DATA SHEET

BTA216B series D, E and F
Three quadrant triacs guaranteed commutation

Product specification

July 2018

WeEn
WeEn Semiconductors

Three quadrant triacs guaranteed commutation

BTA216B series D, E and F

GENERAL DESCRIPTION

Passivated guaranteed commutation triacs in a plastic envelope suitable for surface mounting, intended for use in motor control circuits or with other highly inductive loads. These devices balance the requirements of commutation performance and gate sensitivity. The "sensitive gate" E series and "logic level" D series are intended for interfacing with low power drivers, including micro controllers.

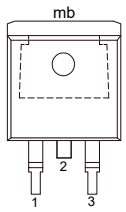
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
	BTA216B-	**600D**	
	BTA216B-	**600E**	
V_{DRM}	**BTA216B-**	**600F**	V
	Repetitive peak off-state voltages	600	
$I_{T(RMS)}$	RMS on-state current	16	A
I_{TSM}	Non-repetitive peak on-state current	140	A

PINNING - SOT404

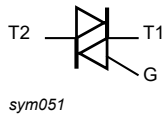
PIN	DESCRIPTION
1	main terminal 1
2	main terminal 2
3	gate
mb	main terminal 2

PIN CONFIGURATION



D2PAK (SOT404)

SYMBOL



sym051

LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DRM}	Repetitive peak off-state voltages		-	600[1]	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 99$ ˚C	-	16	A
I_{TSM}	Non-repetitive peak on-state current	full sine wave; $T_j = 25$ ˚C prior to surge	-		
		t = 20 ms	-	140	A
		t = 16.7 ms		150	A
I^2t	I^2t for fusing	t = 10 ms	-	98	A^2s
dI_T/dt	Repetitive rate of rise of on-state current after triggering	I_{TM} = 20 A; I_G = 0.2 A; dI_G/dt = 0.2 A/µs		100	A/µs
I_{GM}	Peak gate current		-	2	A
P_{GM}	Peak gate power		-	5	W
$P_{G(AV)}$	Average gate power	over any 20 ms period	-	0.5	W
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	125	˚C

1 Although not recommended, off-state voltages up to 800V may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed 15 A/µs.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	full cycle	-	-	1.2	K/W
		half cycle	-	-	1.7	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	minimum footprint, FR4 board	-	55	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		BTA216B-		**...D**	**...E**	**...F**	
I_{GT}	Gate trigger current[2]	V_D = 12 V; I_T = 0.1 A					
		T2+ G+	-	5	10	25	mA
		T2+ G-	-	5	10	25	mA
		T2- G-	-	5	10	25	mA
I_L	Latching current	V_D = 12 V; I_{GT} = 0.1 A					mA
		T2+ G+	-	15	25	30	mA
		T2+ G-	-	25	30	40	mA
		T2- G-	-	25	30	40	
I_H	Holding current	V_D = 12 V; I_{GT} = 0.1 A	-	15	25	30	mA
			...D, E, F				
V_T	On-state voltage	I_T = 20 A	-	1.5			V
V_{GT}	Gate trigger voltage	V_D = 12 V; I_T = 0.1 A	-	1.5			V
		V_D = 400 V; I_T = 0.1 A; T_j = 125 ˚C	0.25	-			V
I_D	Off-state leakage current	V_D = $V_{DRM(max)}$; T_j = 125 ˚C	-	0.5			mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.			MAX.	UNIT
		BTA216B-	**...D**	**...E**	**...F**		
dV_D/dt	Critical rate of rise of off-state voltage	V_{DM} = 67% $V_{DRM(max)}$; T_j = 110 ˚C; exponential waveform; gate open circuit	30	60	70	-	V/µs
dI_{com}/dt	Critical rate of change of commutating current	V_{DM} = 400 V; T_j = 125 ˚C; $I_{T(RMS)}$ = 16 A; dV_{com}/dt = 10V/µs; gate open circuit	2.5	6.2	18	-	A/ms
dI_{com}/dt	Critical rate of change of commutating current	V_{DM} = 400 V; T_j = 125 ˚C; $I_{T(RMS)}$ = 16 A; dV_{com}/dt = 0.1V/µs; gate open circuit	12	20	50	-	A/ms

