# Schottky Diode, 0.5 A

SOD-123


## FEATURES

- Surface mountable
- Very low forward voltage drop
- Extremely fast switching
- Negligible switching losses
- Guard ring for enhanced ruggedness and long term reliability
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for industrial level

Pb-free Available

RoHS* COMPLIANT

## DESCRIPTION

This Schottky diode is ideally suited for low voltage, high frequency operation, as freewheeling and polarity protection. Small size of the package allows proper use in applications where compact size is critical, fitting also the GSM and PCMCIA requirement.

| PRODUCT SUMMARY | |
|---|---|
| $I_{F(AV)}$ | 0.5 A |
| $V_R$ | 40 V |
| $V_F$ at 0.5 A at 25 °C | 0.560 V |
| $I_{RM}$ | 13 mA at 100 °C |

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|---|---|---|---|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| $I_{F(AV)}$ | DC | 0.5 | A |
| $V_{RRM}$ | | 40 | V |
| $I_{FSM}$ | $t_p$ = 10 ms sine | 6.0 | A |
| $V_F$ | 0.5 Apk, $T_J$ = 100 °C | 0.42 | V |
| $T_J$ | Range | - 65 to 150 | °C |

| VOLTAGE RATINGS | | | |
|---|---|---|---|
| PARAMETER | SYMBOL | MBR0540PbF | UNITS |
| Maximum DC reverse voltage | $V_R$ | 40 | V |
| Maximum working peak reverse voltage | $V_{RWM}$ | | |

| ABSOLUTE MAXIMUM RATINGS | | | | | |
|---|---|---|---|---|---|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Forward current | $I_F$ | DC, $T_L$ = 122 °C | | 0.5 | A |
| Maximum peak one cycle non-repetitive surge current at $T_J$ = 25 °C | $I_{FSM}$ | 5 µs sine or 3 µs rect. pulse | Following any rated load condition and with rated $V_{RRM}$ applied | 50 | |
| | | 10 ms sine or 6 ms rect. pulse | | 6.0 | |

* Pb containing terminations are not RoHS compliant, exemptions may apply

| ELECTRICAL SPECIFICATIONS | | | | | |
|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **TEST CONDITIONS** | | **VALUES** | **UNITS** |
| Maximum forward voltage drop | $V_{FM}$ (1) | 0.5 A | $T_J$ = 25 °C | 0.480 | V |
| | | 1 A | | 0.560 | |
| | | 0.5 A | $T_J$ = 100 °C | 0.420 | |
| | | 1 A | | 0.520 | |
| Maximum reverse leakage current | $I_{RM}$ (1) | $T_J$ = 25 °C | $V_R$ = 20 V | 10 | µA |
| | | $T_J$ = 100 °C | | 5 | mA |
| | | $T_J$ = 25 °C | $V_R$ = 40 V | 20 | µA |
| | | $T_J$ = 100 °C | | 13 | mA |
| Maximum junction capacitance | $C_T$ | $V_R$ = 5 $V_{DC}$ (test signal range 100 kHz to 1 MHz) $T_J$ = 25 °C | | 60 | pF |
| 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 and storage temperature range | $T_J$ (1), $T_{Stg}$ | | - 65 to 150 | °C |
| Maximum thermal resistance, junction to lead | $R_{thJL}$ | Mounted on PC board FR4 with minimum pad size | 150 | °C/W |
| Maximum thermal resistance, junction to ambient | $R_{thJA}$ | 1" square pad size (1 x 0.5" for each lead) on FR4 board | 200 | |
| Approximate weight | | | 0.012 | g |
| Marking device | | Case style SOD-123 | C$\underline{Y}\overline{W}$LC | |

**Note**

(1) $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{thJA}}$ thermal runaway condition for a diode on its own heatsink

