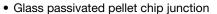


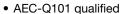
# High Voltage, Input Rectifier Diode, 20 A



PRIMARY CHARACTERISTICS						
I <sub>F(AV)</sub> 20 A						
$V_{R}$	1600 V					
V <sub>F</sub> at I <sub>F</sub>	1.1 V					
I <sub>FSM</sub>	300 A					
T <sub>J</sub> max.	150 °C					
Package 2L TO-220AC						
Circuit configuration	Single					

#### **FEATURES**





• Meets JESD 201 class 1A whisker test

RoHS
COMPLIANT
HALOGEN
T FREE

• Flexible solution for reliable AC power rectification

- High surge, low V<sub>F</sub> rugged blocking diode for DC charging stations
- Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912"><u>www.vishay.com/doc?99912</u></a>

#### **APPLICATIONS**

- On-board and off-board EV/HEV battery chargers
- Input rectification

#### **DESCRIPTION**

High voltage rectifiers optimized for very low forward voltage drop with moderate leakage.

These devices are intended for use in main rectification (single or three phase bridge).

OUTPUT CURRENT IN TYPICAL APPLICATIONS						
APPLICATIONS SINGLE-PHASE BRIDGE THREE-PHASE BRIDGE UNITS						
Capacitive input filter T <sub>A</sub> = 55 °C, T <sub>J</sub> = 125 °C common heatsink of 1 °C/W						

MAJOR RATINGS AND CHARACTERISTICS							
SYMBOL CHARACTERISTICS VALUES UNI							
I <sub>F(AV)</sub>	Sinusoidal waveform	20	Α				
$V_{RRM}$		1600	V				
I <sub>FSM</sub>		300	Α				
V <sub>F</sub>	10 A, T <sub>J</sub> = 25 °C	1.0	V				
T <sub>J</sub>		-40 to +150	°C				

<b>VOLTAGE RATINGS</b>			
PART NUMBER	V <sub>RRM</sub> , MAXIMUM PEAK REVERSE VOLTAGE V	V <sub>RSM</sub> , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I <sub>RRM</sub> AT 150 °C mA
VS-20ETS16THM3	1600	1700	1



ABSOLUTE MAXIMUM RATINGS						
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS		
Maximum average forward current	I <sub>F(AV)</sub>	T <sub>C</sub> = 105 °C, 180° conduction half sine wave	20			
Maximum peak one cycle		10 ms sine pulse, rated V <sub>RRM</sub> applied	250	Α		
non-repetitive surge current	IFSM	10 ms sine pulse, no voltage reapplied	300			
Maximum I <sup>2</sup> t for fusing	l <sup>2</sup> t	10 ms sine pulse, rated V <sub>RRM</sub> applied	316	A <sup>2</sup> s		
Maximum i-t for fusing	1-1	10 ms sine pulse, no voltage reapplied	442	A-S		
Maximum I <sup>2</sup> √t for fusing	I²√t	t = 0.1 ms to 10 ms, no voltage reapplied	4420	A²√s		

ELECTRICAL SPECIFICATIONS								
PARAMETER SYMBOL TEST CONDITIONS VALUES UNITS								
Maximum forward voltage drop	V <sub>FM</sub>	20 A, T <sub>J</sub> = 25 °C	20 A, T <sub>J</sub> = 25 °C		V			
Forward slope resistance	r <sub>t</sub>	T <sub>.1</sub> = 150 °C	10.4	mΩ				
Threshold voltage	V <sub>F(TO)</sub>	1J = 150 C	0.85	V				
Maximum rayaraa laakaga ayrrant	1	T <sub>J</sub> = 25 °C		0.1	m۸			
Maximum reverse leakage current	I <sub>RM</sub>	T <sub>J</sub> = 150 °C	V <sub>R</sub> = Rated V <sub>RRM</sub>	1.0	- mA			

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER		SYMBOL TEST CONDITIONS		VALUES	UNITS	
Maximum junction and stora temperature range	ige	T <sub>J</sub> , T <sub>Stg</sub>		-40 to +150	°C	
Maximum thermal resistance junction to case	· ·		DC operation	1.3	°C AM	
Typical thermal resistance, case to heatsink		R <sub>thCS</sub>	Mounting surface, smooth and greased	0.5	°C/W	
Approximate weight				2	g	
				0.07	OZ.	
Maunting toyour	minimum			6 (5)	kgf · cm	
Mounting torque	maximum			12 (10)	(lbf $\cdot$ in)	
Marking device Case style 2L TO-220AC 20		20ETS	S16TH			

