COMPLIANT

HALOGEN

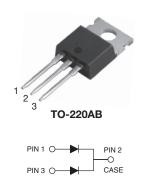
FREE



# Vishay General Semiconductor

# Dual High Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.54 \text{ V}$  at  $I_F = 5.0 \text{ A}$ 



PRIMARY CHARACTERISTICS							
I <sub>F(AV)</sub>	2 x 15 A						
$V_{RRM}$	170 V						
I <sub>FSM</sub>	260 A						
$V_F$ at $I_F = 15 A (T_J = 125 °C)$	0.65 V						
T <sub>J</sub> max.	175 °C						
Package	TO-220AB						
Circuit configuration	Common cathode						

#### **FEATURES**

- Trench MOS Schottky technology
- · Low forward voltage drop, low power losses
- · High efficiency operation
- Solder bath temperature 275 °C maximum, 10 s per JESD 22-B106
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see <a href="https://www.vishav.com/doc?99912">www.vishav.com/doc?99912</a>

## **TYPICAL APPLICATIONS**

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

#### **MECHANICAL DATA**

Case: TO-220AB

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant

Base P/NHM3\_X - halogen-free, RoHS-compliant, and

AEC-Q101 qualified

("\_X" denotes revision code e.g. A, B,....)

Terminals: matte tin plated leads, solderable per

J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 1A whisker test, HM3 suffix

meets JESD 201 class 2 whisker test

Mounting torque: 10 in-lbs maximum

MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)								
PARAMETER		SYMBOL	VX30170C	UNIT				
Maximum repetitive peak reverse voltage		$V_{RRM}$	170	V				
Maximum average forward rectified current (fig. 1)	per device	1	30	^				
	per diode	I <sub>F(AV)</sub>	15	A				
Peak forward surge current 8.3 ms single half superimposed on rated load	sine-wave	I <sub>FSM</sub>	260	Α				
Operating junction temperature range		T <sub>J</sub> <sup>(1)</sup>	-40 to +175	°C				
Storage temperature range	T <sub>STG</sub>	-40 to +175	]					

#### Note

<sup>(1)</sup> The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$ 



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<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>J</sub> = 25 °C unless otherwise noted)								
PARAMETER	TEST CO	NDITIONS	SYMBOL	TYP.	MAX.	UNIT		
Instantaneous forward voltage per diode	I <sub>F</sub> = 5 A		V <sub>F</sub> <sup>(1)</sup>	0.69	-	V		
	I <sub>F</sub> = 10 A	T <sub>J</sub> = 25 °C		0.75	-			
	I <sub>F</sub> = 15 A			0.78	0.84			
	I <sub>F</sub> = 5 A			0.54	-			
	I <sub>F</sub> = 10 A	T <sub>J</sub> = 125 °C		0.60	-			
	I <sub>F</sub> = 15 A			0.65	0.70			
Reverse current at rated V <sub>R</sub> per diode	V <sub>R</sub> = 136 V	T <sub>J</sub> = 25 °C	I <sub>B</sub> <sup>(2)</sup>	0.0008	-	mA		
	v <sub>R</sub> = 130 v	T <sub>J</sub> = 125 °C		1.3	-			
	V <sub>R</sub> = 170 V	T <sub>J</sub> = 25 °C	IR (=/	-	0.1			
	v <sub>R</sub> = 170 v	T <sub>J</sub> = 125 °C		2.0	8			
Typical junction capacitance	4.0 V, 1 MHz		CJ	1200	-	pF		

#### **Notes**

 $^{(1)}$  Pulse test: 300  $\mu s$  pulse width, 1 % duty cycle

(2) Pulse test: Pulse width  $\leq 5 \text{ ms}$ 

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	SYMBOL	VX30170C	UNIT			
Typical thermal resistance per device	R <sub>0</sub> JC (1)	1	°C/W			

#### Note

(1) Thermal resistance junction-to-case to follow JEDEC® 51-14 transient dual interface test method (TDIM)

ORDERING INFORMATION (Example)								
PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE				
VX30170C-M3/P	2.03	Р	50/tube	Tube				
VX30170CHM3_A/P (1)	2.03	Р	50/tube	Tube				

