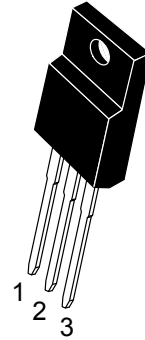




TO-220F



Features

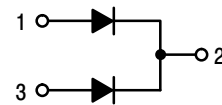
- Metal silicon junction, majority carrier conduction
- Plastic material used carries Underwriters Laboratory Classifications 94V-0
- High surge capability
- Low power loss, high efficiency
- High current capability, low forward voltage drop
- For use in low voltage, high frequency inverters, free wheeling, and polarity protection applications
- Guardring for overvoltage protection
- High temperature soldering guaranteed: 260°C/10 seconds, at terminals
- Green compound with suffix "G" on packing code & prefix "G" on datecode.

Mechanical Data

- Case:TO-220F molded plastic body
- Polarity: As marked
- Terminals: Pure tin plated, lead free. solderable per MIL-STD-750, Method 2026
- Mounting position: Any
- Weight: 1.7grams
- Mounting torque: 5 in. - lbs. max

Maximum Ratings and Electrical Characteristics

Rating at 25 °C ambient temperature unless otherwise specified.  
Single phase, half wave, 60 Hz, resistive or inductive load.  
For capacitive load, derate current by 20%



Marking Diagram



- Y = Year
- A = Assembly Location
- WW = Work Week
- V =Versio
- MBRF20XX = Specific Device Code

| Type Number  | Symbol          | MBRF20100CTG                                 | Unit |
|--|-----------------|--|------|
| Maximum Repetitive Peak Reverse Voltage  | $V_{RRM}$       | 100  | V    |
| Maximum RMS Voltage  | $V_{RMS}$       | 70   | V    |
| Maximum DC Blocking Voltage  | $V_{DC}$        | 100  | V    |
| Maximum Average Forward Rectified Current at $T_c=135^{\circ}C$  | $I_{F(AV)}$     | 20   | A    |
| Peak Repetitive Forward Current (Rated VR, Square Wave, 20KHz) at $T_c=135^{\circ}C$   | $I_{FRM}$       | 20   | A    |
| Peak Forward Surge Current, 8.3 ms Single Half Sine-wave Superimposed on Rated Load (JEDEC method)                           | $I_{FSM}$       | 300  | A    |
| Peak Repetitive Reverse Surge Current (Note 1)   | $I_{RRM}$       | 0.5  | A    |
| Maximum Instantaneous Forward Voltage (Note 2)<br>IF=10A, TA=25°C<br>IF=10A, TA=125°C<br>IF=20A, TA=25°C<br>IF=20A, TA=125°C | $V_F$           | 0.85<br>0.75<br>0.90<br>0.80                 | V    |
| Maximum Reverse Current @ Rated VR<br>$T_A=25^{\circ}C$<br>$T_A=125^{\circ}C$  | $I_R$           | 0.1<br>0.6                                   | mA   |
| Voltage Rate of Change (Rated $V_R$ )  | dV/dt           | 10,000                                       | V/us |
| Typical Junction Capacitance   | $C_j$           | 320  | pF   |
| RMS Isolation Voltage (MBRF Type Only) from Terminals to Heatsink with $t=1.0$ Second, RH ≤ 30%                              | $V_{ISO}$       | 4500(Note 3)<br>3500(Note 4)<br>1500(Note 5) | V    |
| Typical Thermal Resistance Per Leg   | $R_{\theta JC}$ | 2.0  | °C/W |
| Operating Temperature Range  | $T_J$           | - 40 to + 150                                | °C   |
| Storage Temperature Range  | $T_{STG}$       | - 40 to + 150                                | °C   |

Note 1: 2.0uS Pulse Width, f=1.0KHz  
 Note 2: Pulse Test : 300uS Pulse Width, 1% Duty Cycle  
 Note 3: Clip Mounting (on case), where lead does not overlap heatsink with 0.11" offset  
 Note 4: Clip Mounting (on case), where lead does not overlap heatsink  
 Note 5: Screw Mounting screw, where diameter is ≤ 4.9mm(0.19")



