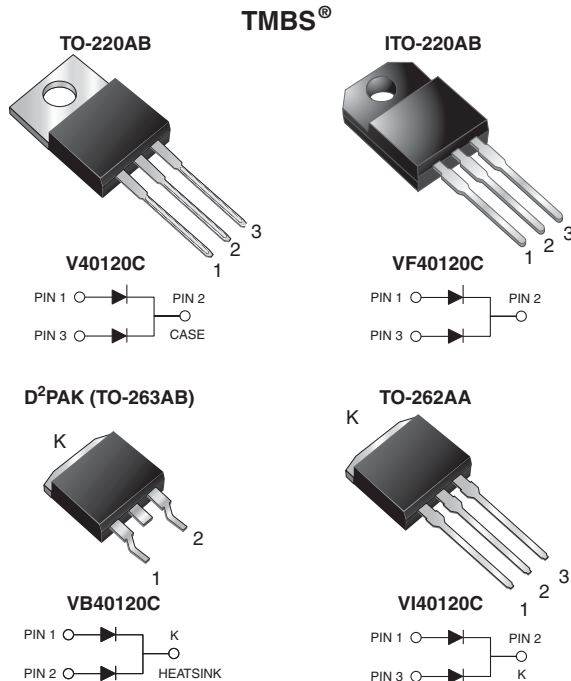


# Dual High Voltage Trench MOS Barrier Schottky Rectifier

 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, 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  
 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

E3 and M3 suffix meet JESD 201 class 1A whisker test

**Polarity:** as marked

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

## DESIGN SUPPORT TOOLS

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PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 20 A
$V_{RRM}$	120 V
$I_{FSM}$	250 A
$V_F$ at $I_F = 20 \text{ A}$	0.63 V
$T_J$ max.	150 °C
Package	TO-220AB, ITO-220AB, D <sup>2</sup> PAK (TO-263AB), TO-262AA
Circuit configuration	Common cathode

MAXIMUM RATINGS ( $T_A = 25 \text{ °C}$ unless otherwise noted)						
PARAMETER	SYMBOL	V40120C	VF40120C	VB40120C	VI40120C	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	120				V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}$	per device	40			A
		per diode	20			
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode	$I_{FSM}$	250				A
Non-repetitive avalanche energy at $T_J = 25 \text{ °C}$ , $L = 100 \text{ mH}$ per diode	$E_{AS}$	180				mJ
Peak repetitive reverse current at $t_p = 2 \text{ } \mu\text{s}$ , 1 kHz, $T_J = 38 \text{ °C} \pm 2 \text{ °C}$ per diode	$I_{RRM}$	0.5				A
Voltage rate of change (rated $V_F$ )	dV/dt	10 000				V/ $\mu\text{s}$
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	$I_R = 1.0\text{ mA}$	$T_A = 25\text{ }^\circ\text{C}$	$V_{BR}$	120 (minimum)	-	V
Instantaneous forward voltage per diode	$I_F = 5\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.50	-	V
	$I_F = 10\text{ A}$			0.60	-	
	$I_F = 20\text{ A}$			0.78	0.88	
	$I_F = 5\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.43	-	
	$I_F = 10\text{ A}$			0.53	-	
	$I_F = 20\text{ A}$			0.63	0.71	
Reverse current per diode	$V_R = 90\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	19	-	$\mu\text{A}$
		$T_A = 125\text{ }^\circ\text{C}$		10	-	mA
	$V_R = 120\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$		-	500	$\mu\text{A}$
		$T_A = 125\text{ }^\circ\text{C}$		22	45	mA

**Notes**

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

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ 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	$^\circ\text{C/W}$

<b>ORDERING INFORMATION</b> (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
TO-220AB	V40120C-M3/4W	1.88	4W	50/tube	Tube
ITO-220AB	VF40120C-M3/4W	1.76	4W	50/tube	Tube
TO-263AB	VB40120C-M3/4W	1.39	4W	50/tube	Tube
TO-263AB	VB40120C-M3/8W	1.39	8W	800/reel	Tape and reel
TO-262AA	VI40120C-M3/4W	1.46	4W	50/tube	Tube

