DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

BT158 SERIES

SILICON BIDIRECTIONAL THYRISTORS

FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak repetitive off-state voltage (T_J = -40 to 110°C, ½ 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°C, t ≤ 10ms, 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°C) (T_C = 100°C)	$I_{T(RMS)}$	 8.0 4.0	Amps
Peak surge current (1 cycle, 60Hz, T_C = 90°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°C, pulse width = 2.0µs)	P_{GM}	20	Watts
Average gate power (T_C = 90°C, t = 10ms)	$P_{G(AV)}$	0.5	Watts
Operating junction temperature range	T_J	-40 to +110	°C
Storage temperature range	T_{stg}	-40 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
Thermal resistance, junction to case	$R_{\Theta JC}$	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 = 110°C, gate open)	I_{DRM}	-	-	2.0	mA
Peak on-state voltage (either direction) (I_{TM} = 11A peak, pulse width = 1 to 2ms, duty cycle ≤ 2%)	V_{TM}	-	1.3	1.55	Volts
Gate trigger current (continuous dc) (main terminal voltage = 12V, R_L = 100Ω, minimum gate pulse width = 2.0µs) MT2(+), G(-) MT2(-), G(-) MT2(+), G(-); MT2(-), G(-), T_C = -40°C	I_{GT}	 - - -	 12 20 -	 40 40 60	mA

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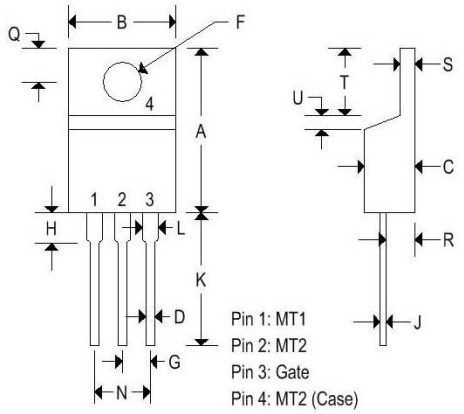
Gate trigger voltage (continuous dc)					
(main terminal voltage = 12V, R_L = 100Ω, minimum gate pulse width = 2.0µs)					
MT2(+), G(-)	V_{GT}	-	0.9	1.5	Volts
MT2(-), G(-)		-	1.1	1.5	
MT2(+), G(-); MT2(-), G(-), T_C = -40°C		-	-	2.0	
(main terminal voltage = rated V_{DRM}, R_L = 10kΩ, T_J = 110°C)					
MT2(+), G(-); MT2(-), G(-)		0.2	-	-	
Holding current (either direction)					
(main terminal voltage= 12V, gate open, initiating current = 200mA)	I_H				mA
T_C = 25°C		-	6.0	30	
T_C = -40°C		-	-	50	
Latching current					
(main terminal voltage = 12V, R_L = variable, gate pulse width = 20µs, duty cycle ≤ 2%)					
MT2(+), G(-) @ I_{GT} = 40mA	I_L	-	30	50	mA
MT2(-), G(-) @ I_{GT} = 40mA		-	6.0	30	
MT2(+), G(-) @ I_{GT} = 60mA, T_C = -40°C		-	-	75	
MT2(-), G(-) @ I_{GT} = 60mA, T_C = -40°C		-	-	50	
Critical rate of rise of off-state voltage	dv/dt				V/µs
(Rated V_{DRM}, exponential voltage rise, gate open, T_C = 110°C)		-	100	-	

