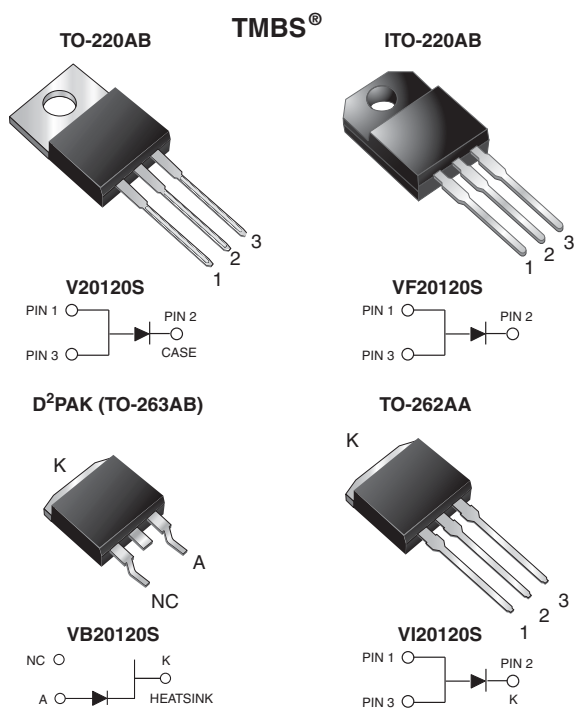




## High Voltage Trench MOS Barrier Schottky Rectifier

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



### DESIGN SUPPORT TOOLS



[click logo to get started](#)

### PRIMARY CHARACTERISTICS

|                              |                                                 |
|------------------------------|-------------------------------------------------|
| $I_{F(AV)}$                  | 20 A                                            |
| $V_{RRM}$                    | 120 V                                           |
| $I_{FSM}$                    | 200 A                                           |
| $V_F$ at $I_F = 20\text{ A}$ | 0.73 V                                          |
| $T_J$ max.                   | 150 °C                                          |
| Package                      | TO-220AB, ITO-220AB, D²PAK (TO-263AB), TO-262AA |
| Circuit configuration        | Single                                          |

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

| PARAMETER                                                                                                     | SYMBOL         | V20120S | VF20120S    | VB20120S | VI20120S | UNIT             |
|---------------------------------------------------------------------------------------------------------------|----------------|---------|-------------|----------|----------|------------------|
| Maximum repetitive peak reverse voltage                                                                       | $V_{RRM}$      |         | 120         |          |          | 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                            | $I_{FSM}$      |         | 200         |          |          | A                |
| Non-repetitive avalanche energy at $T_J = 25\text{ °C}$ , $L = 60\text{ mH}$                                  | $E_{AS}$       |         | 130         |          |          | mJ               |
| Peak repetitive reverse current at $t_p = 2\text{ }\mu\text{s}$ , 1 kHz, $T_J = 38\text{ °C} \pm 2\text{ °C}$ | $I_{RRM}$      |         | 0.5         |          |          | 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               |

### FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- 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)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

### TYPICAL APPLICATIONS

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

### MECHANICAL DATA

**Case:** TO-220AB, ITO-220AB, D²PAK (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



| 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>               | 120 (minimum) | -    | V    |
| Instantaneous forward voltage per diode                                    | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.57          | -    | V    |
|                                                                            | I <sub>F</sub> = 10 A  |                         |                               | 0.71          | -    |      |
|                                                                            | I <sub>F</sub> = 20 A  |                         |                               | 0.99          | 1.12 |      |
|                                                                            | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 125 °C |                               | 0.50          | -    |      |
|                                                                            | I <sub>F</sub> = 10 A  |                         |                               | 0.61          | -    |      |
|                                                                            | I <sub>F</sub> = 20 A  |                         |                               | 0.73          | 0.81 |      |
| Reverse current per diode                                                  | V <sub>R</sub> = 90 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 10            | -    | μA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 6             | -    | mA   |
|                                                                            | V <sub>R</sub> = 120 V | T <sub>A</sub> = 25 °C  |                               | -             | 300  | μA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 14            | 30   | mA   |

