

# DIGITRON SEMICONDUCTORS

## BT162 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
<b>Peak repetitive off-state voltage</b> ( $T_J = -40$ to $110^\circ\text{C}$ , half sine wave, 50 to 60Hz, gate open) BT162-400 BT162-600	$V_{DRM}$	400 600	Volts
<b>Non-repetitive peak off-state voltage</b> ( $T_J = -40$ to $+110^\circ\text{C}$ , $t \leq 10\text{ms}$ , gate open) BT162-400 BT162-600	$V_{DSM}$	500 700	Volts
<b>RMS on-state current</b> (full cycle sine wave 50 to 60Hz) ( $T_C = 80^\circ\text{C}$ ) ( $T_C = 95^\circ\text{C}$ )	$I_{T(RMS)}$	12.0 6.0	Amps
<b>Peak surge current</b> (1 cycle, $T_C = 80^\circ\text{C}$ , preceded and followed by rated current) 60Hz 50Hz	$I_{TSM}$	120 110	Amps
<b>Rate of rise of on-state current</b> (gate open, non-repetitive)	$di_T/dt$	10	A/ $\mu\text{s}$
<b>Circuit fusing considerations</b> ( $T_J = -40$ to $110^\circ\text{C}$ , $t = 1.0$ to $10\text{ms}$ )	$I^2t$	40	A <sup>2</sup> s
<b>Peak gate voltage</b>	$V_{GM}$	10	Volts
<b>Peak gate current</b>	$I_{GM}$	2.0	Amps
<b>Peak gate power</b> ( $T_C = 80^\circ\text{C}$ , pulse width = $2.0\mu\text{s}$ )	$P_{GM}$	20	Watts
<b>Average gate power</b> ( $T_C = 80^\circ\text{C}$ , $t = 10\text{ms}$ )	$P_{G(AV)}$	0.5	Watts
<b>Operating junction temperature range</b>	$T_J$	-40 to +110	$^\circ\text{C}$
<b>Storage temperature range</b>	$T_{stg}$	-40 to +150	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
<b>Thermal resistance, junction to case</b>	$R_{\theta JC}$	2.0	$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min	Typ.	Max	Unit
<b>Peak blocking current</b> (either direction) (Rated $V_{DRM}$ @ $T_J = 110^\circ\text{C}$ , gate open)	$I_{DRM}$	-	-	2.0	mA
<b>Peak on-state voltage</b> (either direction) ( $I_{TM} = 17\text{A}$ peak, pulse width = 1 to 2ms, duty cycle $\leq 2\%$ )	$V_{TM}$	-	1.3	1.75	Volts
<b>Gate trigger current</b> (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(-), $T_C = -40^\circ\text{C}$	$I_{GT}$	-	25 20	40 40 75	mA
<b>Gate trigger voltage</b> (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(-)	$V_{GT}$	-	0.9 1.1	1.5 1.5 2.0	Volts
		0.2	-	-	

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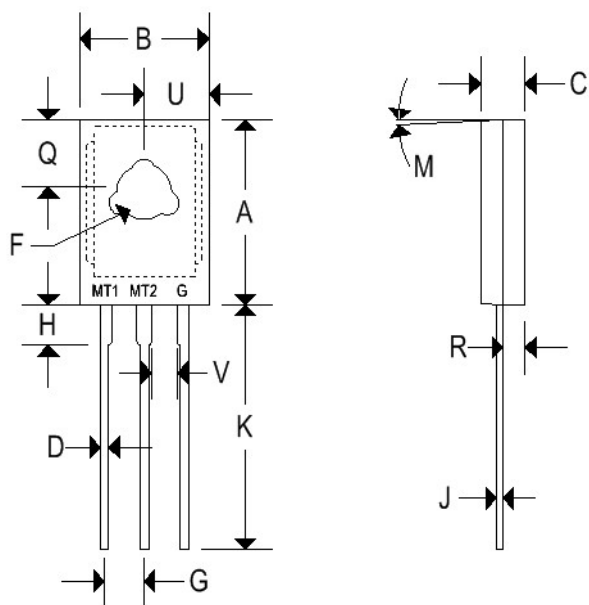
## SILICON BIDIRECTIONAL THYRISTORS

