## ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
|---|---|---|---|---|---|
| Maximum forward voltage drop | $V_{FM}$ (1) | 20 A | $T_J$ = 25 °C | 0.60 | V |
| | | 40 A | | 0.78 | |
| | | 20 A | $T_J$ = 125 °C | 0.58 | |
| | | 40 A | | 0.75 | |
| Maximum instantaneus reverse current | $I_{RM}$ (1) | $T_J$ = 25 °C | Rated DC voltage | 1 | mA |
| | | $T_J$ = 100 °C | | 50 | |
| | | $T_J$ = 125 °C | | 95 | |
| Maximum junction capacitance | $C_T$ | $V_R$ = 5 $V_{DC}$, (test signal range 100 kHz to 1 MHz) 25 °C | | 900 | pF |
| Typical series inductance | $L_S$ | Measured from top of terminal to mounting plane | | 8.0 | nH |
| Maximum voltage rate of change | dV/dt | Rated $V_R$ | | 10 000 | V/µs |

**Note**

(1) Pulse width < 300 µs, duty cycle < 2 %

## THERMAL - MECHANICAL SPECIFICATIONS

| PARAMETER | | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|---|---|---|---|---|
| Maximum junction temperature range | | $T_J$ | | - 65 to 150 | °C |
| Maximum storage temperature range | | $T_{Stg}$ | | - 65 to 175 | |
| Maximum thermal resistance, junction to case per leg | | $R_{thJC}$ | DC operation | 1.5 | °C/W |
| Typical thermal resistance, case to heatsink | | $R_{thCS}$ | Mounting surface, smooth and greased (Only for TO-220) | 0.50 | |
| Maximum thermal resistance, junction to ambient | | $R_{thJA}$ | DC operation (For $D^2PAK$ and TO-262) | 50 | |
| Approximate weight | | | | 2 | g |
| | | | | 0.07 | oz. |
| Mounting torque | minimum | | Non-lubricated threads | 6 (5) | kgf · cm (lbf · in) |
| | maximum | | | 12 (10) | |
| Marking device | | | Case style TO-220AB | MBR4045CT | |

