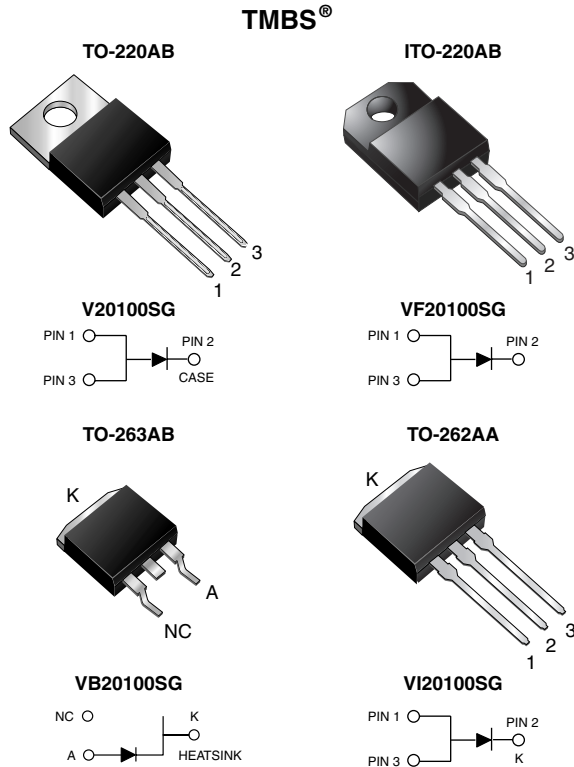




# High-Voltage Trench MOS Barrier Schottky Rectifier

Ultra Low  $V_F = 0.50\text{ V}$  at  $I_F = 5\text{ A}$



## FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Low thermal resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C (for TO-263AB package)
- Solder bath temperature 275 °C maximum, 10 s, per JESD 22-B106 (for TO-220AB, ITO-220AB, and TO-262AA package)
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC



RoHS COMPLIANT

## TYPICAL APPLICATIONS

For use in high frequency converters, switching power supplies, freewheeling diodes, OR-ing diode, dc-to-dc converters and reverse battery protection.

## MECHANICAL DATA

**Case:** TO-220AB, ITO-220AB, TO-263AB, and TO-262AA  
Molding compound meets UL 94 V-0 flammability rating  
Base P/N-E3 - RoHS compliant, commercial grade

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102  
E3 suffix meets JESD 201 class 1A whisker test

**Polarity:** As marked

**Mounting Torque:** 10 in-lbs maximum

### PRIMARY CHARACTERISTICS

|                              |        |
|------------------------------|--------|
| $I_{F(AV)}$                  | 20 A   |
| $V_{RRM}$                    | 100 V  |
| $I_{FSM}$                    | 150 A  |
| $V_F$ at $I_F = 20\text{ A}$ | 0.75 V |
| $T_J$ max.                   | 150 °C |

### MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)

| PARAMETER                                                                                                     | SYMBOL         | V20100SG | VF20100SG     | VB20100SG | VI20100SG | UNIT             |
|---------------------------------------------------------------------------------------------------------------|----------------|----------|---------------|-----------|-----------|------------------|
| Maximum repetitive peak reverse voltage                                                                       | $V_{RRM}$      |          |               | 100       |           | V                |
| Maximum average forward rectified current (fig. 1)                                                            | $I_{F(AV)}$    |          | 20            |           |           | A                |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load                            | $I_{FSM}$      |          | 150           |           |           | A                |
| Non-repetitive avalanche energy at $T_J = 25\text{ °C}$ , $L = 60\text{ mH}$                                  | $E_{AS}$       |          | 150           |           |           | mJ               |
| Peak repetitive reverse current at $t_p = 2\text{ }\mu\text{s}$ , 1 kHz, $T_J = 38\text{ °C} \pm 2\text{ °C}$ | $I_{RRM}$      |          | 1.0           |           |           | A                |
| Voltage rate of change (rated $V_R$ )                                                                         | $dV/dt$        |          | 10 000        |           |           | V/ $\mu\text{s}$ |
| Isolation voltage (ITO-220AB only) from terminal to heatsink $t = 1\text{ min}$                               | $V_{AC}$       |          | 1500          |           |           | V                |
| Operating junction and storage temperature range                                                              | $T_J, T_{STG}$ |          | - 40 to + 150 |           |           | °C               |

| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                        |                         |                               |               |      |      |
|----------------------------------------------------------------------------|------------------------|-------------------------|-------------------------------|---------------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS        |                         | SYMBOL                        | TYP.          | MAX. | UNIT |
| Breakdown voltage                                                          | I <sub>R</sub> = 10 mA | T <sub>A</sub> = 25 °C  | V <sub>BR</sub>               | 105 (minimum) | -    | V    |
| Instantaneous forward voltage                                              | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.55          | -    | V    |
|                                                                            | I <sub>F</sub> = 10 A  |                         |                               | 0.66          | -    |      |
|                                                                            | I <sub>F</sub> = 20 A  |                         |                               | 0.91          | 1.07 |      |
|                                                                            | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 125 °C |                               | 0.50          | -    |      |
|                                                                            | I <sub>F</sub> = 10 A  |                         |                               | 0.59          | -    |      |
|                                                                            | I <sub>F</sub> = 20 A  |                         |                               | 0.75          | 0.82 |      |
| Reverse current                                                            | V <sub>R</sub> = 70 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 15            | -    | μA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 6             | -    | mA   |
|                                                                            | V <sub>R</sub> = 100 V | T <sub>A</sub> = 25 °C  |                               | 60            | 350  | μA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 13            | 25   | mA   |

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: Pulse width ≤ 40 ms

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                  |          |           |           |           |      |
|-------------------------------------------------------------------------|------------------|----------|-----------|-----------|-----------|------|
| PARAMETER                                                               | SYMBOL           | V20100SG | VF20100SG | VB20100SG | VI20100SG | UNIT |
| Typical thermal resistance                                              | R <sub>θJC</sub> | 2.2      | 4.0       | 2.2       | 2.2       | °C/W |

| ORDERING INFORMATION (Example) |                 |                 |              |               |               |  |
|--------------------------------|-----------------|-----------------|--------------|---------------|---------------|--|
| PACKAGE                        | PREFERRED P/N   | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |  |
| TO-220AB                       | V20100SG-E3/4W  | 1.88            | 4W           | 50/tube       | Tube          |  |
| ITO-220AB                      | VF20100SG-E3/4W | 1.74            | 4W           | 50/tube       | Tube          |  |
| TO-263AB                       | VB20100SG-E3/4W | 1.37            | 4W           | 50/tube       | Tube          |  |
| TO-263AB                       | VB20100SG-E3/8W | 1.37            | 8W           | 800/reel      | Tape and reel |  |
| TO-262AA                       | VI20100SG-E3/4W | 1.45            | 4W           | 50/tube       | Tube          |  |

RATINGS AND CHARACTERISTICS CURVES

(T<sub>A</sub> = 25 °C unless otherwise noted)

