

File Number 1301

BTA23 Series

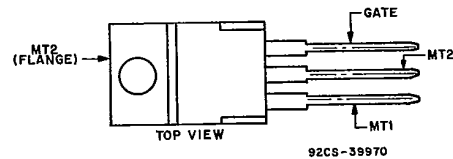
12-A Silicon Triacs

For Power-Control and Power-Switching Applications

Features:

- 800V, 125 Deg. C T_J Operating
- High dv/dt and di/dt Capability
- Low Switching Losses
- High Pulse Current Capability
- Low Forward and Reverse Leakage
- Silicon Oxide Glass Multilayer Passivation System
- Advanced Unisurface Construction
- Precise Ion Implanted Diffusion Source

TERMINAL DESIGNATIONS



JEDEC TO-2203AB

The RCA BTA23-series triacs are gate-controlled full-wave silicon switches utilizing a plastic case with three leads to facilitate mounting on printed-circuit boards. They are intended for the control of ac loads in such applications as motor controls, light dimmers, heating controls, and power-switching systems.

These devices are designed to switch from an off-state to an on-state for either polarity of applied voltage with positive or negative gate-triggering voltages. They have an on-state

current rating of 10 amperes at a T_C of 75°C and repetitive off-state voltage ratings of 200, 300, 400, 500, 600, and 800 volts.

These devices are characterized for I⁺, III⁻ gate-triggering modes only and should suit a wide range of applications that employ diac or anode on/off triggering.

All these types are supplied in the JEDEC TO-220AB VER-SAWATT plastic package.

MAXIMUM RATINGS, Absolute-Maximum Values:

	BTA23B	BTA23C	BTA23D	BTA23E	BTA23M	BTA23N	
	200	300	400	500	600	800	
V _{DROM} [*] , Gate open, T _J = -65 to 125°C				12			V
I _{T(RMS)} , T _C = 70°C, θ = 360°				115			A
I _{TSM} (for 1 full cycle) 60 Hz (sinusoidal)				108			A
							A
di/dt				70			A/μs
V _D = V _{DROM} , I _G = 200 mA, t _r = 0.1 μs							
f ² t (See Fig. 14)				73			A ² s
t = 20 ms				36			A ² s
t = 2.5 ms				20			A ² s
t = 0.5 ms							
I _{GTM} [■]				4			A
For 1 μs max.				16			W
P _{GM} (For 1 μs max., I _{GTM} ≤ 4 A)				0.2			W
P _{G(AV)}				-65 to 150			°C
T _{stg} [†]				-65 to 125			°C
T _C [†]							
T _T (During Soldering):				225			°C
For 10 s max. (terminals and case)							

*For either polarity of main terminal 2 voltage (V_{MT2}) with reference to main terminal 1.

■For either polarity to gate voltage (V_G) with reference to main terminal 1.

†For temperature measurement reference point, see Dimensional Outline.



3875081 G E SOLID STATE

01E 17777 D T-25-15

Triacs

BTA23 Series

ELECTRICAL CHARACTERISTICS, At Maximum Ratings Unless Otherwise Specified, and at Indicated Temperature

CHARACTERISTIC	LIMITS			UNITS
	For All Types Unless Otherwise Specified			
	Min.	Typ.	Max.	
I_{DROM}^* Gate open, $T_J = 125^\circ C$, $V_{DROM} = \text{Max. rated value}$	—	0.1	2	mA
V_{TM}^* $I_T = 30 \text{ A (peak)}$, $T_C = 25^\circ C$ (See Fig. 6)	—	—	1.6	V
I_{HO}^* Gate open, Initial principal current = 150 mA (dc) $V_D = 12 \text{ V}$, $T_C = 25^\circ C$	—	15	—	mA
For other case temperatures See Fig. 7				
dv/dt (Commutating)* $V_D = V_{DROM}$, $I_{T(RMS)} = 10 \text{ A}$, commutating $di/dt = 4.44 \text{ A/ms}$, gate unenergized, $T_C = 75^\circ C$ (See Fig. 15)	4	10	—	V/ μs
dv/dt^* $V_D = V_{DROM}$, exponential voltage rise, gate open, $T_C = 100^\circ C$:				
BTA23B	100	300	—	V/ μs
BTA23C	85	275	—	
BTA23D	75	250	—	
BTA23E	65	225	—	
BTA23M	60	200	—	
BTA23N	30	70	—	
$I_{GT}^{*■}$ Mode V_{MT2} V_G $V_D = 12 \text{ V (dc)}$ I^+ positive positive	—	10	25	mA
$R_L = 30 \Omega$ III^- negative negative	—	20	30	
$T_C = 25^\circ C$ III^- positive negative	—	20	60	
For other case temperatures See Figs. 10 & 11	—	30	60	
$V_{GT}^{*■}$ $V_D = 12 \text{ V (dc)}$, $R_L = 30 \Omega$, $T_C = 25^\circ C$	—	1.25	2.5	V
For other case temperatures See Fig. 12	—	—	—	
$V_D = V_{DROM}$, $R_L = 125 \Omega$, $T_C = 100^\circ C$	0.2	—	—	
t_{gt} For $V_D = V_{DROM}$, $I_G = 80 \text{ mA}$, $t_r = 0.1 \mu s$, $I_T = 10 \text{ A (peak)}$, $T_C = 25^\circ C$ (See Fig. 13)	—	1.6	—	μs
$R_{\theta JC}$	—	—	2.2	$^\circ C/W$
$R_{\theta JA}$	—	—	60	

