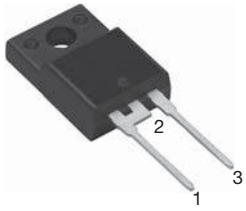
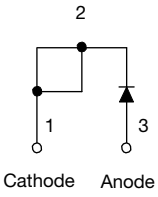
High Voltage, Input Rectifier Diode, 20 A



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

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 °C, T_J = 125 °C common heatsink of 1 °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 °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 °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 ms to 10 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 °C		1.1	V
Forward slope resistance	r_t	T_J = 150 °C		10.4	mΩ
Threshold voltage	$V_{F(TO)}$			0.85	V
Maximum reverse leakage current	I_{RM}	T_J = 25 °C	V_R = Rated V_{RRM}	0.1	mA
		T_J = 150 °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	°C
Maximum thermal resistance, junction to case		R_{thJC}	DC operation	2.8	°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 · cm (lbf · in)
	maximum			12 (10)	
Marking device			Case style TO-220 FULL-PAK	20ETS08FP	
				20ETS12FP	

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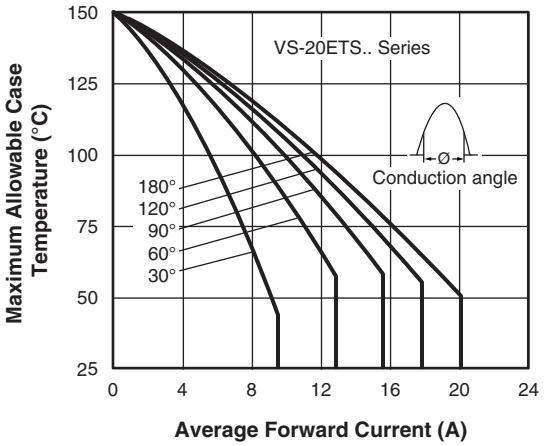

