

DIGITRON SEMICONDUCTORS

BT158 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 ($T_J = -40$ to 110°C , $\frac{1}{2}$ sine wave, 50 to 60Hz, gate open) BT158-400 BT158-600	V_{DRM}	400 600	Volts
Non-repetitive peak off-state voltage ($T_J = -40$ to $+110^\circ\text{C}$, $t \leq 10\text{ms}$, gate open) BT158-400 BT158-600	V_{DSM}	500 700	Volts
RMS on-state current (full cycle sine wave 50 to 60Hz) ($T_C = 90^\circ\text{C}$) ($T_C = 100^\circ\text{C}$)	$I_{T(RMS)}$	8.0 4.0	Amps
Peak surge current (1 cycle, 60Hz, $T_C = 90^\circ\text{C}$, preceded and followed by rated current) (50Hz, preceded and followed by rated current)	I_{TSM}	80 75	Amps
Rate of rise of on-state current (gate open, non-repetitive)	di_T/dt	10	A/ μs
Circuit fusing considerations ($T_J = -40$ to 110°C , $t = 1.0$ to 10ms)	I^2t	30	A^2s
Peak gate voltage	V_{GM}	10	Volts
Peak gate current	I_{GM}	2.0	Amps
Peak gate power ($T_C = 90^\circ\text{C}$, pulse width = $2.0\mu\text{s}$)	P_{GM}	20	Watts
Average gate power ($T_C = 90^\circ\text{C}$, $t = 10\text{ms}$)	$P_{G(AV)}$	0.5	Watts
Operating junction temperature range	T_J	-40 to +110	$^\circ\text{C}$
Storage temperature range	T_{stg}	-40 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
Thermal resistance, junction to case	$R_{\theta JC}$	2.2	$^\circ\text{C/W}$

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ.	Max	Unit
Peak blocking current (either direction) (Rated V_{DRM} @ $T_J = 110^\circ\text{C}$, gate open)	I_{DRM}	-	-	2.0	mA
Peak on-state voltage (either direction) ($I_{TM} = 11\text{A}$ peak, pulse width = 1 to 2ms, duty cycle $\leq 2\%$)	V_{TM}	-	1.3	1.55	Volts
Gate trigger current (continuous dc) (main terminal voltage = 12V, $R_L = 100\Omega$, minimum gate pulse width = $2.0\mu\text{s}$) MT2(+), G(-) MT2(-), G(-) MT2(+), G(-); MT2(-), G(-), $T_C = -40^\circ\text{C}$	I_{GT}	- - -	12 20 -	40 40 60	mA
Gate trigger voltage (continuous dc) (main terminal voltage = 12V, $R_L = 100\Omega$, minimum gate pulse width = $2.0\mu\text{s}$) MT2(+), G(-) MT2(-), G(-) MT2(+), G(-); MT2(-), G(-), $T_C = -40^\circ\text{C}$ (main terminal voltage = rated V_{DRM} , $R_L = 10\text{k}\Omega$, $T_J = 110^\circ\text{C}$) MT2(+), G(-); MT2(-), G(-)	V_{GT}	- - - 0.2	0.9 1.1 - -	1.5 1.5 2.0 -	Volts

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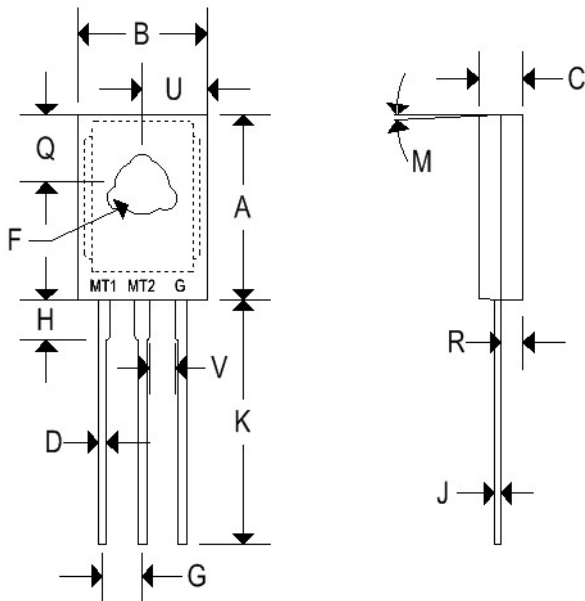
SILICON BIDIRECTIONAL THYRISTORS

