

# 20A, 35V - 100V Schottky Barrier Rectifier

#### **FEATURES**

- AEC-Q101 qualified available
- Low power loss, high efficiency
- Guard ring for over-voltage protection
- High surge current capability
- UL Recognized File # E-326243
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

#### **APPLICATIONS**

- Switching mode power supply (SMPS)
- Adapters
- DC to DC converter

### **MECHANICAL DATA**

- Case: ITO-220AC
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Mounting torque: 0.56 N·m maximum
  Meet JESD 201 class 2 whisker test
- Polarity: As marked
- Weight: 1.80g (approximately)

| KEY PARAMETERS   |            |      |  |  |
|------------------|------------|------|--|--|
| PARAMETER        | VALUE      | UNIT |  |  |
| I <sub>F</sub>   | 20         | Α    |  |  |
| $V_{RRM}$        | 35 - 100   | V    |  |  |
| I <sub>FSM</sub> | 150        | Α    |  |  |
| $T_{JMAX}$       | 150 °C     |      |  |  |
| Package          | ITO-220AC  |      |  |  |
| Configuration    | Single die |      |  |  |

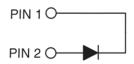








ITO-220AC



| ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25°C unless otherwise noted)            |                  |              |              |              |              |              |               |      |
|--|------------------|--------------|--------------|--------------|--------------|--------------|---------------|------|
| PARAMETER  | SYMBOL           | MBRF<br>2035 | MBRF<br>2045 | MBRF<br>2050 | MBRF<br>2060 | MBRF<br>2090 | MBRF<br>20100 | UNIT |
| Marking code on the device   |                  | MBRF<br>2035 | MBRF<br>2045 | MBRF<br>2050 | MBRF<br>2060 | MBRF<br>2090 | MBRF<br>20100 |      |
| Repetitive peak revers voltage   | $V_{RRM}$        | 35           | 45           | 50           | 60           | 90           | 100           | V    |
| Reverse voltage total rms value  | $V_{R(RMS)}$     | 24           | 31           | 35           | 42           | 63           | 70            | V    |
| Forward current  | I <sub>F</sub>   | 20           |              |              |              |              | Α             |      |
| Surge peak forward current, 8.3ms single half sine wave superimposed on rated load | I <sub>FSM</sub> | 150          |              |              |              | А            |               |      |
| Peak repetitive reverse surge current <sup>(1)</sup>                               | I <sub>RRM</sub> | 1.0 0.5      |              |              |              | Α            |               |      |
| Peak repetitive forward current (Rated V <sub>R</sub> , Square wave, 20KHz)        | I <sub>FRM</sub> | 40           |              |              |              |              | Α             |      |
| Critical rate of rise of off-state voltage   | dv/dt            | 10,000       |              |              |              | V/µs         |               |      |
| Junction temperature   | TJ               | -55 to +150  |              |              |              | °C           |               |      |
| Storage temperature  | T <sub>STG</sub> | -55 to +150  |              |              |              | °C           |               |      |

#### Notes:

1.  $tp = 2.0\mu s$ , 1.0KHz

| THERMAL PERFORMANCE         |                  |     |      |  |  |
|-----------------------------|------------------|-----|------|--|--|
| PARAMETER                   | SYMBOL           | TYP | UNIT |  |  |
| Junction-to-case resistance | R <sub>eJC</sub> | 3   | °C/W |  |  |

| PARAMETER   |  | CONDITIONS                                   | SYMBOL           | TYP | MAX  | UNIT |
|---|--|--|------------------|-----|------|------|
| Forward voltage <sup>(1)</sup>                        | MBRF2035<br>MBRF2045                         | I <sub>F</sub> = 20A, T <sub>J</sub> = 25°C  | V <sub>F</sub>   | -   | 0.75 | V    |
|   | MBRF2050<br>MBRF2060                         |  |                  | -   | 0.82 | V    |
|   | MBRF2090<br>MBRF20100                        |  |                  | -   | 0.95 | V    |
|   | MBRF2035<br>MBRF2045                         | I <sub>F</sub> = 20A, T <sub>J</sub> = 125°C |                  | -   | 0.65 | V    |
|   | MBRF2050<br>MBRF2060                         |  |                  | -   | 0.72 | V    |
|   | MBRF2090<br>MBRF20100                        |  |                  | _   | 0.87 | V    |
| Reverse current @ rated V <sub>R</sub> <sup>(2)</sup> | MBRF2035<br>MBRF2045<br>MBRF2050<br>MBRF2060 | T <sub>J</sub> = 25°C                        |                  | -   | 200  | μΑ   |
|   | MBRF2090                                     |  |                  |     | 100  | μΑ   |
|   | MBRF2035<br>MBRF2045                         | T <sub>J</sub> = 125°C                       | - I <sub>R</sub> | -   | 15   | mA   |
|   | MBRF2050<br>MBRF2060                         |  |                  | -   | 10   | mA   |
|   | MBRF2090<br>MBRF20100                        |  |                  | -   | 5    | mA   |

## Notes:

- 1. Pulse test with PW = 0.3ms
- 2. Pulse test with PW = 30ms

| ORDERING INFORMATION |           |           |  |  |  |
|----------------------|-----------|-----------|--|--|--|
| ORDERING CODE(1)(2)  | PACKAGE   | PACKING   |  |  |  |
| MBRF20x              | ITO-220AC | 50 / Tube |  |  |  |
| MBRF20xH             | ITO-220AC | 50 / Tube |  |  |  |