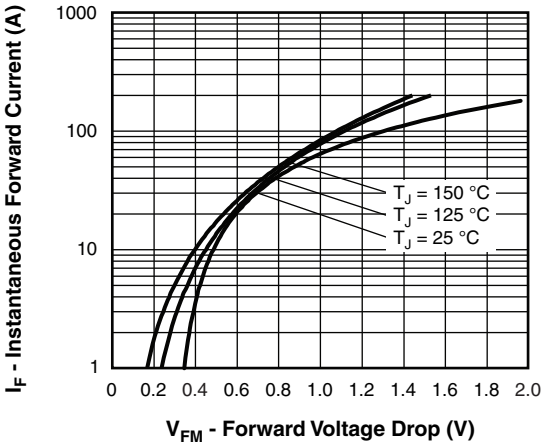



Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

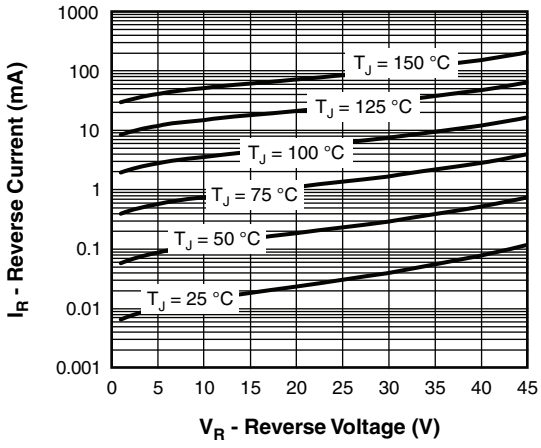



Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

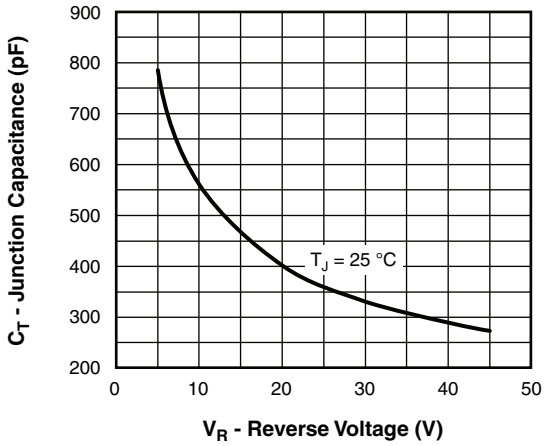



Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

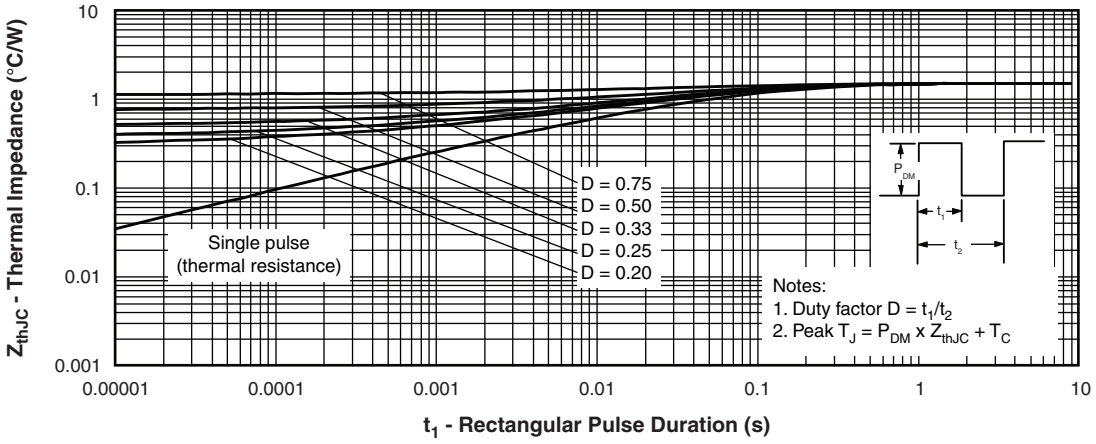



Fig. 4 - Maximum Thermal Impedance $Z_{thJC}$ Characteristics (Per Leg)

