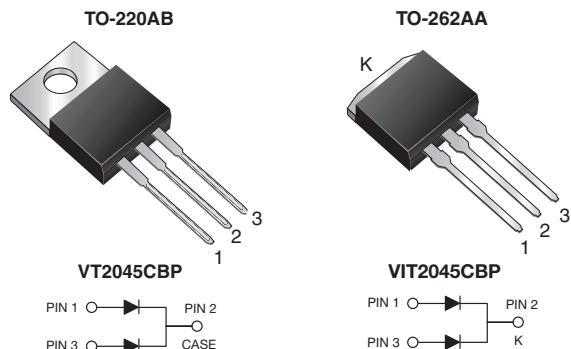


# **TMBS® (Trench MOS Barrier Schottky) Rectifier for PV Solar Cell Bypass Protection**

Ultra Low  $V_F = 0.33\text{ V}$  at  $I_F = 5.0\text{ A}$



## **FEATURES**

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Solder dip 275 °C max. 10 s, per JESD 22-B106
- $T_J$  200 °C max. in solar bypass mode application
- 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 solar cell junction box as a bypass diode for protection, using DC forward current without reverse bias.

## **MECHANICAL DATA**

**Case:** TO-220AB, 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 maximum

## **PRIMARY CHARACTERISTICS**

$I_{F(AV)}$	2 x 10 A
$V_{RRM}$	45 V
$I_{FSM}$	160 A
$V_F$ at $I_F = 10\text{ A}$	0.41 V
$T_{OP}$ max. (AC mode)	150 °C
$T_J$ max. (DC forward current)	200 °C
Package	TO-220AB, TO-262AA
Circuit configurations	Common cathode

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

PARAMETER	SYMBOL	VT2045CBP	VIT2045CBP	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	45		V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}^{(1)}$	20		A
		10		
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode	$I_{FSM}$	160		A
Operating junction and storage temperature range (AC mode)	$T_{OP}, T_{STG}$	-40 to +150		°C
Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$	$T_J^{(2)}$	$\leq 200$		°C

### **Notes**

(1) With heatsink

(2) Meets the requirements of IEC 61215 ed. 2 bypass diode thermal test

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

PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage per diode	$I_F = 5\text{ A}$	$V_F^{(1)}$	0.44	-	V
	$I_F = 10\text{ A}$		0.49	0.58	
	$I_F = 5\text{ A}$		0.33	-	
	$I_F = 10\text{ A}$		0.41	0.52	
Reverse current per diode	$V_R = 45\text{ V}$	$I_R^{(2)}$	-	2000	$\mu\text{A}$
	$T_A = 125\text{ °C}$		10	30	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 <sub>A</sub> = 25 °C unless otherwise noted)					
PARAMETER		SYMBOL	VT2045CBP	VIT2045CBP	UNIT
Typical thermal resistance	per diode	R <sub>θJC</sub>	3.0		°C/W
	per device		2.0		

<b>ORDERING INFORMATION</b> (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
TO-220AB	VT2045CBP-M3/4W	1.88	4W	50/tube	Tube
TO-2262AA	VIT2045CBP-M3/4W	1.45	4W	50/tube	Tube

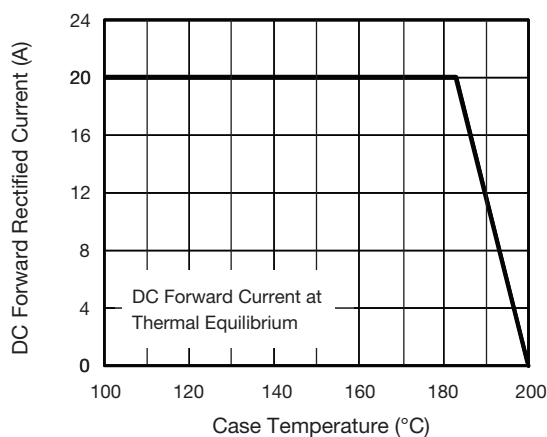
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

