

Description

This MOSFETS use advanced trench technology and design to provide excellent RDS(on) with low gate charge. It can be used in a wide variety of applications.

SYMBOL	PARAMETER	MAX	MAX	UNIT
	-----	BTA04-600B	BTA04-600B	
V _{DRM}	Repetitive peak off-state	600	600	V
ID	RMS on-state current	4	4	A

Features

- 1) Low gate charge.
- 2) Green device available.
- 3) Advanced high cell density trench technology for ultra RDS(ON)
- 4) Excellent package for good heat dissipation.



TO-220

Thermal Characteristics

Symbol	Parameter	Ratings	Units
R _{θJC}	Thermal Resistance ,Junction to Case1	—	K/W
R _{θJA}	Thermal Resistance, Junction to Ambient1	—	

Package Marking and Ordering Information

Part NO.	Marking	Package
<u>BTA04-600B</u>	BTA04-600B	TO-220

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board 2OZ copper.
2. The data tested by pulse width≤300us,duty cycle≤2%
3. The EAS data shows Max.rating.The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, i_{AS}=17.8A$
4. The power dissipation is limited by 150℃ junction temperature.

Typical Characteristics $T_J=25^{\circ}C$ unless otherwise noted

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	RMS on-state current (360° conduction angle)	BTA	$T_c = 90^{\circ}C$	4	A
		BTB	$T_c = 95^{\circ}C$		
I_{TSM}	Non repetitive surge peak on-state current (T_j initial = 25°C)	$t_p = 8.3ms$		42	A
		$t_p = 10ms$		40	
I_t^2	I_t^2 value	$t_p = 10ms$		8	A ² s
di/dt	Critical rate of rise of on-state current Gate supply: $I_G = 50mA$ $di_G/dt = 0.1A/\mu s$	Repetitive $F = 50Hz$		10	A/ μs
		Non repetitive		50	
T_{stg} T_j	Storage and operating junction temperature range			-40 to +150 -40 to +110	°C
T_l	Maximum lead soldering temperature during 10s at 4.5mm from case			260	°C

Symbol	Parameter	BTA / BTB04-			Unit
		400 T/D/S/A	600 T/D/S/A	700 T/D/S/A	
V_{DRM} V_{RRM}	Repetitive peak off-state voltage $T_J = 110^{\circ}C$	400	600	700	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
$R_{th(j-a)}$	Junction to ambient		60	°C/W
$R_{th(j-c)} DC$	Junction to case for DC	BTA	4.4	°C/W
		BTB	3.2	
$R_{th(j-c)} AC$	Junction to case for 360° conduction angle ($F = 50Hz$)	BTA	3.3	°C/W
		BTB	2.4	

ELECTRICAL CHARACTERISTICS

Symbol	Test conditions		Quadrant		BTA / BTB04				Unit
					T	D	S	A	
I _{GT}	V _D = 12V (DC) R _L = 33Ω	T _J = 25°C	I - II - III	MAX.	5	5	10	10	mA
			IV	MAX.	5	10	10	25	
V _{GT}	V _D = 12V (DC) R _L = 33Ω	T _J = 25°C	I - II - III - IV	MAX.	1.5				V
V _{GD}	V _D = V _{DRM} R _L = 3.3kΩ	T _J = 110°C	I - II - III - IV	MIN.	0.2				V
tgt	V _D = V _{DRM} I _G = 40mA di _G /dt = 0.5A/μs	T _J = 25°C	I - II - III - IV	TYP.	2				μs
I _L	I _G = 1.2I _{GT}	T _J = 25°C	I - III - IV	TYP.	10	10	20	20	mA
			II		20	20	40	40	
I _H *	I _T = 100mA Gate open	T _J = 25°C		MAX.	15	15	25	25	mA
V _{TM} *	I _{TM} = 5.5A tp = 380μs	T _J = 25°C		MAX.	1.65				V
I _{DRM} I _{RRM}	V _{DRM} rated V _{RRM} rated	T _J = 25°C		MAX.	0.01				mA
		T _J = 110°C		MAX.	0.75				
dV/dt *	Linear slope up to V _D = 67% V _{DRM} gate open	T _J = 110°C		TYP.	10	10	-	-	V/μs
				MIN.	-	-	10	10	
(di/dt)c*	(di/dt)c = 1.8A/ms	T _J = 110°C		TYP.	1	1	5	5	V/μs

* For either polarity of electrode A₂ voltage with reference to electrode A₁

Fig. 1: Maximum RMS power dissipation versus RMS on-state current ($F = 50\text{Hz}$). (Curves are cut off by $(di/dt)_c$ limitation)

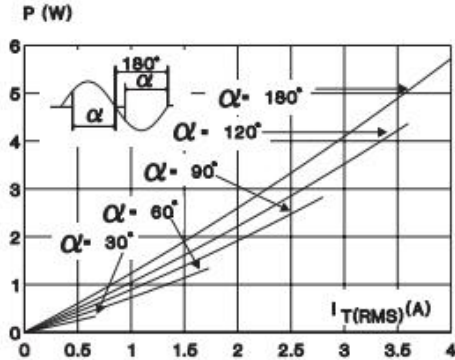


Fig. 2: Correlation between maximum RMS power dissipation and maximum allowable temperature (T_{amb} and T_{case}) for different thermal resistances heatsink + contact (BTA).

