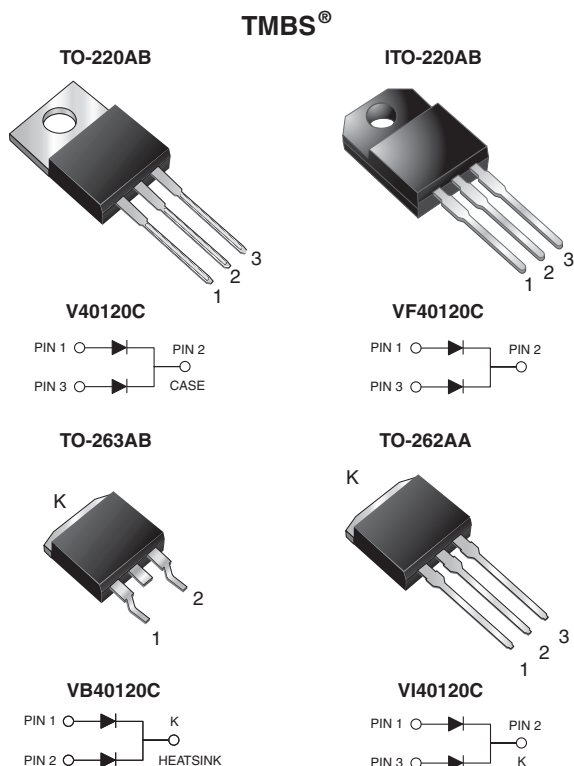


## Dual High Voltage Trench MOS Barrier Schottky Rectifier

Ultra Low  $V_F = 0.43 \text{ V}$  at  $I_F = 5 \text{ A}$



### 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, 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

|                               |                                         |
|-------------------------------|-----------------------------------------|
| $I_{F(AV)}$                   | 2 x 20 A                                |
| $V_{RRM}$                     | 120 V                                   |
| $I_{FSM}$                     | 250 A                                   |
| $V_F$ at $I_F = 20 \text{ A}$ | 0.63 V                                  |
| $T_J \text{ max.}$            | 150 °C                                  |
| Package                       | TO-220AB, ITO-220AB, TO-263AB, TO-262AA |
| Diode variation               | Common cathode                          |

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

| PARAMETER                                                                                                | SYMBOL                            | V40120C       | VF40120C | VB40120C | VI40120C | UNIT |
|----------------------------------------------------------------------------------------------------------|-----------------------------------|---------------|----------|----------|----------|------|
| Maximum repetitive peak reverse voltage                                                                  | V <sub>RRM</sub>                  | 120           |          |          |          | V    |
| Maximum average forward rectified current (fig. 1) <div>per device</div> <div>per diode</div>            | I <sub>F(AV)</sub>                | 40            |          |          |          | A    |
|                                                                                                          |                                   | 20            |          |          |          |      |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode             | I <sub>FSM</sub>                  | 250           |          |          |          | A    |
| Non-repetitive avalanche energy at T <sub>J</sub> = 25 °C, L = 100 mH per diode                          | E <sub>AS</sub>                   | 180           |          |          |          | mJ   |
| Peak repetitive reverse current at t <sub>p</sub> = 2 μs, 1 kHz, T <sub>J</sub> = 38 °C ± 2 °C per diode | I <sub>RRM</sub>                  | 0.5           |          |          |          | A    |
| Voltage rate of change (rated V <sub>R</sub> )                                                           | dV/dt                             | 10 000        |          |          |          | V/μs |
| Operating junction and storage temperature range                                                         | T <sub>J</sub> , T <sub>STG</sub> | - 40 to + 150 |          |          |          | °C   |