RATINGS AND CHARACTERISTIC CURVES

FIG. 1 FORWARD CURRENT DERATING CURVE

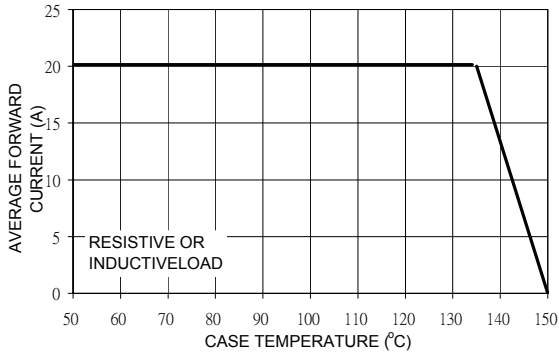


FIG. 2 MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT PER LEG

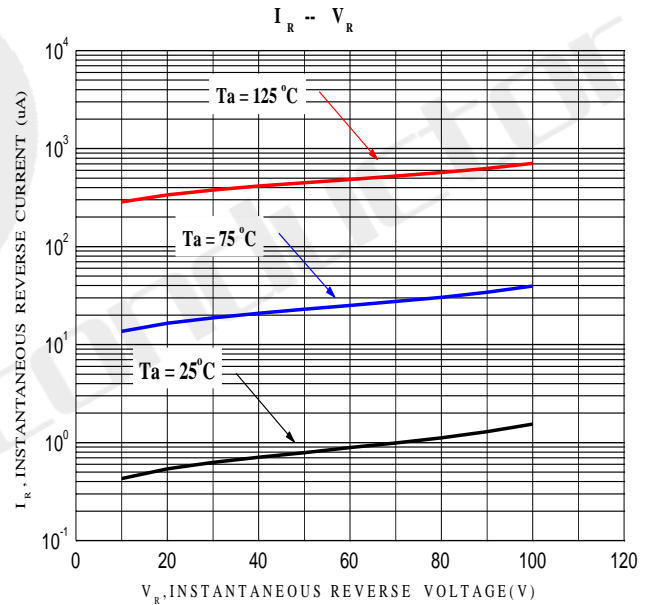
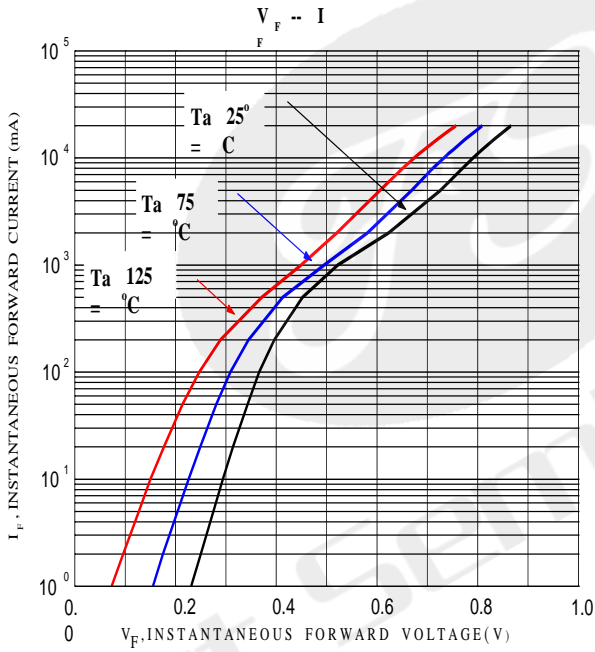
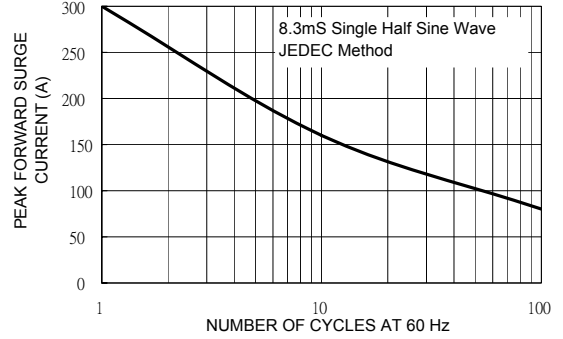


FIG. 5 TYPICAL JUNCTION CAPACITANCE PER LEG

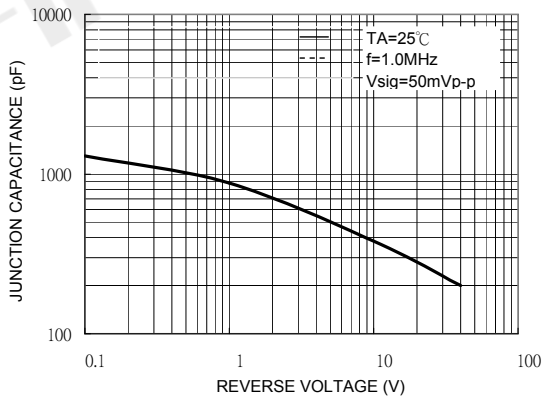
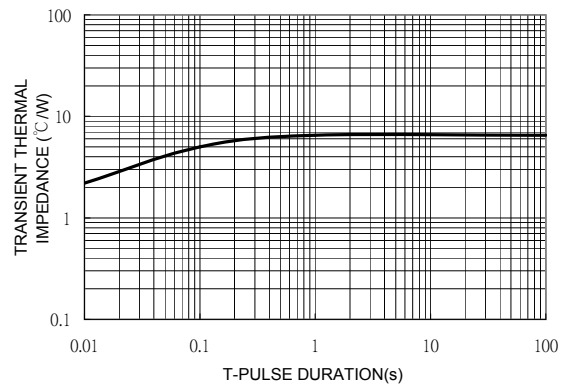