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

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

<b>Case</b>	TO-220AB
<b>Marking</b>	Body painted, alpha-numeric
<b>Pin out</b>	See below



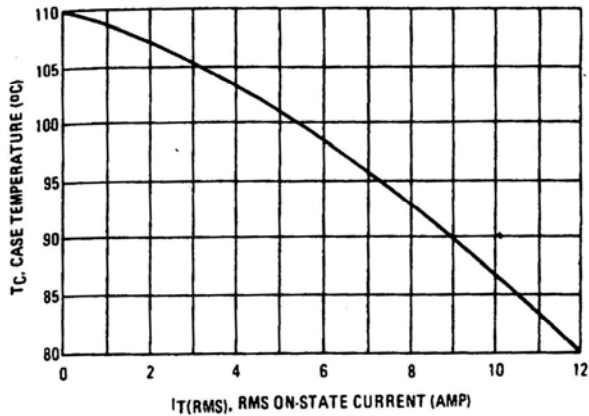
	TO-220AB			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.575	0.620	14.600	15.750
B	0.380	0.405	9.650	10.290
C	0.160	0.190	4.060	4.820
D	0.025	0.035	0.640	0.890
F	0.142	0.147	3.610	3.730
G	0.095	0.105	2.410	2.670
H	0.110	0.155	2.790	3.930
J	0.014	0.022	0.360	0.560
K	0.500	0.562	12.700	14.270
L	0.045	0.055	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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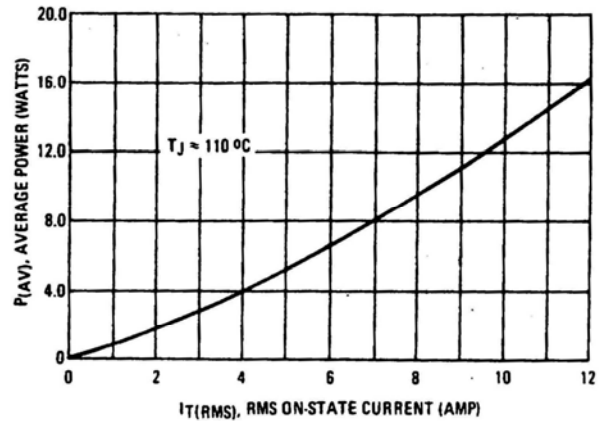
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### SILICON BIDIRECTIONAL THYRISTORS

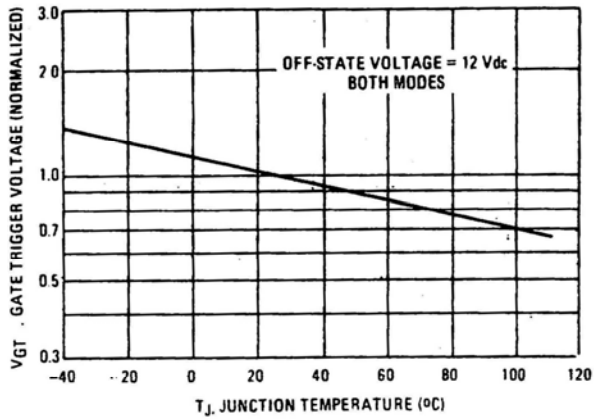
**FIGURE 1 – RMS CURRENT DERATING**



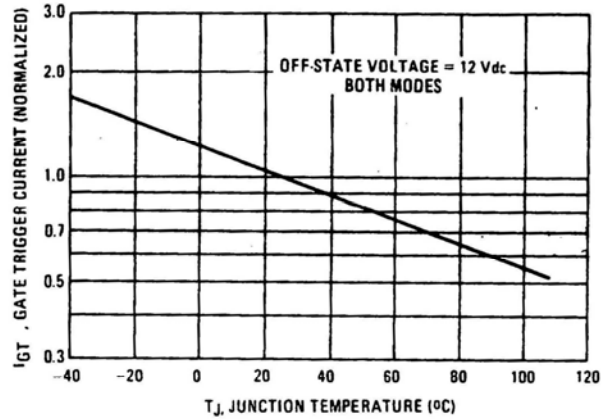
**FIGURE 2 – ON-STATE POWER DISSIPATION**