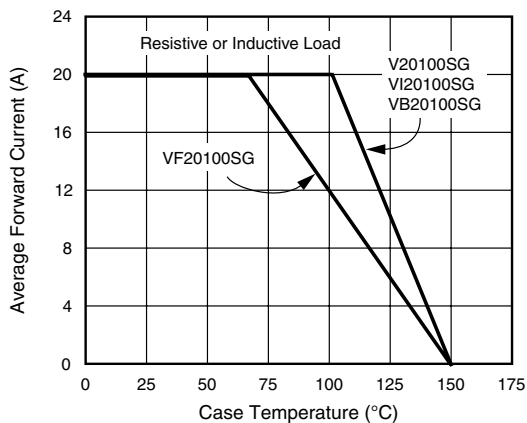


Fig. 1 - Maximum Forward Current Derating Curve

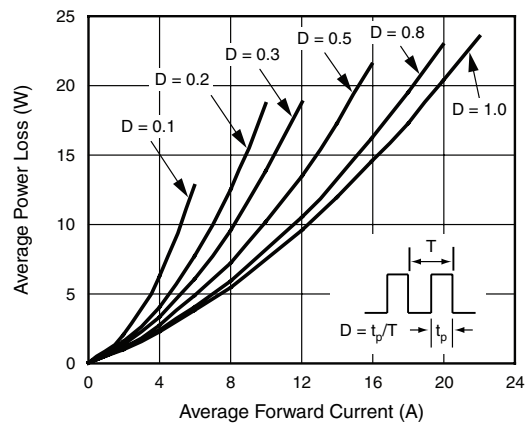


Fig. 2 - Forward Power Loss Characteristics



# V20100SG, VF20100SG, VB20100SG, VI20100SG

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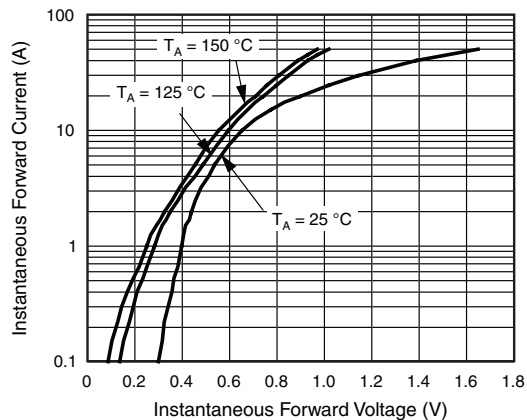


