

# FG1000BV-90DA

HIGH POWER INVERTER USE  
PRESS PACK TYPE

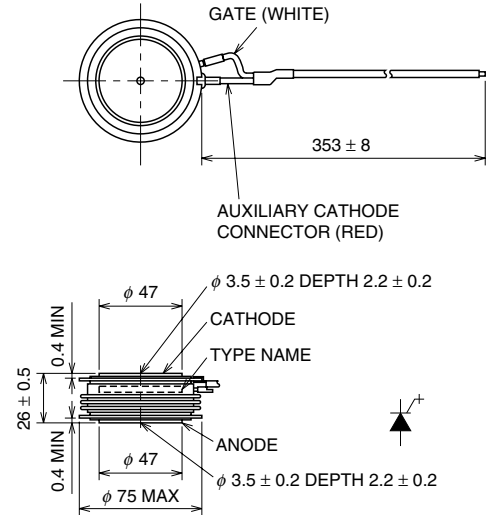
## FG1000BV-90DA



- ITQRM Repetitive controllable on-state current ..... 1000A
- IT(AV) Average on-state current ..... 400A
- VDRM Repetitive peak off-state voltage ..... 4500V
- Anode short type

## OUTLINE DRAWING

Dimensions in mm



## APPLICATION

Inverters, D.C. choppers, Induction heaters, D.C. to D.C. converters.

## MAXIMUM RATINGS

| Symbol | Parameter                              | Voltage class |  | Unit |
|--------|--|---------------|--|------|
|        |  | 90DA          |  |      |
| VRRM   | Repetitive peak reverse voltage        | 17            |  | V    |
| VRSM   | Non-repetitive peak reverse voltage    | 17            |  | V    |
| VR(DC) | DC reverse voltage                     | 17            |  | V    |
| VDRM   | Repetitive peak off-state voltage*     | 4500          |  | V    |
| VDSM   | Non-repetitive peak off-state voltage* | 4500          |  | V    |
| VD(DC) | DC off-state voltage*                  | 3600          |  | V    |

\* : V<sub>GK</sub> = -2V

| Symbol                      | Parameter                                 | Conditions  | Ratings               | Unit             |
|-----------------------------|---|---|-----------------------|------------------|
| ITQRM                       | Repetitive controllable on-state current  | V <sub>D</sub> = 2250V, V <sub>DM</sub> = 3375V, T <sub>j</sub> = 125°C, C <sub>s</sub> = 0.7μF, L <sub>s</sub> = 0.3μH | 1000                  | A                |
| IT(RMS)                     | RMS on-state current                      |   | 630                   | A                |
| IT(AV)                      | Average on-state current                  | f = 60Hz, sine wave θ = 180°, T <sub>r</sub> = 70°C   | 400                   | A                |
| ITSM                        | Surge (non-repetitive) on-state current   | One half cycle at 60Hz  | 8.4                   | kA               |
| I <sup>2</sup> <sub>t</sub> | Current-squared, time integration         | One cycle at 60Hz   | 2.9 × 10 <sup>5</sup> | A <sup>2</sup> s |
| diT/dt                      | Critical rate of rise of on-state current | V <sub>D</sub> = 2250V, I <sub>GM</sub> = 20A, T <sub>j</sub> = 125°C   | 1000                  | A/μs             |
| VFGM                        | Peak forward gate voltage                 |   | 10                    | V                |
| VRGM                        | Peak reverse gate voltage                 |   | 17                    | V                |
| IFGM                        | Peak forward gate current                 |   | 60                    | A                |
| IRGM                        | Peak reverse gate current                 |   | 500                   | A                |
| PFGM                        | Peak forward gate power dissipation       |   | 240                   | W                |
| PRGM                        | Peak reverse gate power dissipation       |   | 15                    | kW               |
| PFG(AV)                     | Average forward gate power dissipation    |   | 45                    | W                |
| PRG(AV)                     | Average reverse gate power dissipation    |   | 100                   | W                |
| T <sub>j</sub>              | Junction temperature                      |   | -40 ~ +125            | °C               |
| T <sub>stg</sub>            | Storage temperature                       |   | -40 ~ +150            | °C               |
| —                           | Mounting force required                   | Recommended value 13  | 12 ~ 15               | kN               |
| —                           | Weight                                    | Standard value  | 530                   | g                |