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

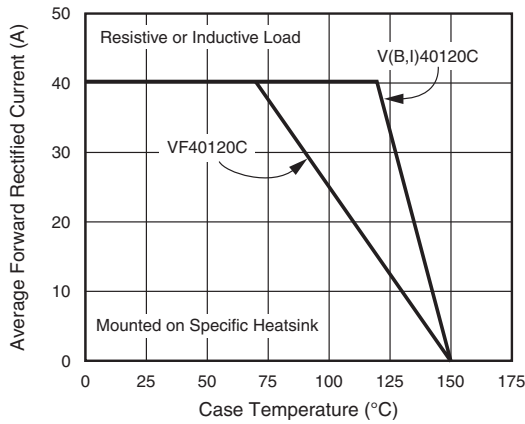


Fig. 1 - Maximum Forward Current Derating Curve

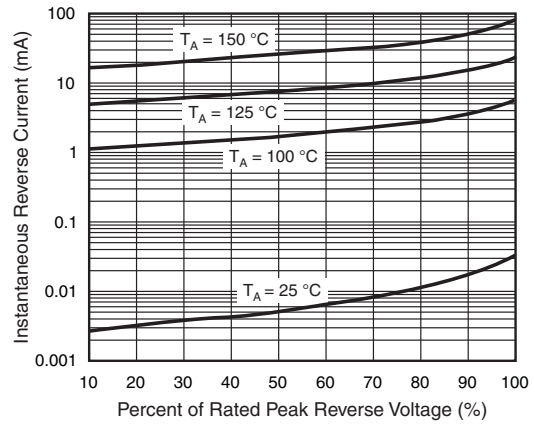


Fig. 4 - Typical Reverse Characteristics Per Diode

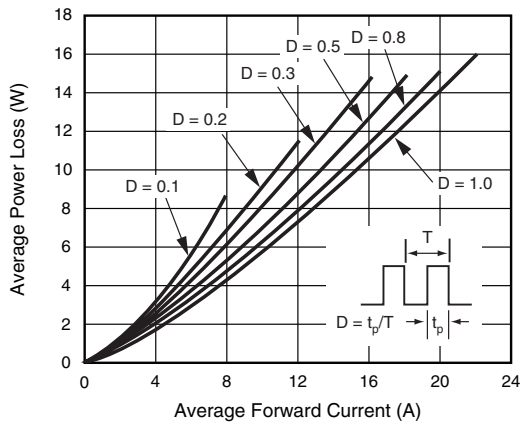


Fig. 2 - Forward Power Loss Characteristics Per Diode

