

## Excellent Integrated System Limited

Stocking Distributor

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[Vishay Semiconductor/Diodes Division](#)  
[VS-20ETS08FPPBF](#)

For any questions, you can email us directly:

[sales@integrated-circuit.com](mailto:sales@integrated-circuit.com)

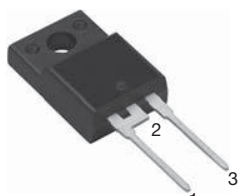


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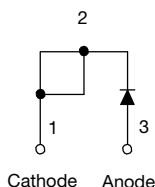
## VS-20ETS..FPPbF Series, VS-20ETS..FP-M3 Series

Vishay Semiconductors

### High Voltage, Input Rectifier Diode, 20 A



TO-220 FULL-PAK



#### FEATURES

- Very low forward voltage drop
- 150 °C max. operating junction temperature
- Glass passivated pellet chip junction
- Designed and qualified according to JEDEC®-JESD 47
- Fully isolated package ( $V_{INS} = 2500 V_{RMS}$ )
- UL E78996 approved
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available

PRODUCT SUMMARY	
Package	TO-220FP
$I_{F(AV)}$	20 A
$V_R$	800 V to 1200 V
$V_F$ at $I_F$	1.1 V
$I_{FSM}$	300 A
$T_J$ max.	150 °C
Diode variation	Single die

#### APPLICATIONS

- Input rectification
- Vishay Semiconductors switches and output rectifiers which are available in identical package outlines

#### 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 $T_A = 55\text{ °C}$ , $T_J = 125\text{ °C}$ common heatsink of $1\text{ °C/W}$	18	22	A

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Sinusoidal waveform	20	A
$V_{RRM}$	Range	800/1200	V
$I_{FSM}$		300	A
$V_F$	10 A, $T_J = 25\text{ °C}$	1.0	V
$T_J$		-40 to +150	°C

VOLTAGE RATINGS			
PART NUMBER	$V_{RRM}$ , MAXIMUM PEAK REVERSE VOLTAGE V	$V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	$I_{RRM}$ AT 150 °C mA
VS-20ETS08FPPbF, VS-20ETS08FP-M3	800	900	1
VS-20ETS12FPPbF, VS-20ETS12FP-M3	1200	1300	



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ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 51\text{ }^\circ\text{C}$ , 180° conduction half sine wave	20	A
Maximum peak one cycle non-repetitive surge current	$I_{FSM}$	10 ms sine pulse, rated $V_{RRM}$ applied	250	
		10 ms sine pulse, no voltage reapplied	300	
Maximum $I^2t$ for fusing	$I^2t$	10 ms sine pulse, rated $V_{RRM}$ applied	316	$A^2s$
		10 ms sine pulse, no voltage reapplied	442	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1\text{ ms to }10\text{ ms}$ , no voltage reapplied	4420	$A^2\sqrt{s}$

ELECTRICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum forward voltage drop	$V_{FM}$	20 A, $T_J = 25\text{ }^\circ\text{C}$	1.1	V
Forward slope resistance	$r_t$	$T_J = 150\text{ }^\circ\text{C}$	10.4	$m\Omega$
Threshold voltage	$V_{F(TO)}$		0.85	V
Maximum reverse leakage current	$I_{RM}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_{RRM}$	0.1
		$T_J = 150\text{ }^\circ\text{C}$		1.0

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$		-40 to +150	$^\circ\text{C}$
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation	2.8	$^\circ\text{C/W}$
Maximum thermal resistance, junction to ambient	$R_{thJA}$		62	
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth, and greased	0.5	
Approximate weight			2	g
			0.07	oz.
Mounting torque	minimum		6.0 (5.0)	$kgf \cdot cm$ ( $lbf \cdot in$ )
	maximum		12 (10)	
Marking device		Case style TO-220 FULL-PAK	20ETS08FP	
			20ETS12FP	



