

20A, 35V - 200V Schottky Barrier Rectifier

FEATURES

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

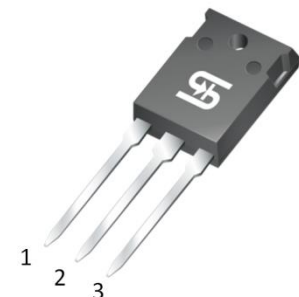
APPLICATIONS

- Switching mode power supply (SMPS)
- Adapters
- Monitor
- DC to DC converters
- TV

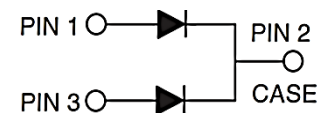
MECHANICAL DATA

- Case: TO-247AD (TO-3P)
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Mounting torque: 1.13 N·m maximum
- Polarity: As marked
- Weight: 6.10g (approximately)

| KEY PARAMETERS | | |
|----------------|------------------|------|
| PARAMETER | VALUE | UNIT |
| I_F | 20 | A |
| V_{RRM} | 35 - 200 | V |
| I_{FSM} | 150 | A |
| T_{JMAX} | 150 | °C |
| Package | TO-247AD (TO-3P) | |
| Configuration | Dual dies | |



TO-247AD (TO-3P)



| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | | | | | | | | |
|---|--------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|------|
| PARAMETER | SYMBOL | MBR 2035 PT | MBR 2045 PT | MBR 2050 PT | MBR 2060 PT | MBR 2090 PT | MBR 20100 PT | MBR 20150 PT | MBR 20200 PT | UNIT |
| Marking code on the device | | MBR 2035 PT | MBR 2045 PT | MBR 2050 PT | MBR 2060 PT | MBR 2090 PT | MBR 20100 PT | MBR 20150 PT | MBR 20200 PT | |
| Repetitive peak reverse voltage | V_{RRM} | 35 | 45 | 50 | 60 | 90 | 100 | 150 | 200 | V |
| Reverse voltage, total rms value | $V_{R(RMS)}$ | 24 | 31 | 25 | 42 | 63 | 70 | 105 | 140 | V |
| Forward current | I_F | 20 | | | | | | | | A |
| Surge peak forward current 8.3ms single half sine wave superimposed on rated load | I_{FSM} | 150 | | | | | | | | A |
| Peak repetitive reverse surge current ⁽¹⁾ | I_{RRM} | 1.0 | | | 0.5 | | | | | A |
| Peak repetitive forward current (Rated V_R , Square wave, 20KHz) | I_{FRM} | 20 | | | | | | | | A |

Notes:

1. $t_p = 2.0\mu\text{s}$, 1.0KHz

| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | | | | | | | | |
|---|-----------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|------------------|
| PARAMETER | SYMBOL | MBR 2035 PT | MBR 2045 PT | MBR 2050 PT | MBR 2060 PT | MBR 2090 PT | MBR 20100 PT | MBR 20150 PT | MBR 20200 PT | UNIT |
| Critical rate of rise of off-state voltage | dV/dt | 10,000 | | | | | | | | V/ μs |
| Junction temperature | T_J | -55 to +150 | | | | | | | | $^\circ\text{C}$ |
| Storage temperature | T_{STG} | -55 to +150 | | | | | | | | $^\circ\text{C}$ |

| THERMAL PERFORMANCE | | | |
|-------------------------------------|-----------------|-----|---------------------------|
| PARAMETER | SYMBOL | TYP | UNIT |
| Junction-to-case thermal resistance | $R_{\theta JC}$ | 1 | $^\circ\text{C}/\text{W}$ |

| ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | | | | |
|--|--------------------------|---|--------|---|------|------|
| PARAMETER | | CONDITIONS | SYMBOL | TYP | MAX | UNIT |
| Forward voltage per diode ⁽¹⁾ | MBR2035PT MBR2045PT | $I_F = 10\text{A}, T_J = 25^\circ\text{C}$ | V_F | - | - | V |
| | MBR2050PT MBR2060PT | | | - | 0.80 | V |
| | MBR2090PT MBR20100PT | | | - | 0.85 | V |
| | MBR20150PT MBR20200PT | | | - | 0.95 | V |
| | MBR2035PT MBR2045PT | | | $I_F = 20\text{A}, T_J = 25^\circ\text{C}$ | - | 0.84 |
| | MBR2050PT MBR2060PT | - | | | 0.95 | V |
| | MBR2090PT MBR20100PT | - | | | 0.95 | V |
| | MBR20150PT MBR20200PT | - | | | 1.02 | V |
| | MBR2035PT MBR2045PT | $I_F = 10\text{A}, T_J = 125^\circ\text{C}$ | | | - | 0.57 |
| | MBR2050PT MBR2060PT | | | - | 0.70 | V |
| | MBR2090PT MBR20100PT | | | - | 0.75 | V |
| | MBR20150PT MBR20200PT | | | - | 0.92 | V |
| | MBR2035PT MBR2045PT | | | $I_F = 20\text{A}, T_J = 125^\circ\text{C}$ | - | 0.72 |
| | MBR2050PT MBR2060PT | - | | | 0.85 | V |
| | MBR2090PT MBR20100PT | - | | | 0.85 | V |
| | MBR20150PT MBR20200PT | - | | | 0.98 | V |

