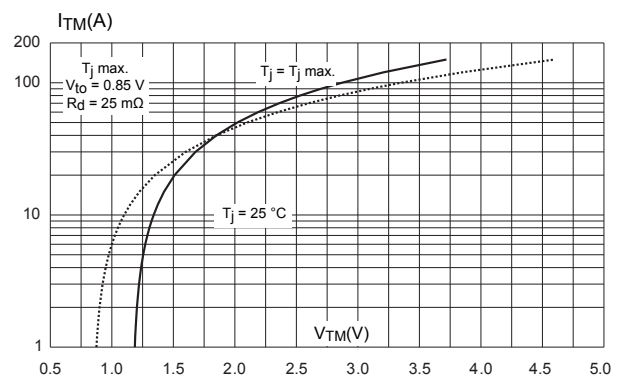
RMS on-state current versus case temperature (full cycle)



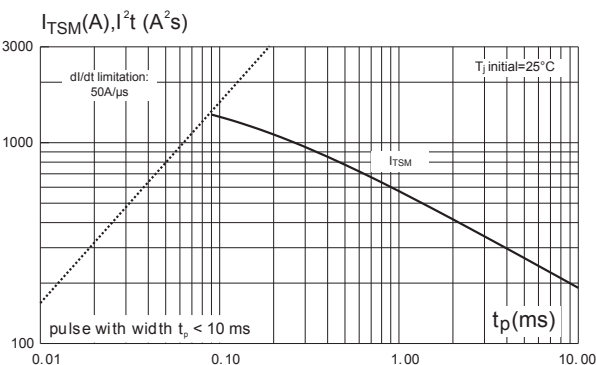
Relative variation of thermal impedance versus pulse duration



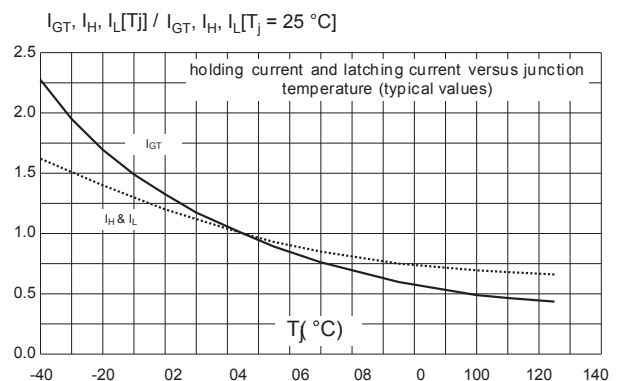
On-state characteristics (maximum values)



Non-repetitive surge peak on-state current for a sinusoidal

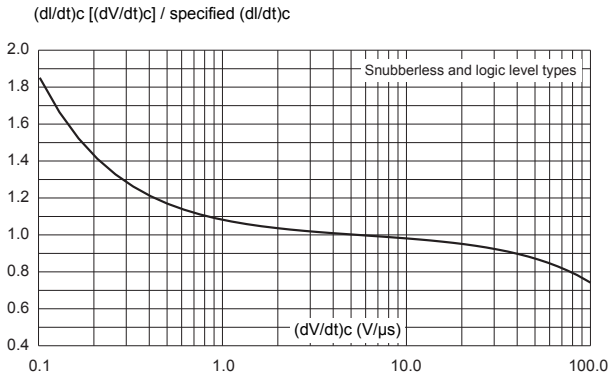


Relative variation of gate trigger current

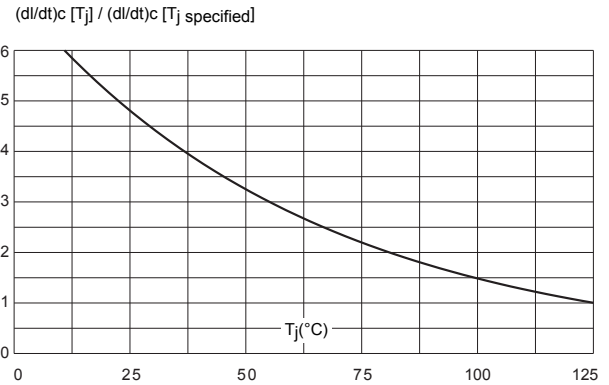




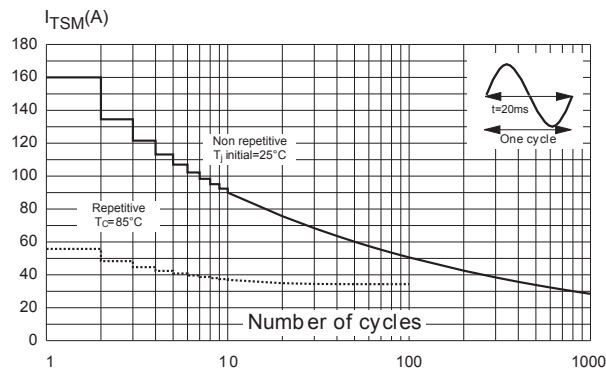
Relative variation of critical rate of decrease of main current versus  $(dV/dt)_c$  (typical values)



Relative variation of critical rate of decrease of main current versus (junction temperature) (typical values)

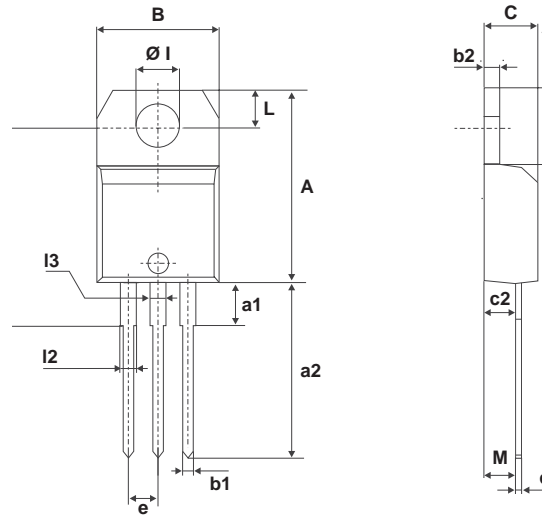


Surge peak on-state current versus number of cycles





**Package Information**  
**TO-220A**  
**(TO-220)**



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	2.40		2.70	0.094		0.106
F	6.20		6.60	0.244		0.259
ØI	3.75		3.85	0.147		0.151
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
I2	1.14		1.70	0.044		0.066
I3	1.14		1.70	0.044		0.066
M		2.60			0.102	



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