*For either polarity of main terminal 2 voltage (V_{MT2}) with reference to main terminal 1.
 ■For either polarity of gate voltage (V_G) with reference to main terminal 1.



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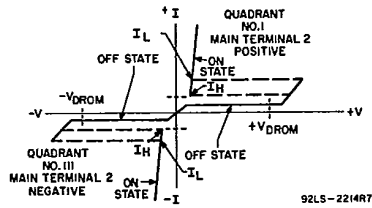


Fig. 1 — Principal voltage-current characteristic.

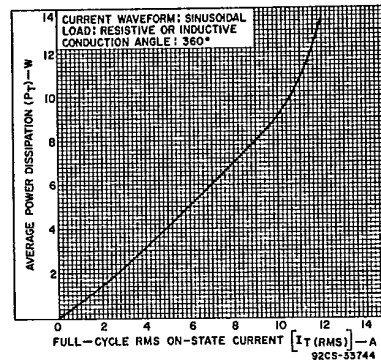


Fig. 2 — Power dissipation as a function of on-state current.

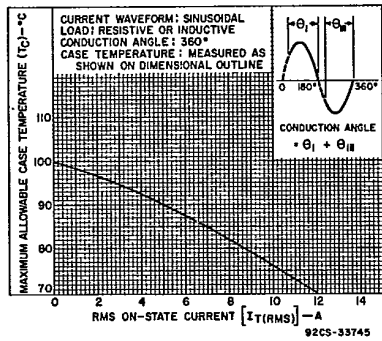


Fig. 3 - Allowable case temperature as a function of on-state current.

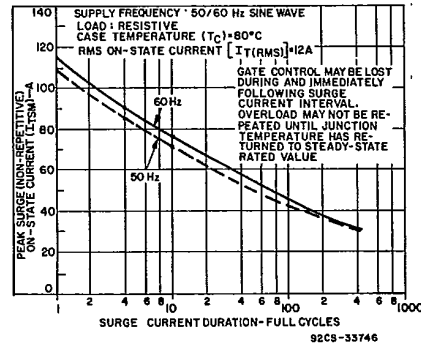


Fig. 4 — Peak surge on-state current as a function of surge current duration.

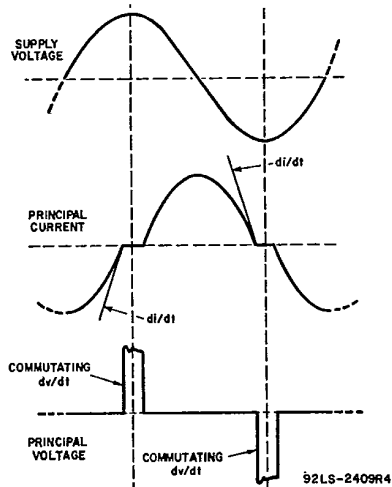


Fig. 5 — Oscilloscope display of commutating dv/dt.

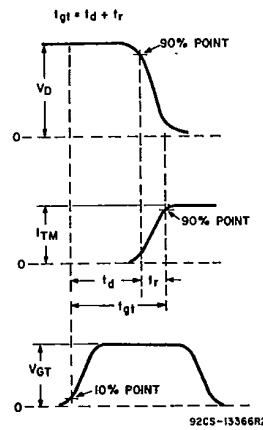


Fig. 6 — Oscilloscope display for measurement of gate-controlled turn-on time (t_{qt}).



Triacs

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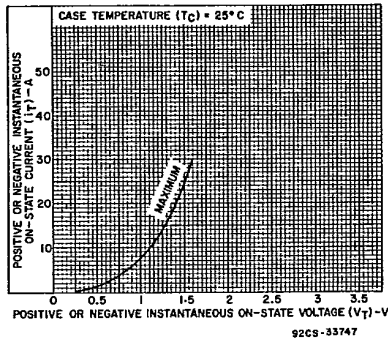


Fig. 7 — On-state current vs. on-state voltage.

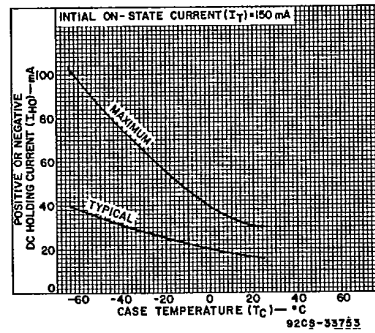


Fig. 8 — DC holding current for either direction of on-state current vs. case temperature.