Fig. 3 - Typical Instantaneous Forward Characteristics

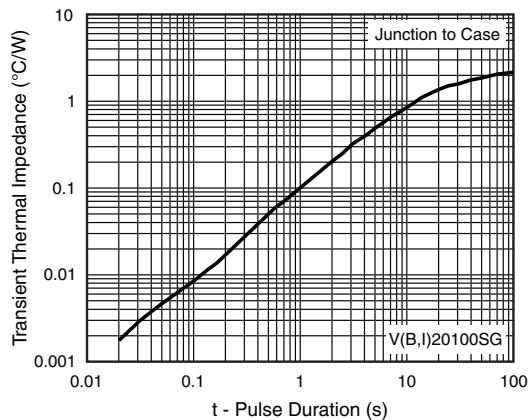


Fig. 6 - Typical Transient Thermal Impedance

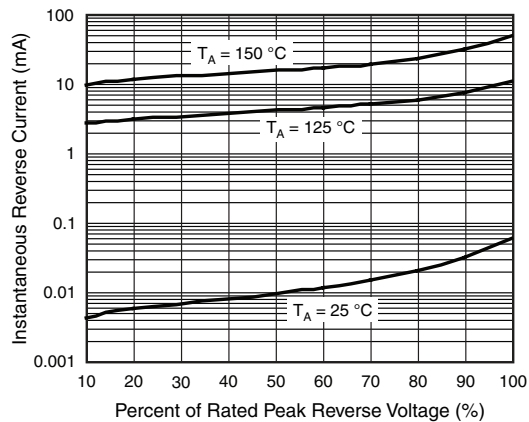


Fig. 4 - Typical Reverse Characteristics

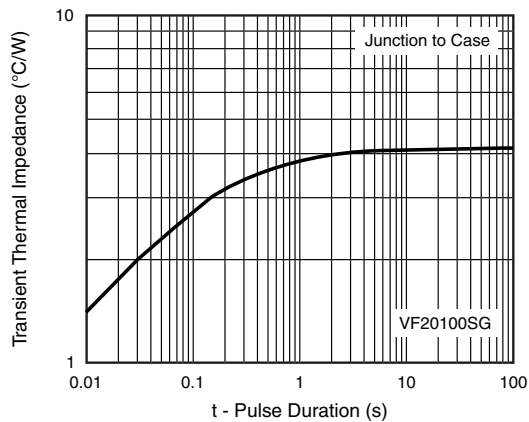


Fig. 7 - Typical Transient Thermal Impedance

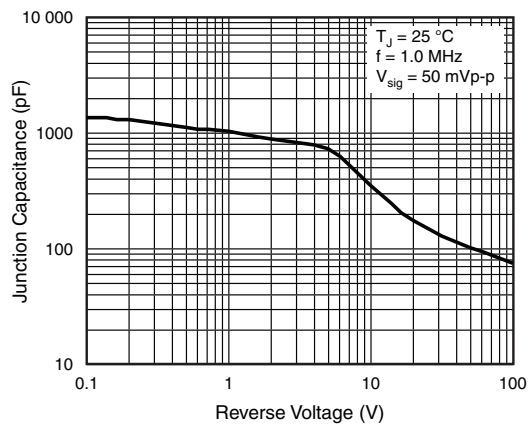


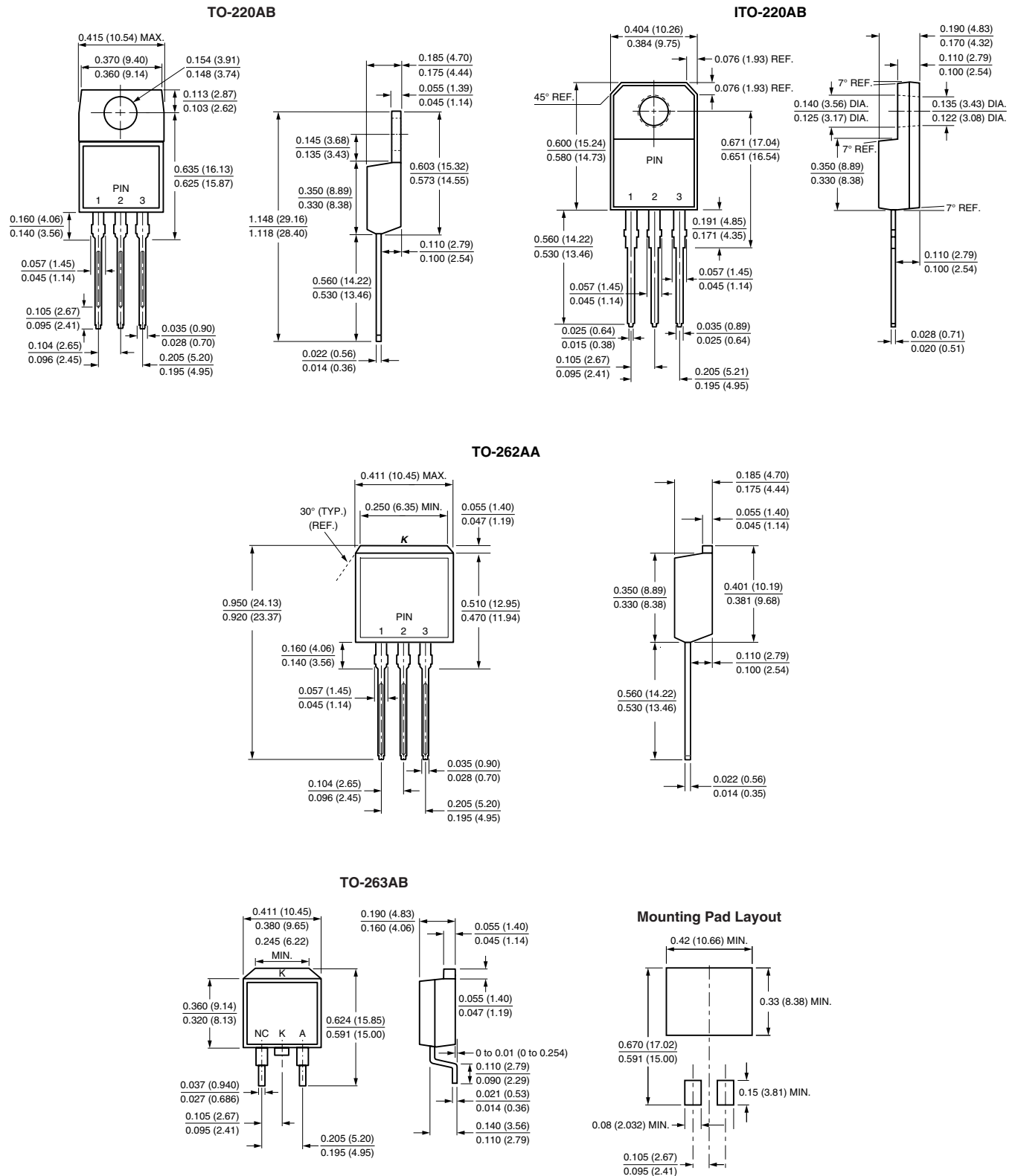
Fig. 5 - Typical Junction Capacitance

# V20100SG, VF20100SG, VB20100SG, VI20100SG

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## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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