2 Device does not trigger in the T2-, G+ quadrant.

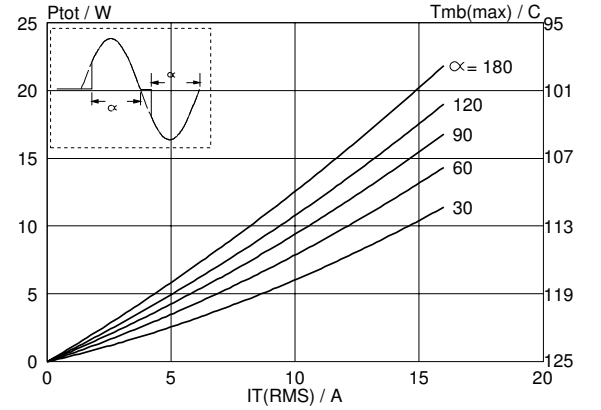


Fig.1. Maximum on-state dissipation, P_{tot}, versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

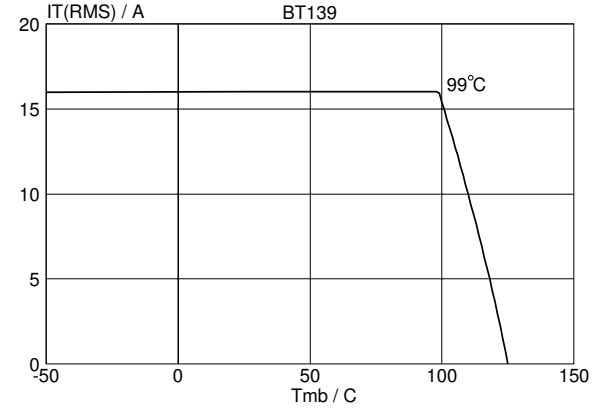


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb}.

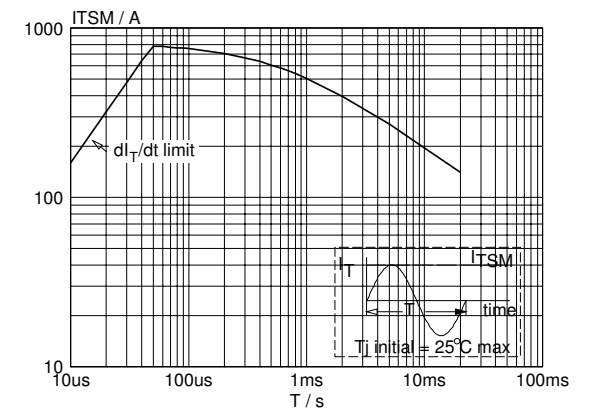


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus pulse width t_p, for sinusoidal currents, $t_p \leq 20ms$.

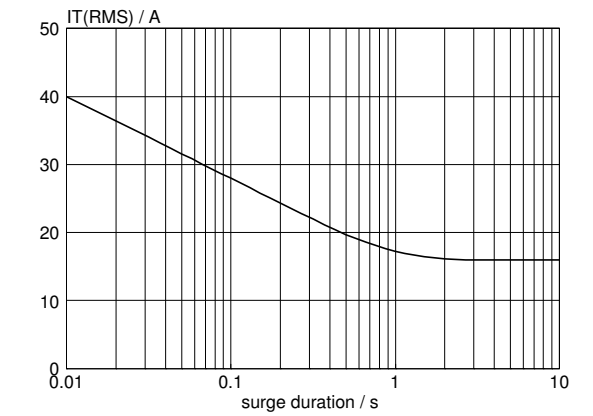


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, f = 50 Hz; $T_{mb} \leq 99˚C$.