Notes:

- Pulse test with PW = 0.3ms

| ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | | | | |
|---|---|---------------------------|---------------|------------|------------|---------------|
| PARAMETER | | CONDITIONS | SYMBOL | TYP | MAX | UNIT |
| Reverse current @ rated V_R per diode ⁽²⁾ | MBR2035PT MBR2045PT MBR2050PT MBR2060PT MBR2090PT MBR20100PT MBR20150PT MBR20200PT | $T_J = 25^\circ\text{C}$ | I_R | - | 100 | μA |
| | MBR2035PT MBR2045PT | $T_J = 125^\circ\text{C}$ | | - | 15 | mA |
| | MBR2050PT MBR2060PT | | | - | 10 | mA |
| | MBR2090PT MBR20100PT MBR20150PT MBR20200PT | | | - | 5 | mA |

Notes:

- Pulse test with $PW = 30\text{ms}$

| ORDERING INFORMATION | | |
|--|------------------|----------------|
| ORDERING CODE ⁽¹⁾⁽²⁾ | PACKAGE | PACKING |
| MBR20xPT | TO-247AD (TO-3P) | 30 / Tube |
| MBR20xPTH | TO-247AD (TO-3P) | 30 / Tube |

Notes:

- “x” defines voltage from 35V(MBR2035PT) to 200V(MBR20200PT)
- “H” means AEC-Q101 qualified