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

| PARAMETER                               | TEST CONDITIONS         |                         | SYMBOL                        | TYP.             | MAX. | UNIT |
|-----------------------------------------|-------------------------|-------------------------|-------------------------------|------------------|------|------|
| Breakdown voltage                       | I <sub>R</sub> = 1.0 mA | T <sub>A</sub> = 25 °C  | V <sub>BR</sub>               | 120<br>(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> | 0.50             | -    | V    |
|                                         | I <sub>F</sub> = 10 A   |                         |                               | 0.60             | -    |      |
|                                         | I <sub>F</sub> = 20 A   |                         |                               | 0.78             | 0.88 |      |
|                                         | I <sub>F</sub> = 5 A    | T <sub>A</sub> = 125 °C |                               | 0.43             | -    |      |
|                                         | I <sub>F</sub> = 10 A   |                         |                               | 0.53             | -    |      |
|                                         | I <sub>F</sub> = 20 A   |                         |                               | 0.63             | 0.71 |      |
| Reverse current per diode               | V <sub>R</sub> = 90 V   | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 19               | -    | μA   |
|                                         |                         | T <sub>A</sub> = 125 °C |                               | 10               | -    | mA   |
|                                         | V <sub>R</sub> = 120 V  | T <sub>A</sub> = 25 °C  |                               | -                | 500  | μA   |
|                                         |                         | T <sub>A</sub> = 125 °C |                               | 22               | 45   | 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** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| PARAMETER                            | SYMBOL          | V40120C | VF40120C | VB40120C | VI40120C | UNIT                 |
|--------------------------------------|-----------------|---------|----------|----------|----------|----------------------|
| Typical thermal resistance per diode | $R_{\theta JC}$ | 1.8     | 4.0      | 1.8      | 1.8      | $^{\circ}\text{C/W}$ |

**ORDERING INFORMATION** (Example)

| PACKAGE   | PREFERRED P/N  | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
|-----------|----------------|-----------------|--------------|---------------|---------------|
| TO-220AB  | V40120C-E3/4W  | 1.88            | 4W           | 50/tube       | Tube          |
| ITO-220AB | VF40120C-E3/4W | 1.76            | 4W           | 50/tube       | Tube          |
| TO-263AB  | VB40120C-E3/4W | 1.39            | 4W           | 50/tube       | Tube          |
| TO-263AB  | VB40120C-E3/8W | 1.39            | 8W           | 800/reel      | Tape and reel |
| TO-262AA  | VI40120C-E3/4W | 1.46            | 4W           | 50/tube       | Tube          |

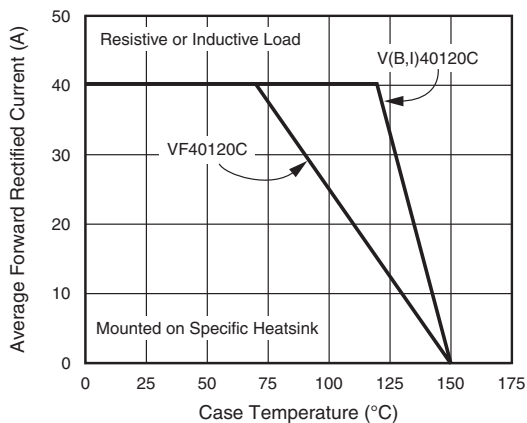
**RATINGS AND CHARACTERISTICS CURVES**( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