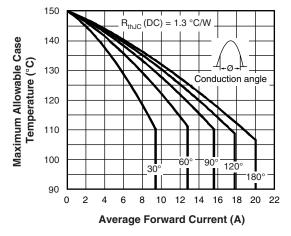


Fig. 1 - Current Rating Characteristics

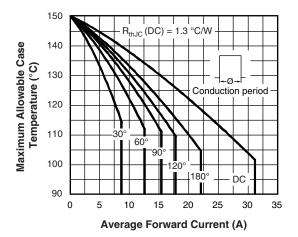


Fig. 2 - Current Rating Characteristics



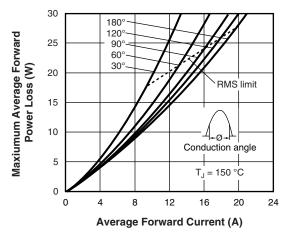


Fig. 3 - Forward Power Loss Characteristics

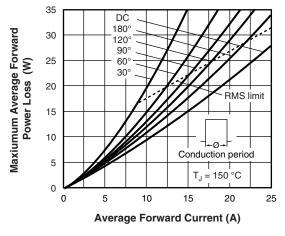


Fig. 4 - Forward Power Loss Characteristics

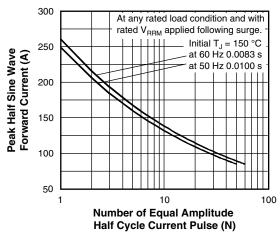


Fig. 5 - Maximum Non-Repetitive Surge Current

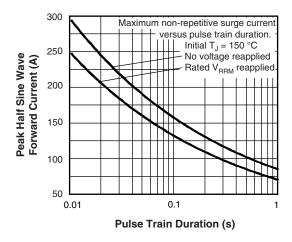


Fig. 6 - Maximum Non-Repetitive Surge Current

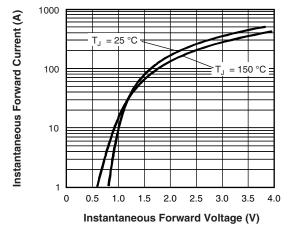


Fig. 7 - Forward Voltage Drop Characteristics

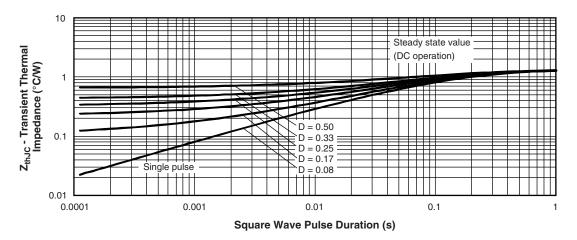
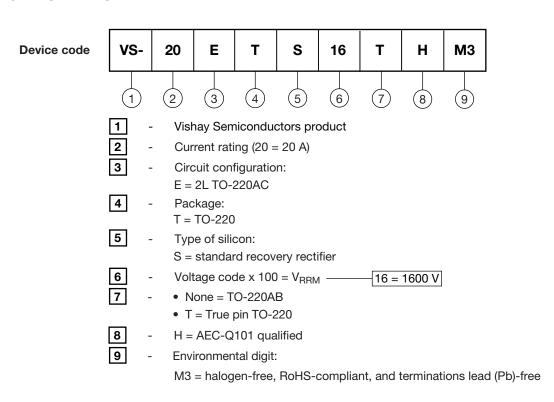


Fig. 8 - Thermal Impedance Z<sub>thJC</sub> Characteristics

#### **ORDERING INFORMATION TABLE**



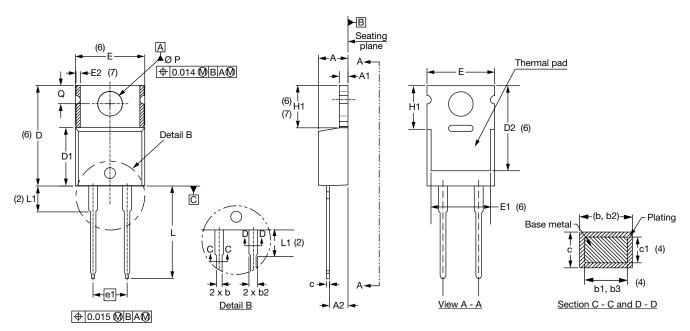
ORDERING INFORMATION (Example)						
PREFERRED P/N QUANTITY PER T/R MINIMUM ORDER QUANTITY PACKAGING DESCRIPTION						
VS-20ETS16THM3	50	1000	Antistatic plastic tubes			

LINKS TO RELATED DOCUMENTS				
Dimensions <u>www.vishay.com/doc?96069</u>				
Part marking information	www.vishay.com/doc?95391			



### **TO-220AC 2L**

#### **DIMENSIONS** in millimeters and inches



SYMBOL	MILLIM	IETERS	INC	HES	NOTES
STINIBUL	MIN.	MAX.	MIN.	MAX.	NOIES
Α	4.25	4.65	0.167	0.183	
A1	1.14	1.40	0.045	0.055	
A2	2.56	2.92	0.101	0.115	
b	0.69	1.01	0.027	0.040	
b1	0.38	0.97	0.015	0.038	4
b2	1.20	1.73	0.047	0.068	
b3	1.14	1.73	0.045	0.068	4
С	0.36	0.61	0.014	0.024	
c1	0.36	0.56	0.014	0.022	4
D	14.85	15.25	0.585	0.600	3
D1	8.38	9.02	0.330	0.355	
D2	11.68	12.88	0.460	0.507	6
E	10.11	10.51	0.398	0.414	3, 6

SYMBOL	MILLIN	IETERS	INCHES		NOTES
STWIDOL	MIN.	MAX.	MIN.	MAX.	NOTES
E1	6.86	8.89	0.270	0.350	6
E2	ı	0.76	-	0.030	7
e1	4.88	5.28	0.192	0.208	
H1	5.84	6.86	0.230	0.270	6, 7
L	13.52	14.02	0.532	0.552	
L1	3.32	3.82	0.131	0.150	2
ØΡ	3.54	3.73	0.139	0.147	
Ø	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 dimension: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2 and E1
- $^{(7)}$  Dimension E2 x H1 define a zone where stamping and singulation irregularities are allowed
- (8) Outline conforms to JEDEC® TO-220, except D2, where JEDEC® minimum is 0.480"



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Vishay

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