

Surface Mount Trench MOS Barrier Schottky Rectifier



FEATURES

- Low profile package
- Ideal for automated placement
- Trench MOS Schottky technology
- Low power losses, high efficiency
- Low forward voltage drop
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

TYPICAL APPLICATIONS

For use in high frequency converters, freewheeling diodes, DC/DC converters and polarity protection applications.

MECHANICAL DATA

Case: DO-214AA (SMB)

Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free and RoHS-compliant, commercial grade

Terminals: Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 2 whisker test

Polarity: Color band denotes the cathode end

| PRIMARY CHARACTERISTICS | |
|-------------------------|----------------|
| $I_{F(AV)}$ | 4.0 A |
| V_{RRM} | 200 V |
| I_{FSM} | 40 A |
| V_F at $I_F = 4.0$ A | 0.71 V |
| T_J max. | 150 °C |
| Package | DO-214AA (SMB) |
| Diode variation | Single die |

| MAXIMUM RATINGS ($T_A = 25$ °C unless otherwise noted) | | | |
|---|----------------|-------------|------------|
| PARAMETER | SYMBOL | VSSB420S | UNIT |
| Device marking code | | V4D | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 200 | V |
| Maximum DC forward current | $I_F^{(1)}$ | 4.0 | A |
| | $I_F^{(2)}$ | 1.8 | |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I_{FSM} | 40 | A |
| Voltage rate of change (rated V_R) | dV/dt | 10 000 | V/ μ s |
| Operating junction and storage temperature range | T_J, T_{STG} | -40 to +150 | °C |

Notes

(1) Units mounted on PCB with 20 mm x 20 mm pad areas

(2) Free air, mounted on recommended PCB 1 oz. pad area

| ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|--|----------------------|-----------------------------------|-------------|------|------|---------------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage | $I_F = 4.0\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$ | $V_F^{(1)}$ | 1.44 | 1.90 | V |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 0.71 | 0.80 | |
| Reverse current per diode | $V_R = 180\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | $I_R^{(2)}$ | 3 | - | μA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 0.7 | - | mA |
| | $V_R = 200\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | | 4 | 150 | μA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 1.1 | 10 | mA |
| Typical junction capacitance | 4.0 V, 1 MHz | | C_J | 120 | - | pF |

Notes

- (3) Pulse test: 300 μs pulse width, 1 % duty cycle
 (4) Pulse test: Pulse width $\leq 40\text{ ms}$

| THERMAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | |
|---|-----------------------|----------|--------------------|
| PARAMETER | SYMBOL | VSSB420S | UNIT |
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 120 | $^\circ\text{C/W}$ |
| | $R_{\theta JM}^{(2)}$ | 15 | |

Notes

- (1) Free air, mounted on recommended PCB 1 oz. pad area; thermal resistance $R_{\theta JA}$ - junction to ambient
 (2) Units mounted on PCB with 20 mm x 20 mm copper pad areas; thermal resistance $R_{\theta JM}$ - junction to mount

| ORDERING INFORMATION (Example) | | | | |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| VSSB420S-M3/52T | 0.096 | 52T | 750 | 7" diameter plastic tape and reel |
| VSSB420S-M3/5BT | 0.096 | 5BT | 3200 | 13" diameter plastic tape and reel |

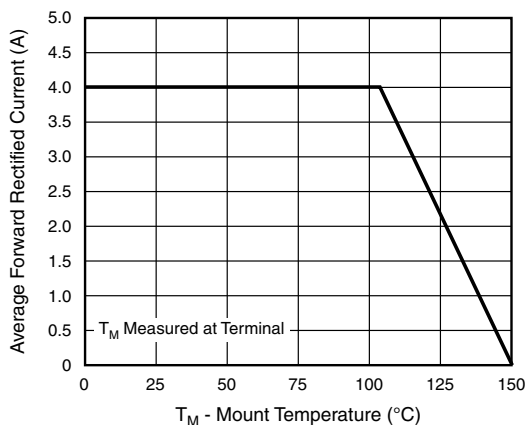
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