Fig. 1 - Maximum Forward Current Derating Curve

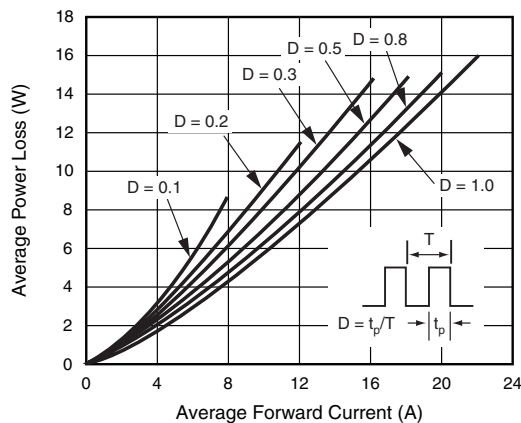


Fig. 2 - Forward Power Loss Characteristics Per Diode

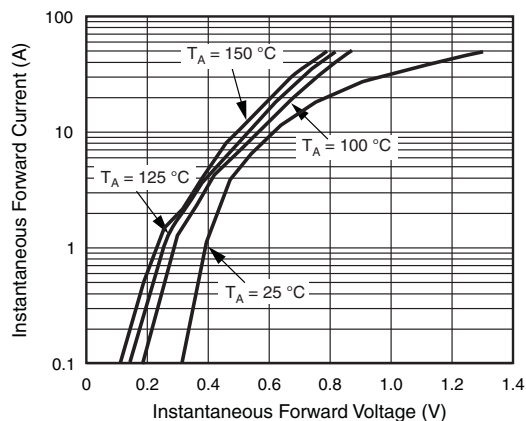


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

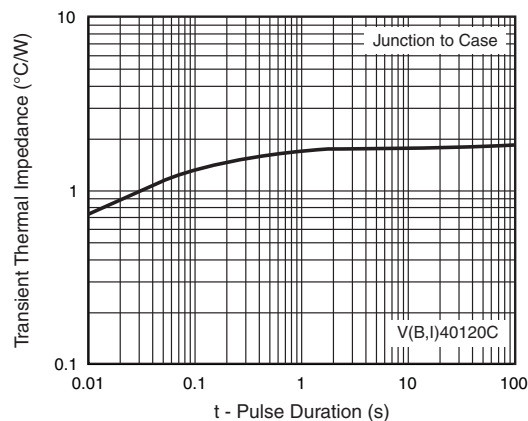


Fig. 6 - Typical Transient Thermal Impedance Per Diode

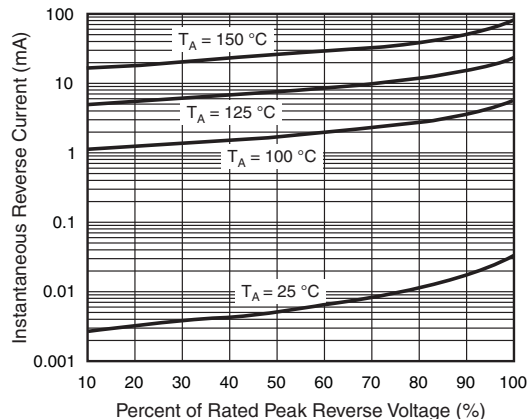


Fig. 4 - Typical Reverse Characteristics Per Diode

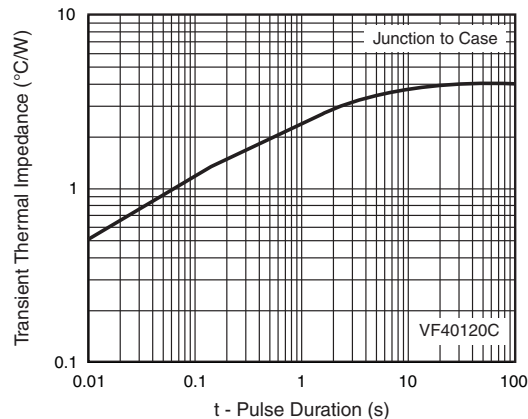


Fig. 7 - Typical Transient Thermal Impedance Per Diode

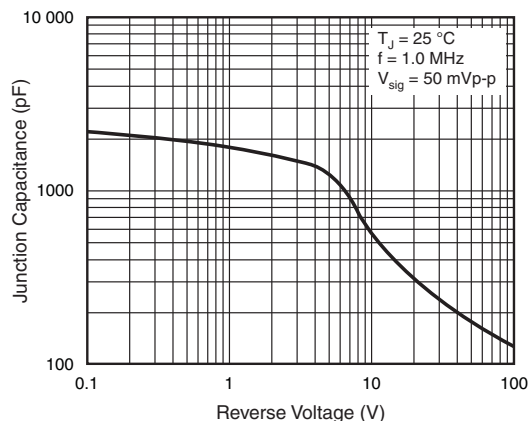
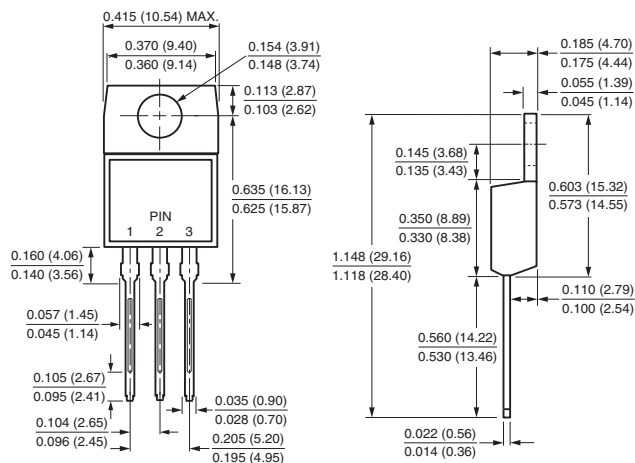