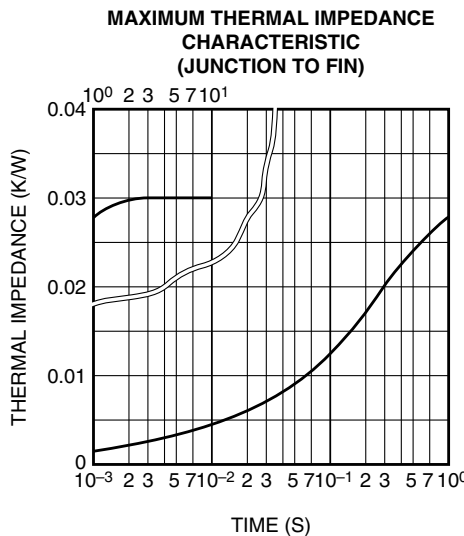
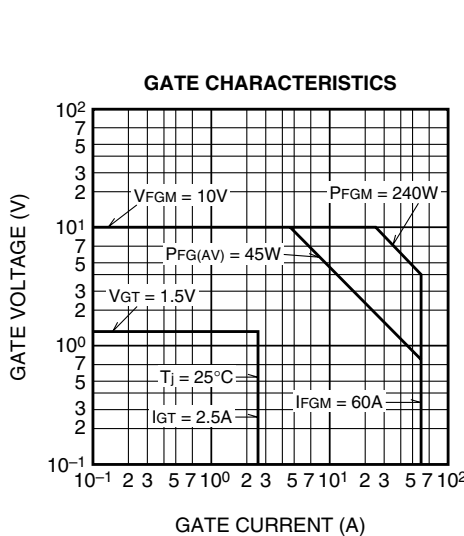
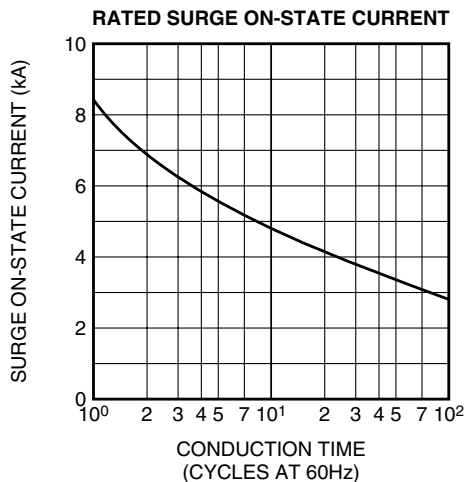
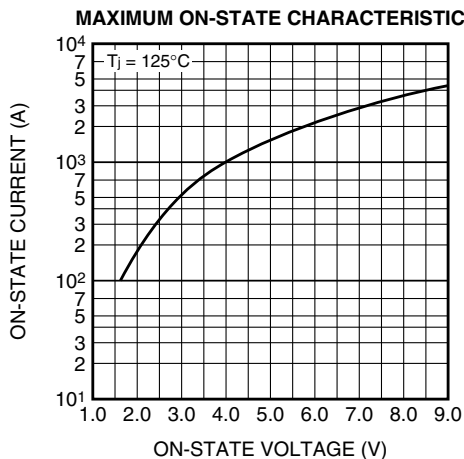
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## ELECTRICAL CHARACTERISTICS

| Symbol               | Parameter                                  | Test conditions  | Limits |     |      | Unit |
|----------------------|--|--|--------|-----|------|------|
|                      |  |  | Min    | Typ | Max  |      |
| V <sub>TM</sub>      | On-state voltage                           | T <sub>j</sub> = 125°C, I <sub>TM</sub> = 1000A, Instantaneous measurement   | —      | —   | 4.0  | V    |
| I <sub>RRM</sub>     | Repetitive peak reverse current            | T <sub>j</sub> = 125°C, V <sub>RRM</sub> Applied   | —      | —   | 100  | mA   |
| I <sub>DRM</sub>     | Repetitive peak off-state current          | T <sub>j</sub> = 125°C, V <sub>DRM</sub> Applied, V <sub>GK</sub> = -2V  | —      | —   | 100  | mA   |
| I <sub>RG</sub>      | Reverse gate current                       | T <sub>j</sub> = 125°C, V <sub>RG</sub> = 17V  | —      | —   | 100  | mA   |
| dv/dt                | Critical rate of rise of off-state voltage | T <sub>j</sub> = 125°C, V <sub>D</sub> = 2250V, V <sub>GK</sub> = -2V  | 1000   | —   | —    | V/μs |
| t <sub>gt</sub>      | Turn-on time                               | T <sub>j</sub> = 125°C, I <sub>TM</sub> = 1000A, I <sub>GM</sub> = 20A, V <sub>D</sub> = 2250V   | —      | —   | 10   | μs   |
| t <sub>gq</sub>      | Turn-off time                              | T <sub>j</sub> = 125°C, I <sub>TM</sub> = 1000A, V <sub>D</sub> = 2250V, di <sub>GQ</sub> /dt = -30A/μs<br>V <sub>RG</sub> = 17V, C <sub>S</sub> = 0.7μF, L <sub>S</sub> = 0.3μH | —      | —   | 20   | μs   |
| I <sub>GQM</sub>     | Peak gate turn-off current                 |  | —      | 380 | —    | A    |
| V <sub>GT</sub>      | Gate trigger voltage                       | DC METHOD : V <sub>D</sub> = 24V, R <sub>L</sub> = 0.1Ω, T <sub>j</sub> = 25°C   | —      | —   | 1.5  | V    |
| I <sub>GT</sub>      | Gate trigger current                       |  | —      | —   | 2.5  | A    |
| R <sub>th(j-f)</sub> | Thermal resistance                         | Junction to fin  | —      | —   | 0.03 | K/W  |

