# CR20F

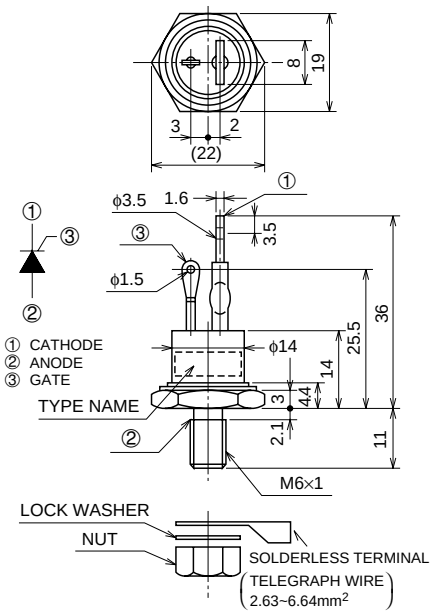
**MEDIUM POWER USE**

**NON-INSULATED TYPE, GLASS PASSIVATION TYPE**

**CR20F**


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

**OUTLINE DRAWING** Dimensions in mm




Note: Mica washer and spacer are provided only upon request.

## APPLICATION

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

## MAXIMUM RATINGS

| Symbol | Parameter | Voltage class | | | | | Unit |
|---|---|---|---|---|---|---|---|
| | | 8 | 12 | 16 | 20 | 24 | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 400 | 600 | 800 | 1000 | 1200 | V |
| $V_{RSM}$ | Non-repetitive peak reverse voltage | 480 | 720 | 960 | 1200 | 1350 | V |
| $V_{R\,(DC)}$ | DC reverse voltage | 320 | 480 | 640 | 800 | 960 | V |
| $V_{DRM}$ | Repetitive peak off-state voltage | 400 | 600 | 800 | 1000 | 1200 | V |
| $V_{DSM}$ | Non-repetitive peak off-state voltage | 480 | 720 | 980 | 1000 | 1200 | V |
| $V_{D\,(DC)}$ | 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°C | 20 | A |
| $I_{TSM}$ | Surge on-state current | 60Hz sine half wave 1 full cycle, peak value, non-repetitive | 300 | A |
| $I^2t$ | $I^2t$ for fusing | Value corresponding to 1 cycle of half wave 60Hz, surge on-state current | 380 | $A^2s$ |
| di/dt | Critical rate of rise of on-state current | $V_D$=1/2$V_{DRM}$, $I_{TM}$=60A, $I_G$=0.1A. $T_j$=25°C, f=60Hz | 100 | A/µs |
| $P_{GM}$ | Peak gate power dissipation | | 5.0 | W |
| $P_{G\,(AV)}$ | Average gate power dissipation | | 0.5 | W |
| $V_{FGM}$ | Peak gate forward voltage | | 10 | V |
| $V_{RGM}$ | Peak gate reverse voltage | | 5 | V |
| $I_{FGM}$ | 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 |
| | | | 2.94 | N·m |
| — | Weight | Typical value | 20 | g |



MITSUBISHI ELECTRIC

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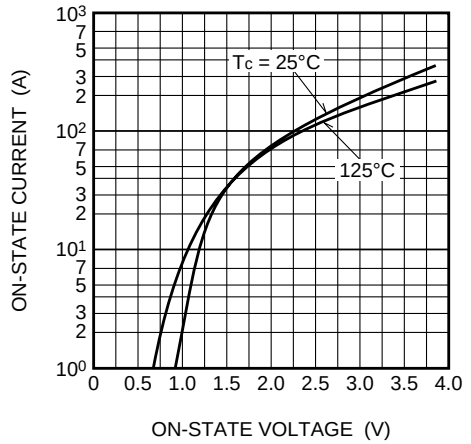
## ELECTRICAL CHARACTERISTICS

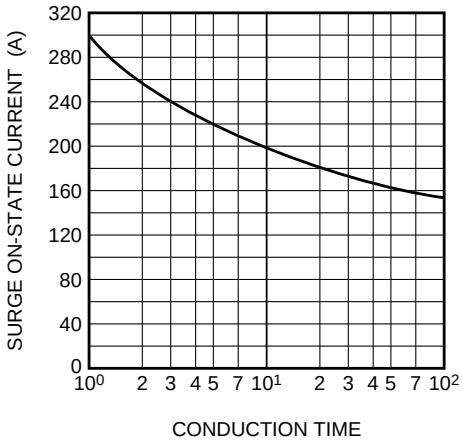
| Symbol | Parameter | Test conditions | Limits | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $I_{RRM}$ | Repetitive peak reverse current | $T_j$=125°C, $V_{RRM}$ applied | — | — | 4.0 | mA |
| $I_{DRM}$ | Repetitive peak off-state current | $T_j$=125°C, $V_{DRM}$ applied | — | — | 4.0 | mA |
| $V_{TM}$ | On-state voltage | $T_C$=25°C, $I_{TM}$=60A, Instantaneous value | — | — | 1.8 | V |
| dv/dt | Critical-rate of rise of off-state voltage | $T_j$=125°C, $V_D$=2/3$V_{DRM}$ | 50 | — | — | V |
| $V_{GT}$ | Gate trigger voltage | $T_j$=25°C, $V_D$=6V, $I_T$=0.5A | — | — | 3.0 | V |
| $V_{GD}$ | Gate non-trigger voltage | $T_j$=125°C, $V_D$=1/2$V_{DRM}$ | 0.25 | — | — | V |
| $I_{GT}$ | Gate trigger current | $T_j$=25°C, $V_D$=6V, $I_T$=0.5A | — | — | 50 | mA |
| $t_{gt}$ | Turn-on time | $T_C$=25°C, $V_D$=100V, $I_T$=15A, $I_G$=0.1A | — | — | 10 | µs |
| $R_{th\ (j-c)}$ | Thermal resistance | Junction to case | — | — | 1.0 | °C/W |
| $R_{th\ (c-f)}$ | Contact thermal resistance | Case to fin | — | — | 0.4 | °C/W |