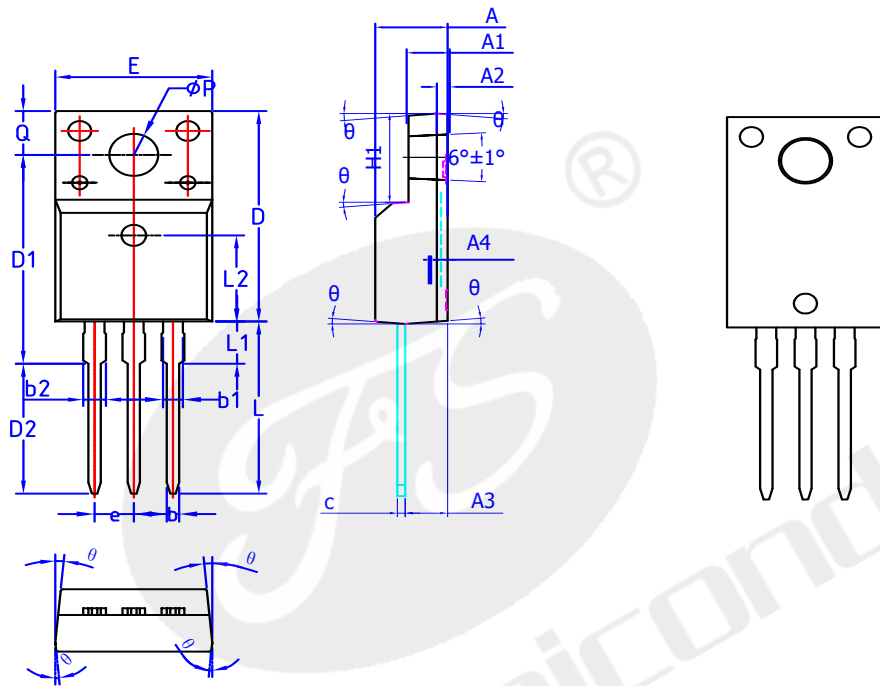
FIG. 6 TYPICAL TRANSIENT THERMAL IMPEDANCE PER LEG





Package Dimensions

TO-220F



COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN      | NOM   | MAX   |
|--------|----------|-------|-------|
| A      | 4.50     | 4.70  | 4.90  |
| A1     | 2.34     | 2.54  | 2.74  |
| A2     | 0.70 REF |       |       |
| A3     | 2.56     | 2.76  | 2.96  |
| b      | 0.70     | 0.80  | 0.90  |
| b1     | 1.17     | 1.2   | 1.25  |
| b2     | 1.17     | 1.2   | 1.25  |
| c      | 0.45     | 0.50  | 0.60  |
| D      | 15.67    | 15.87 | 16.07 |
| D1     | 15.55    | 15.75 | 15.95 |
| D2     | 10.0     | 10.2  | 10.4  |
| E      | 9.96     | 10.16 | 10.36 |
| e      | 2.54BSC  |       |       |
| H1     | 6.48     | 6.68  | 6.88  |
| L      | 12.68    | 12.98 | 13.28 |
| L1     | -        | -     | 3.50  |
| L2     | 6.50REF  |       |       |
| φP     | 3.08     | 3.18  | 3.28  |
| Q      | 3.20     | 3.30  | 3.40  |
| θ 1    | 1°       | 3°    | 5°    |
| A4     | 0.53     | 0.56  | 0.59  |



Declaration

- FIRST reserves the right to change the specifications, the same specifications of products due to different packaging line mold, the size of the appearance will be slightly different, shipped in kind, without notice! Customers should obtain the latest version information before ordering, and verify whether the relevant information is complete and up-to-date.
- Any semiconductor product under certain conditions has the possibility of failure or failure, The buyer has the responsibility to comply with safety standards and take safety measures when using FIRST products for system design and manufacturing, To avoid To avoid potential failure risks, which may cause personal injury or property damage!
- Product promotion endless, our company will wholeheartedly provide customers with better products!

**ATTACHMENT**

Revision History

| Date       | REV | Description     | Page |
|------------|-----|-----------------|------|
| 2018.01.01 | 1.0 | Initial release |      |