## Note

(1) AEC-Q101 qualified



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

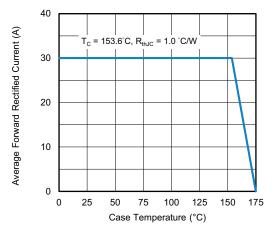


Fig. 1 - Maximum Forward Current Derating Curve

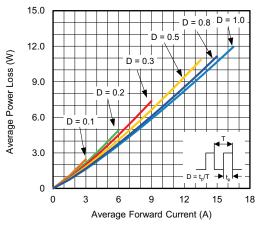


Fig. 2 - Average Power Loss Characteristics

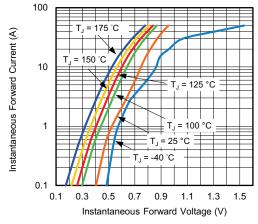


Fig. 3 - Typical Instantaneous Forward Characteristics

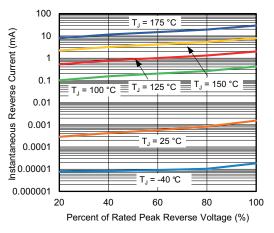


Fig. 4 - Typical Reverse Leakage Characteristics

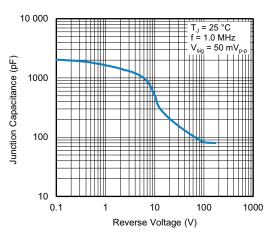


Fig. 5 - Typical Junction Capacitance

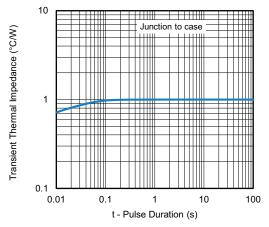
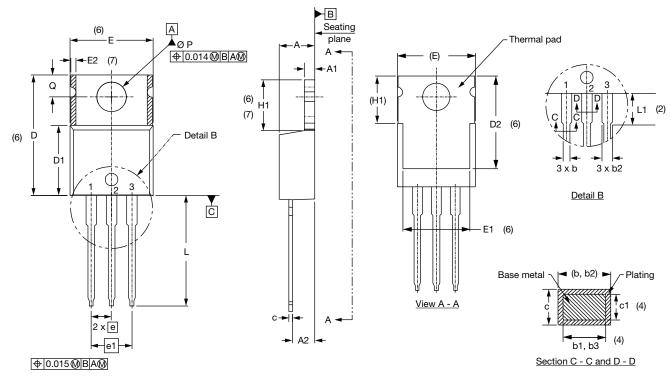


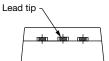
Fig. 6 - Typical Transient Thermal Impedance



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## **DIMENSIONS** in millimeters (inches) **TO-220AB**





### Conforms to JEDEC® outline TO-220AB

SYMBOL	MILLIM	IETERS	INC	HES	NOTES	NOTES	SYMBOL	MILLIMETERS		INCHES		NOTES
STIVIDUL	MIN.	MAX.	MIN.	MAX.	NOTES	NOTES	STIVIBUL	MIN.	MAX.	MIN.	MAX.	NOTES
Α	4.25	4.65	0.167	0.183			D2	11.68	12.88	0.460	0.507	6
A1	1.14	1.40	0.045	0.055			E	10.11	10.51	0.398	0.414	3, 6
A2	2.56	2.92	0.101	0.115			E1	6.86	8.89	0.270	0.350	6
b	0.69	1.01	0.027	0.040			E2	-	0.76	-	0.030	7
b1	0.38	0.97	0.015	0.038	4		е	2.41	2.67	0.095	0.105	
b2	1.20	1.73	0.047	0.068			e1	4.88	5.28	0.192	0.208	
b3	1.14	1.73	0.045	0.068	4		H1	5.84	6.86	0.230	0.270	6, 7
С	0.36	0.61	0.014	0.024			L	13.52	14.02	0.532	0.552	
c1	0.36	0.56	0.014	0.022	4		L1	3.32	3.82	0.131	0.150	2
D	14.85	15.25	0.585	0.600	3		ØΡ	3.54	3.73	0.139	0.147	
D1	8.38	9.02	0.330	0.355			Q	2.60	3.00	0.102	0.118	

### Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) Dimension D, D1 and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (4) Dimension b1, b3 and c1 apply to base metal only
- (5) Controlling dimensions: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2 and E1
- $^{(7)}$  Dimensions E2 x H1 define a zone where stamping and singulation irregularities are allowed
- (8) Outline conforms to JEDEC® TO-220, except A2 (maximum) and D2 (minimum) where dimensions are derived from the actual package outline



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