**Notes**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle(2) Pulse test: Pulse width  $\leq 40\text{ ms}$ 

| THERMAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted) |                 |         |          |          |          |                    |
|----------------------------------------------------------------------------|-----------------|---------|----------|----------|----------|--------------------|
| PARAMETER                                                                  | SYMBOL          | V20120S | VF20120S | VB20120S | VI20120S | UNIT               |
| Typical thermal resistance                                                 | $R_{\theta JC}$ | 2       | 4        | 2        | 2        | $^\circ\text{C/W}$ |

| ORDERING INFORMATION (Example) |                |                 |              |               |               |
|--------------------------------|----------------|-----------------|--------------|---------------|---------------|
| PACKAGE                        | PREFERRED P/N  | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| TO-220AB                       | V20120S-E3/4W  | 1.88            | 4W           | 50/tube       | Tube          |
| ITO-220AB                      | VF20120S-E3/4W | 1.75            | 4W           | 50/tube       | Tube          |
| TO-263AB                       | VB20120S-E3/4W | 1.38            | 4W           | 50/tube       | Tube          |
| TO-263AB                       | VB20120S-E3/8W | 1.38            | 8W           | 800/reel      | Tape and reel |
| TO-262AA                       | VI20120S-E3/4W | 1.45            | 4W           | 50/tube       | Tube          |

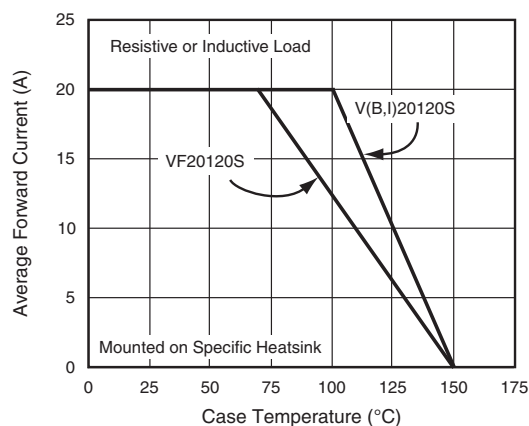
**RATINGS AND CHARACTERISTICS CURVES ( $T_A = 25^\circ\text{C}$  unless otherwise noted)**

