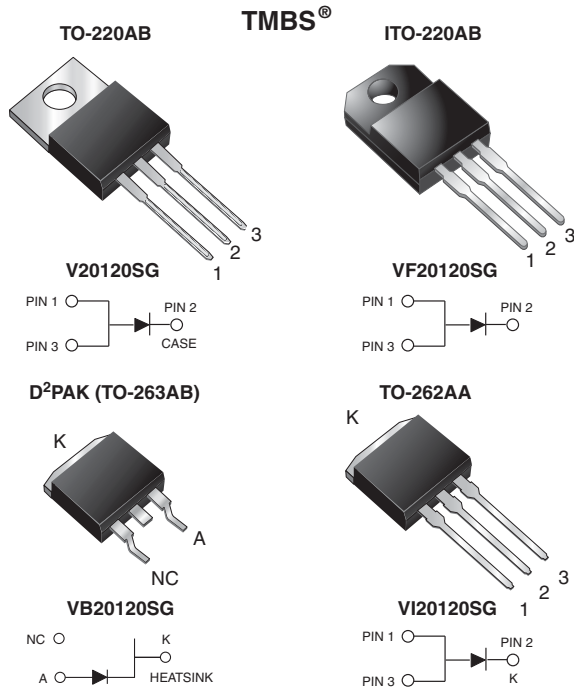




## High Voltage Trench MOS Barrier Schottky Rectifier

Ultra Low  $V_F = 0.54\text{ V}$  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, D<sup>2</sup>PAK (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

### DESIGN SUPPORT TOOLS

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PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	20 A
$V_{RRM}$	120 V
$I_{FSM}$	150 A
$V_F$ at $I_F = 20\text{ A}$	0.78 V
$T_J$ max.	150 °C
Package	TO-220AB, ITO-220AB, D <sup>2</sup> PAK (TO-263AB), TO-262AA
Circuit configuration	Single

MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)						
PARAMETER	SYMBOL	V20120SG	VF20120SG	VB20120SG	VI20120SG	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	$I_{FSM}$			150		A
Non-repetitive avalanche energy at $T_J = 25\text{ °C}$ , $L = 60\text{ mH}$	$E_{AS}$			80		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
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> = 1.0 mA	T <sub>A</sub> = 25 °C	V <sub>BR</sub>	120 (minimum)	-	V
Instantaneous forward voltage	I <sub>F</sub> = 5 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> (1)	0.62	-	V
	I <sub>F</sub> = 10 A			0.81	-	
	I <sub>F</sub> = 20 A			1.20	1.33	
	I <sub>F</sub> = 5 A	T <sub>A</sub> = 125 °C		0.54	-	
	I <sub>F</sub> = 10 A			0.65	-	
	I <sub>F</sub> = 20 A			0.78	0.88	
Reverse current	V <sub>R</sub> = 90 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> (2)	10	-	μA
		T <sub>A</sub> = 125 °C		7	-	mA
	V <sub>R</sub> = 120 V	T <sub>A</sub> = 25 °C		-	250	μA
		T <sub>A</sub> = 125 °C		12	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	V20120SG	VF20120SG	VB20120SG	VI20120SG	UNIT
Typical thermal resistance	R <sub>θJC</sub>	2.2	4.2	2.2	2.2	°C/W

ORDERING INFORMATION (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
TO-220AB	V20120SG-E3/4W	1.88	4W	50/tube	Tube
ITO-220AB	VF20120SG-E3/4W	1.75	4W	50/tube	Tube
TO-263AB	VB20120SG-E3/4W	1.38	4W	50/tube	Tube
TO-263AB	VB20120SG-E3/8W	1.38	8W	800/reel	Tape and reel
TO-262AA	VI20120SG-E3/4W	1.45	4W	50/tube	Tube

