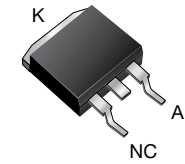




# High Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.446\text{ V}$  at  $I_F = 5\text{ A}$

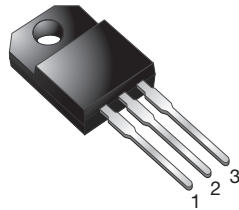
D<sup>2</sup>PAK (TO-263AB)



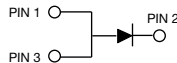
VB20100S



ITO-220AB



VF20100S



## 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 D<sup>2</sup>PAK (TO-263AB) package)
- Solder bath temperature 275 °C maximum, 10 s, per JESD 22-B106 (for ITO-220AB package)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS COMPLIANT HALOGEN FREE

## 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:** ITO-220AB, D<sup>2</sup>PAK (TO-263AB)

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

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

VF20100-M3 suffix meets JESD 201 class 1A whisker test

VI20100-M3 suffix meets JESD 201 class 2 whisker test

**Polarity:** as marked

**Mounting Torque:** 10 in-lbs max.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	20 A
$V_{RRM}$	100 V
$I_{FSM}$	250 A
$V_F$ at $I_F = 20\text{ A}$	0.69 V
$T_J$ max.	150 °C
Package	ITO-220AB, D <sup>2</sup> PAK (TO-263AB)
Circuit configuration	Single

MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)				
PARAMETER	SYMBOL	VF20100S	VB20100S	UNIT
Max. repetitive peak reverse voltage	$V_{RRM}$	100		V
Max. 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	$I_{FSM}$	250		A
Non-repetitive avalanche energy at $T_J = 25\text{ °C}$ , $L = 60\text{ mH}$	$E_{AS}$	210		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

<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Breakdown voltage	$I_R = 10\text{ mA}$	$T_A = 25\text{ }^\circ\text{C}$	$V_{BR}$	105 (min.)	-	V
Instantaneous forward voltage	$I_F = 5\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.51	-	V
	$I_F = 10\text{ A}$			0.60	-	
	$I_F = 20\text{ A}$			0.79	0.90	
	$I_F = 5\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.45	-	
	$I_F = 10\text{ A}$			0.53	-	
	$I_F = 20\text{ A}$			0.69	0.76	
Reverse current	$V_R = 70\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	17	-	$\mu\text{A}$
		$T_A = 125\text{ }^\circ\text{C}$		7	-	$\text{mA}$
	$V_R = 100\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$		70	500	$\mu\text{A}$
		$T_A = 125\text{ }^\circ\text{C}$		14	30	$\text{mA}$

**Notes**

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

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)				
PARAMETER	SYMBOL	VF20100S	VB20100S	UNIT
Typical thermal resistance	$R_{\theta JC}$	4.0	2.0	$^\circ\text{C/W}$

<b>ORDERING INFORMATION</b> (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
ITO-220AB	VF20100S-M3/4W	1.75	4W	50/tube	Tube
D <sup>2</sup> PAK (TO-263AB)	VB20100S-M3/4W	1.37	4W	50/tube	Tube
D <sup>2</sup> PAK (TO-263AB)	VB20100S-M3/8W	1.37	8W	800/reel	Tape and reel

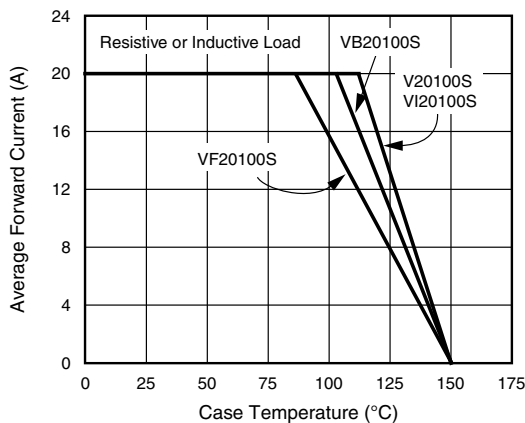
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