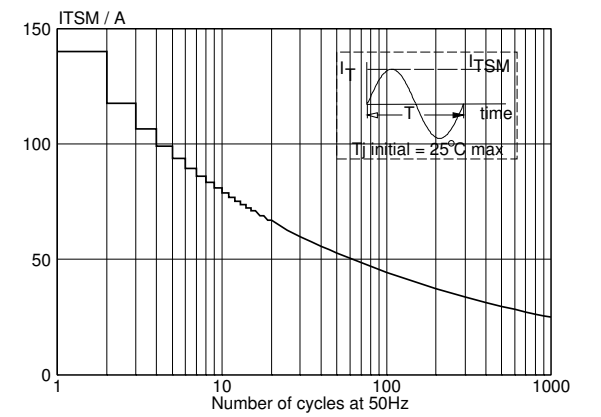


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus number of cycles, for sinusoidal currents, f = 50 Hz.

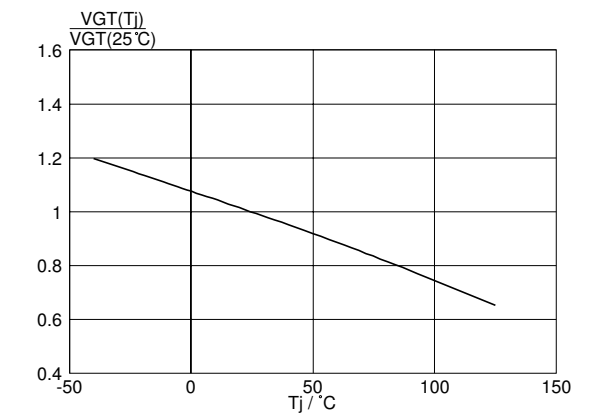


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j)/ V_{GT}(25˚C)$, versus junction temperature T_j.

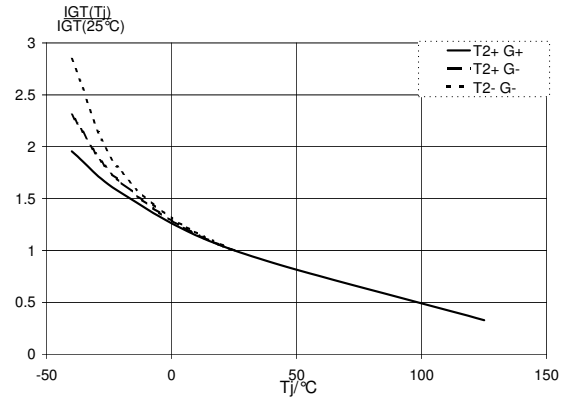


Fig.7. Normalised gate trigger current $I_{GT}(T_j)/ I_{GT}(25^{\circ}C)$, versus junction temperature T_j.

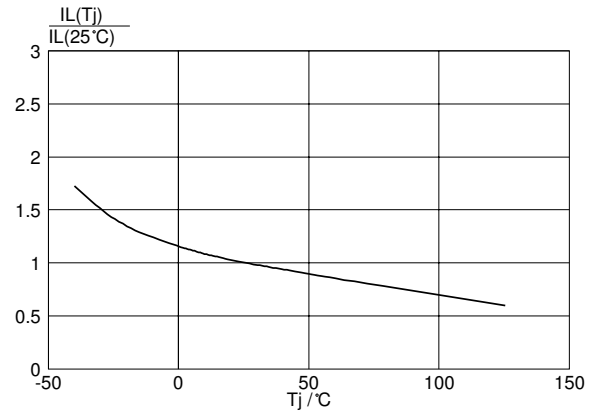


Fig.8. Normalised latching current $I_L(T_j)/ I_L(25^{\circ}C)$, versus junction temperature T_j.