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 CHARACTERISTICS

Case	TO-220AB
Marking	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

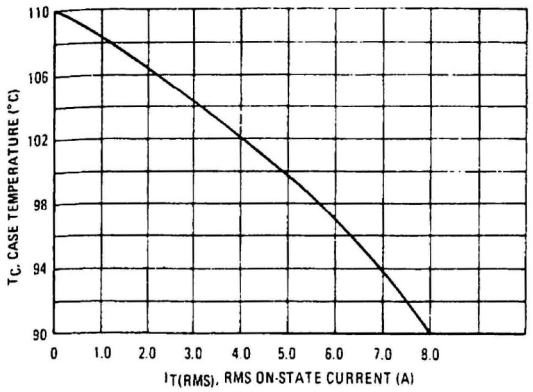

FIGURE 2 – ON-STATE POWER DISSIPATION

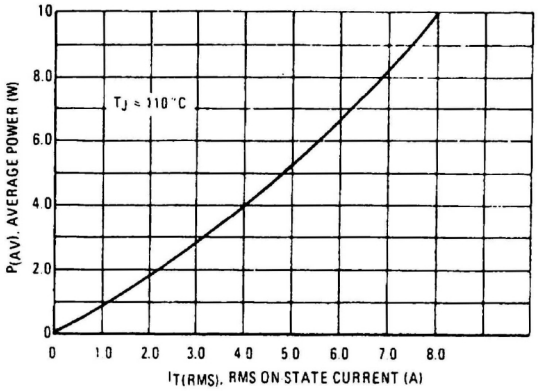

FIGURE 3 – TYPICAL GATE TRIGGER VOLTAGE

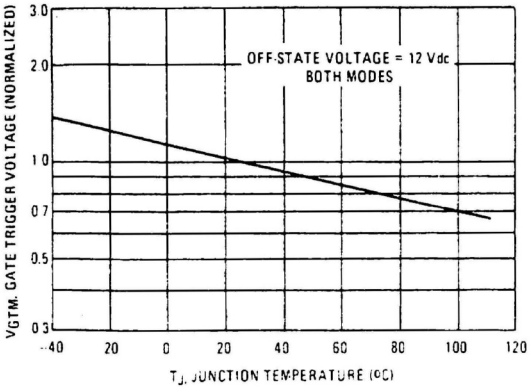

FIGURE 4 – TYPICAL GATE TRIGGER CURRENT

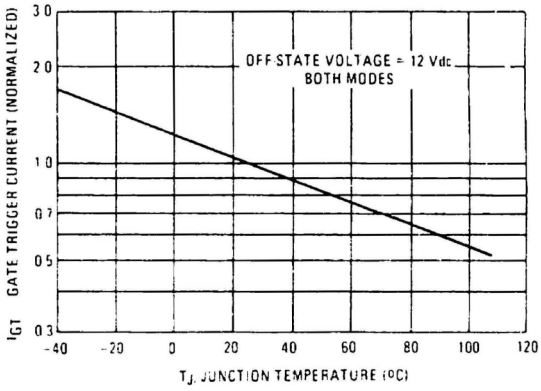

FIGURE 5 – TYPICAL HOLDING CURRENT

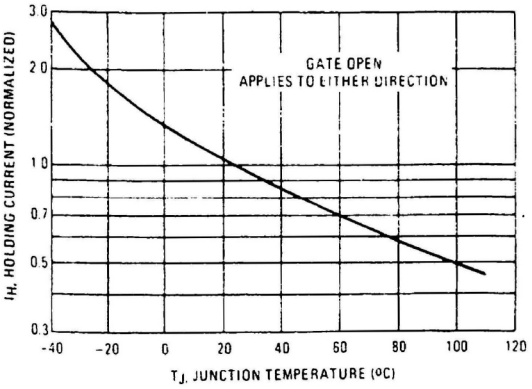

FIGURE 6 – TYPICAL LATCHING CURRENT

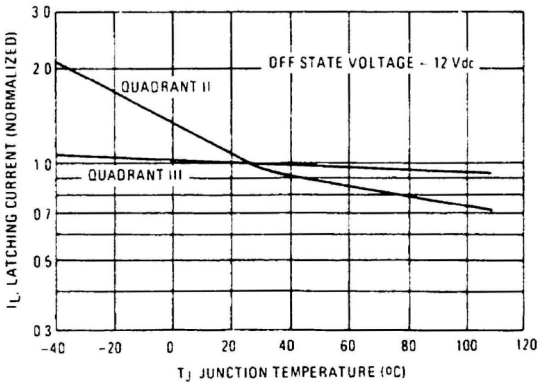

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FIGURE 7 – MAXIMUM ON-STATE CHARACTERISTICS

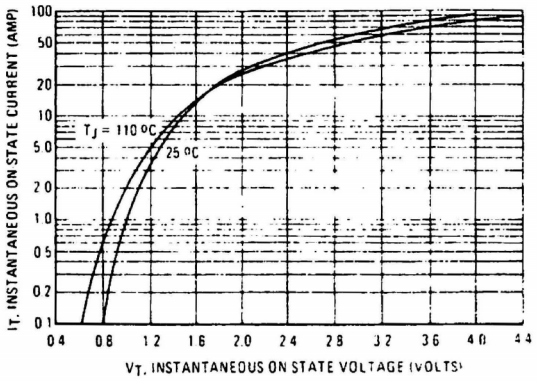

FIGURE 8 – MAXIMUM NON-REPETITIVE SURGE CURRENT

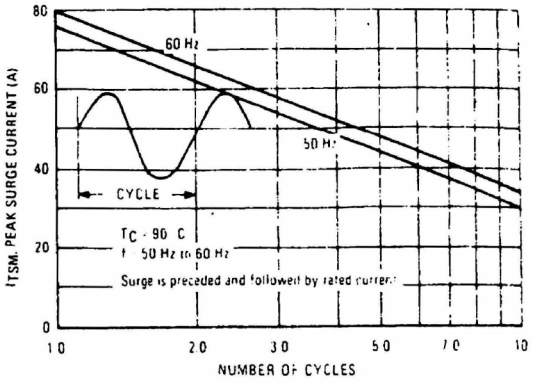

FIGURE 9 – TYPICAL THERMAL RESISTANCE FROM MOUNTING BASE TO HEATSINK

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