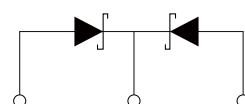
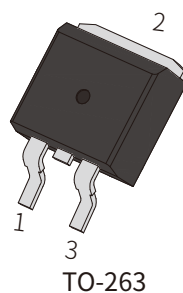


## FEATURES

- Low Power Loss. High efficiency. High Surge capacity
- For Use In Low Voltage, High Frequency Inverters, Free Wheeling, And Polarity Protection Applications
- Metalsilicon junction, majority carrier conduction
- High Current Capability. Low Forward Voltage Drop
- Guard Ring For Over Voltage Protection
- Meet AEC-Q101 Requirements



Schematic Symbol

## APPROVALS

|      |                                    |
|------|------------------------------------|
| RoHS | Compliance with 2011/65/EU         |
| HF   | Compliance with IEC61249-2-21:2003 |

## MAXIMUM RATINGS ( $T_A=25^{\circ}\text{C}$ )

| Parameter                                                                                       |                       | Symbol             | MBRF 4040 VCTQ | MBRF 4045 VCTQ | MBRF 4050 VCTQ | MBRF 4060 VCTQ | MBRF 4080 VCTQ | MBRF 4090 VCTQ | MBRF 40100 VCTQ | MBRF 40150 VCTQ | MBRF 40200 VCTQ | Unit |
|-------------------------------------------------------------------------------------------------|-----------------------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|------|
| Marking                                                                                         |                       |                    | MBR 4040       | MBR 4045       | MBR 4050       | MBR 4060       | MBR 4080       | MBR 4090       | MBR 40100       | MBR 40150       | MBR 40200       |      |
| Maximum Repetitive Peak Reverse Voltage                                                         |                       | V <sub>RRM</sub>   | 40             | 45             | 50             | 60             | 80             | 90             | 100             | 150             | 200             | V    |
| Maximum RMS Voltage                                                                             |                       | V <sub>RMS</sub>   | 28             | 31.5           | 35             | 42             | 56             | 63             | 70              | 105             | 140             | V    |
| Maximum DC Blocking Voltage                                                                     |                       | V <sub>DC</sub>    | 40             | 45             | 50             | 60             | 80             | 90             | 100             | 150             | 200             | V    |
| Maximum Average Forward Current                                                                 |                       | I <sub>F(AV)</sub> | 40             |                |                |                |                |                |                 |                 |                 | A    |
| Peak Forward Surge Current:8.3ms Single Half Sine-wave Superimposed On Rated Load(Jedec Method) |                       | I <sub>FSM</sub>   | 400            |                |                |                |                |                |                 |                 |                 | A    |
| Maximum Forward Voltage at 20A Per Leg                                                          |                       | V <sub>F</sub>     | 0.53           |                | 0.58           |                | 0.85           |                |                 | 0.90            |                 | V    |
| Maximum DC Reverse Current at Rated DC Blocking Voltage                                         | T <sub>J</sub> =25°C  | I <sub>R</sub>     | 0.1            |                |                |                |                |                |                 | 0.05            |                 | mA   |
|                                                                                                 | T <sub>J</sub> =125°C |                    | 20             |                |                |                |                |                |                 |                 |                 | mA   |
| Typical Thermal Resistance                                                                      |                       | R <sub>θJC</sub>   | 1.3            |                |                |                |                |                |                 |                 |                 | °C/W |
| Maximum Operating Junction Temperature                                                          |                       | T <sub>J</sub>     | 150            |                |                |                | 175            |                |                 |                 |                 | °C   |
| Storage Temperature                                                                             |                       | T <sub>STG</sub>   | -55 to +150    |                |                |                | -65~+175       |                |                 |                 |                 | °C   |