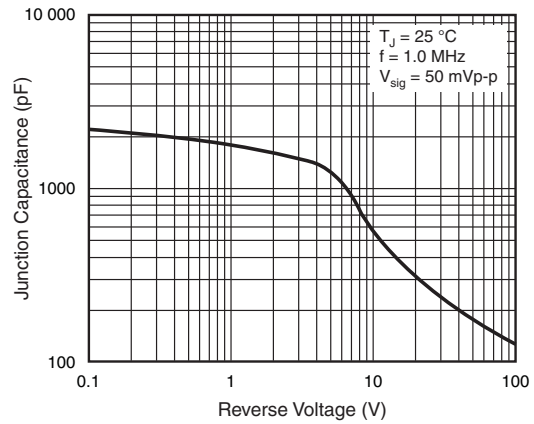


Fig. 5 - Typical Junction Capacitance Per Diode

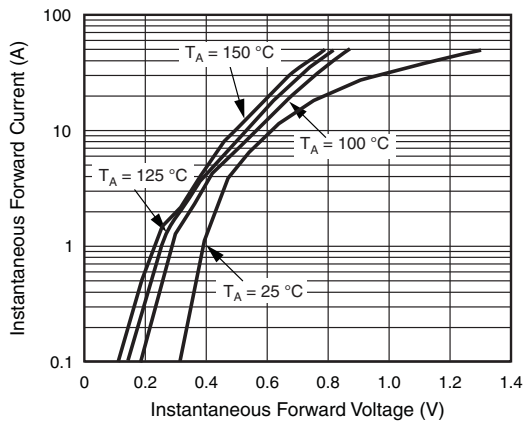


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

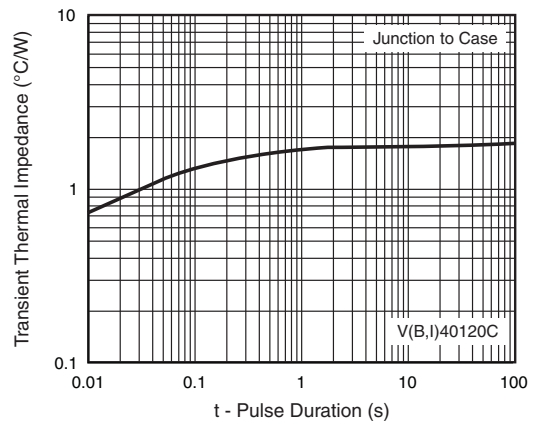


Fig. 6 - Typical Transient Thermal Impedance Per Diode

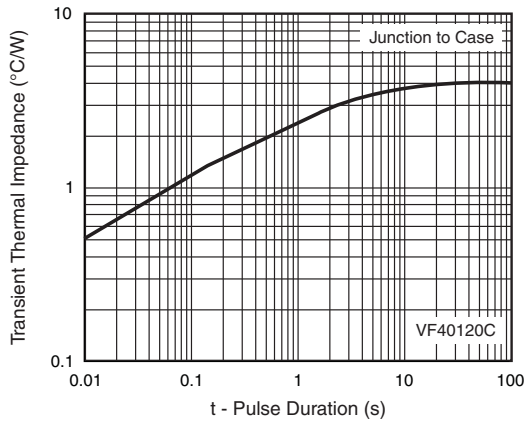
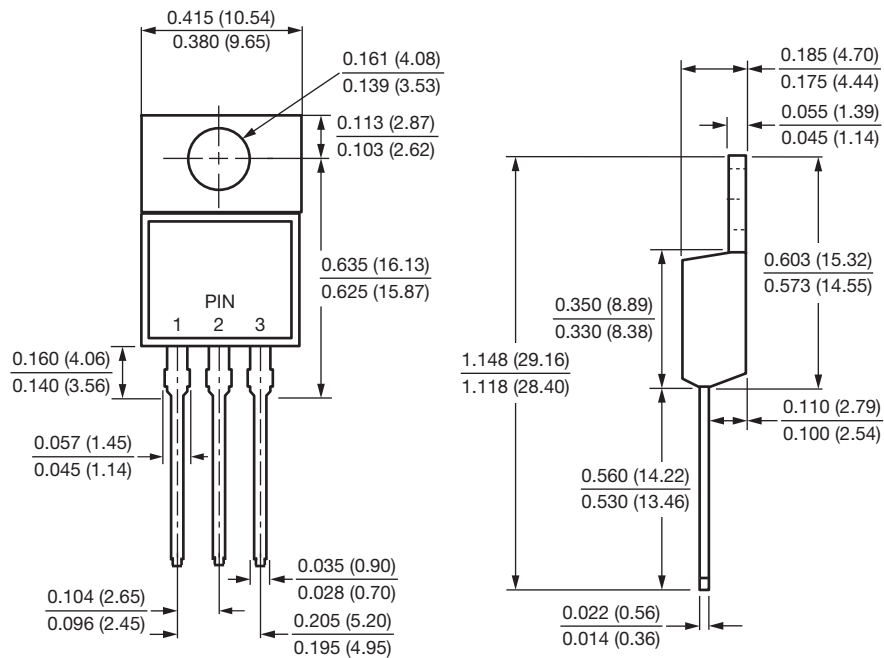