Fig. 5 - Typical Junction Capacitance Per Diode

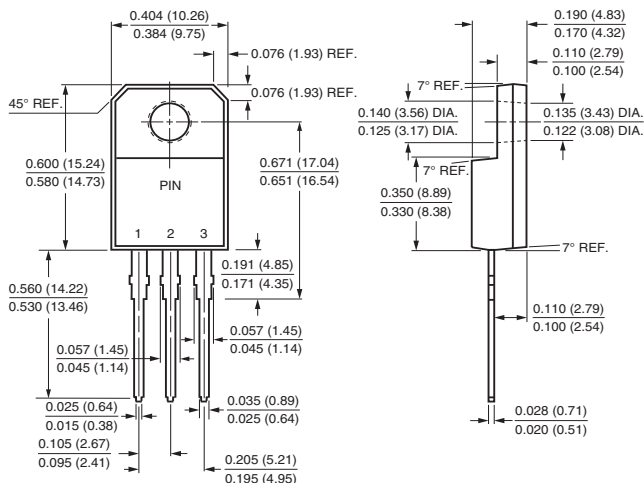


## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

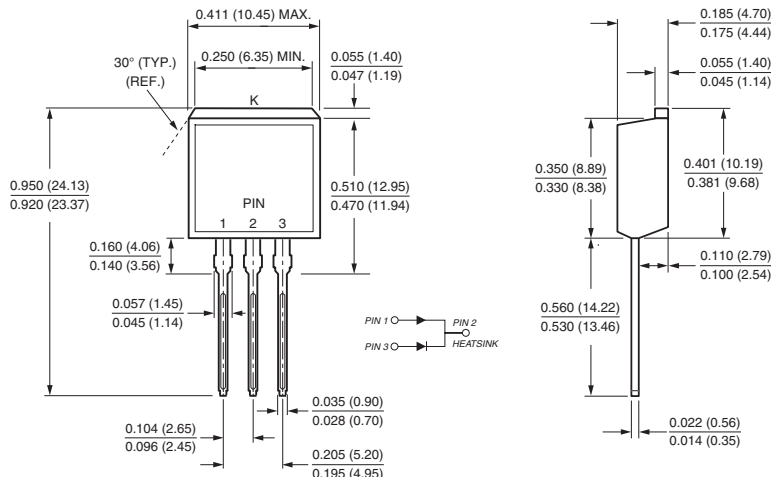
TO-220AB



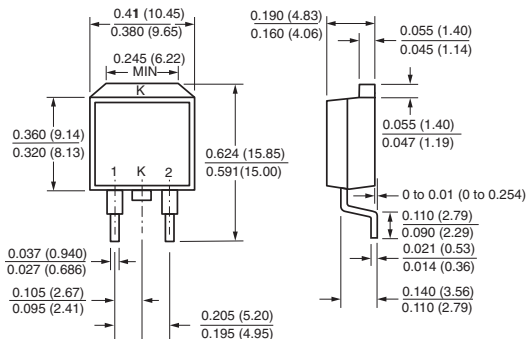
ITO-220AB



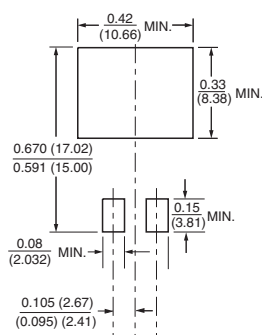
TO-262AA



TO-263AB



Mounting Pad Layout





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