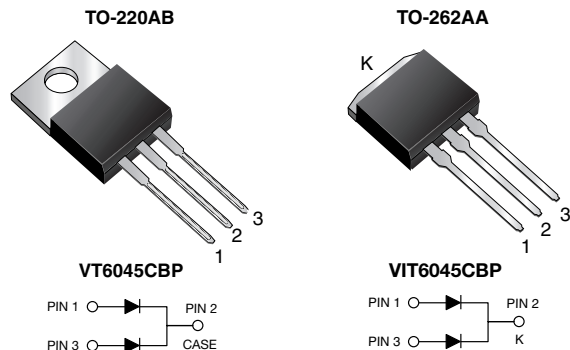


# **TMBS® (Trench MOS Barrier Schottky) Rectifier for PV Solar Cell Bypass Protection**

Ultra Low  $V_F = 0.33 \text{ V}$  at  $I_F = 10 \text{ A}$



## **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.

## **PRIMARY CHARACTERISTICS**

$I_{F(AV)}$	2 x 30 A
$V_{RRM}$	45 V
$I_{FSM}$	320 A
$V_F$ at $I_F = 30 \text{ A}$	0.47 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

## **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

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

PARAMETER	SYMBOL	VT6045CBP	VIT6045CBP	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	45		V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}^{(1)}$	60		A
		30		
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode	$I_{FSM}$	320		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 <sub>A</sub> = 25 °C unless otherwise noted)							
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT	
Instantaneous forward voltage per diode	I <sub>F</sub> = 10 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.44	-	V	
	I <sub>F</sub> = 15 A			0.47	-		
	I <sub>F</sub> = 30 A			0.54	0.64		
	I <sub>F</sub> = 10 A	T <sub>A</sub> = 125 °C		0.33	-		
	I <sub>F</sub> = 15 A			0.37	-		
	I <sub>F</sub> = 30 A			0.47	0.56		
Reverse current per diode	V <sub>R</sub> = 45 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	-	3000	μA	
		T <sub>A</sub> = 125 °C		18	50	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	VT6045CBP	VIT6045CBP	UNIT
Typical thermal resistance	per diode	R <sub>θJC</sub>	1.5		°C/W
	per device		0.8		

<b>ORDERING INFORMATION</b> (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
TO-220AB	VT6045CBP-M3/4W	1.89	4W	50/tube	Tube
TO-262AA	VIT6045CBP-M3/4W	1.45	4W	50/tube	Tube