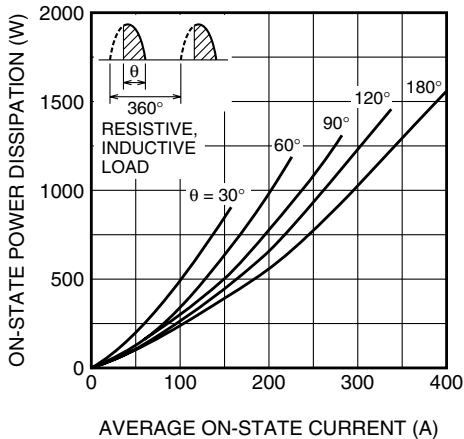
## PERFORMANCE CURVES



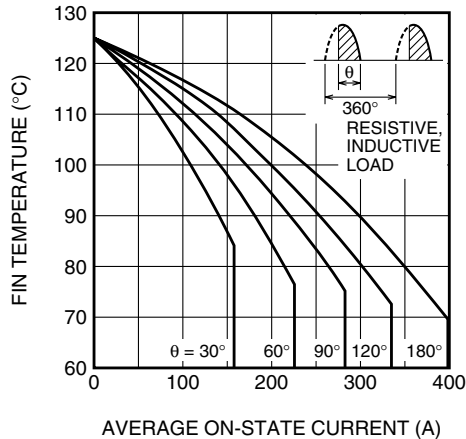
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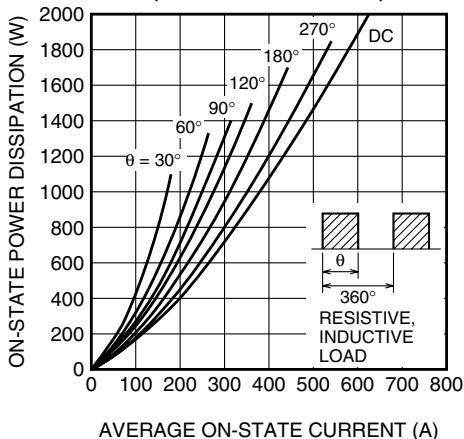
**MAXIMUM ON-STATE POWER DISSIPATION CHARACTERISTICS (SINGLE-PHASE HALF WAVE)**



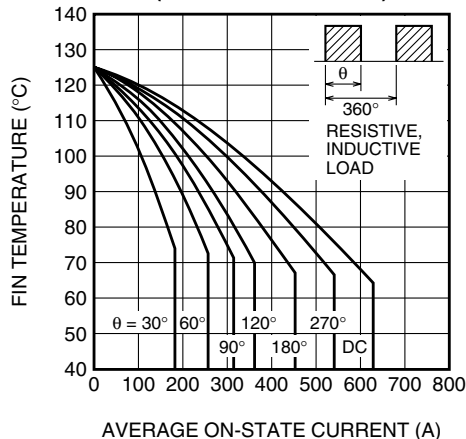
**ALLOWABLE FIN TEMPERATURE VS. AVERAGE ON-STATE CURRENT (SINGLE-PHASE HALF WAVE)**



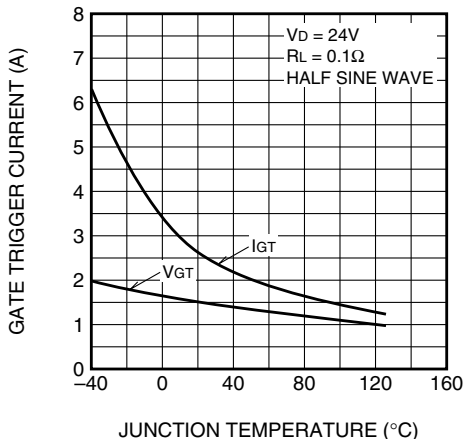
**MAXIMUM ON-STATE POWER DISSIPATION CHARACTERISTICS (RECTANGULAR WAVE)**



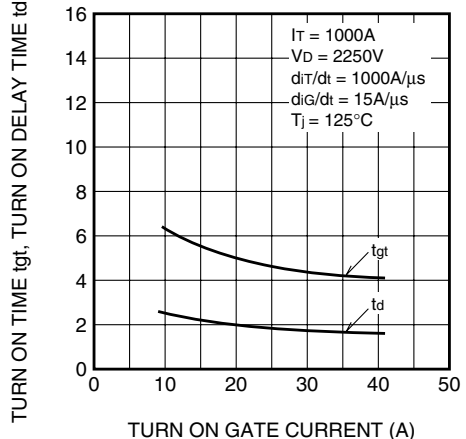
**ALLOWABLE FIN TEMPERATURE VS. AVERAGE ON-STATE CURRENT (RECTANGULAR WAVE)**



**GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE (TYPICAL)**



**TURN ON TIME, TURN ON DELAY TIME VS. TURN ON GATE CURRENT (TYPICAL)**



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