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MITSUBISHI SEMICONDUCTOR (THYRISTOR)

# CR20F

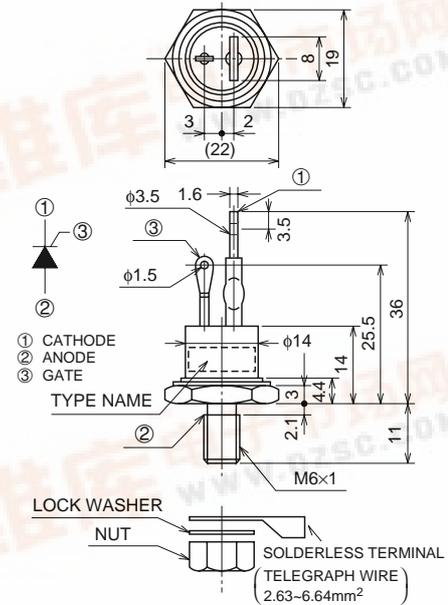
MEDIUM POWER USE  
NON-INSULATED TYPE, GLASS PASSIVATION TYPE



- $I_T$  (AV) ..... **20A**
- $V_{DRM}$  ..... **400V/600V/800V/1000V/1200V**
- $I_{GT}$  ..... **50mA**

## OUTLINE DRAWING

Dimensions in mm



## APPLICATION

DC motor control, electric furnace control, static switches, DC supply

## MAXIMUM RATINGS

Symbol	Parameter	Voltage class					Unit
		8	12	16	20	24	
VRRM	Repetitive peak reverse voltage	400	600	800	1000	1200	V
VRSM	Non-repetitive peak reverse voltage	480	720	960	1200	1350	V
VR (DC)	DC reverse voltage	320	480	640	800	960	V
VDRM	Repetitive peak off-state voltage	400	600	800	1000	1200	V
VDSM	Non-repetitive peak off-state voltage	480	720	980	1000	1200	V
VD (DC)	DC off-state voltage	320	480	640	800	960	V

Symbol	Parameter	Conditions	Ratings	Unit
$I_T$ (RMS)	RMS on-state current		31.5	A
$I_T$ (AV)	Average on-state current	Commercial frequency, sine half wave, 180° conduction, $T_c=86^\circ\text{C}$	20	A
$I_{TSM}$	Surge on-state current	60Hz sine half wave 1 full cycle, peak value, non-repetitive	300	A
$I_t^2$	$I_t^2$ for fusing	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current	380	A <sup>2</sup> s
di/dt	Critical rate of rise of on-state current	$V_D=1/2V_{DRM}$ , $I_{TM}=60\text{A}$ , $I_G=0.1\text{A}$ , $T_j=25^\circ\text{C}$ , $f=60\text{Hz}$	100	A/ $\mu\text{s}$
PGM	Peak gate power dissipation		5.0	W
PG (AV)	Average gate power dissipation		0.5	W
VFGM	Peak gate forward voltage		10	V
VRGM	Peak gate reverse voltage		5	V
IFGM	Peak gate forward current		2	A
$T_j$	Junction temperature		-30 ~ +125	°C
$T_{stg}$	Storage temperature		-30 ~ +125	°C
—	Mounting torque		30	kg·cm
—	Weight	Typical value	2.94	N·m
—	Weight	Typical value	20	g



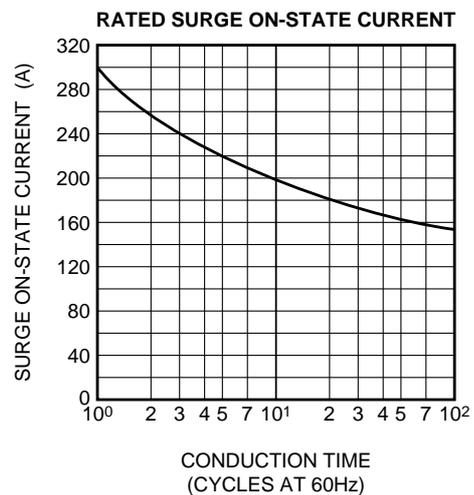
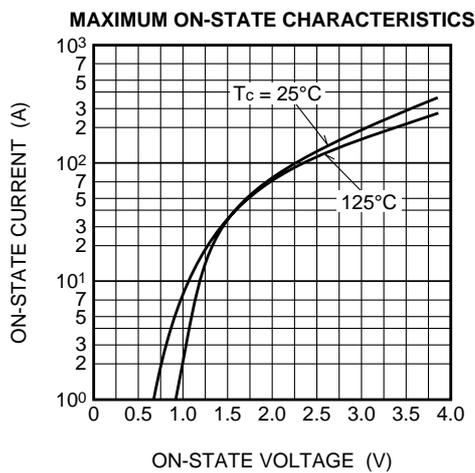
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## ELECTRICAL CHARACTERISTICS