Fig. 1 - Maximum Forward Current Derating Curve

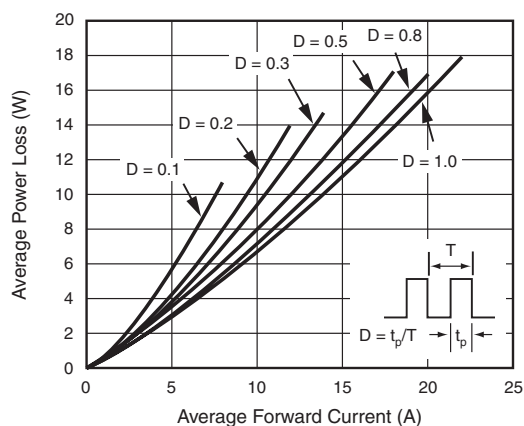


Fig. 2 - Forward Power Loss Characteristics

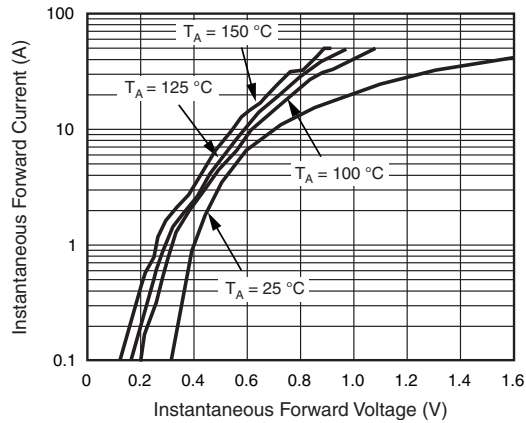


Fig. 3 - Typical Instantaneous Forward Characteristics

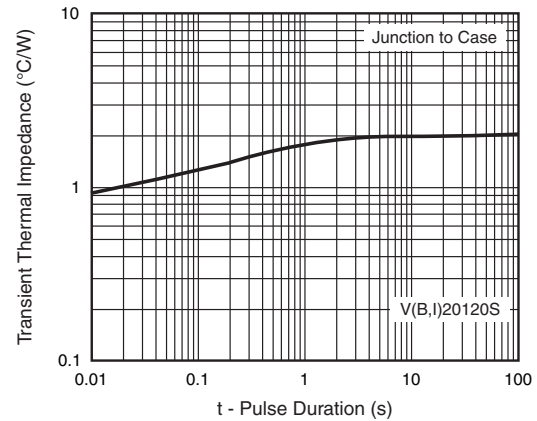


Fig. 6 - Typical Transient Thermal Impedance

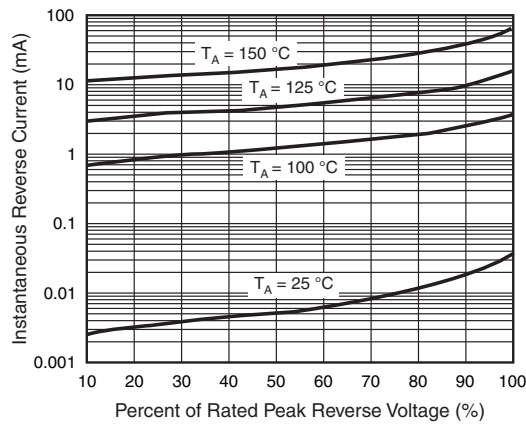


Fig. 4 - Typical Reverse Characteristics

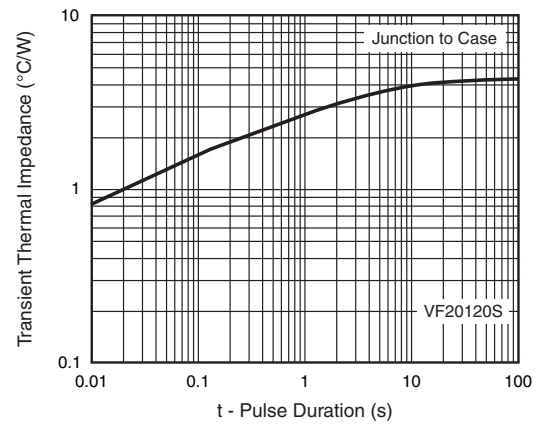


Fig. 7 - Typical Transient Thermal Impedance

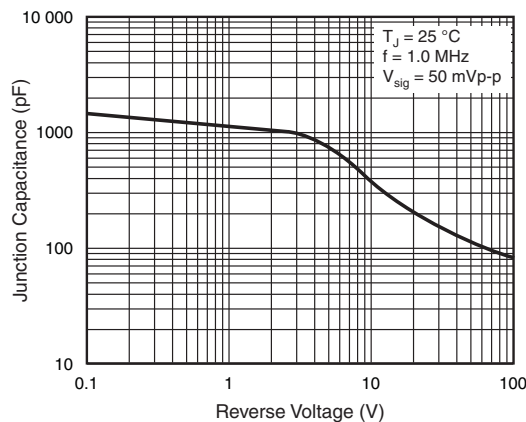
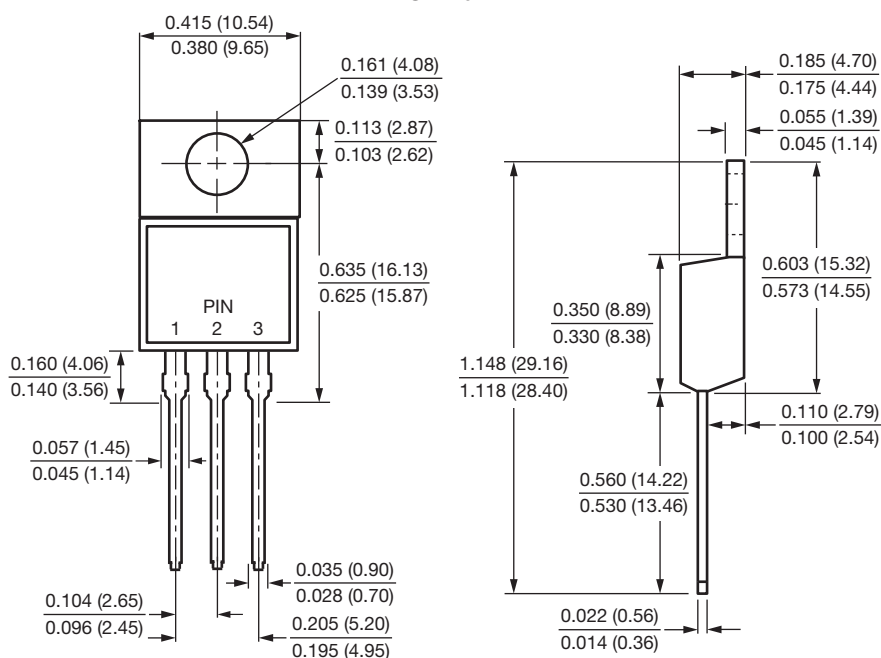


