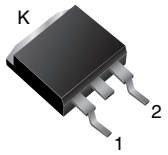
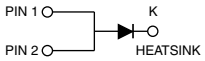
TMBS® (Trench MOS Barrier Schottky) Rectifier for PV Solar Cell Bypass Protection

Ultra Low V_F = 0.28 V at I_F = 5 A

D^2PAK (TO-263AB)





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
- Material categorization: for definitions of compliance please see 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: D^2PAK (TO-263AB)
Epoxy 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

LINKS TO ADDITIONAL RESOURCES

3D Models

PRIMARY CHARACTERISTICS	
$I_{F(DC)}$	40 A
V_{RRM}	45 V
I_{FSM}	240 A
V_F at I_F = 40 A	0.51 V
T_{OP} max. (AC mode)	150 °C
T_J max. (DC forward current)	200 °C
Package	D^2PAK (TO-263AB)
Circuit configuration	Single

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)			
PARAMETER	**SYMBOL**	**VBT4045BP**	**UNIT**
Maximum repetitive peak reverse voltage	V_{RRM}	45	V
Maximum DC forward bypassing current (fig. 1)	$I_{F(DC)}$ (1)	40	A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I_{FSM}	240	A
Operating junction temperature range (AC mode)	T_{OP}	-40 to +150	°C
Junction temperature in DC forward current without reverse bias, t ≤ 1 h	T_J (1)	≤ 200	°C

Notes

(1) With heatsink

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

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I_F = 5 A	T_A = 25 °C	V_F (1)	0.41	-	V
	I_F = 20 A			0.50	-	
	I_F = 40 A			0.57	0.67	
	I_F = 5 A	T_A = 125 °C		0.28	-	
	I_F = 20 A			0.41	-	
	I_F = 40 A			0.51	0.63	
Reverse current	V_R = 45 A	T_A = 25 °C	I_R (2)	-	3000	µA
		T_A = 125 °C		29	85	mA

Notes

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: Pulse width ≤ 40 ms

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	VBT4045BP	UNIT
Typical thermal resistance	$R_{\theta JC}$	0.8	°C/W

ORDERING INFORMATION (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
D^2PAK (TO-263AB)	VBT4045BP-M3/4W	1.37	4W	50/tube	Tube
D^2PAK (TO-263AB)	VBT4045BP-M3/8W	1.37	8W	800/reel	Tape and reel

RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

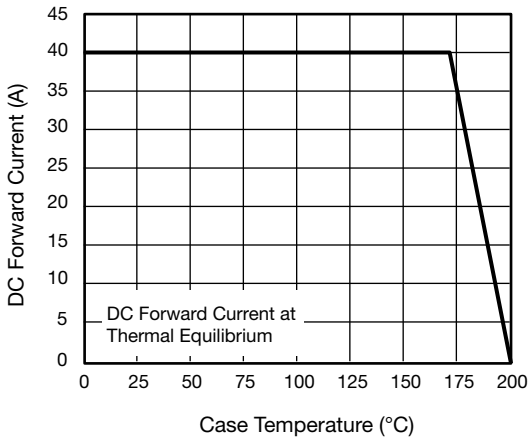

Fig. 1 - Forward Current Derating Curve

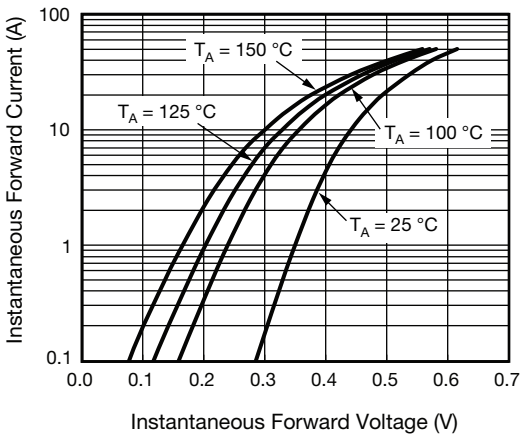

Fig. 2 - Typical Instantaneous Forward Characteristics

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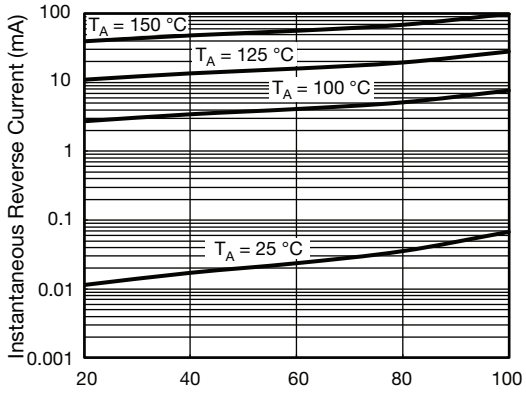


Fig. 3 - Typical Reverse Characteristics

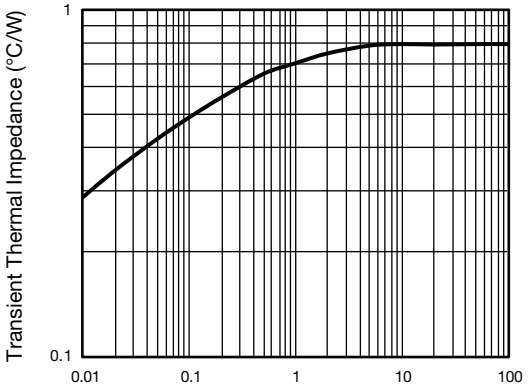


Fig. 5 - Typical Transient Thermal Impedance

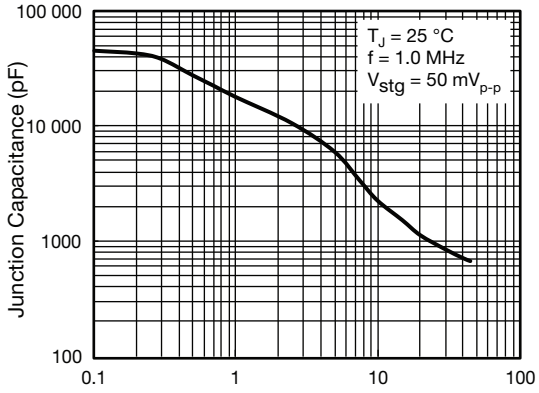
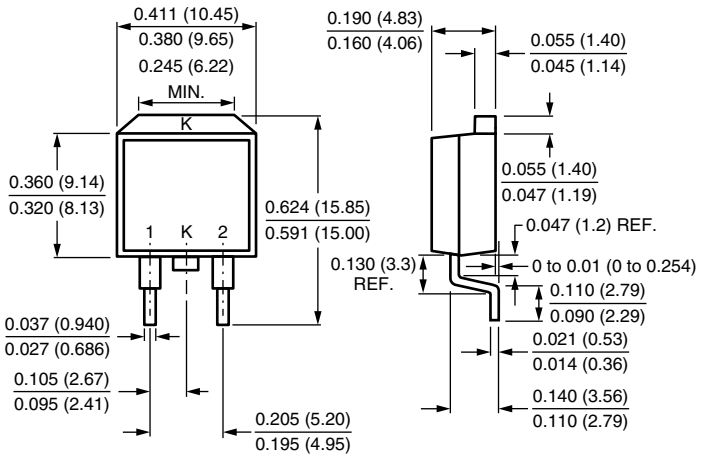


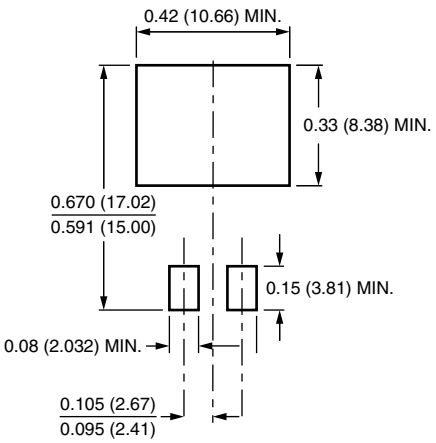
Fig. 4 - Typical Junction Capacitance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

D^2PAK (TO-263AB)



Mounting Pad Layout



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