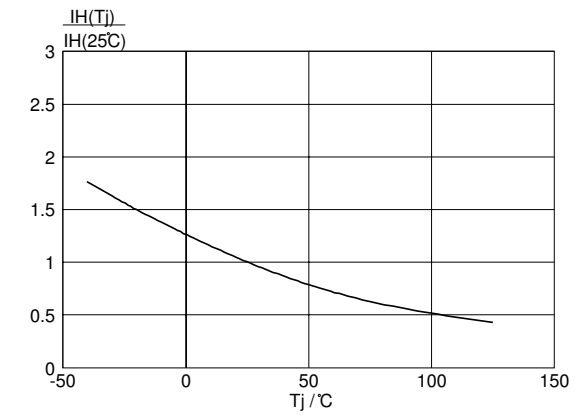


Fig.9. Normalised holding current $I_H(T_j)/ I_H(25^{\circ}C)$, versus junction temperature T_j.

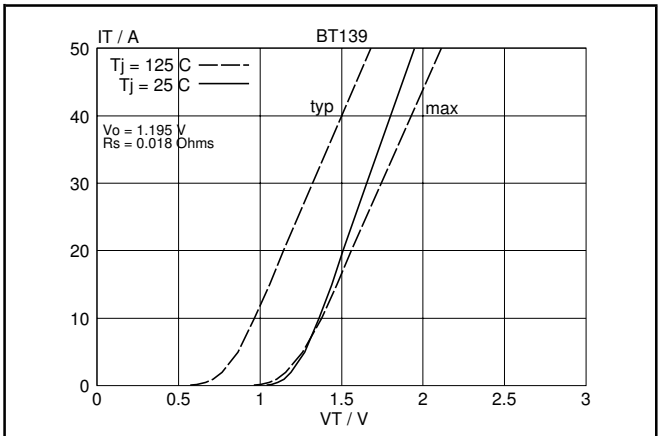


Fig.10. Typical and maximum on-state characteristic.

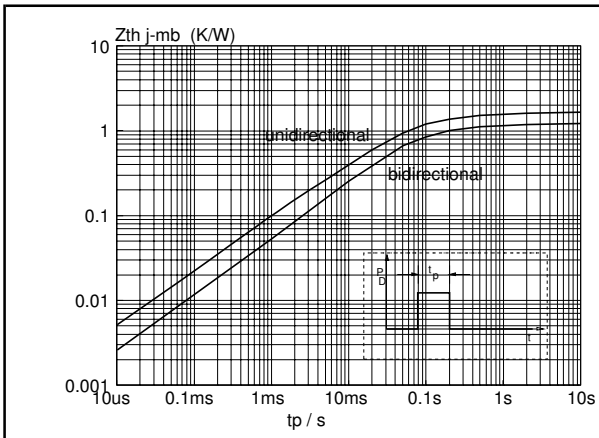


Fig.11. Transient thermal impedance $Z_{th\ j\text{-}mb}$, versus pulse width t_p.