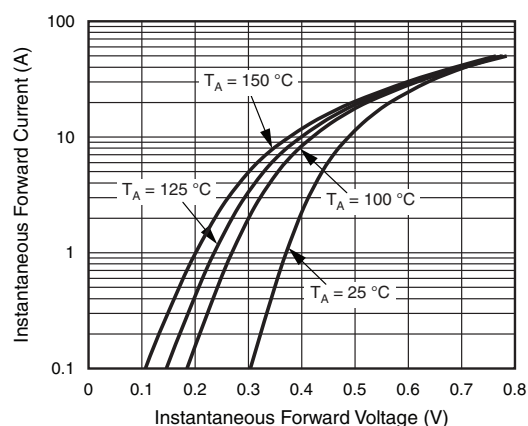


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

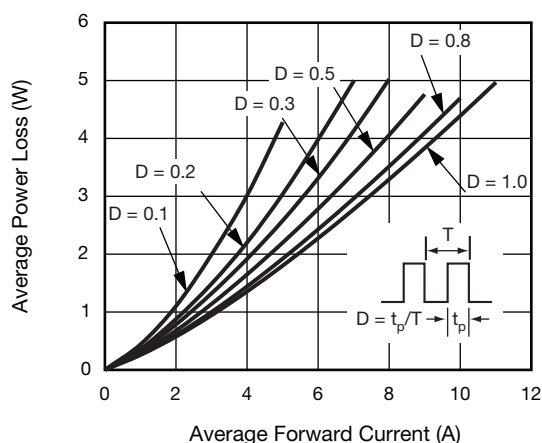


Fig. 2 - Forward Power Loss Characteristics Per Diode

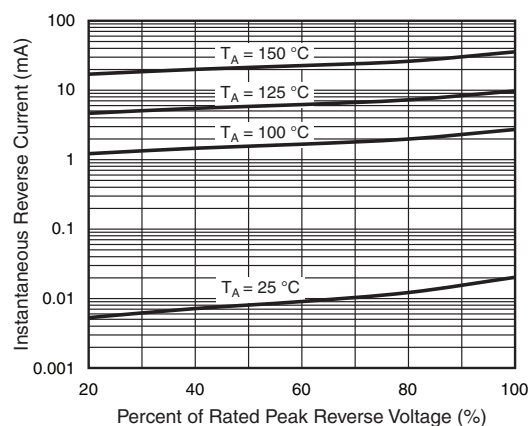


Fig. 4 - Typical Reverse Characteristics Per Diode

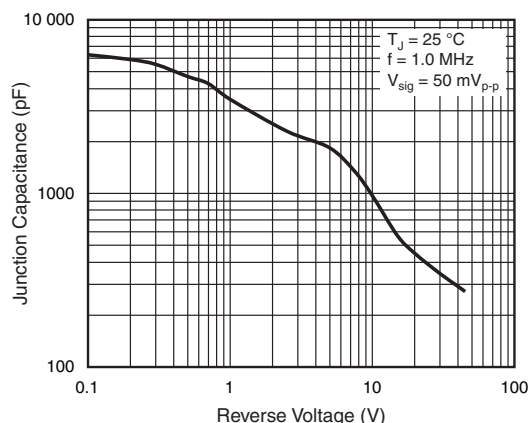


Fig. 5 - Typical Junction Capacitance Per Diode

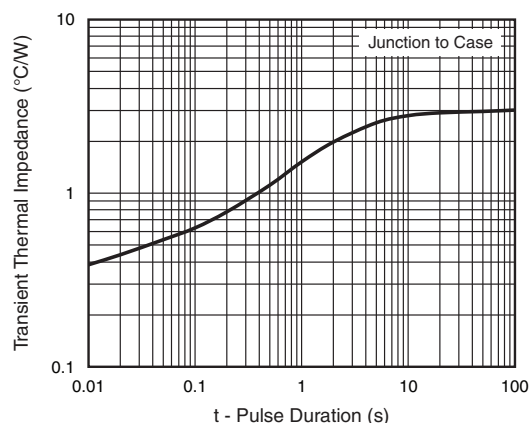
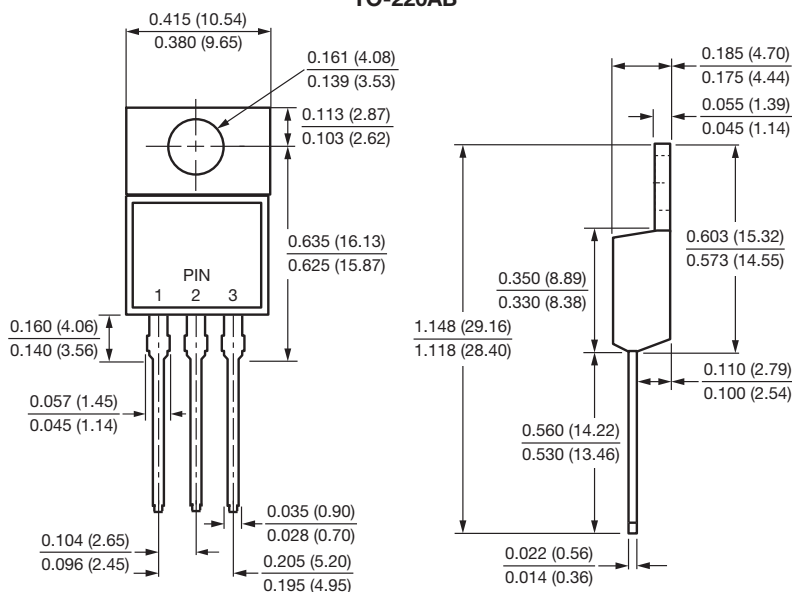
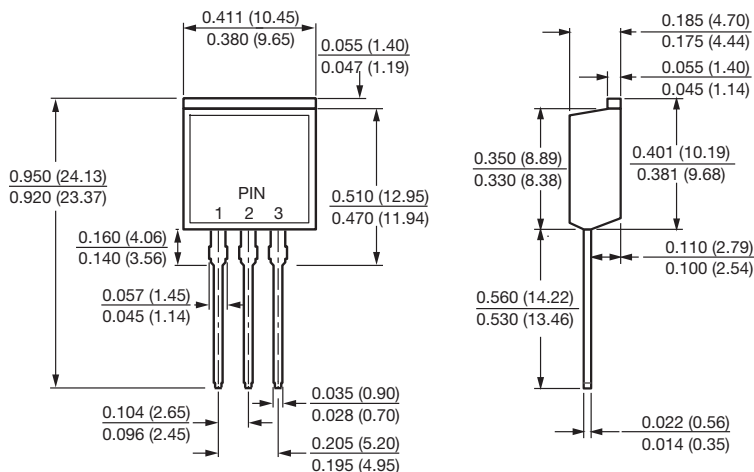


Fig. 6 - Typical Transient Thermal Impedance Per Diode

**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**TO-220AB**

**TO-262AA**




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