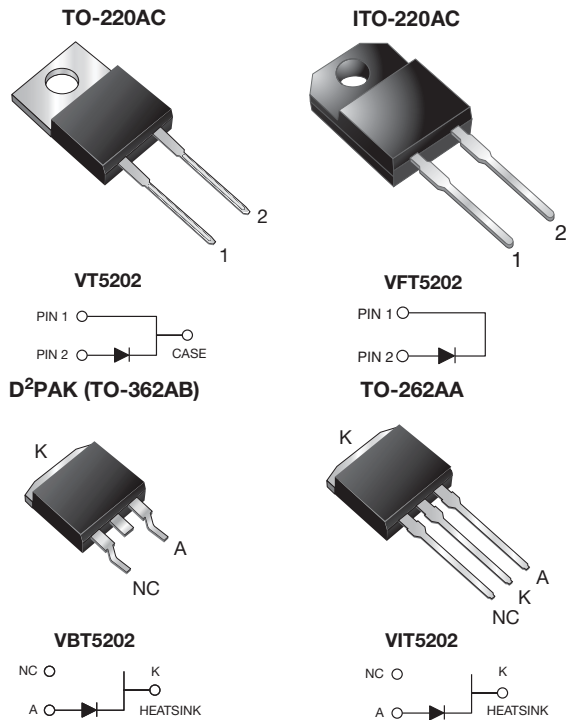


# TMBS<sup>®</sup> (Trench MOS Barrier Schottky) Rectifier

 Ultra Low  $V_F = 0.58 \text{ V}$  at  $I_F = 2.5 \text{ A}$ 


## FEATURES

- Trench MOS Schottky technology Gen 2
- 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 D<sup>2</sup>PAK (TO-263AB) package)
- Solder bath temperature 275 °C max. 10 s, per JESD 22-B106 (for TO-220AC, ITO-220AC, 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  
HALOGEN  
**FREE**

## TYPICAL APPLICATIONS

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

## MECHANICAL DATA

**Case:** TO-220AC, ITO-220AC, D<sup>2</sup>PAK (TO-263AB), and TO-262AA

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

M3 suffix meets JESD 201 class 1A whisker test

**Polarity:** as marked

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

## DESIGN SUPPORT TOOLS AVAILABLE



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	5.0 A
$V_{RRM}$	200 V
$I_{FSM}$	100 A
$V_F$ at $I_F = 5.0 \text{ A}$ ( $T_J = 125 \text{ °C}$ )	0.65 V
$T_J$ max.	175 °C
Package	TO-220AC, ITO-220AC, D <sup>2</sup> PAK (TO-263AB), TO-262AA
Circuit configuration	Single

MAXIMUM RATINGS ( $T_A = 25 \text{ °C}$ unless otherwise noted)						
PARAMETER	SYMBOL	VT5202	VFT5202	VBT5202	VIT5202	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	200				V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}$	5.0				A
Maximum DC reverse voltage	$V_{DC}$	160				V
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	100				A
Voltage rate of change (rated $V_F$ )	$dV/dt$	10 000				V/ $\mu$ s
Isolation voltage (ITO-220AC 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 +175				°C



ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage per diode <sup>(1)</sup>	I <sub>F</sub> = 2.5 A	T <sub>A</sub> = 25 °C	V <sub>F</sub>	0.74	-	V
	I <sub>F</sub> = 5.0 A			0.80	0.88	
	I <sub>F</sub> = 2.5 A	T <sub>A</sub> = 125 °C		0.58	-	
	I <sub>F</sub> = 5.0 A			0.65	0.73	
Reverse current <sup>(2)</sup>	V <sub>R</sub> = 160 V	T <sub>A</sub> = 25 °C	I <sub>R</sub>	0.2	-	μA
		T <sub>A</sub> = 125 °C		0.4	-	mA
	V <sub>R</sub> = 200 V	T <sub>A</sub> = 25 °C		-	150	μA
		T <sub>A</sub> = 125 °C		1.0	5	mA

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: Pulse width ≤ 5 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	SYMBOL	VT5202	VFT5202	VBT5202	VIT5202	UNIT
Typical thermal resistance	R <sub>θJC</sub>	3.4	6.8	3.4		°C/W
	R <sub>θJA</sub> <sup>(1)(2)</sup>	52	60	52		