# CHARACTERISTIC CURVES

Fig. 1- Forward Current Derating Curve

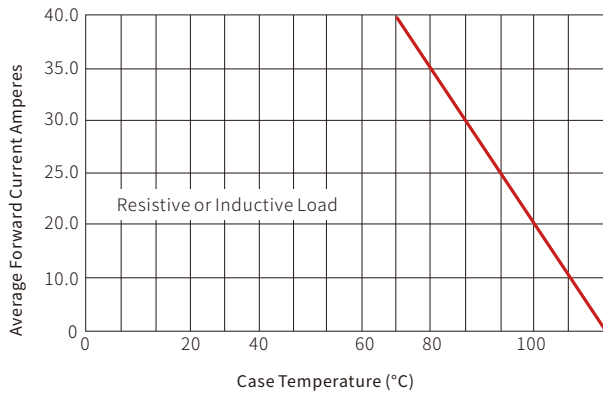


Fig. 2-Maximum Non-repetitive Peak Forward Surge Current Perleg

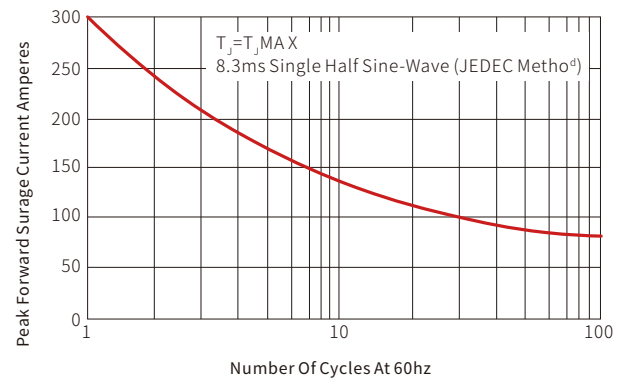


Fig. 3-Typical Instantaneous Forward Characteristics

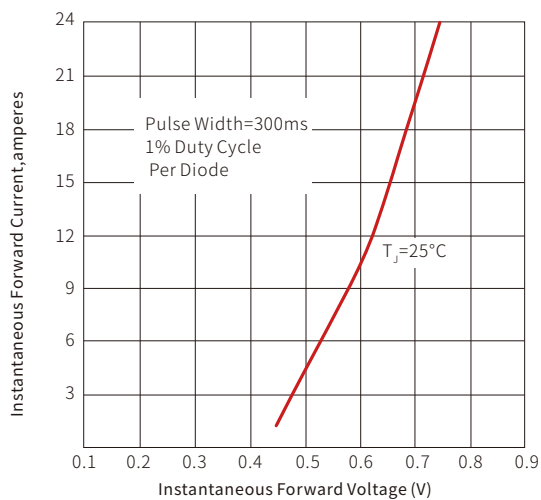
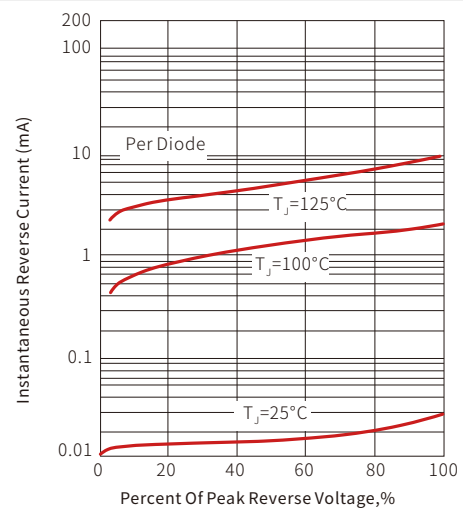
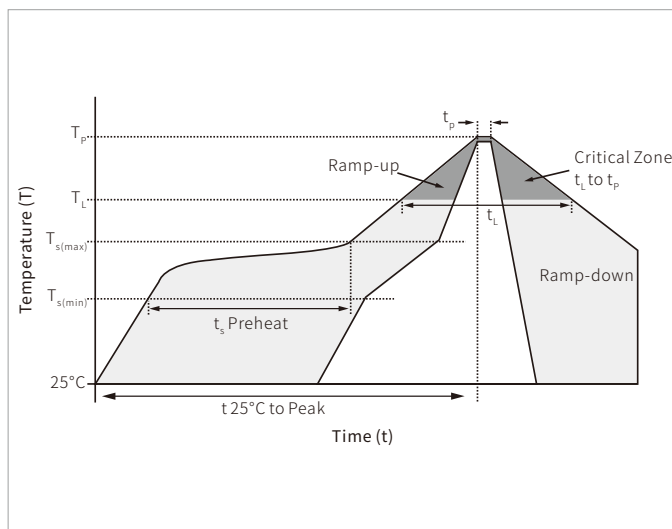