**RATINGS AND CHARACTERISTICS CURVES (T<sub>A</sub> = 25 °C unless otherwise noted)**

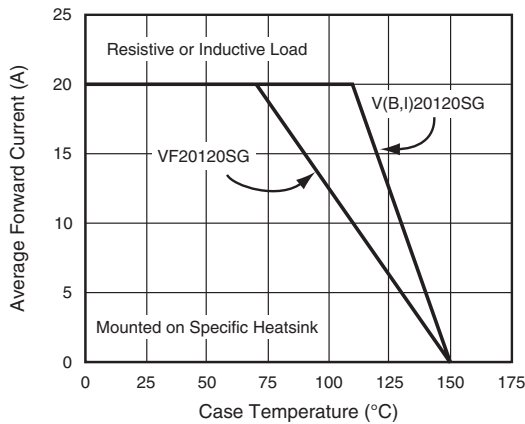


Fig. 1 - Forward Current Derating Curve

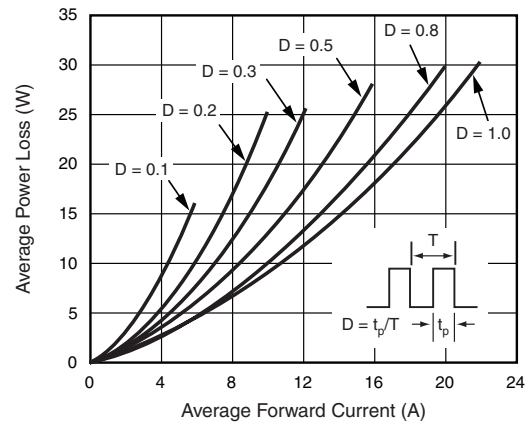


Fig. 2 - Forward Power Loss Characteristics

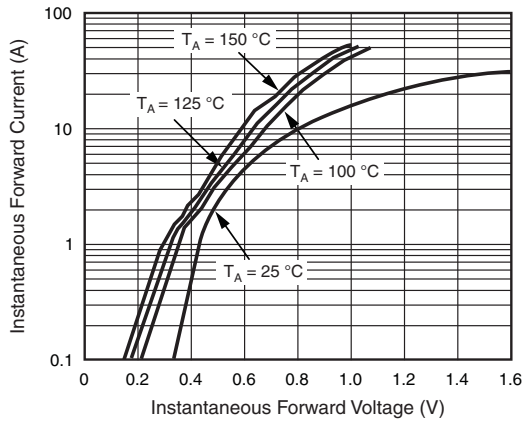


Fig. 3 - Typical Instantaneous Forward Characteristics