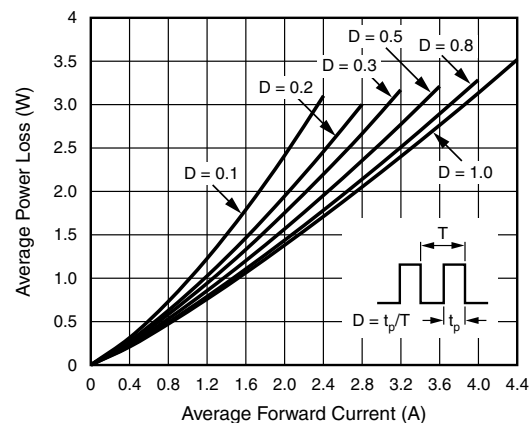


Fig. 2 - Forward Power Loss Characteristics

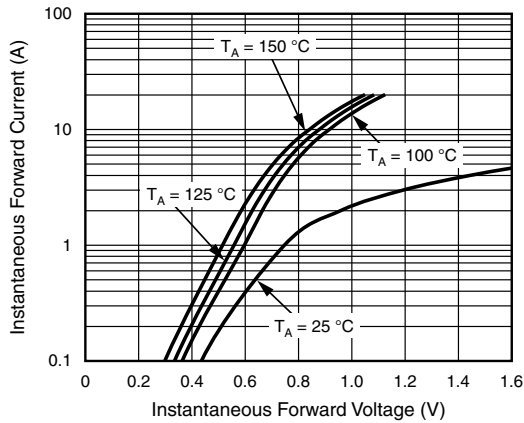


Fig. 3 - Typical Instantaneous Forward Characteristics

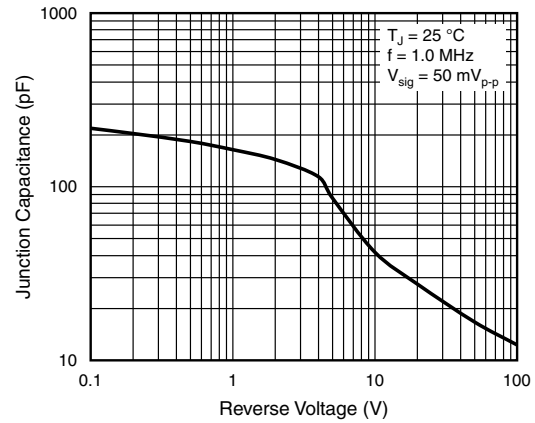


Fig. 5 - Typical Junction Capacitance

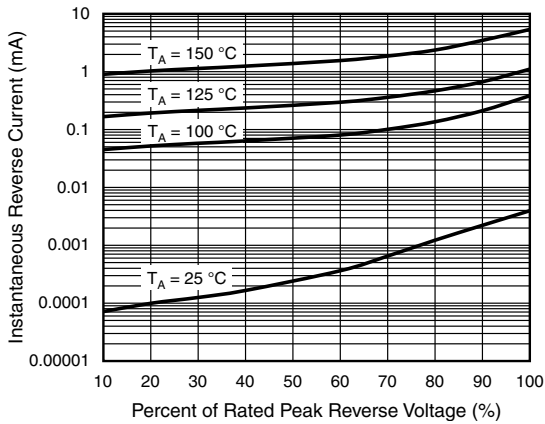


Fig. 4 - Typical Reverse Characteristics

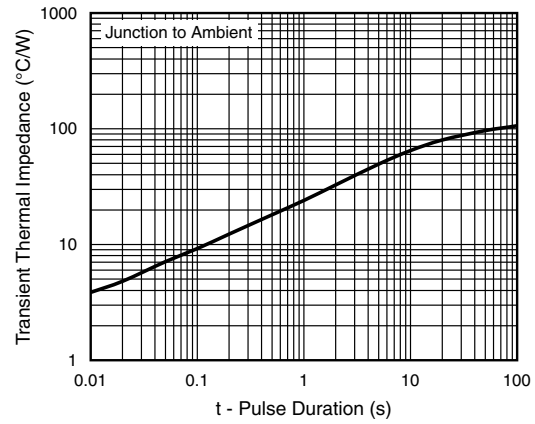
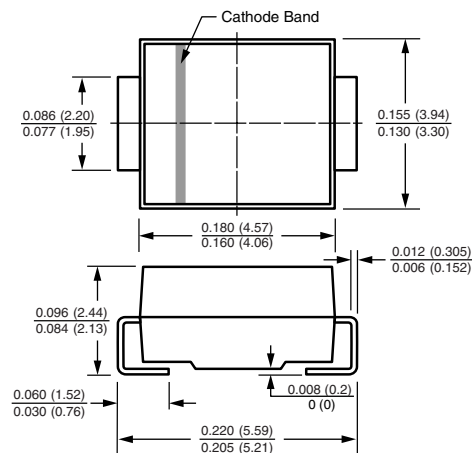


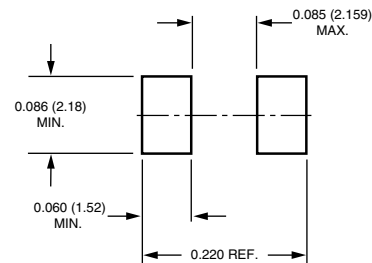
Fig. 6 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-214AA (SMB)



Mounting Pad Layout





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