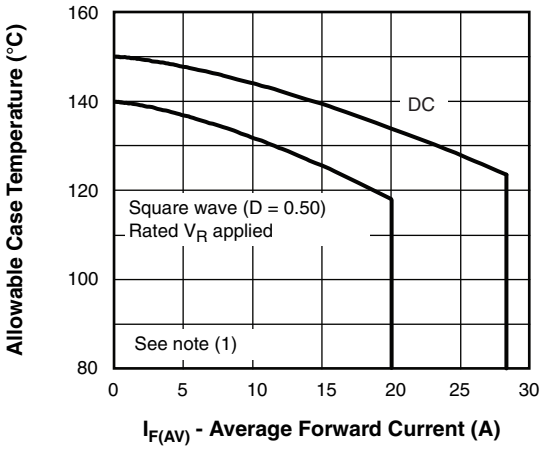



Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

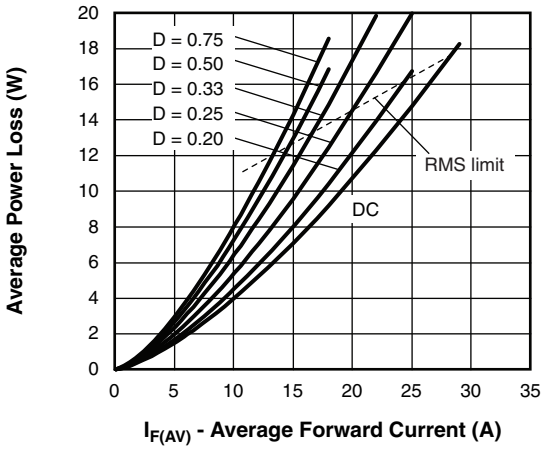



Fig. 6 - Forward Power Loss Characteristics

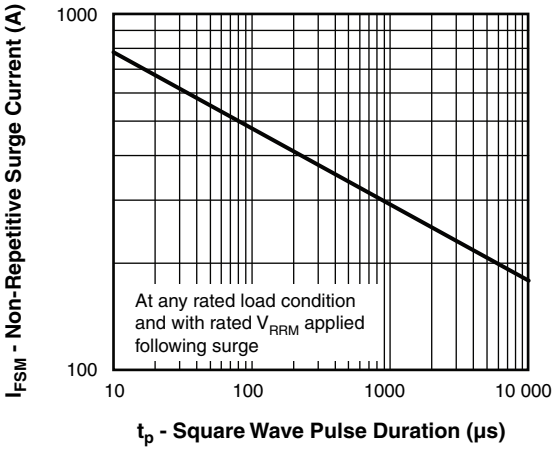


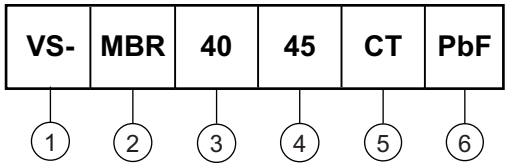

Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

**Note**

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6);
$Pd_{REV}$ = Inverse power loss = $V_{R1} \times I_R (1 - D)$; $I_R$ at $V_{R1}$ = Rated $V_R$