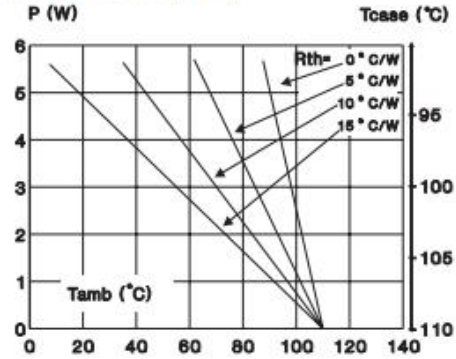


Fig. 3: Correlation between maximum RMS power dissipation and maximum allowable temperature (T_{amb} and T_{case}) for different thermal resistances heatsink + contact (BTB).

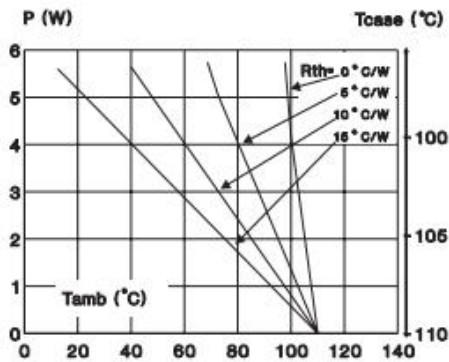


Fig. 4: RMS on-state current versus case temperature.

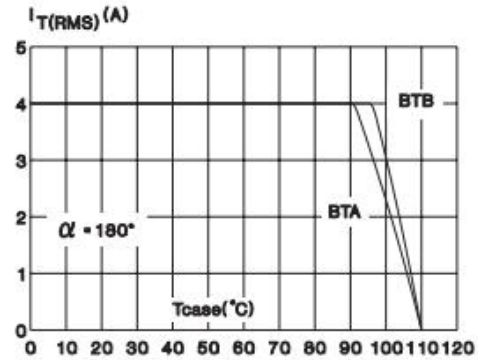


Fig. 5: Relative variation of thermal impedance versus pulse duration.

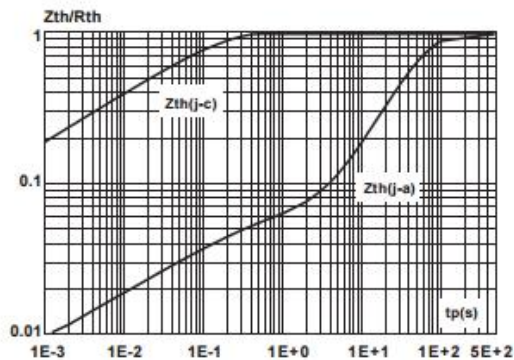


Fig. 6: Relative variation of gate trigger current and holding current versus junction temperature.

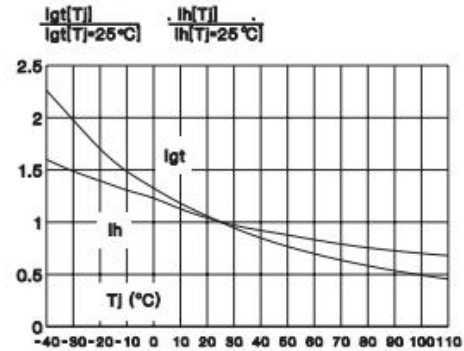


Fig. 7: Non repetitive surge peak on-state current versus number of cycles.

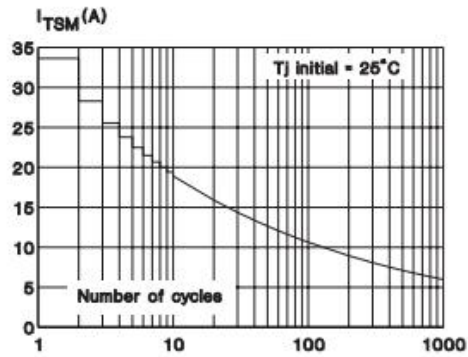


Fig. 8: Non repetitive surge peak on-state current for a sinusoidal pulse with width: $t \leq 10\text{ms}$, and corresponding value of I^2t .

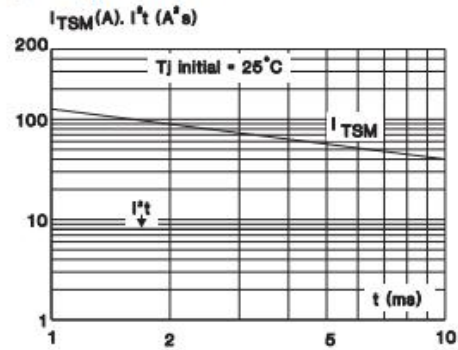


Fig. 9: On-state characteristics (maximum values).