# Notes:

- 1. "x" defines voltage from 35V(MBRF2035) to 100V(MBRF20100)
- 2. "H" means AEC-Q101 qualified



## **CHARACTERISTICS CURVES**

 $(T_A = 25^{\circ}C \text{ unless otherwise noted})$ 

Fig.1 Forward Current Derating Curve

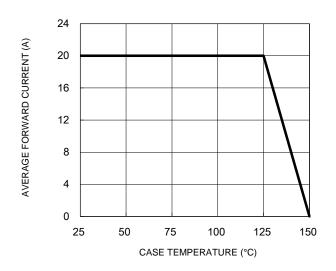


Fig.2 Typical Junction Capacitance

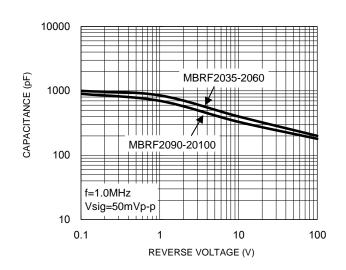
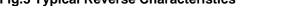


Fig.3 Typical Reverse Characteristics



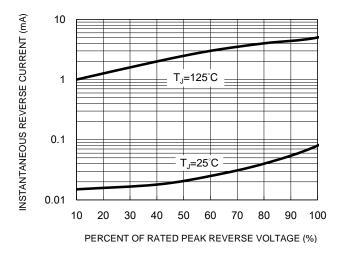


Fig.4 Typical Forward Characteristics

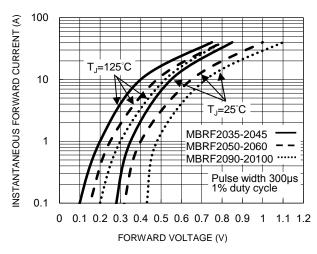
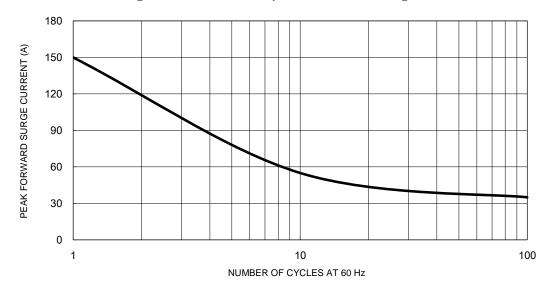


Fig.5 Maximum Non-Repetitive Forward Surge Current

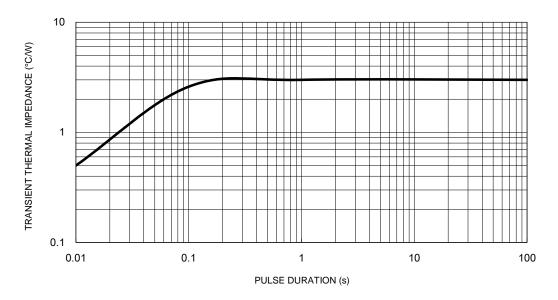




# **CHARACTERISTICS CURVES**

 $(T_A = 25^{\circ}C \text{ unless otherwise noted})$ 

Fig.6 Typical Transient Thermal Characteristics

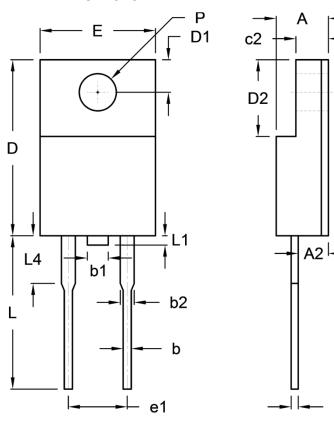




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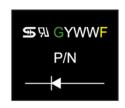
# **PACKAGE OUTLINE DIMENSIONS**

## **ITO-220AC**



| DIM.   | Unit (mm) |       | Unit ( | inch) |
|--------|-----------|-------|--------|-------|
| DIIVI. | Min.      | Max.  | Min.   | Max.  |
| Α      | 4.30      | 4.70  | 0.169  | 0.185 |
| A2     | 2.30      | 2.90  | 0.091  | 0.114 |
| b      | 0.50      | 0.90  | 0.020  | 0.035 |
| b1     | -         | 1.80  | -      | 0.071 |
| b2     | 0.95      | 1.45  | 0.037  | 0.057 |
| С      | 0.46      | 0.76  | 0.018  | 0.030 |
| c2     | 2.50      | 3.10  | 0.098  | 0.114 |
| D      | 14.80     | 15.50 | 0.583  | 0.610 |
| D1     | 2.40      | 3.20  | 0.094  | 0.126 |
| D2     | 6.30      | 6.90  | 0.248  | 0.272 |
| E      | 9.60      | 10.30 | 0.378  | 0.406 |
| e1     | 4.95      | 5.20  | 0.195  | 0.205 |
| L      | 12.60     | 13.80 | 0.496  | 0.543 |
| L1     | 0.00      | 1.60  | 0.000  | 0.063 |
| L4     | -         | 4.10  | -      | 0.161 |
| Р      | 3.00      | 3.40  | 0.118  | 0.134 |

# **MARKING DIAGRAM**



= Marking Code P/N G = Green Compound

= Date Code YWW

F = Factory Code



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