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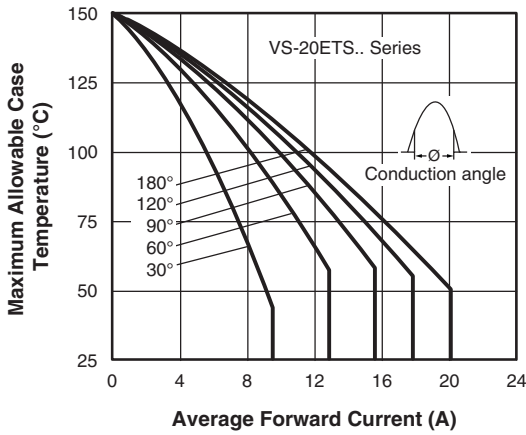


Fig. 1 - Current Rating Characteristics

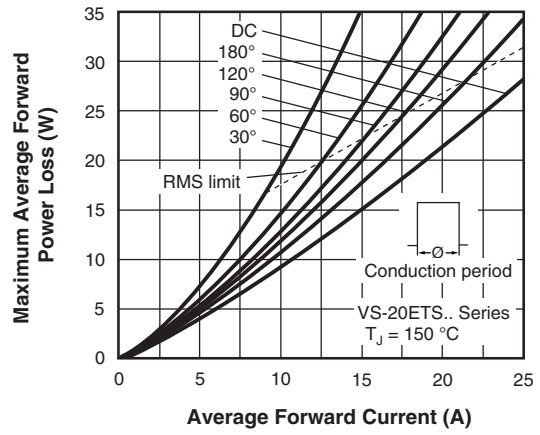


Fig. 4 - Forward Power Loss Characteristics

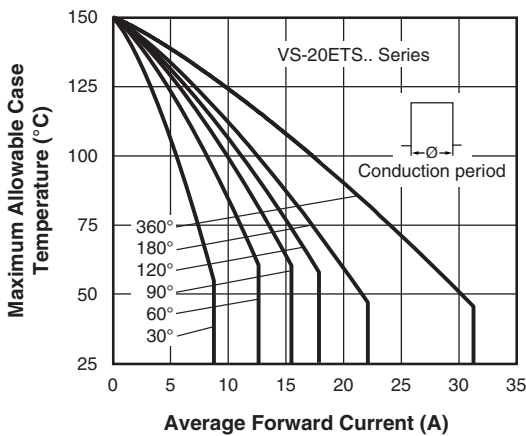


Fig. 2 - Current Rating Characteristics

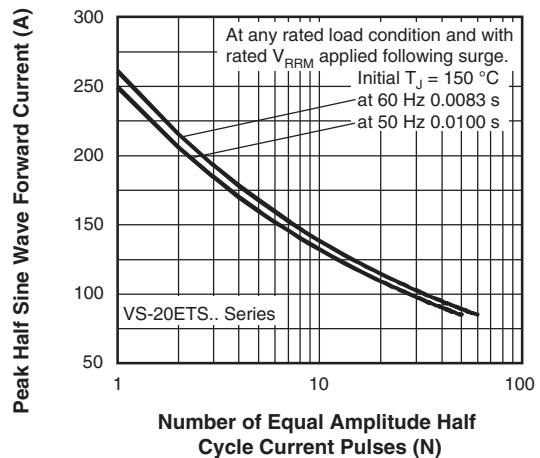


Fig. 5 - Maximum Non-Repetitive Surge Current

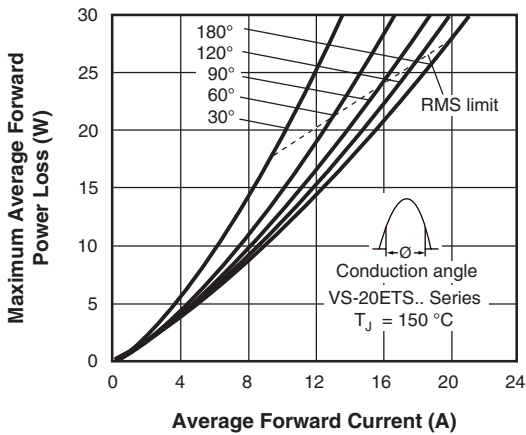