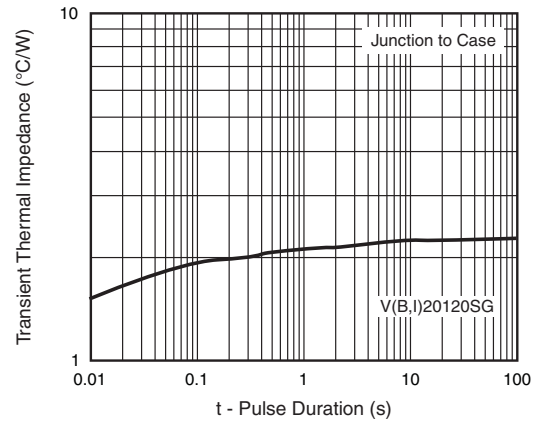


Fig. 6 - Typical Transient Thermal Impedance

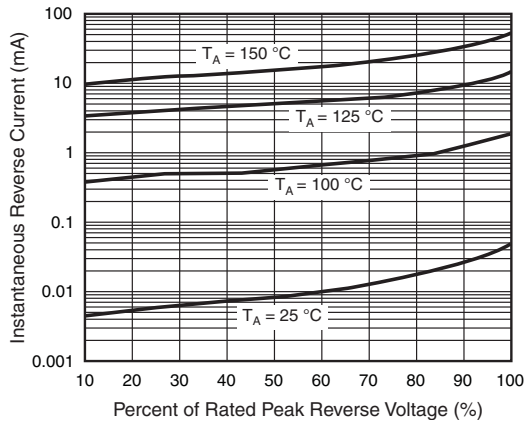


Fig. 4 - Typical Reverse Characteristics

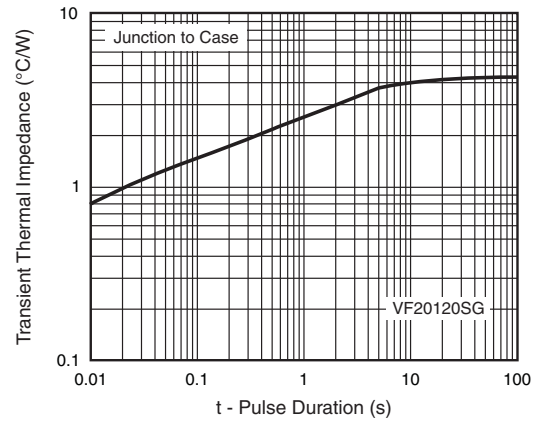


Fig. 7 - Typical Transient Thermal Impedance

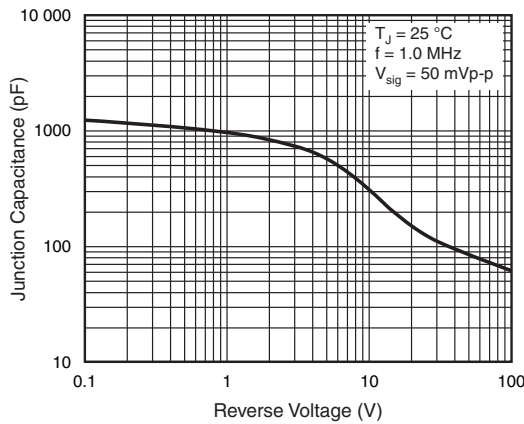
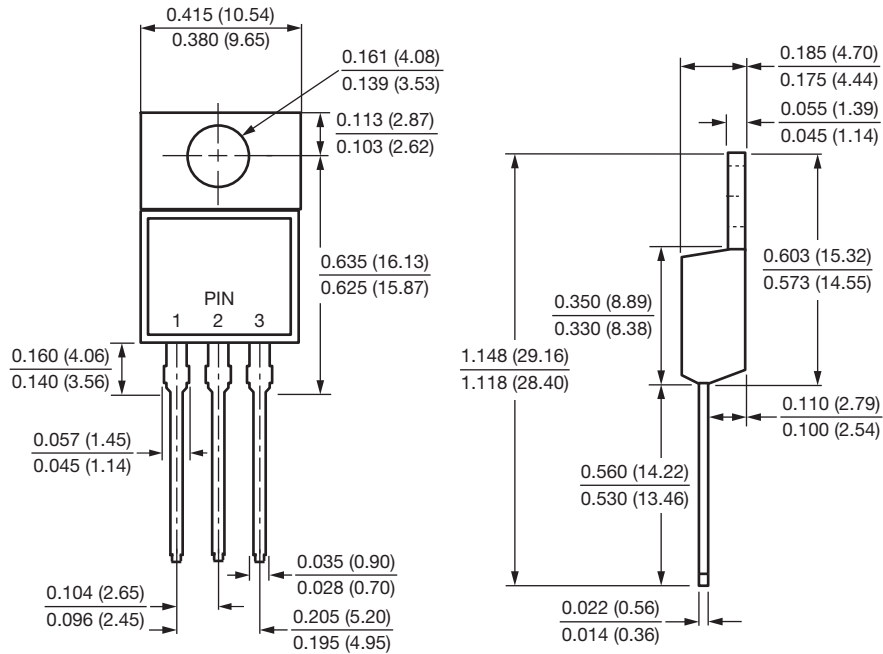