CHARACTERISTICS CURVES

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

Fig.1 Forward Current Derating Curve

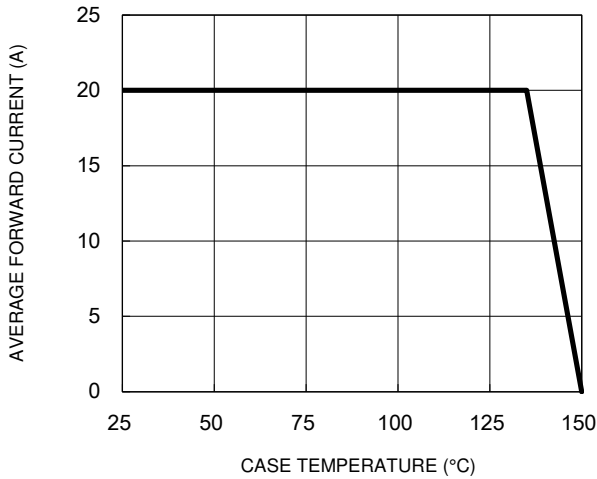


Fig.2 Typical Junction Capacitance

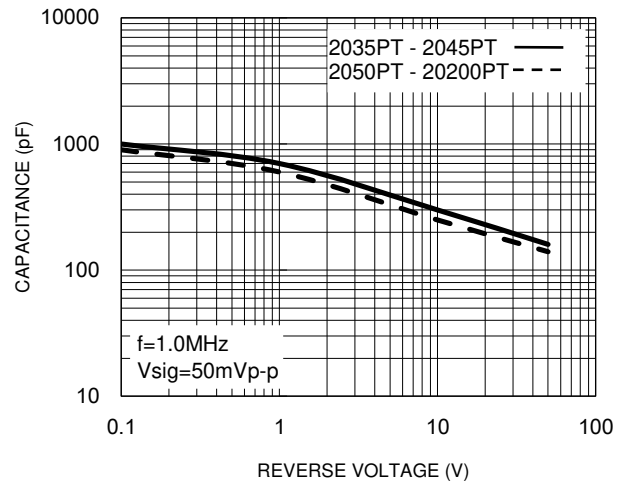


Fig.3 Typical Reverse Characteristics

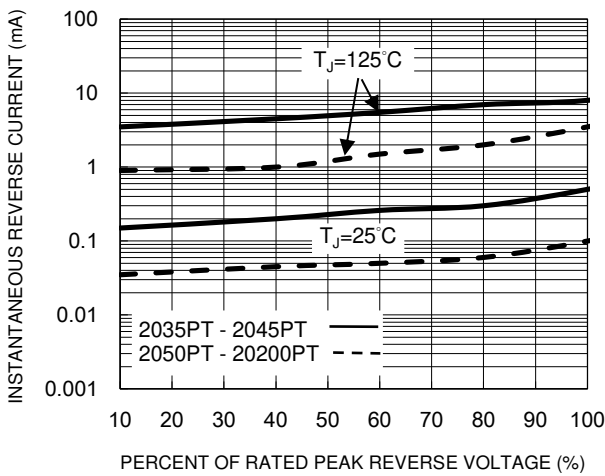


Fig.4 Typical Forward Characteristics

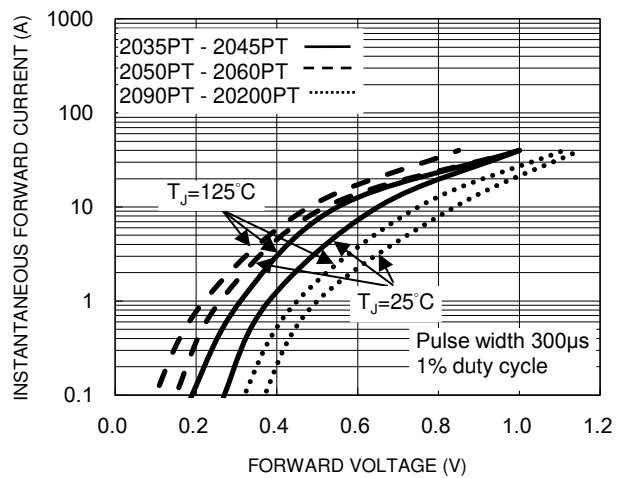
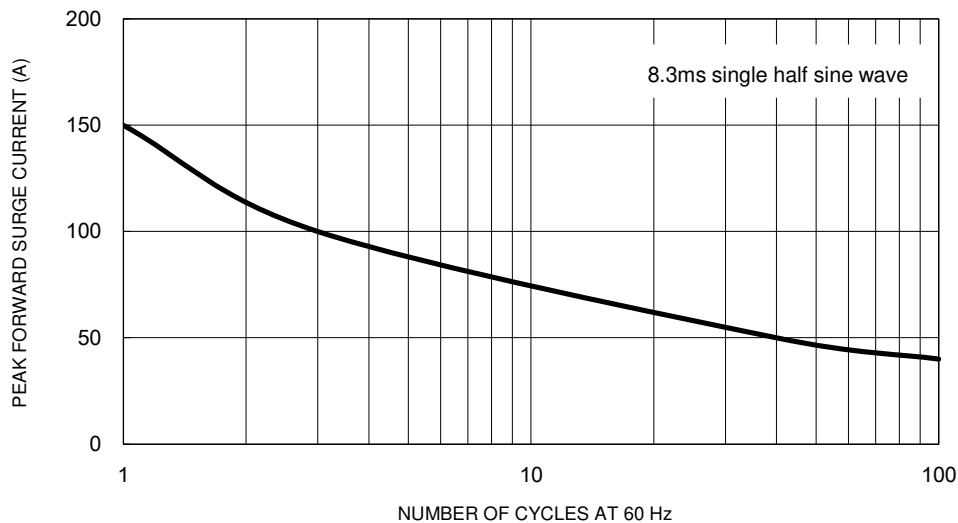