Notes

- (1) The heat generated must be less than the thermal conductivity from junction-to-ambient: dP<sub>D</sub>/dT<sub>J</sub> < 1/R<sub>θJA</sub>
- (2) Free air, without heatsink

ORDERING INFORMATION (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
TO-220AC	VT5202-M3/4W	1.89	4W	50/tube	Tube
ITO-220AC	VFT5202-M3/4W	1.65	4W	50/tube	Tube
D <sup>2</sup> PAK (TO-263AB)	VBT5202-M3/4W	1.38	4W	50/tube	Tube
D <sup>2</sup> PAK (TO-263AB)	VBT5202-M3/8W	1.38	8W	800/reel	Tape and reel
TO-262AA	VIT5202-M3/4W	1.46	4W	50/tube	Tube



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

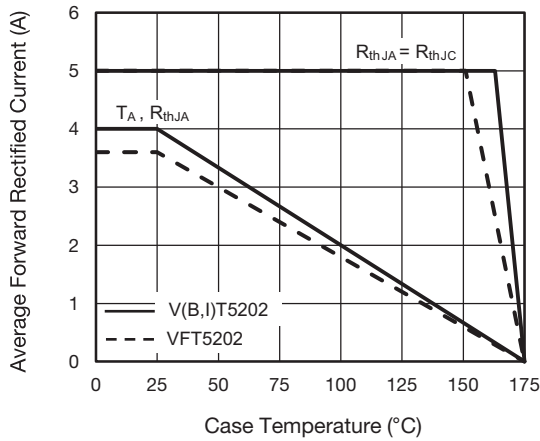


Fig. 1 - Maximum Forward Current Derating Curve

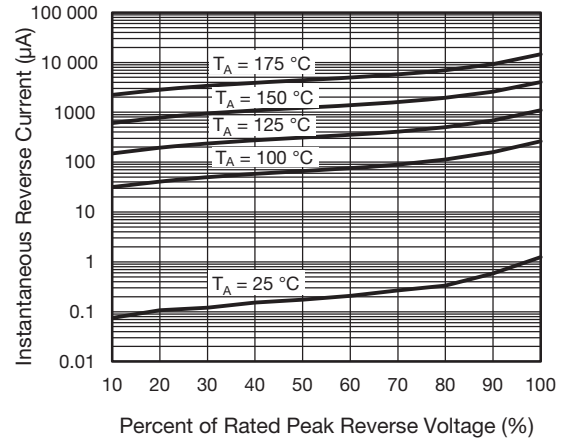


Fig. 4 - Typical Reverse Characteristics

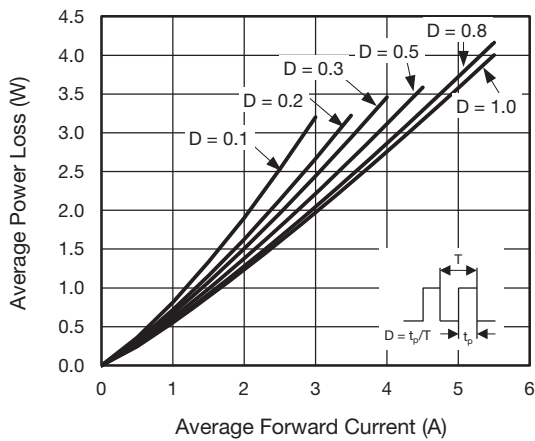


Fig. 2 - Forward Power Dissipation Characteristics

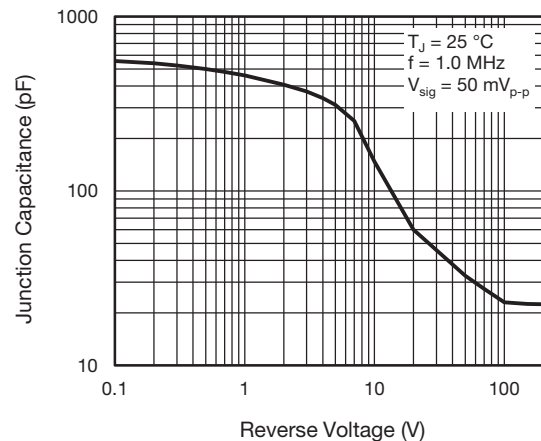


Fig. 5 - Typical Junction Capacitance

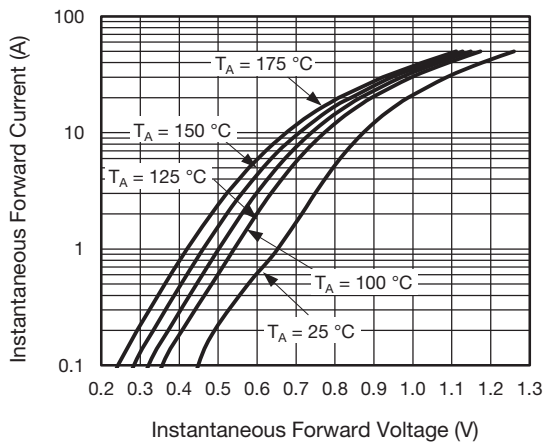


Fig. 3 - Typical Instantaneous Forward Characteristics

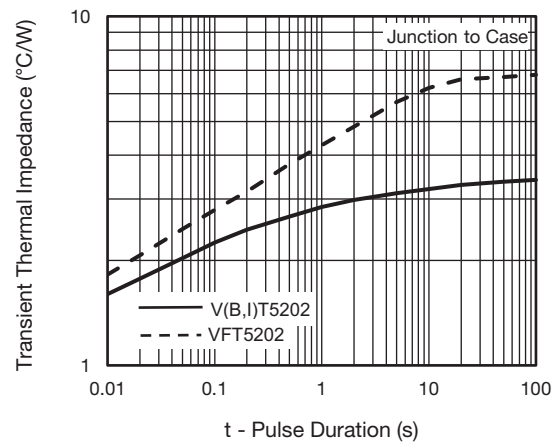
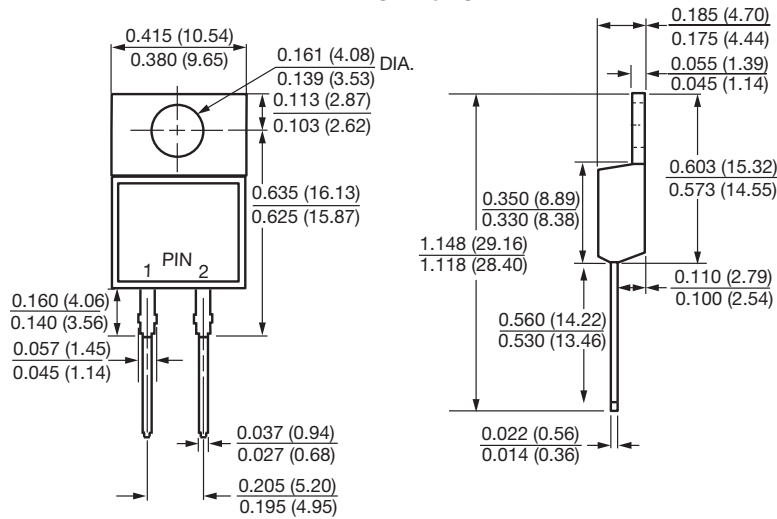