Fig. 5 - Typical Junction Capacitance

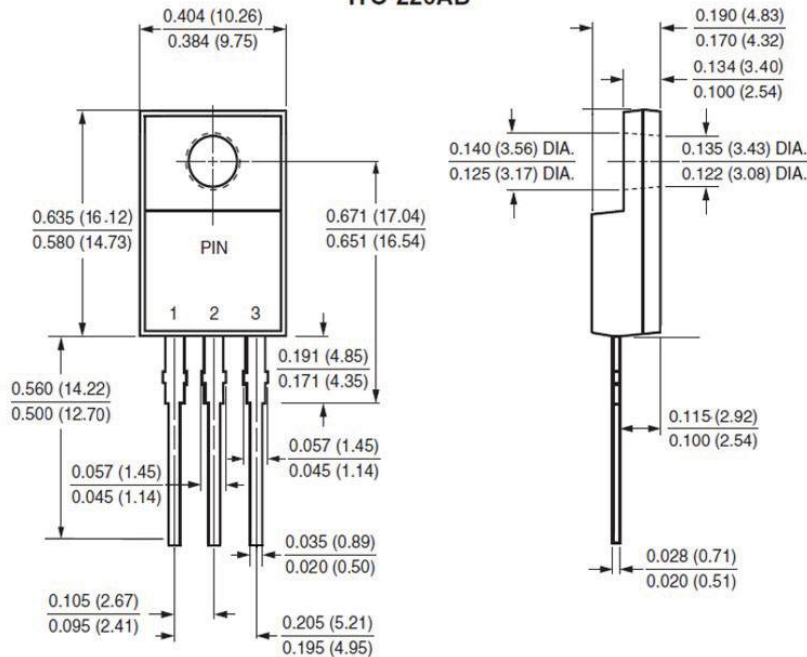


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

TO-220AB

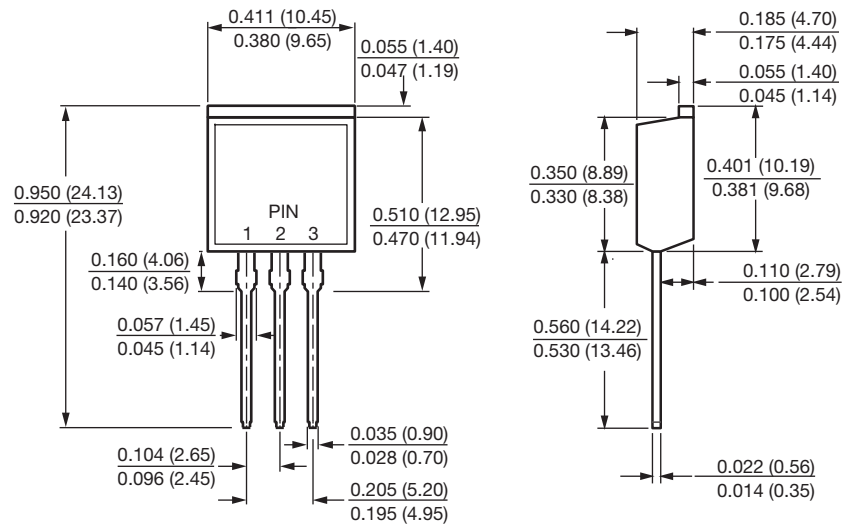


ITO-220AB

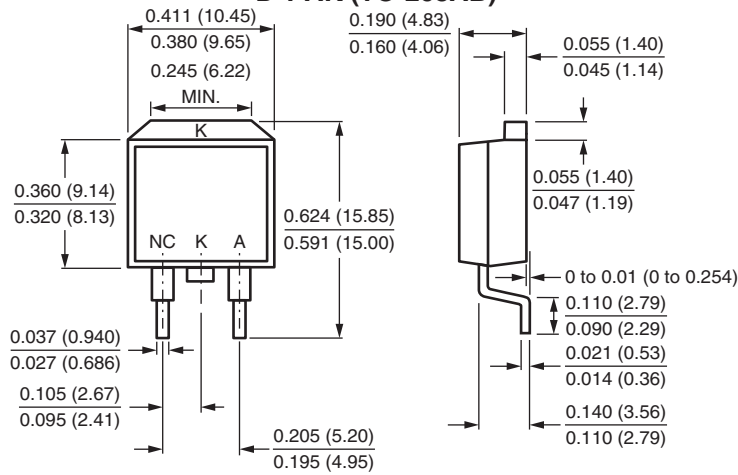




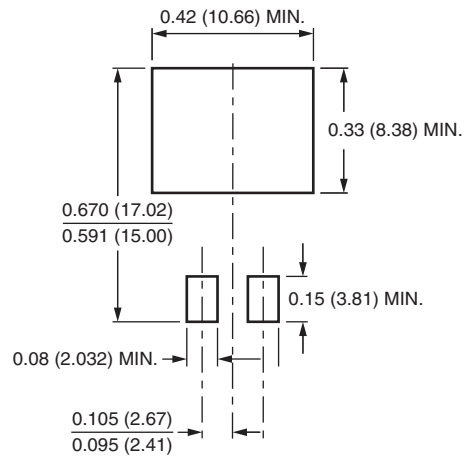
TO-262AA



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



Mounting Pad Layout





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