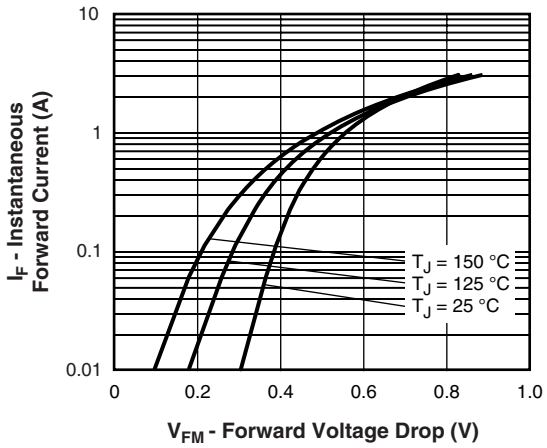


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

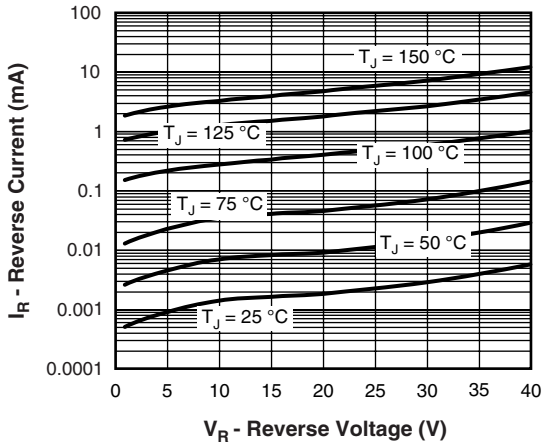


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

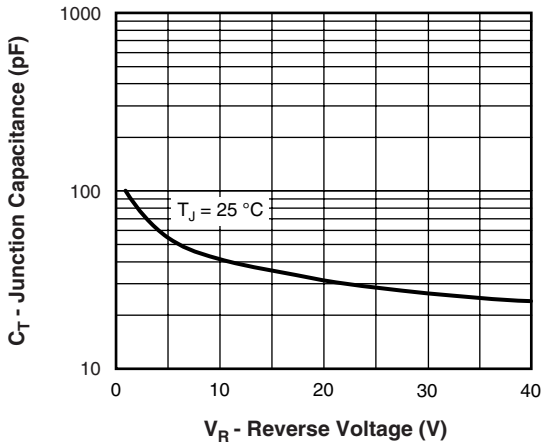


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

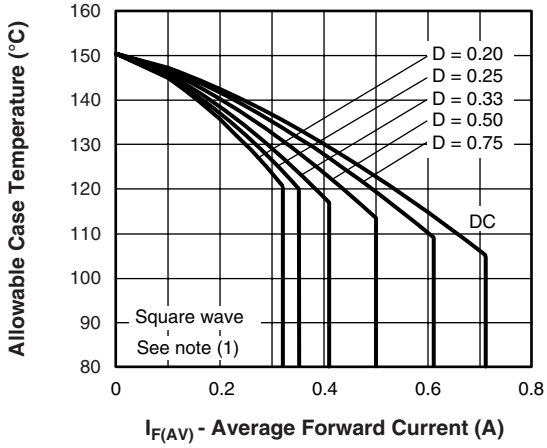


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current

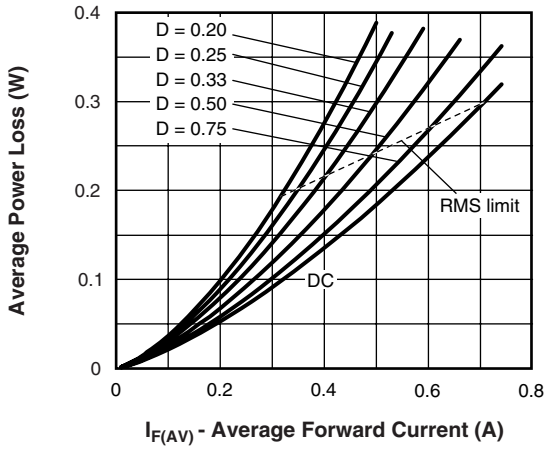


Fig. 5 - Forward Power Loss Characteristics

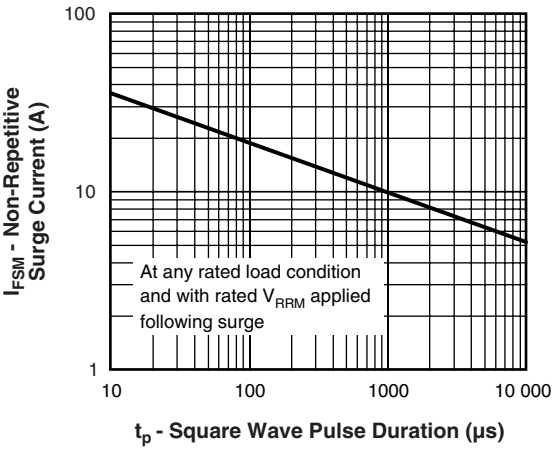


Fig. 6 - Maximum Non-Repetitive Surge Current

**Note**

(1) Formula used: $T_C = T_J - Pd \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 4)

| ORDERING INFORMATION TABLE | | | | |
|---|---|---|---|---|
| **DEVICE** | **PACKAGE** | **MARKING** | **BASE QUANTITY** | **DELIVERY MODE** |
| MBR0540 | SOD-123 | CY$\overline{W}$LC | 3000 | Tape and reel |

| LINKS TO RELATED DOCUMENTS | |
|---|---|
| Dimensions | http://www.vishay.com/doc?95053 |
| Part marking information | http://www.vishay.com/doc?95338 |
| Packaging information | http://www.vishay.com/doc?95061 |

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