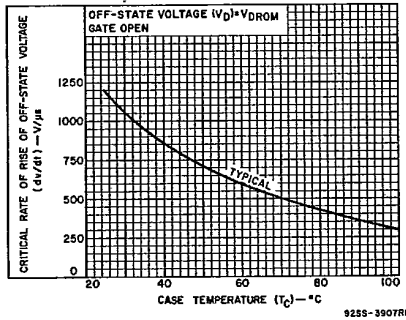


Fig. 9 — Critical rate-of-rise of off-state voltage as a function of case temperature.

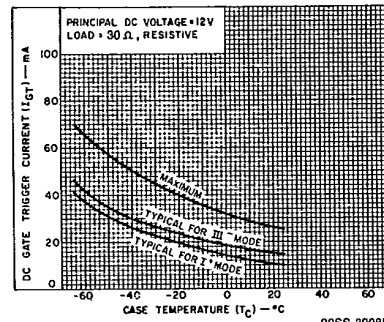


Fig. 10 — DC gate-trigger current (for I⁺ and III⁺ triggering modes) vs. case temperature.

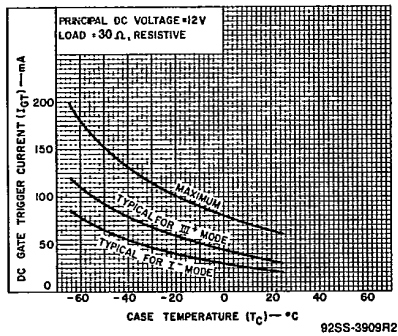


Fig. 11 — DC gate-trigger current (for I⁺ and III⁺ triggering modes) vs. case temperature.

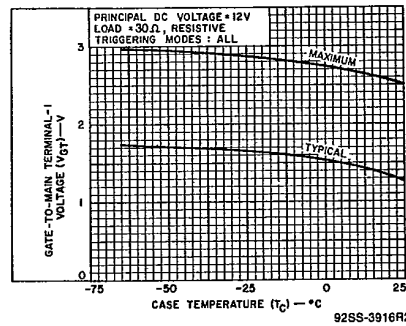


Fig. 12 — DC gate-trigger voltage vs. case temperature.

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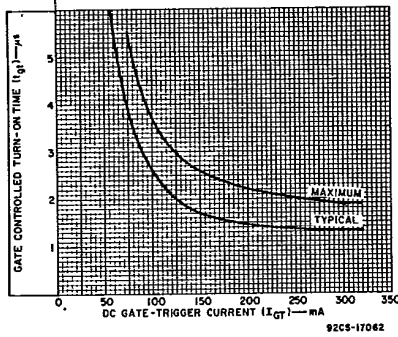


Fig. 13 — Turn-on time vs. gate-trigger current.

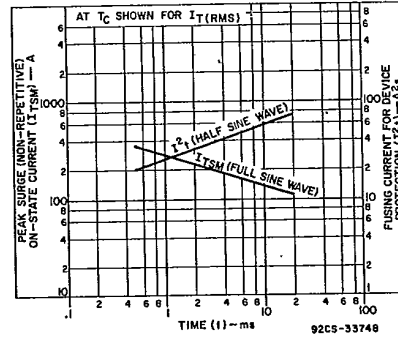
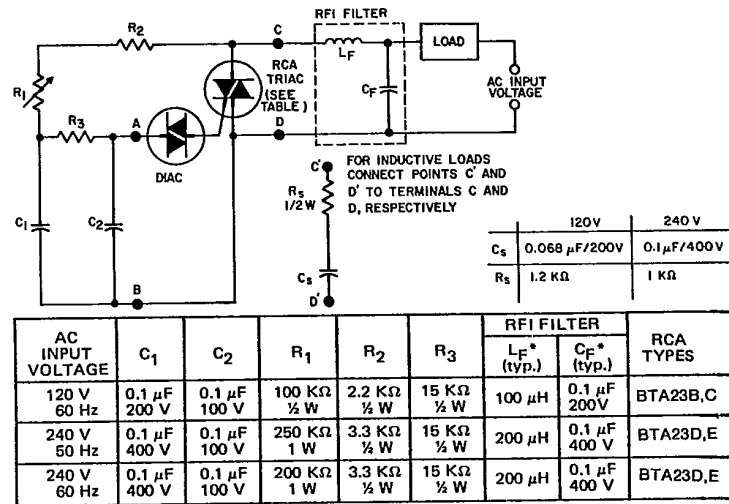


Fig. 14 — Peak surge on-state current and fusing current as a function of time.



*Typical values for lamp-dimming circuits.

92CS-33761

Fig. 15 — Typical phase-control circuit for lamp dimming, heat control, and universal-motor speed control.