Fig. 4-Typical Reverse Characteristics

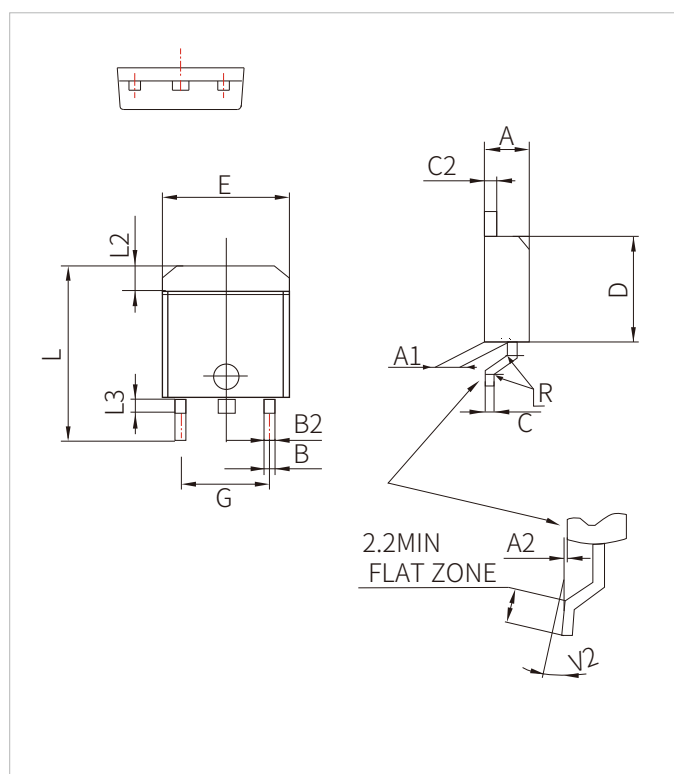


## SOLDERING PARAMETERS

| Reflow Condition                                       |                                  | Lead-free assembly |
|--------------------------------------------------------|----------------------------------|--------------------|
| Pre Heat                                               | Temperature Max ( $T_{s(min)}$ ) | 150°C              |
|                                                        | Temperature Max ( $T_{s(max)}$ ) | 200°C              |
|                                                        | Time (min to max) ( $t_s$ )      | 60 – 180 secs      |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak) |                                  | 3°C/second max     |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                   |                                  | 3°C/second max     |
| Reflow                                                 | Temperature ( $T_L$ ) (Liquidus) | 217°C              |
|                                                        | Time (min to max) ( $t_l$ )      | 60 – 150 seconds   |
| Peak Temperature ( $T_p$ )                             |                                  | 260°C              |
| Time within 5°C of actual peak Temperature ( $t_p$ )   |                                  | 20 – 40 seconds    |
| Ramp-down Rate                                         |                                  | 6°C/second max     |
| Time 25°C to peak Temperature ( $T_p$ )                |                                  | 8 minutes max.     |
| Do not exceed                                          |                                  | 260°C              |



## TO-263 PACKAGE MECHANICAL DATA



| Ref. | Dimensions  |      |       |        |       |       |
|------|-------------|------|-------|--------|-------|-------|
|      | Millimeters |      |       | Inches |       |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ.  | Max.  |
| A    | 4.30        |      | 4.60  | 0.169  |       | 0.181 |
| A1   | 2.49        |      | 2.69  | 0.098  |       | 0.106 |
| A2   | 0.03        |      | 0.23  | 0.001  |       | 0.009 |
| B    | 0.70        |      | 0.93  | 0.027  |       | 0.037 |
| B2   | 1.25        | 1.40 |       | 0.048  | 0.055 |       |
| C    | 0.45        |      | 0.60  | 0.017  |       | 0.024 |
| C2   | 1.21        |      | 1.36  | 0.047  |       | 0.054 |
| D    | 8.95        |      | 9.35  | 0.352  |       | 0.368 |
| E    | 9.80        |      | 10.28 | 0.386  |       | 0.405 |
| G    | 4.88        |      | 5.28  | 0.192  |       | 0.208 |
| L    | 14.80       |      | 15.85 | 0.583  |       | 0.624 |
| L2   | 1.27        |      | 1.40  | 0.050  |       | 0.055 |
| L3   | 1.40        |      | 1.75  | 0.055  |       | 0.069 |
| R    |             | 0.40 |       |        | 0.016 |       |
| V2   | 0°          |      | 8°    | 0°     |       | 8°    |

## ORDERING INFORMATION

| Part Number                | Package | QTY/Reel | Reel Size |
|----------------------------|---------|----------|-----------|
| MBRF4040VCTQ-MBRF40200VCTQ | TO-263  | 800PCS   | 13"       |

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