## PERFORMANCE CURVES

**MAXIMUM ON-STATE CHARACTERISTICS**




**RATED SURGE ON-STATE CURRENT**



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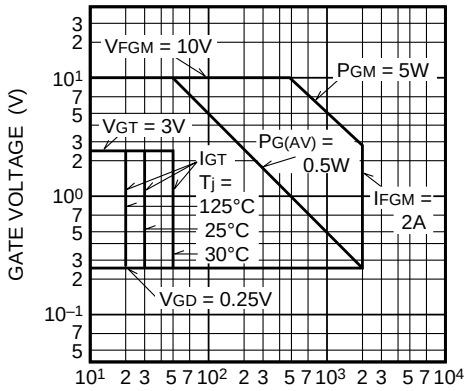
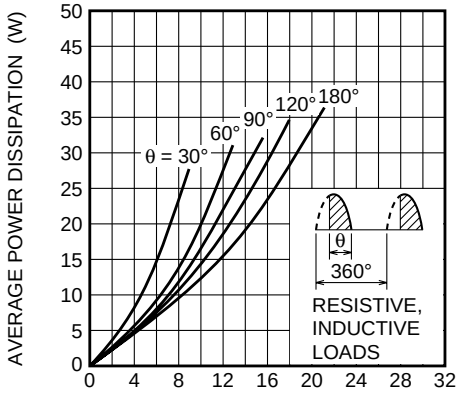
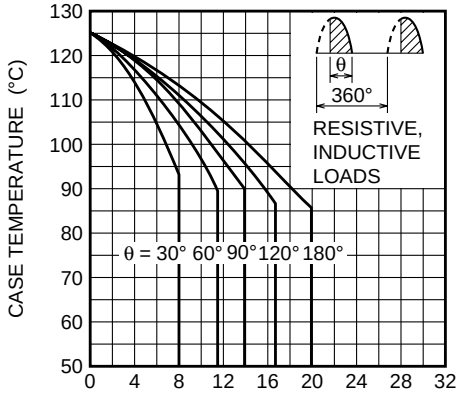
**GATE CHARACTERISTICS**



