

DIGITRON SEMICONDUCTORS

BTC12 SERIES

SILICON BIDIRECTIONAL THYRISTORS

Available Non-RoHS (standard) or RoHS compliant (add PBF suffix).

Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak repetitive off-state voltage ⁽¹⁾ (T _J = 125°C) BTC12-200 BTC12-400 BTC12-600	V _{DRM}	200 400 600	Volts
RMS on-state current (T _C = 70°C)	I _{T(RMS)}	12	Amps
Peak non-repetitive surge current (1 cycle, 50 Hz, t = 20ms) (1/2 cycle, 50Hz, t = 10ms)	I _{TSM}	90 100	Amps
Circuit fusing considerations (T _J = -40 to 125°C, t = 10ms)	I ² t	40	A ² s
Peak gate power (pulse width = 2.0μs)	P _{GM}	16	Watts
Average gate power (t = 10ms)	P _{G(AV)}	0.35	Watts
Peak gate current (pulse width = 1.0μs)	I _{GM}	4.0	Amps
Operating junction temperature range	T _J	-40 to +125	°C
Storage temperature range	T _{stg}	-40 to +150	°C
Maximum rate of change of on-state current (I _{TM} = 12A, I _G = 200mA)	di/dt	10	A/μs

Note 1: Ratings apply for open gate conditions. Thyristor devices shall not be tested with a constant current source for blocking capability such that the voltage applied exceeds the rated blocking voltage.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
Thermal resistance, junction to case	R _{θJC}	2.2	°C/W

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ.	Max	Unit
Peak blocking current (either direction) (Rated V _{DRM} @ T _J = 125°C, gate open)	I _{DRM}	-	-	2.0	mA
Peak on-state voltage (either direction) (I _{TM} = 17A peak)	V _{TM}	-	1.4	1.65	Volts
Peak gate trigger voltage (main terminal voltage = 12V, R _L = 100Ω) All quadrants (main terminal voltage = rated V _{DRM} , R _L = 1kΩ, T _J = 125°C) All quadrants	V _{GTM}	- 0.2	- -	2.5 -	Volts
Holding current (either direction) (main terminal voltage = 12V, gate open, initiating current = 1.0A, T _C = 25°C)	I _H	-	-	50	mA
Latching current (main terminal voltage = 24V, gate trigger source = 15V, 100Ω) MT2(+), G(+) MT2(-), G(-) MT2(+), G(-)	I _L	- - -	- - -	100 100 200	mA
Critical rate of rise of off state voltage (Rated V _{DRM} , exponential voltage rise, gate open, T _J = 125°C)	dv/dt	100	-	-	V/μs
Blocking voltage application rate (@ T _C = 80°C @ V _{DRM} , I _T = 6A, gate open, commutation di/dt = 4.3A/ms)	dv/dt(c)	5	-	-	V/μs

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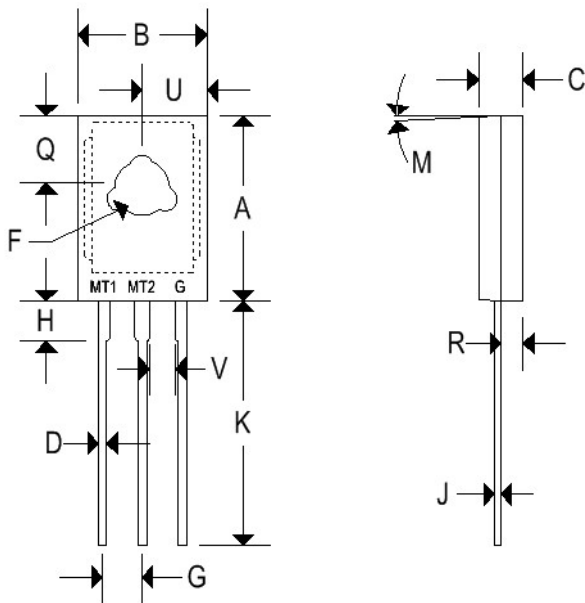
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Characteristic	Symbol	QUADRANT			
		I mA	II mA	III mA	IV mA
Peak trigger current (main terminal voltage = 12V, $R_L = 100\Omega$) BTC12(-), $T_J = 25^\circ\text{C}$ BTC12(-), $T_J = -40^\circ\text{C}$	I_{GTM}	50 100	50 100	50 100	80 200