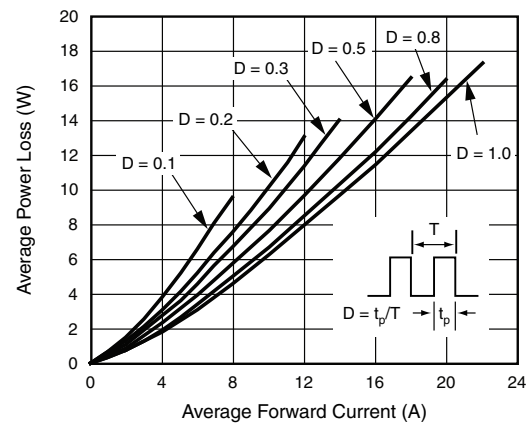


Fig. 2 - Forward Power Loss Characteristics

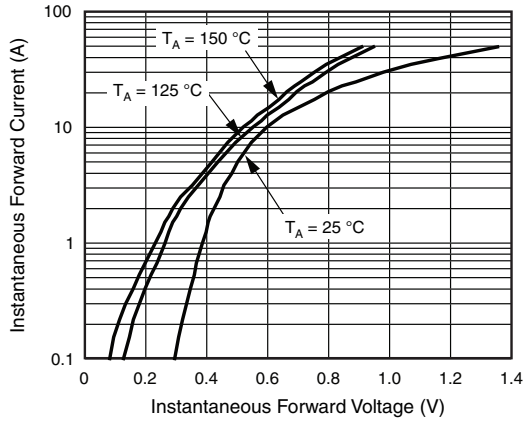


Fig. 3 - Typical Instantaneous Forward Characteristics

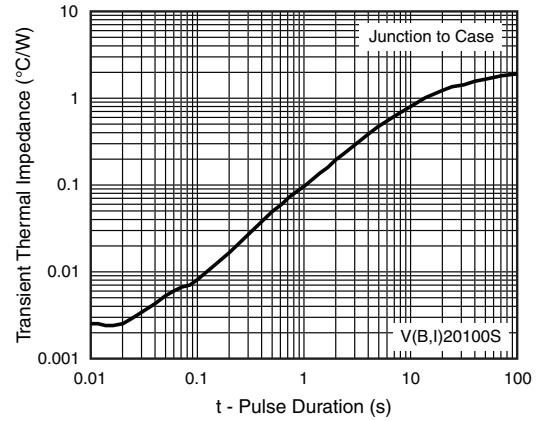


Fig. 6 - Typical Transient Thermal Impedance

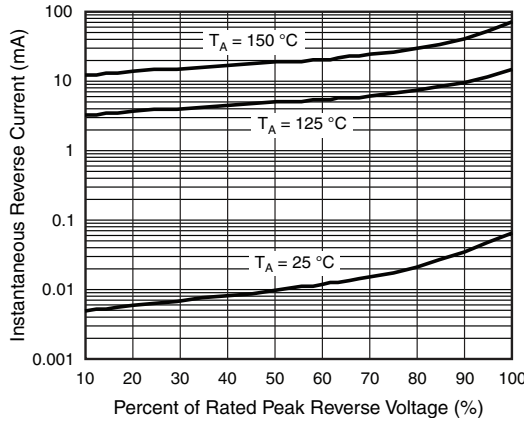


Fig. 4 - Typical Reverse Characteristics