Fig. 3 - Forward Power Loss Characteristics

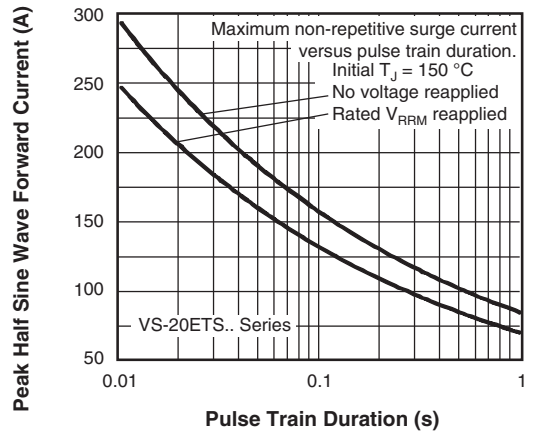


Fig. 6 - Maximum Non-Repetitive Surge Current



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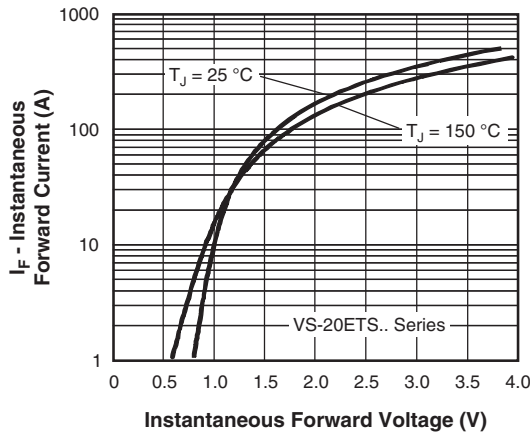


Fig. 7 - Forward Voltage Drop Characteristics

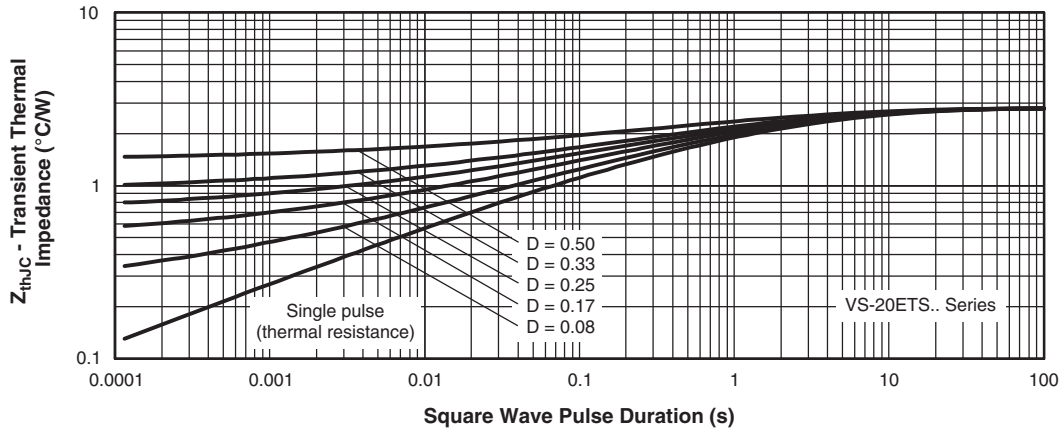


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics



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### ORDERING INFORMATION TABLE