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

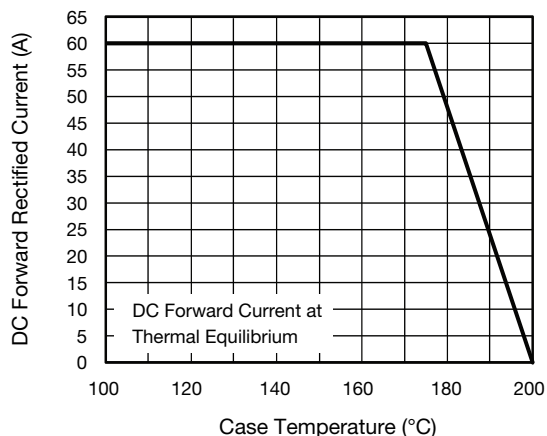


Fig. 1 - Maximum Forward Current Derating Curve

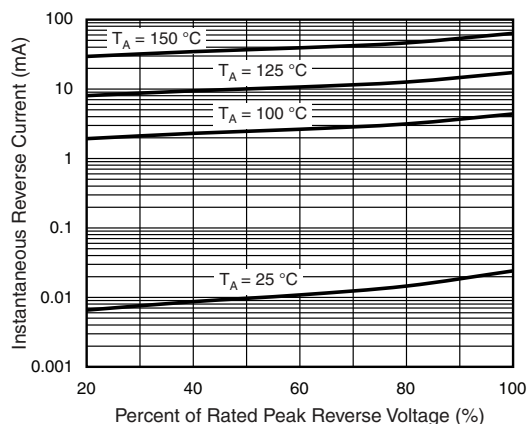


Fig. 4 - Typical Reverse Characteristics Per Diode

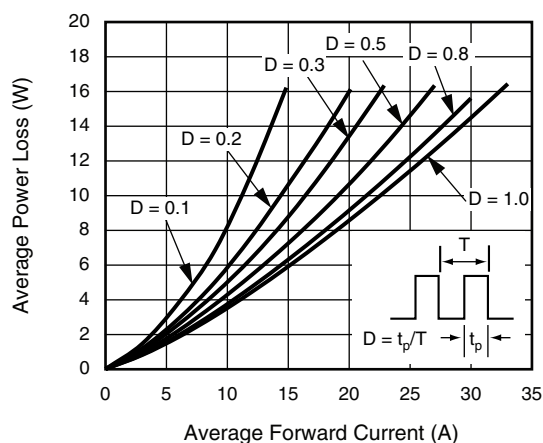


Fig. 2 - Forward Power Loss Characteristics Per Diode

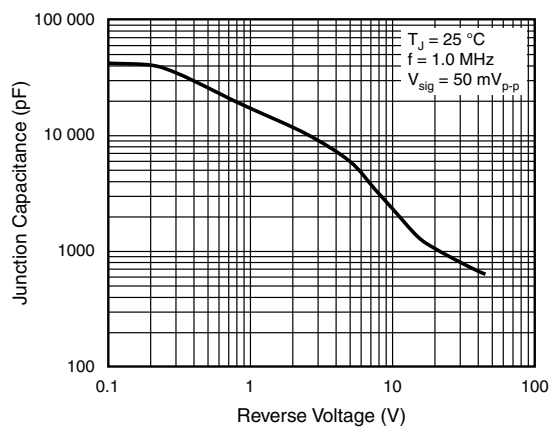


Fig. 5 - Typical Junction Capacitance Per Diode

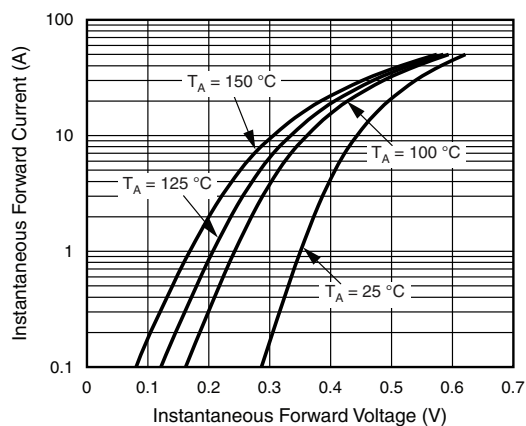


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

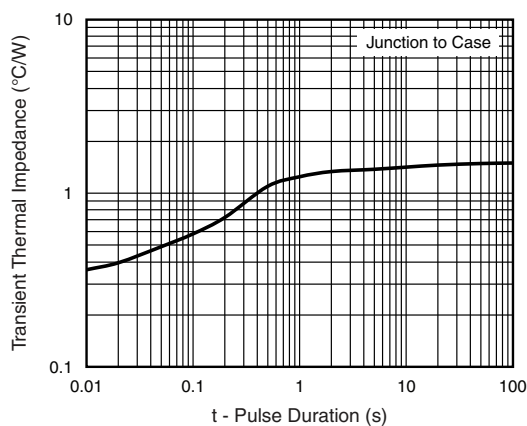
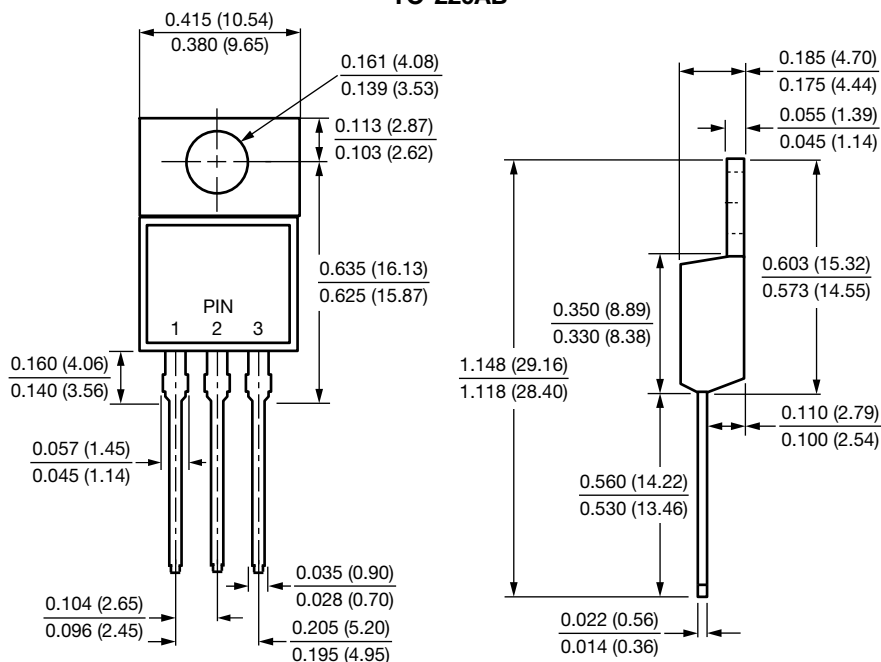


Fig. 6 - Typical Transient Thermal Impedance Per Diode

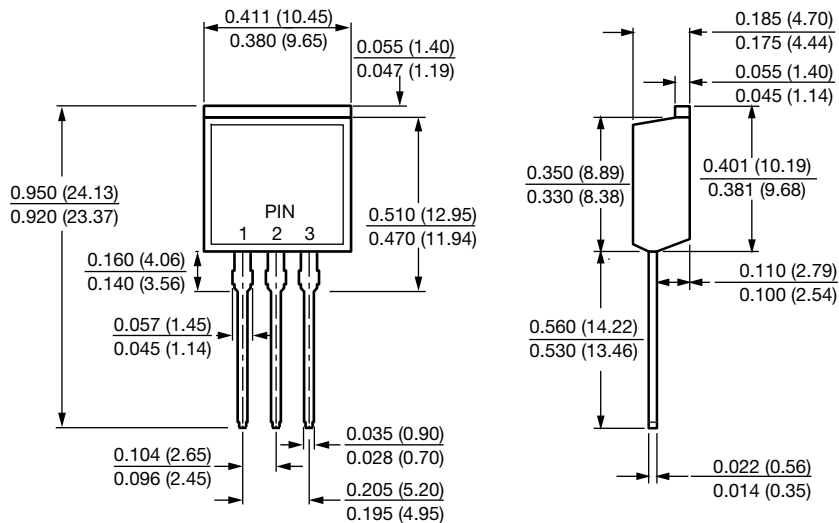


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

TO-220AB



TO-262AA





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