MECHANICAL CHARACTERISTIC

Case	TO-220AB
Marking	Body painted, alpha-numeric
Pin out	See below



	TO-220AB			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.575	0.620	14.600	15.750
B	0.380	0.405	9.650	10.290
C	0.160	0.190	4.060	4.820
D	0.025	0.035	0.640	0.890
F	0.142	0.147	3.610	3.730
G	0.095	0.105	2.410	2.670
H	0.110	0.155	2.790	3.930
J	0.014	0.022	0.360	0.560
K	0.500	0.562	12.700	14.270
L	0.045	0.055	1.140	1.390
N	0.190	0.210	4.830	5.330
Q	0.100	0.120	2.540	3.040
R	0.080	0.110	2.040	2.790
S	0.045	0.055	1.140	1.390
T	0.235	0.255	5.970	6.480
U	-	0.050	-	1.270
V	0.045	-	1.140	-
Z	-	0.080	-	2.030

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FIGURE 1 – RMS CURRENT DERATING

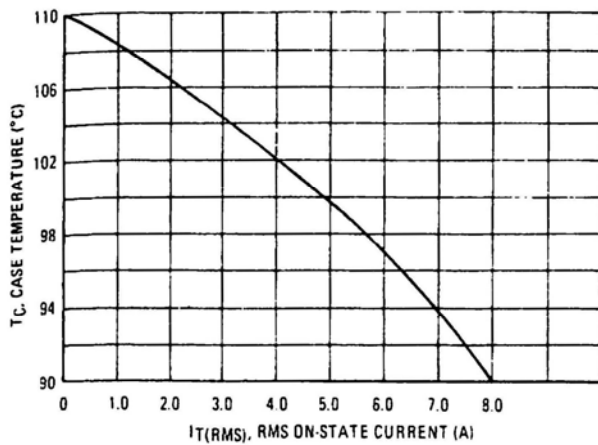


FIGURE 2 – ON-STATE POWER DISSIPATION

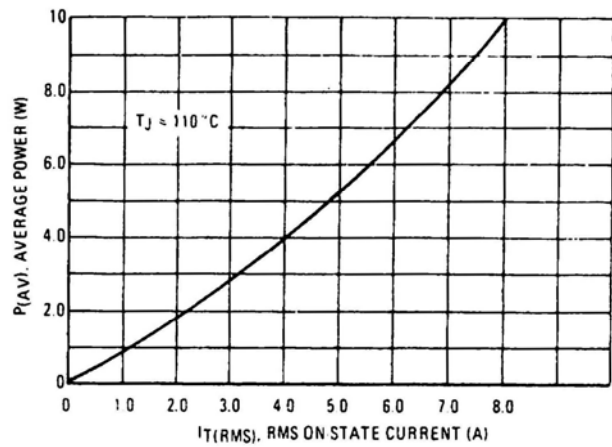


FIGURE 3 – TYPICAL GATE TRIGGER VOLTAGE