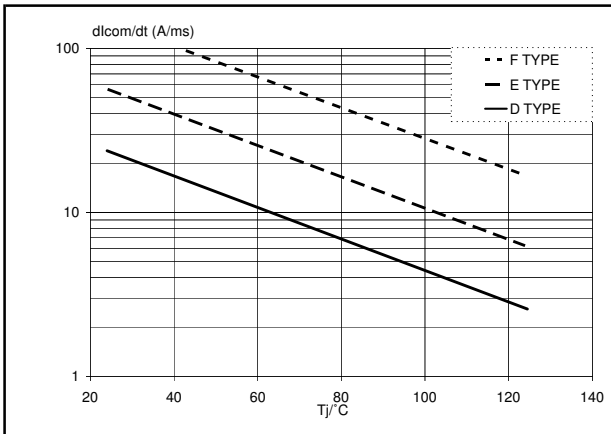
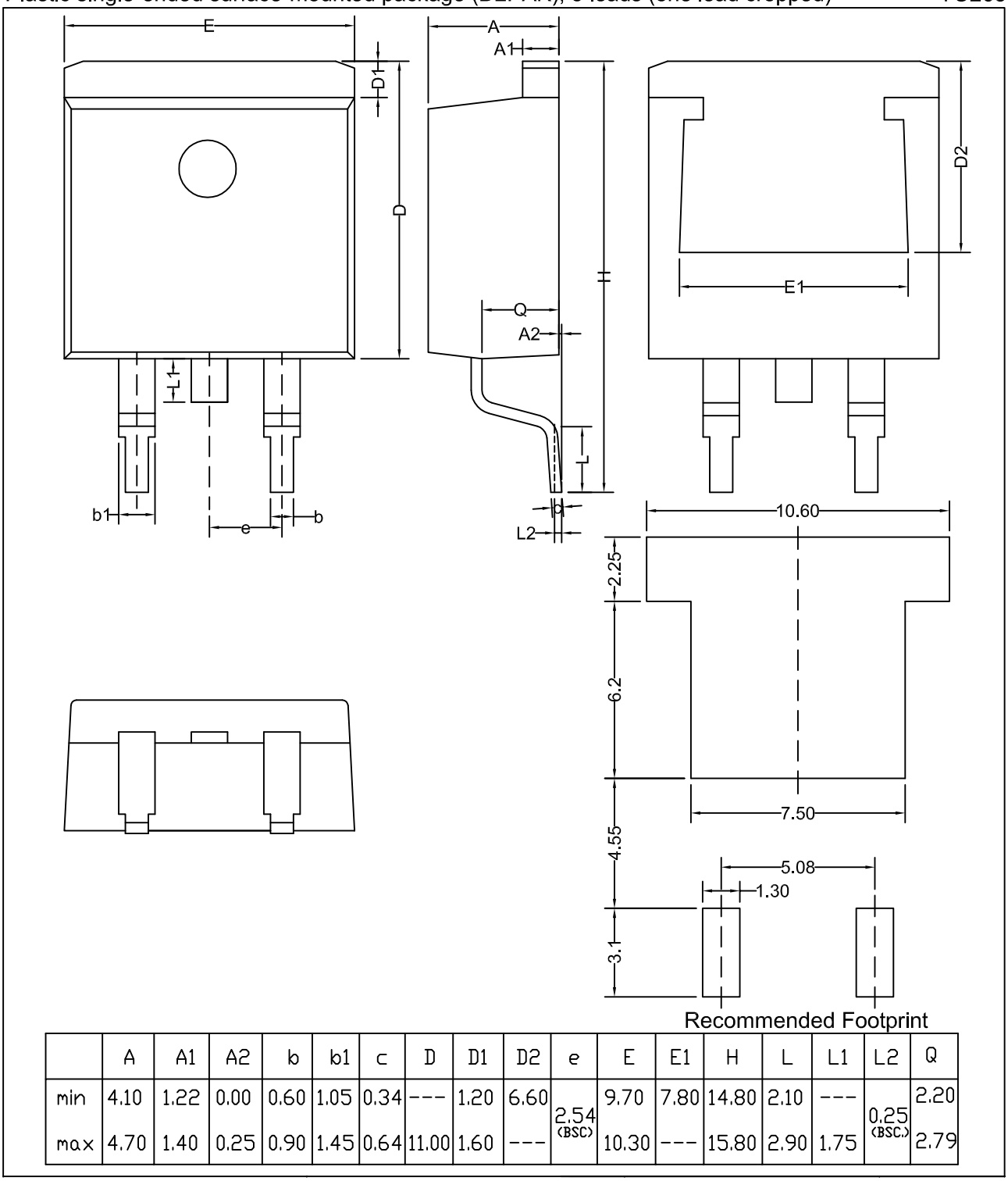


Fig.12. Mimimum, critical rate of change of commutating current dI_{com}/dt versus junction temperature, $dV_{com}/dt = 10V/\mu s$.

MECHANICAL DATA

Plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped) TO263



	A	A1	A2	b	b1	c	D	D1	D2	e	E	E1	H	L	L1	L2	Q
min	4.10	1.22	0.00	0.60	1.05	0.34	---	1.20	6.60	2.54 (BSC)	9.70	7.80	14.80	2.10	---	0.25 (BSC.)	2.20
max	4.70	1.40	0.25	0.90	1.45	0.64	11.00	1.60	---		10.30	---	15.80	2.90	1.75		2.79

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Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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