Characteristic	Symbol	Min	Typ.	Max	Unit
Holding current (either direction) (main terminal voltage= 12V, gate open, initiating current = 200mA) $T_C = 25^\circ\text{C}$ $T_C = -40^\circ\text{C}$	I_H	- -	6.0 -	30 50	mA
Latching current (main terminal voltage = 12V, R_L = variable, gate pulse width = 20 μs , duty cycle $\leq 2\%$) MT2(+), G(-) @ $I_{GT} = 40\text{mA}$ MT2(-), G(-) @ $I_{GT} = 40\text{mA}$ MT2(+), G(-) @ $I_{GT} = 60\text{mA}$, $T_C = -40^\circ\text{C}$ MT2(-), G(-) @ $I_{GT} = 60\text{mA}$, $T_C = -40^\circ\text{C}$	I_L	- - - -	30 6.0 - -	50 30 75 50	mA
Critical rate of rise of off-state voltage (Rated V_{DRM} , exponential voltage rise, gate open, $T_C = 110^\circ\text{C}$)	dv/dt	-	100	-	V/ μs

Note 1: Off state voltage up to 800V may be applied, but triac may switch into the on-state. In that case, the rate of rise of on-state current should not exceed its specified maximum rating.

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

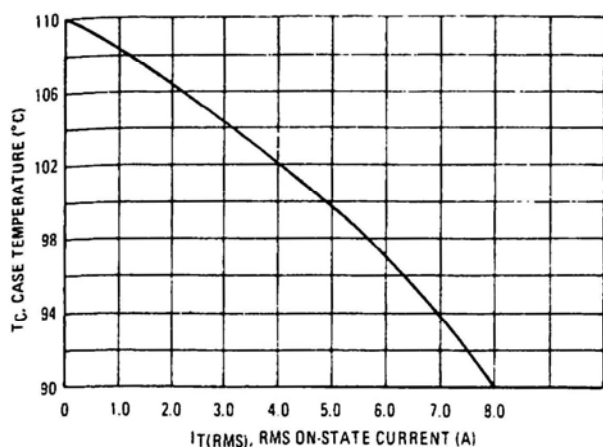


FIGURE 2 – ON-STATE POWER DISSIPATION

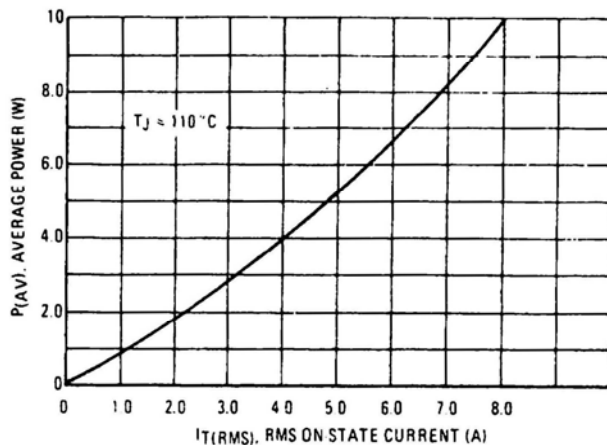


FIGURE 3 – TYPICAL GATE TRIGGER VOLTAGE

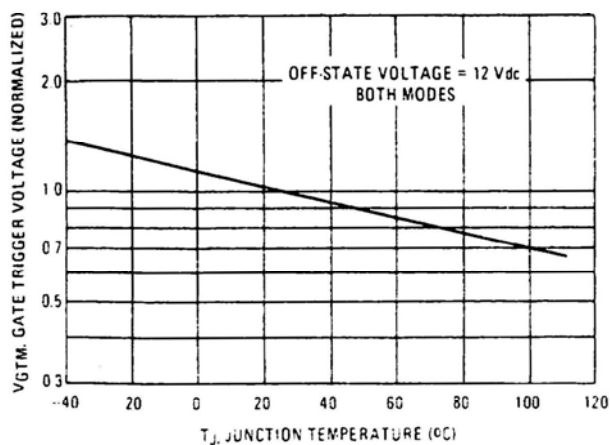


FIGURE 4 – TYPICAL GATE TRIGGER CURRENT

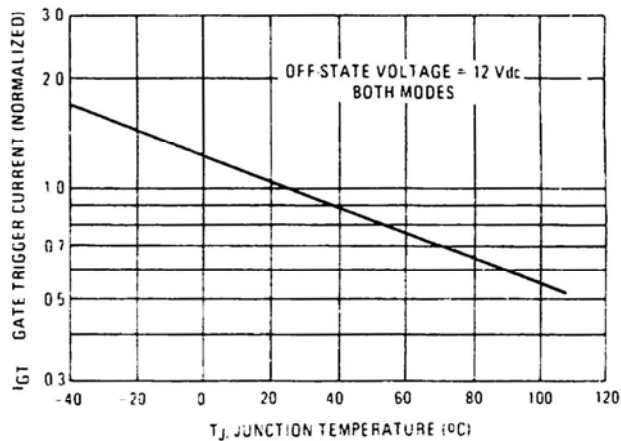


FIGURE 5 – TYPICAL HOLDING CURRENT

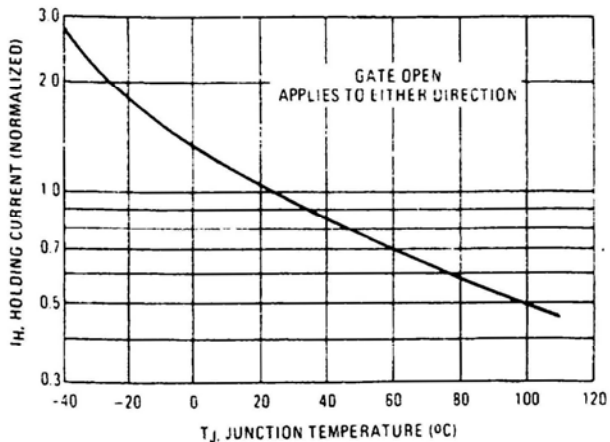
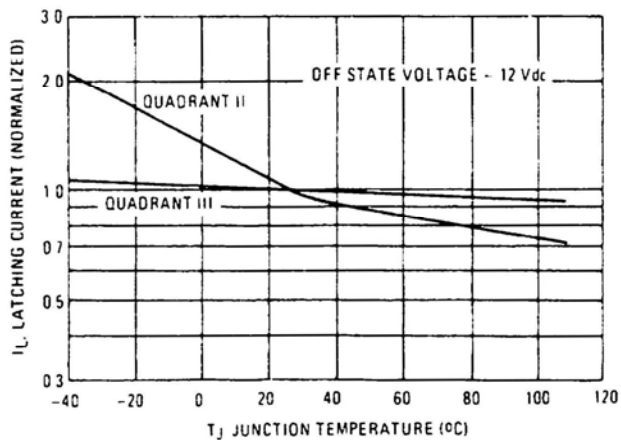


FIGURE 6 – TYPICAL LATCHING CURRENT



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FIGURE 7 – MAXIMUM ON-STATE CHARACTERISTICS

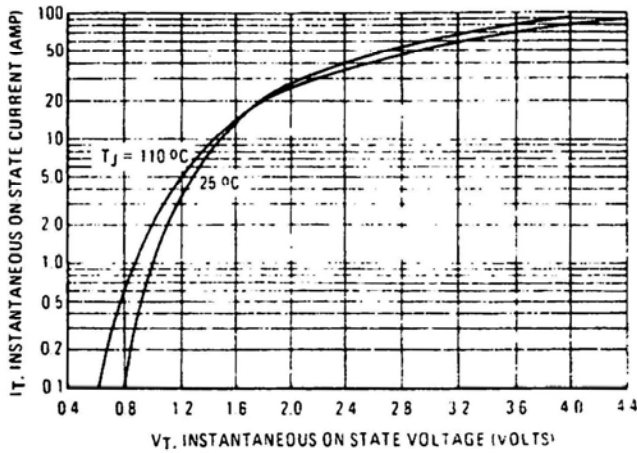


FIGURE 8 – MAXIMUM NON-REPETITIVE SURGE CURRENT

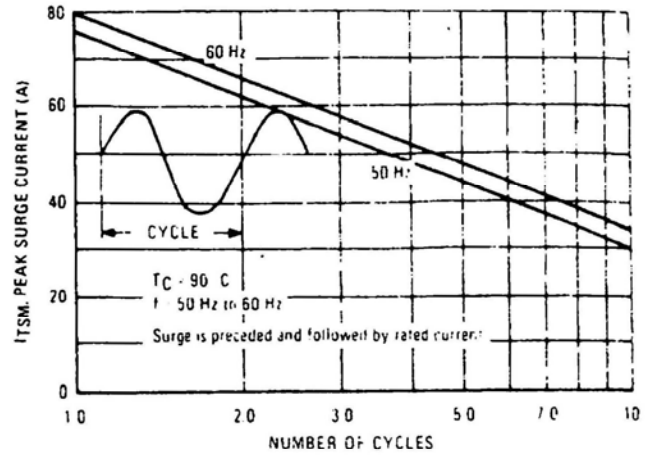


FIGURE 9 – TYPICAL THERMAL RESISTANCE FROM MOUNTING BASE TO HEATSINK

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