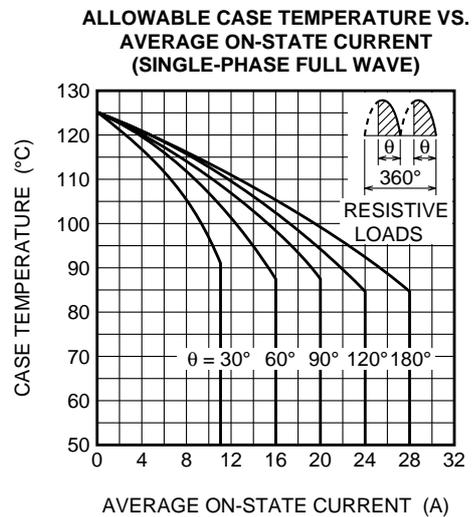
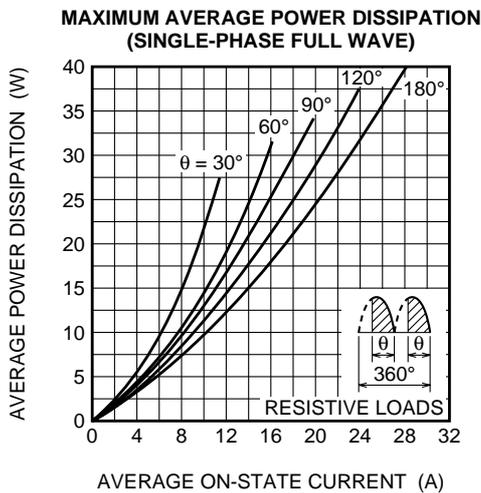
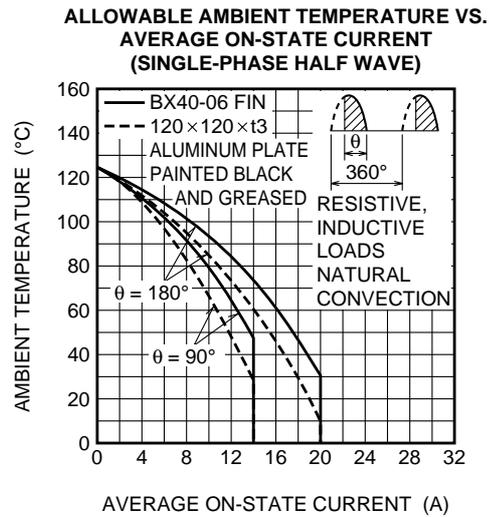
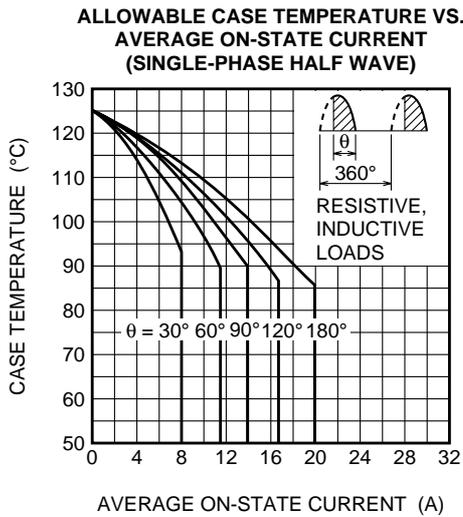
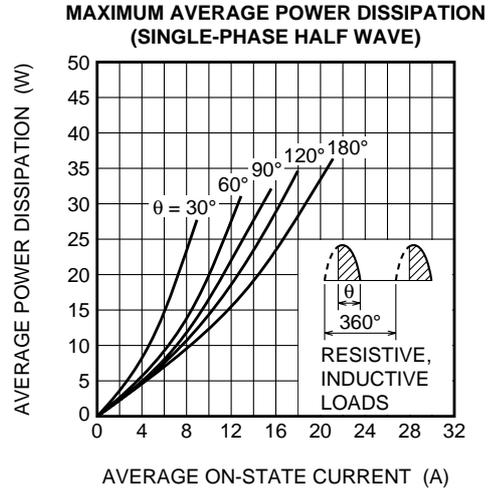
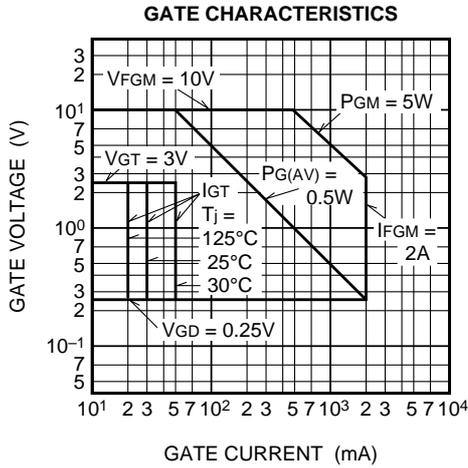
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I <sub>RRM</sub>	Repetitive peak reverse current	T <sub>j</sub> =125°C, V <sub>RRM</sub> applied	—	—	4.0	mA
I <sub>DRM</sub>	Repetitive peak off-state current	T <sub>j</sub> =125°C, V <sub>DRM</sub> applied	—	—	4.0	mA
V <sub>TM</sub>	On-state voltage	T <sub>c</sub> =25°C, I <sub>TM</sub> =60A, Instantaneous value	—	—	1.8	V
dv/dt	Critical-rate of rise of off-state voltage	T <sub>j</sub> =125°C, V <sub>D</sub> =2/3V <sub>DRM</sub>	50	—	—	V
V <sub>GT</sub>	Gate trigger voltage	T <sub>j</sub> =25°C, V <sub>D</sub> =6V, I <sub>T</sub> =0.5A	—	—	3.0	V
V <sub>GD</sub>	Gate non-trigger voltage	T <sub>j</sub> =125°C, V <sub>D</sub> =1/2V <sub>DRM</sub>	0.25	—	—	V
I <sub>GT</sub>	Gate trigger current	T <sub>j</sub> =25°C, V <sub>D</sub> =6V, I <sub>T</sub> =0.5A	—	—	50	mA
t <sub>gt</sub>	Turn-on time	T <sub>c</sub> =25°C, V <sub>D</sub> =100V, I <sub>T</sub> =15A, I <sub>G</sub> =0.1A	—	—	10	μs
R <sub>th(j-c)</sub>	Thermal resistance	Junction to case	—	—	1.0	°C/W
R <sub>th(c-f)</sub>	Contact thermal resistance	Case to fin	—	—	0.4	°C/W