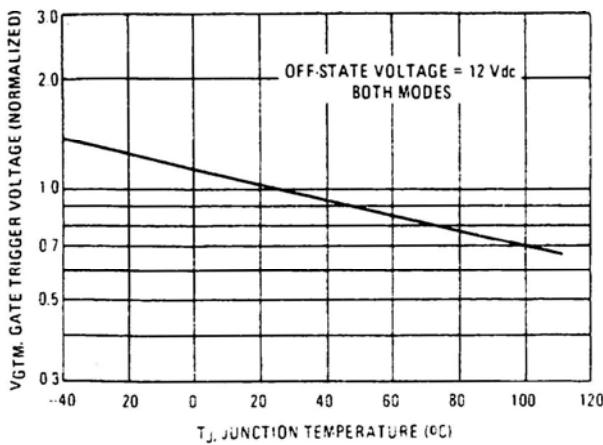


FIGURE 4 – TYPICAL GATE TRIGGER CURRENT

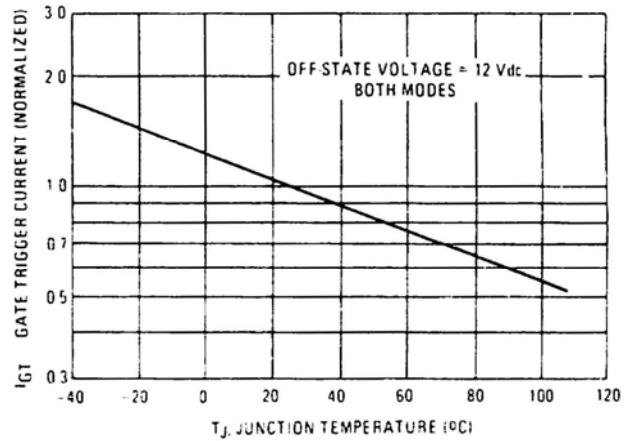


FIGURE 5 – TYPICAL HOLDING CURRENT

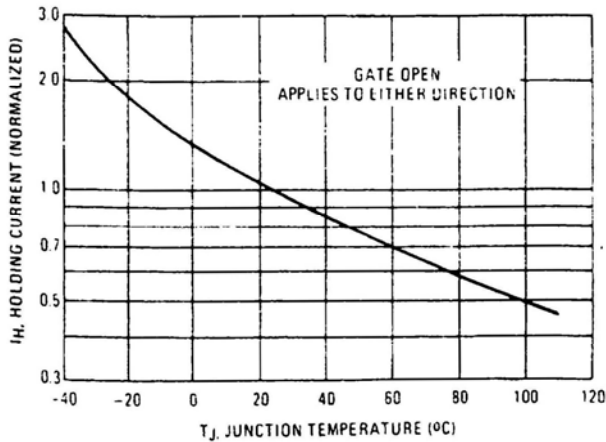
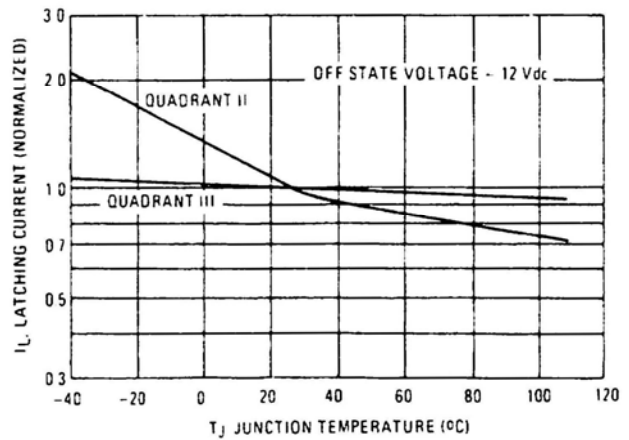


FIGURE 6 – TYPICAL LATCHING CURRENT



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FIGURE 7 – MAXIMUM ON-STATE CHARACTERISTICS

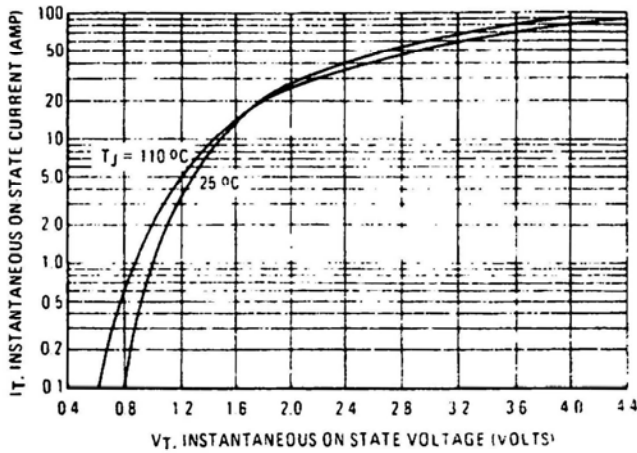


FIGURE 8 – MAXIMUM NON-REPETITIVE SURGE CURRENT

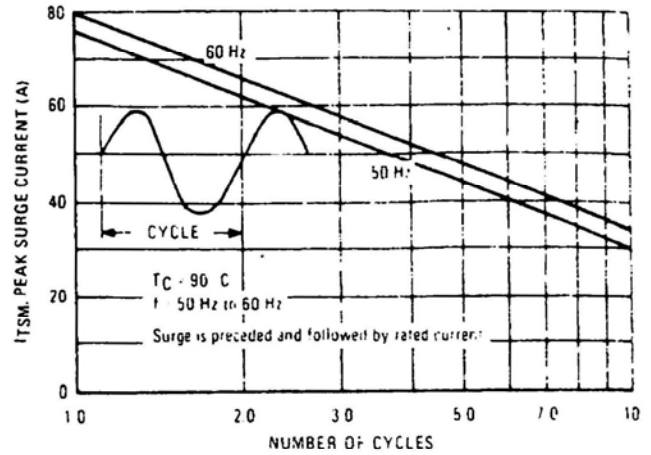


FIGURE 9 – TYPICAL THERMAL RESISTANCE FROM MOUNTING BASE TO HEATSINK

Metal to Metal:	Dry	0,9 °C/W
Metal to Metal:	Lubed	0,3 °C/W
With Insulator:	Dry	Not recommended
With Insulator:	Lubed	1,3 °C/W

These values are available when using the rectangular washer and mica insulator furnished for TO-220 Package. The recommended mounting torque is 0.68 Nm.

FIGURE 10 – THERMAL RESPONSE