Fig. 5 - Typical Junction Capacitance

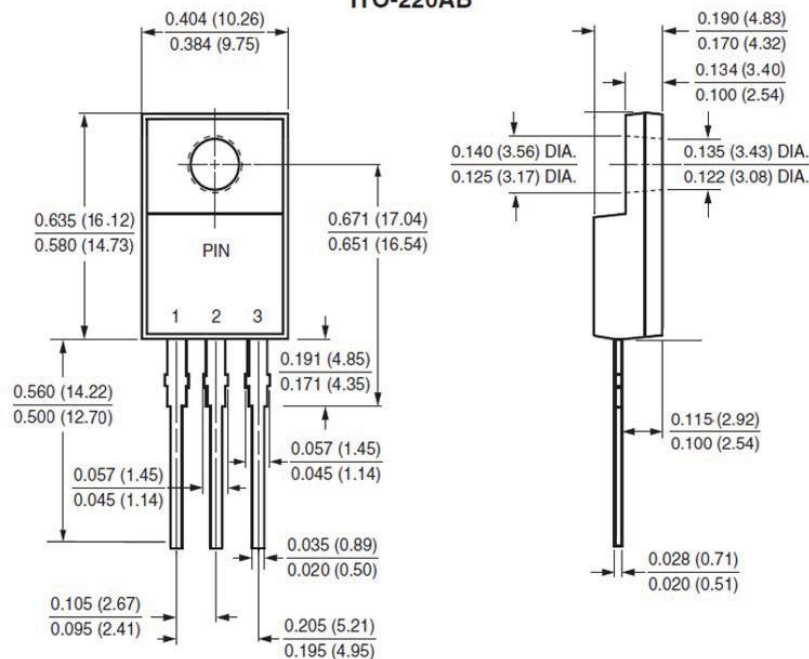


## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### TO-220AB

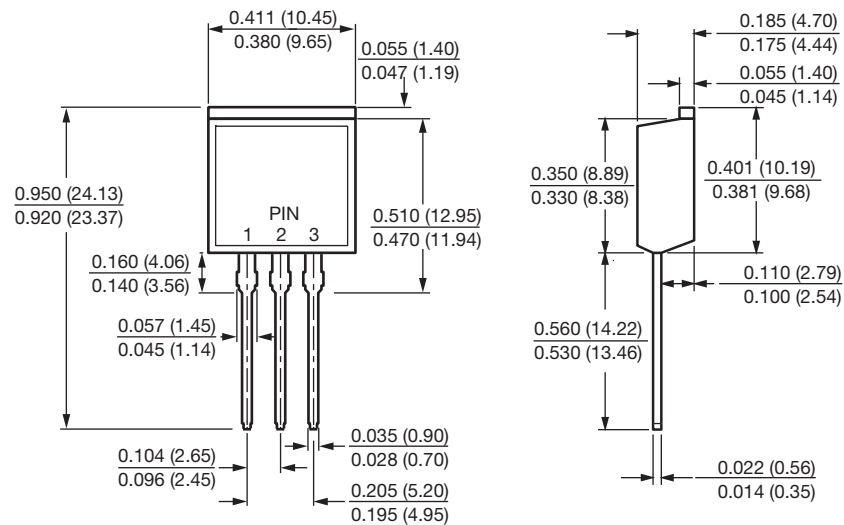


### ITO-220AB

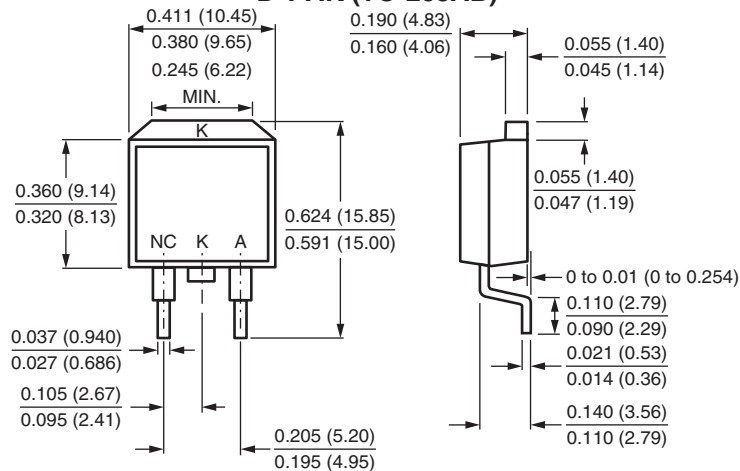




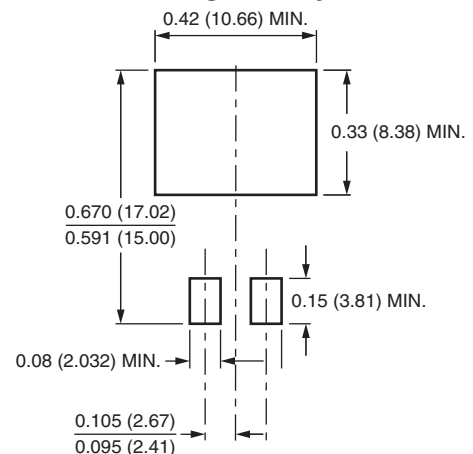
## TO-262AA



## D<sup>2</sup>PAK (TO-263AB)



## Mounting Pad Layout





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