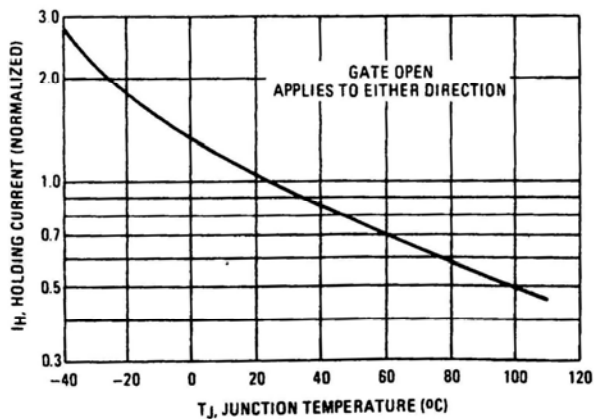
**FIGURE 3 – TYPICAL GATE TRIGGER VOLTAGE**



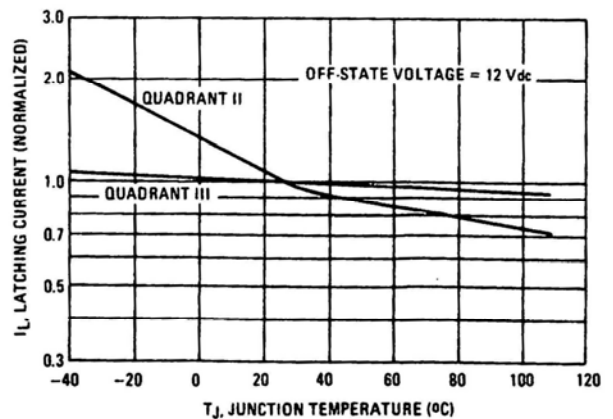
**FIGURE 4 – TYPICAL GATE TRIGGER CURRENT**



**FIGURE 5 – TYPICAL HOLDING CURRENT**



**FIGURE 6 – TYPICAL LATCHING CURRENT**



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FIGURE 7 – MAXIMUM ON-STATE CHARACTERISTICS

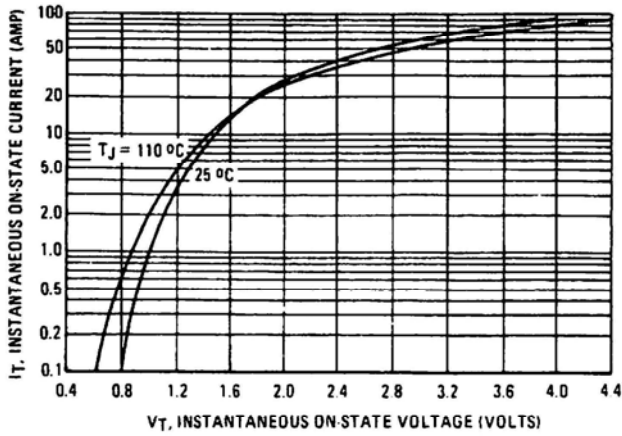


FIGURE 8 – MAXIMUM NON-REPETITIVE SURGE CURRENT

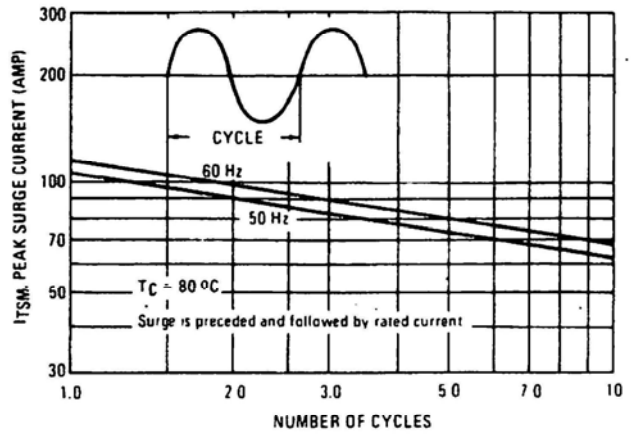


FIGURE 9 – TYPICAL THERMAL RESISTANCE FROM MOUNTING BASE TO HEATSINK

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 with the kit MK221-2. The recommended mounting torque is 8 Kg. cm.

FIGURE 10 – THERMAL RESPONSE