Fig. 6 - Typical Transient Thermal Impedance

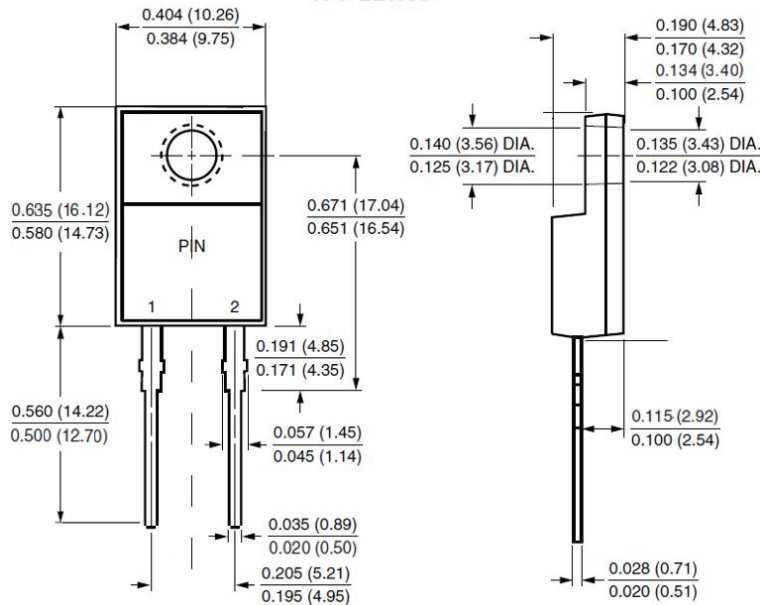


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

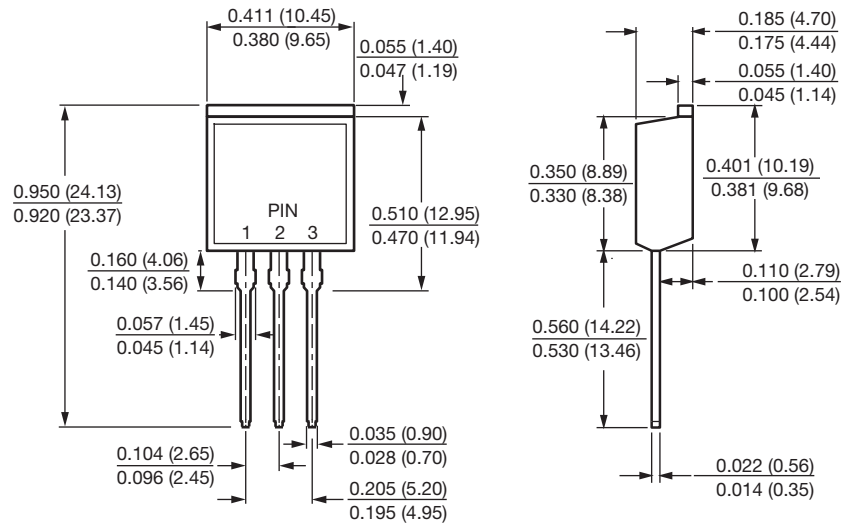
TO-220AC



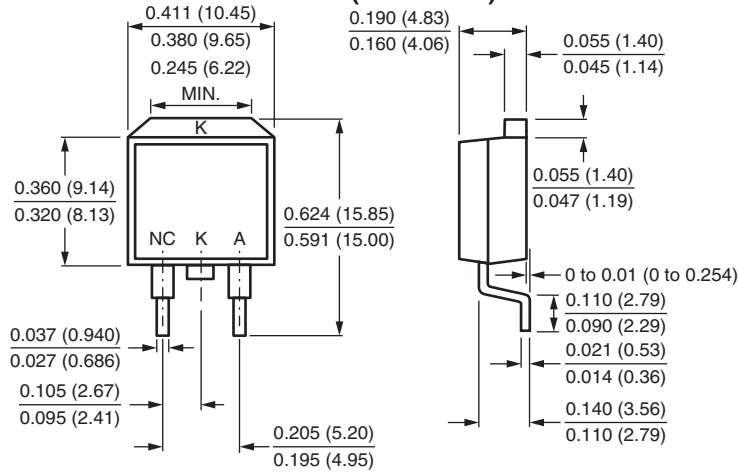
ITO-220AC



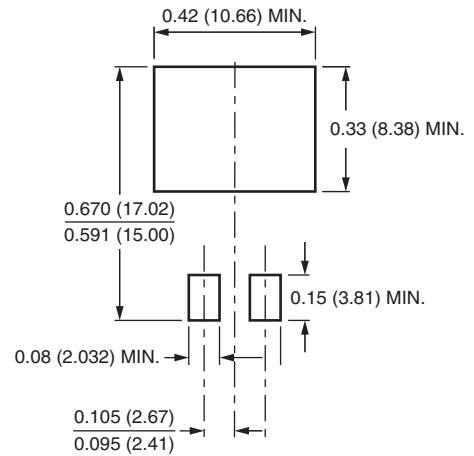
## TO-262AA



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



## Mounting Pad Layout





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