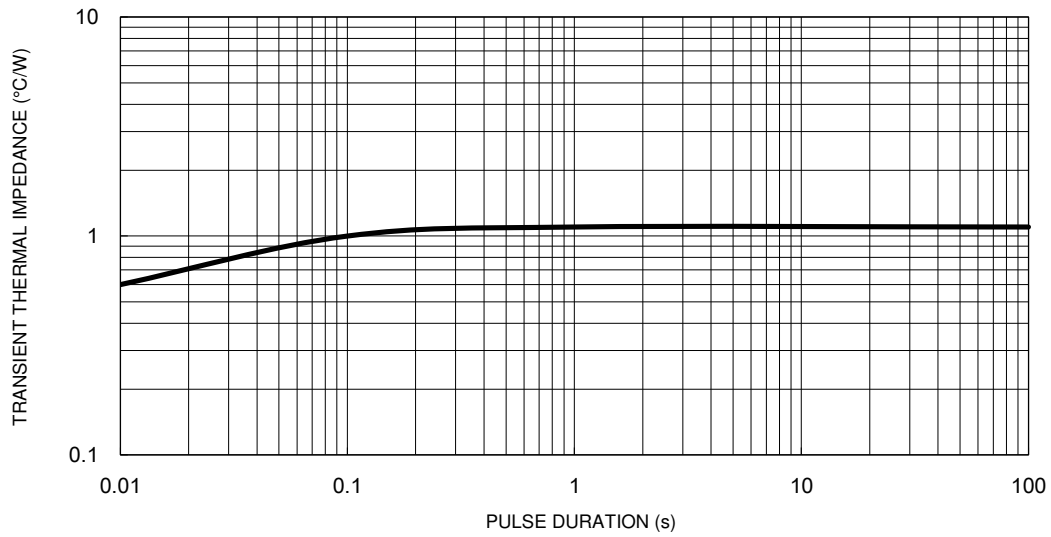
Fig.5 Maximum Non-Repetitive Forward Surge Current



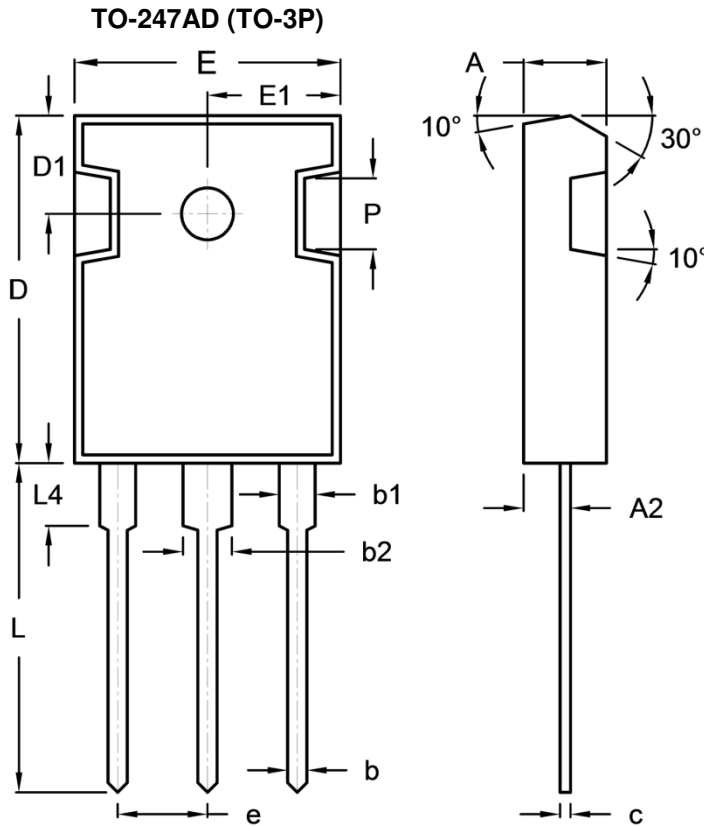
CHARACTERISTICS CURVES

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

Fig.6 Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS



| DIM | Unit (mm) | | Unit (inch) | |
|-----|-----------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 4.90 | 5.16 | 0.193 | 0.203 |
| A2 | 2.70 | 3.00 | 0.106 | 0.118 |
| b | 1.12 | 1.22 | 0.044 | 0.048 |
| b1 | 1.93 | 2.18 | 0.076 | 0.086 |
| b2 | 2.97 | 3.22 | 0.117 | 0.127 |
| c | 0.51 | 0.76 | 0.020 | 0.030 |
| D | 20.80 | 21.30 | 0.819 | 0.839 |
| D1 | 5.70 | 6.20 | 0.224 | 0.244 |
| E | 15.90 | 16.40 | 0.626 | 0.646 |
| E1 | 7.90 | 8.20 | 0.311 | 0.323 |
| e | 5.20 | 5.70 | 0.205 | 0.224 |
| H | 2.90 | 3.40 | 0.114 | 0.134 |
| L | 19.70 | 20.20 | 0.776 | 0.795 |
| L4 | 3.50 | 4.10 | 0.138 | 0.161 |
| P | - | 4.30 | - | 0.169 |

MARKING DIAGRAM



- P/N = Marking Code
- G = Green Compound
- YWW = Date Code
- F = Factory Code

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