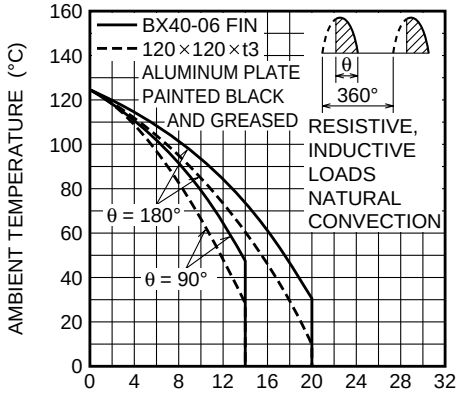

**MAXIMUM AVERAGE POWER DISSIPATION (SINGLE-PHASE HALF WAVE)**



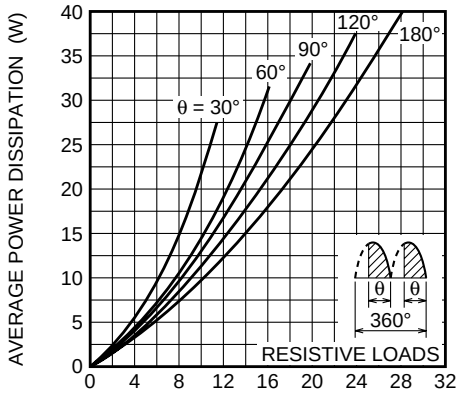

**ALLOWABLE CASE TEMPERATURE VS. AVERAGE ON-STATE CURRENT (SINGLE-PHASE HALF WAVE)**



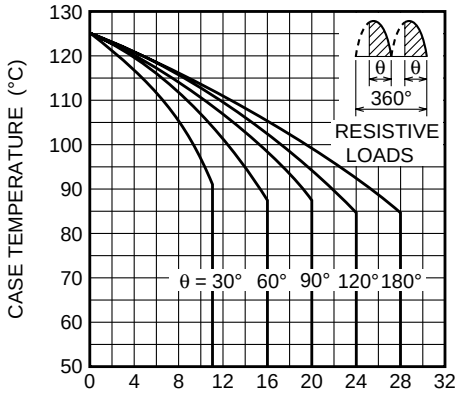

**ALLOWABLE AMBIENT TEMPERATURE VS. AVERAGE ON-STATE CURRENT (SINGLE-PHASE HALF WAVE)**




**MAXIMUM AVERAGE POWER DISSIPATION (SINGLE-PHASE FULL WAVE)**




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



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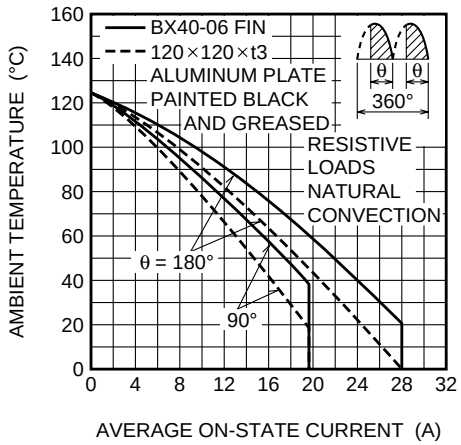
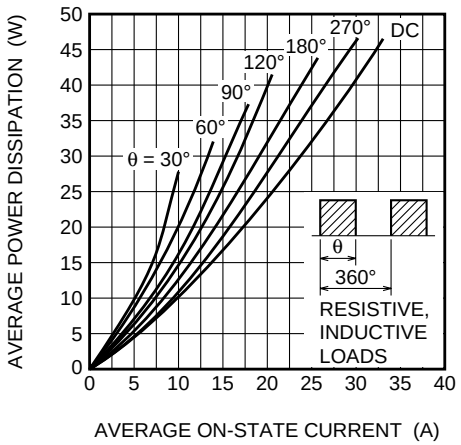
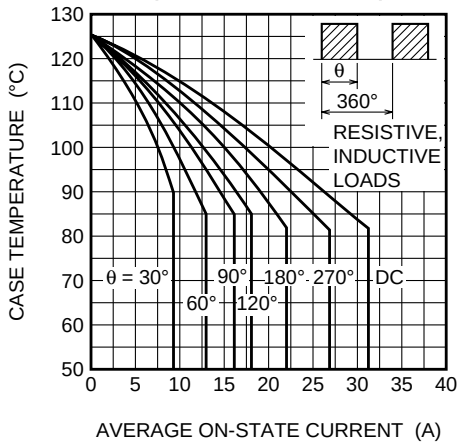
**ALLOWABLE AMBIENT TEMPERATURE VS. AVERAGE ON-STATE CURRENT (SINGLE-PHASE FULL WAVE)**



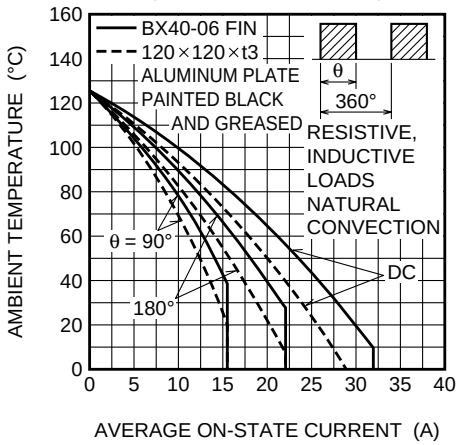

**MAXIMUM AVERAGE POWER DISSIPATION (RECTANGULAR WAVE)**



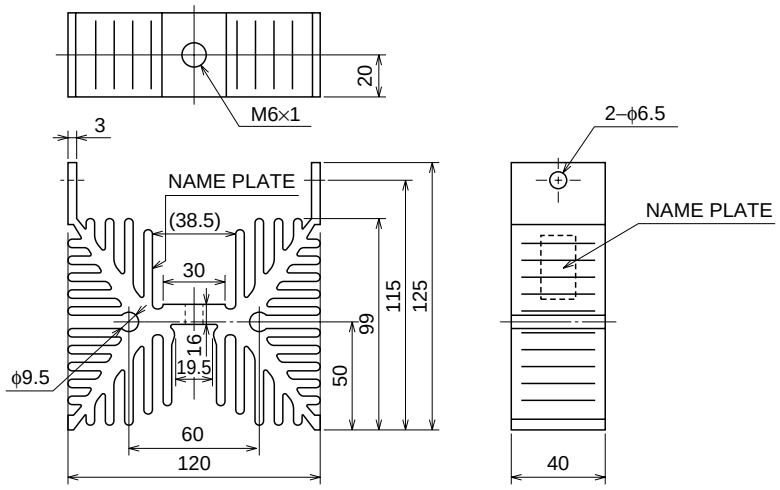

**ALLOWABLE CASE TEMPERATURE VS. AVERAGE ON-STATE CURRENT (RECTANGULAR WAVE)**




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




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



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