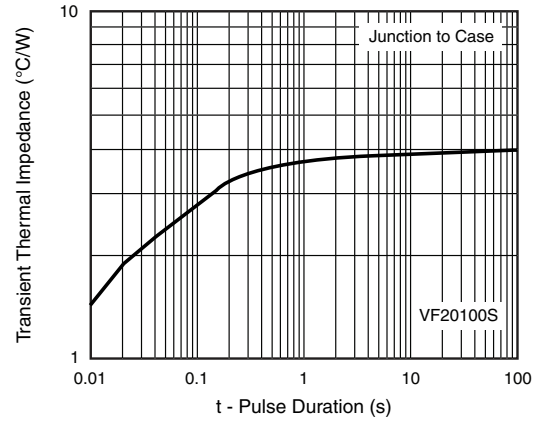


Fig. 7 - Typical Transient Thermal Impedance

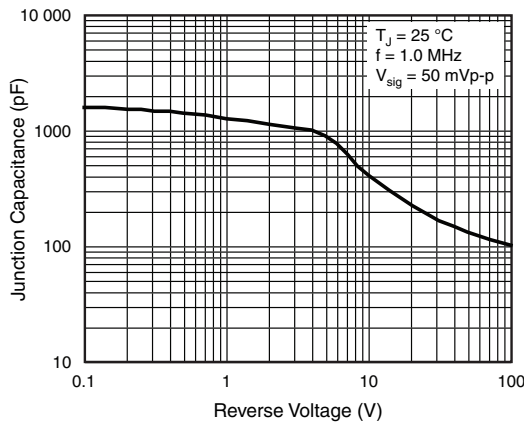
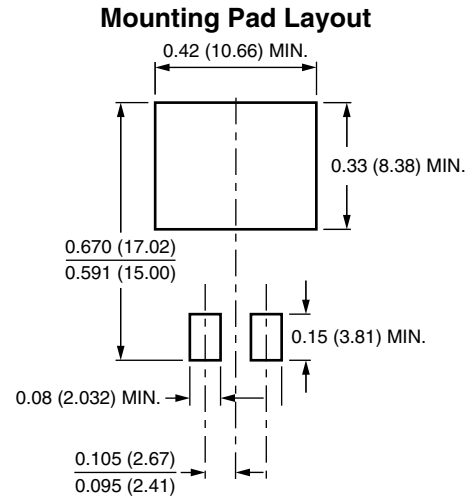
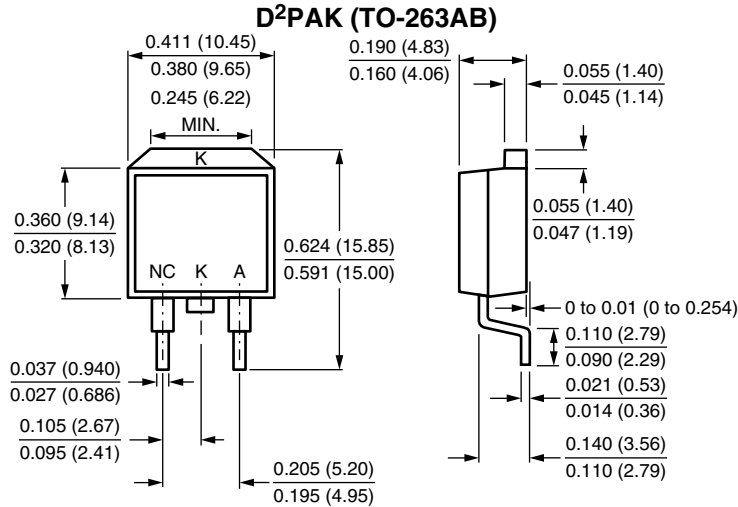
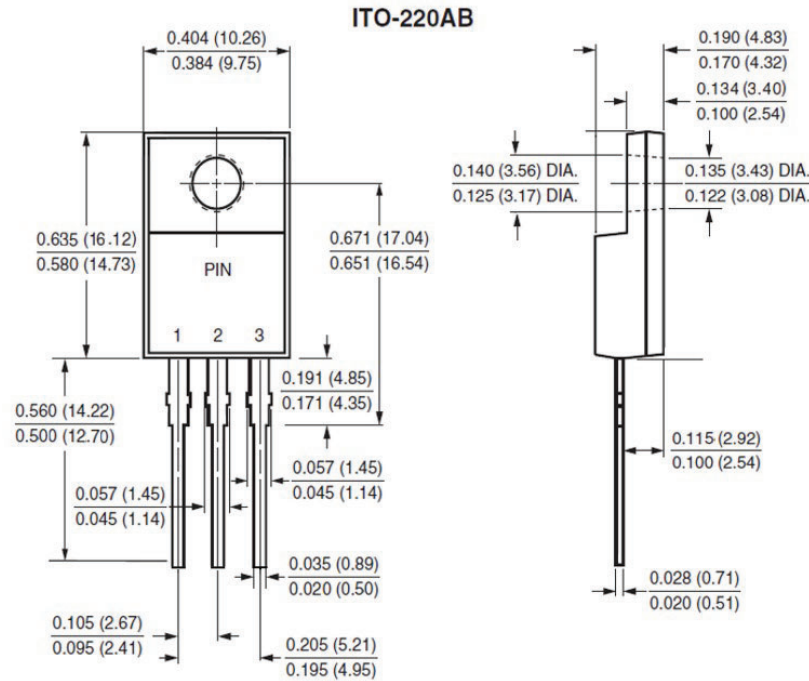


Fig. 5 - Typical Junction Capacitance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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