## ORDERING INFORMATION TABLE

Device code



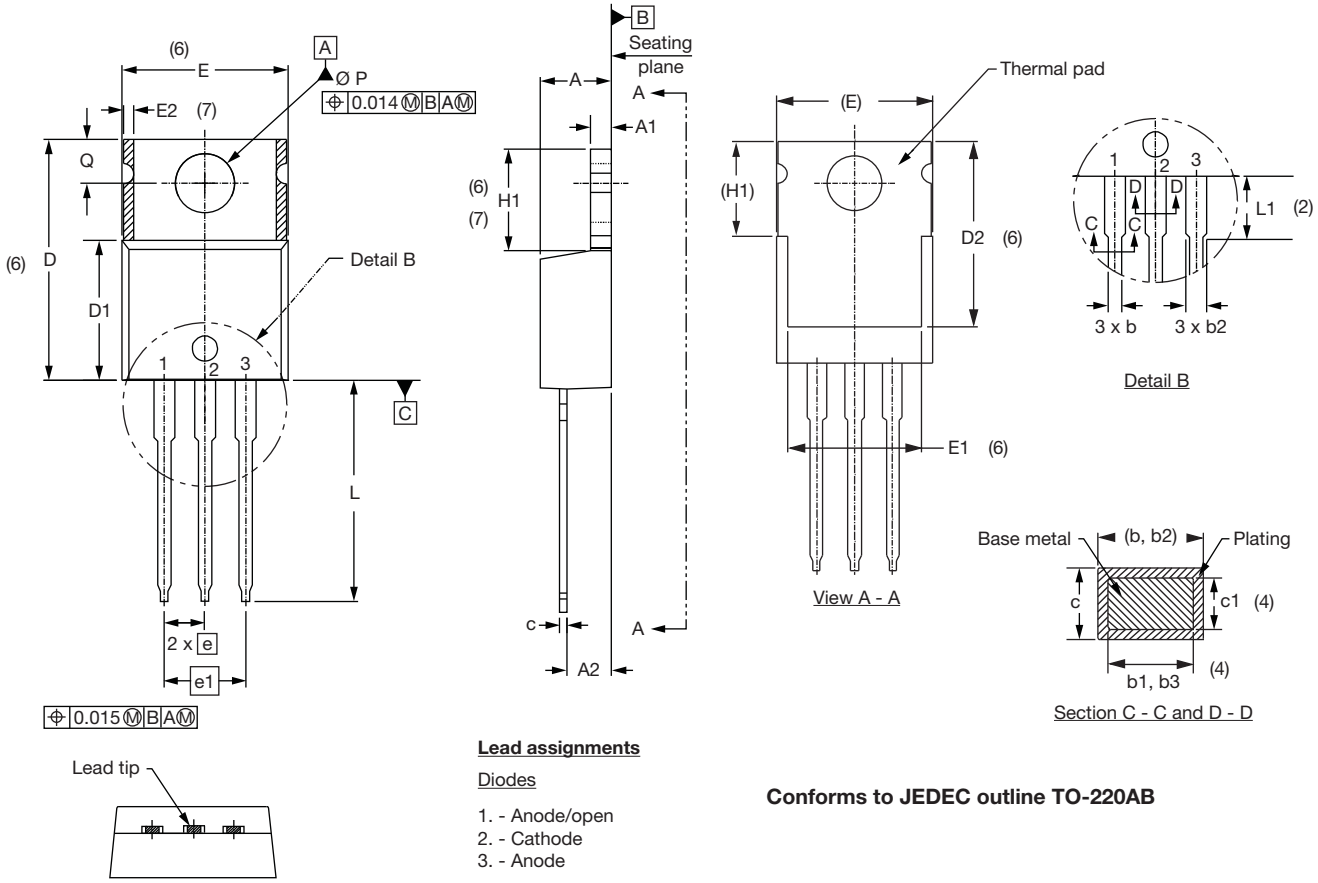

1 - Vishay Semiconductors product
2 - Schottky MBR series
3 - Current rating (40 = 40 A)
4 - Voltage rating (45 = 45 V)
5 - CT = Essential part number
6 - Environmental digit
- PbF = Lead (Pb)-free and RoHS compliant
- -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free

| ORDERING INFORMATION (Example) | | | |
|---|---|---|---|
| PREFERRED P/N | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
| VS-MBR4045CTPbF | 50 | 1000 | Antistatic plastic tube |
| VS-MBR4045CT-N3 | 50 | 1000 | Antistatic plastic tube |

| LINKS TO RELATED DOCUMENTS | | |
|---|---|---|
| Dimensions | | www.vishay.com/doc?95222 |
| Part marking information | TO-220AB PbF | www.vishay.com/doc?95225 |
| | TO-220AB -N3 | www.vishay.com/doc?95028 |
| SPICE model | | www.vishay.com/doc?95296 |

# TO-220AB

**DIMENSIONS** in millimeters and inches







**Lead assignments**

Diodes

1. - Anode/open
2. - Cathode
3. - Anode

**Conforms to JEDEC outline TO-220AB**

| SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|---|---|---|---|---|---|
| | MIN. | MAX. | MIN. | MAX. | |
| A | 4.25 | 4.65 | 0.167 | 0.183 | |
| A1 | 1.14 | 1.40 | 0.045 | 0.055 | |
| A2 | 2.56 | 2.92 | 0.101 | 0.115 | |
| b | 0.69 | 1.01 | 0.027 | 0.040 | |
| b1 | 0.38 | 0.97 | 0.015 | 0.038 | 4 |
| b2 | 1.20 | 1.73 | 0.047 | 0.068 | |
| b3 | 1.14 | 1.73 | 0.045 | 0.068 | 4 |
| c | 0.36 | 0.61 | 0.014 | 0.024 | |
| c1 | 0.36 | 0.56 | 0.014 | 0.022 | 4 |
| D | 14.85 | 15.25 | 0.585 | 0.600 | 3 |
| D1 | 8.38 | 9.02 | 0.330 | 0.355 | |
| D2 | 11.68 | 12.88 | 0.460 | 0.507 | 6 |

| SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|---|---|---|---|---|---|
| | MIN. | MAX. | MIN. | MAX. | |
| E | 10.11 | 10.51 | 0.398 | 0.414 | 3, 6 |
| E1 | 6.86 | 8.89 | 0.270 | 0.350 | 6 |
| E2 | - | 0.76 | - | 0.030 | 7 |
| e | 2.41 | 2.67 | 0.095 | 0.105 | |
| e1 | 4.88 | 5.28 | 0.192 | 0.208 | |
| H1 | 6.09 | 6.48 | 0.240 | 0.255 | 6, 7 |
| L | 13.52 | 14.02 | 0.532 | 0.552 | |
| L1 | 3.32 | 3.82 | 0.131 | 0.150 | 2 |
| Ø P | 3.54 | 3.73 | 0.139 | 0.147 | |
| Q | 2.60 | 3.00 | 0.102 | 0.118 | |
| θ | 90° to 93° | | 90° to 93° | | |

**Notes**

(1) Dimensioning and tolerancing as per ASME Y14.5M-1994
(2) Lead dimension and finish uncontrolled in L1
(3) Dimension D, D1 and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
(4) Dimension b1, b3 and c1 apply to base metal only
(5) Controlling dimensions: inches
(6) Thermal pad contour optional within dimensions E, H1, D2 and E1
(7) Dimensions E2 x H1 define a zone where stamping and singulation irregularities are allowed
(8) Outline conforms to JEDEC TO-220, except A2 (maximum) and D2 (minimum) where dimensions are derived from the actual package outline

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