Fig. 7 - Typical Transient Thermal Impedance Per Diode

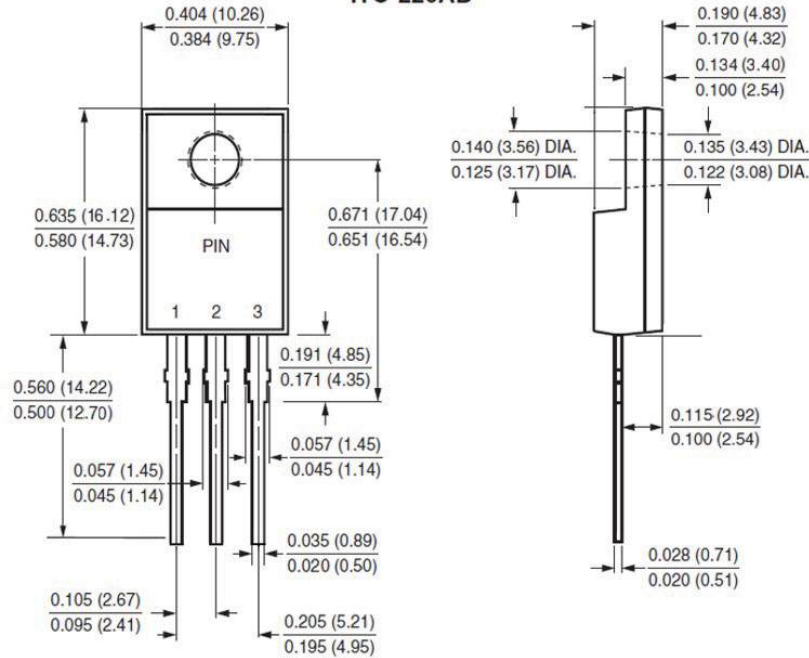
## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### TO-220AB

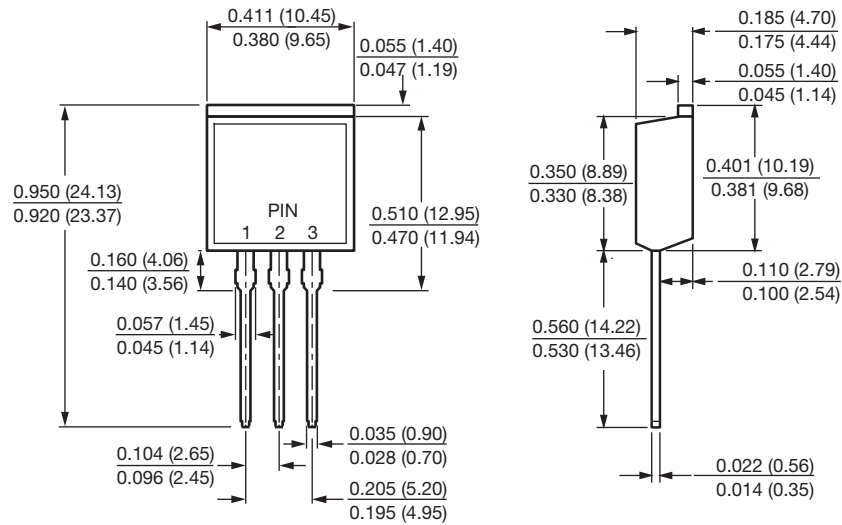




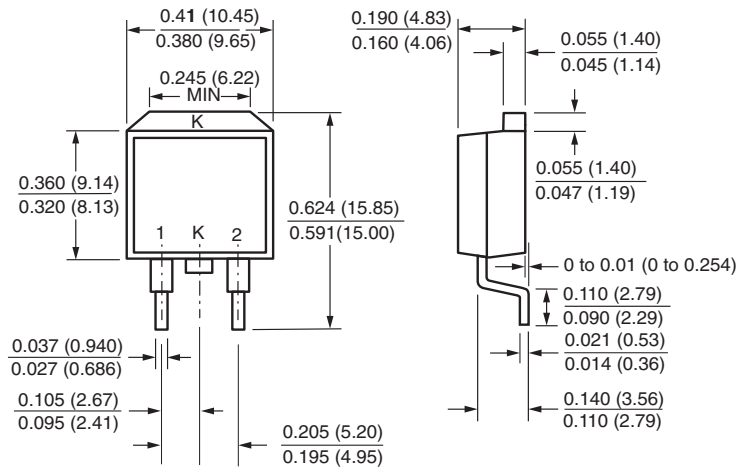
## ITO-220AB



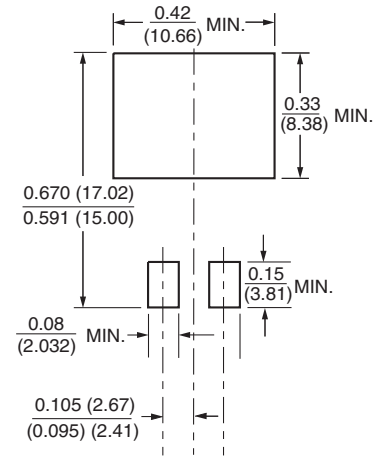
## TO-262AA



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



## Mounting Pad Layout





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