Device code	VS-	20	E	T	S	12	FP	PbF
	1	2	3	4	5	6	7	8
<b>1</b>	-	Vishay Semiconductors product						
<b>2</b>	-	Current rating (20 = 20 A)						
<b>3</b>	-	Circuit configuration: E = single diode						
<b>4</b>	-	Package: T = TO-220						
<b>5</b>	-	Type of silicon: S = standard recovery rectifier						
<b>6</b>	-	Voltage ratings						
<b>7</b>	-	FULL-PAK						
<b>8</b>	-	Environmental digit:						

08 = 800 V  
 12 = 1200 V

PbF = lead (Pb)-free and RoHS-compliant  
 -M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-20ETS08FPPbF	50	1000	Antistatic plastic tubes
VS-20ETS08FP-M3	50	1000	Antistatic plastic tubes
VS-20ETS12FPPbF	50	1000	Antistatic plastic tubes
VS-20ETS12FP-M3	50	1000	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS		
Dimensions		<a href="http://www.vishay.com/doc?95005">www.vishay.com/doc?95005</a>
Part marking information	TO-220 FP PbF	<a href="http://www.vishay.com/doc?95009">www.vishay.com/doc?95009</a>
	TO-220 FP -M3	<a href="http://www.vishay.com/doc?95440">www.vishay.com/doc?95440</a>

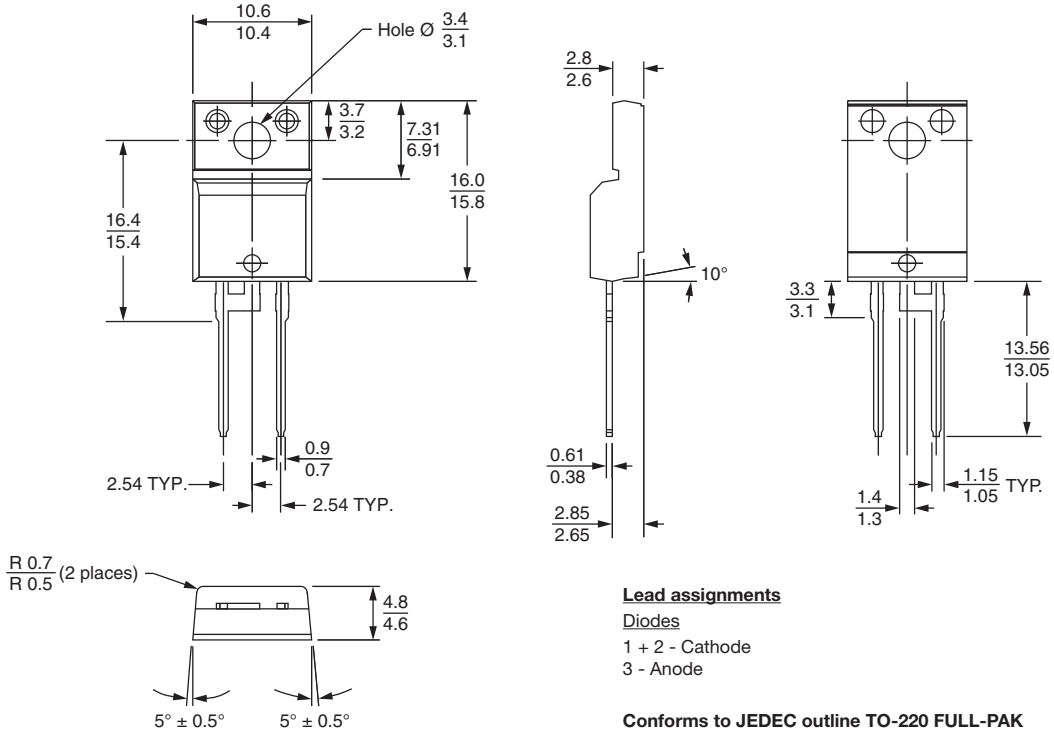


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## Outline Dimensions

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**DIMENSIONS** in millimeters



### Lead assignments

Diodes  
1 + 2 - Cathode  
3 - Anode

Conforms to JEDEC outline TO-220 FULL-PAK



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