## PERFORMANCE CURVES



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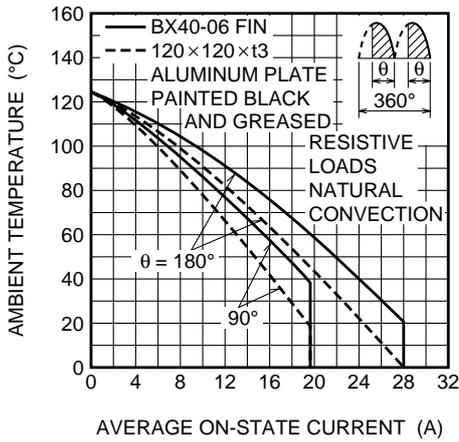
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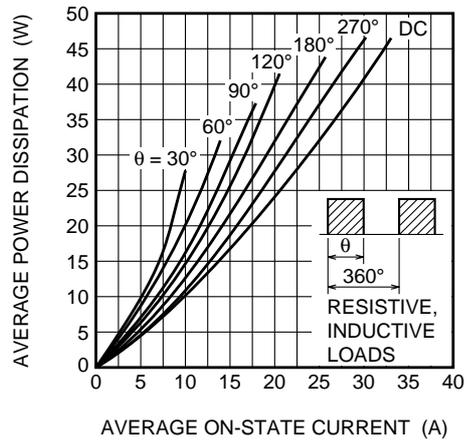
**CR20F**

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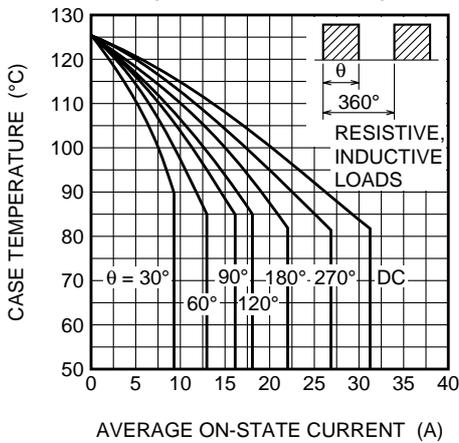
**ALLOWABLE AMBIENT TEMPERATURE VS. AVERAGE ON-STATE CURRENT (SINGLE-PHASE FULL WAVE)**



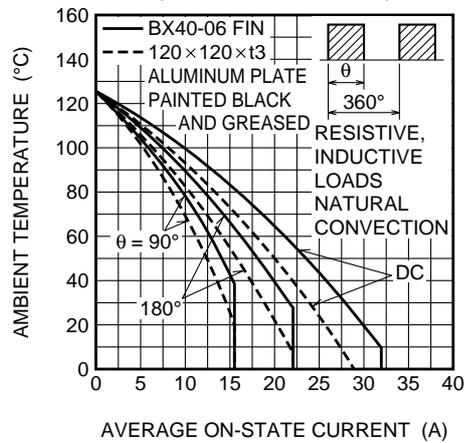
**MAXIMUM AVERAGE POWER DISSIPATION (RECTANGULAR WAVE)**



**ALLOWABLE CASE TEMPERATURE VS. AVERAGE ON-STATE CURRENT (RECTANGULAR WAVE)**



**ALLOWABLE AMBIENT TEMPERATURE VS. AVERAGE ON-STATE CURRENT (RECTANGULAR WAVE)**



**CR20F BLOCK FIN BX40-06 OUTLINE DRAWING (Unit: mm)**