Fig. 1 - Current Rating Characteristics

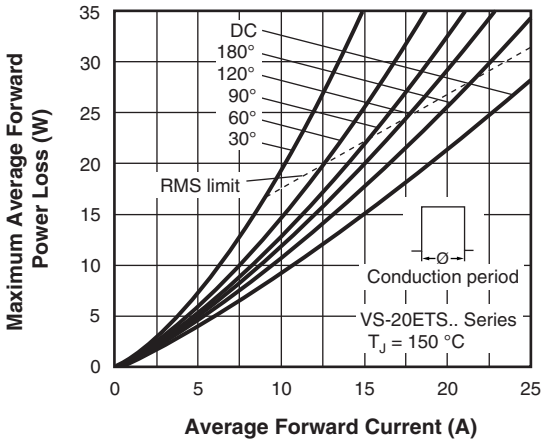

Fig. 4 - Forward Power Loss Characteristics

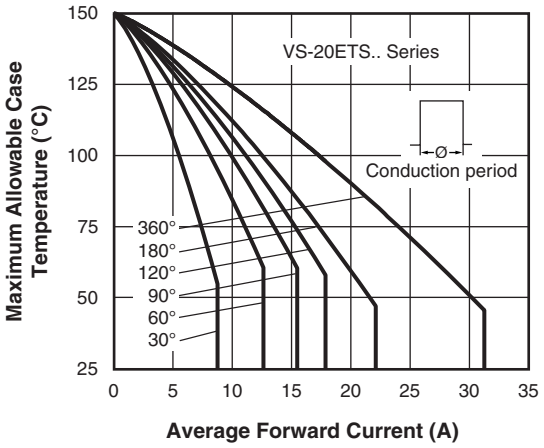

Fig. 2 - Current Rating Characteristics

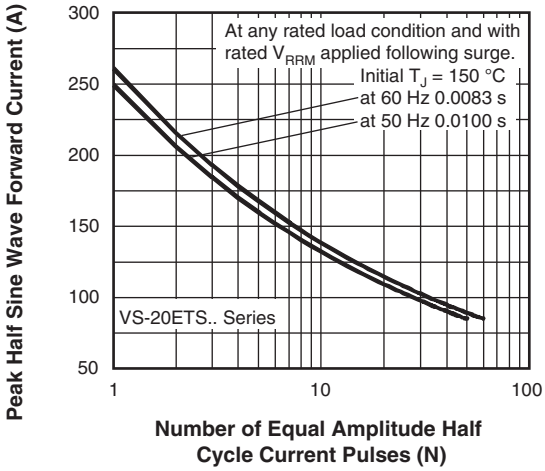

Fig. 5 - Maximum Non-Repetitive Surge Current

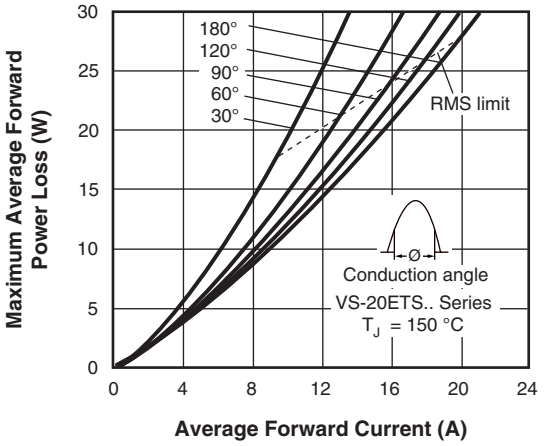

Fig. 3 - Forward Power Loss Characteristics

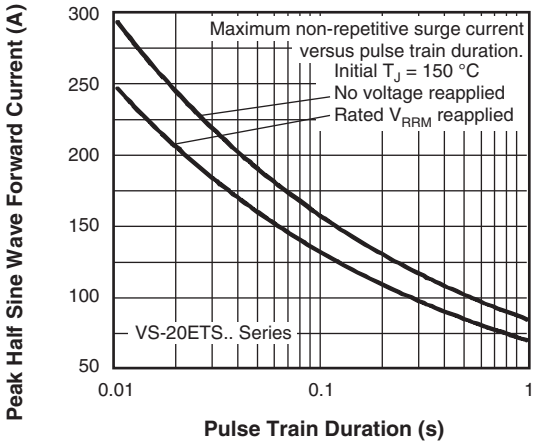

Fig. 6 - Maximum Non-Repetitive Surge Current

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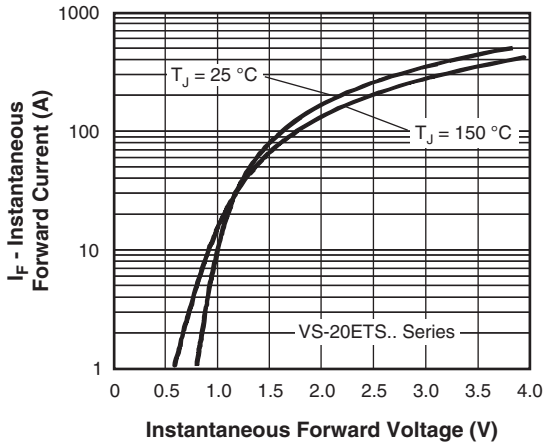

Fig. 7 - Forward Voltage Drop Characteristics

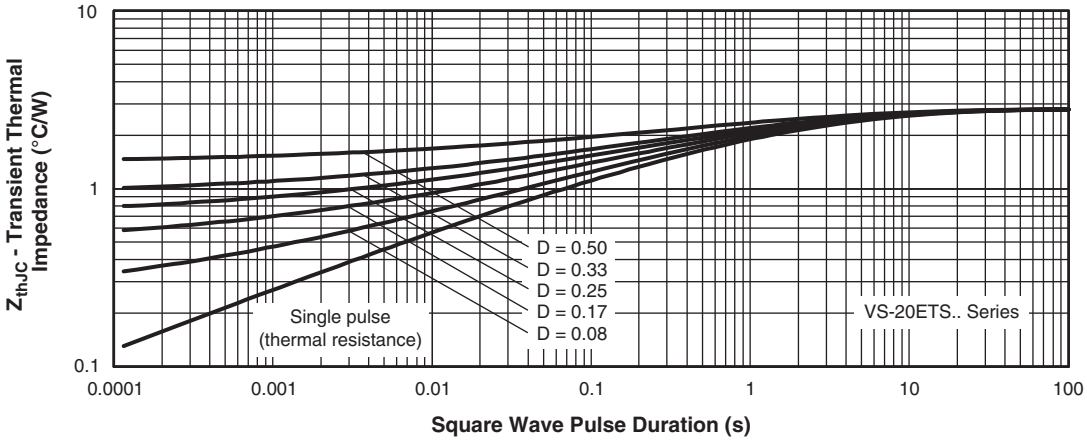

Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

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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

1 - Vishay Semiconductors product
2 - Current rating (20 = 20 A)
3 - Circuit configuration:
E = single diode
4 - Package:
T = TO-220
5 - Type of silicon:
S = standard recovery rectifier
6 - Voltage ratings — 08 = 800 V, 12 = 1200 V
7 - FULL-PAK
8 - Environmental digit:
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		www.vishay.com/doc?95005
Part marking information	TO-220 FP PbF	www.vishay.com/doc?95009
	TO-220 FP -M3	www.vishay.com/doc?95440

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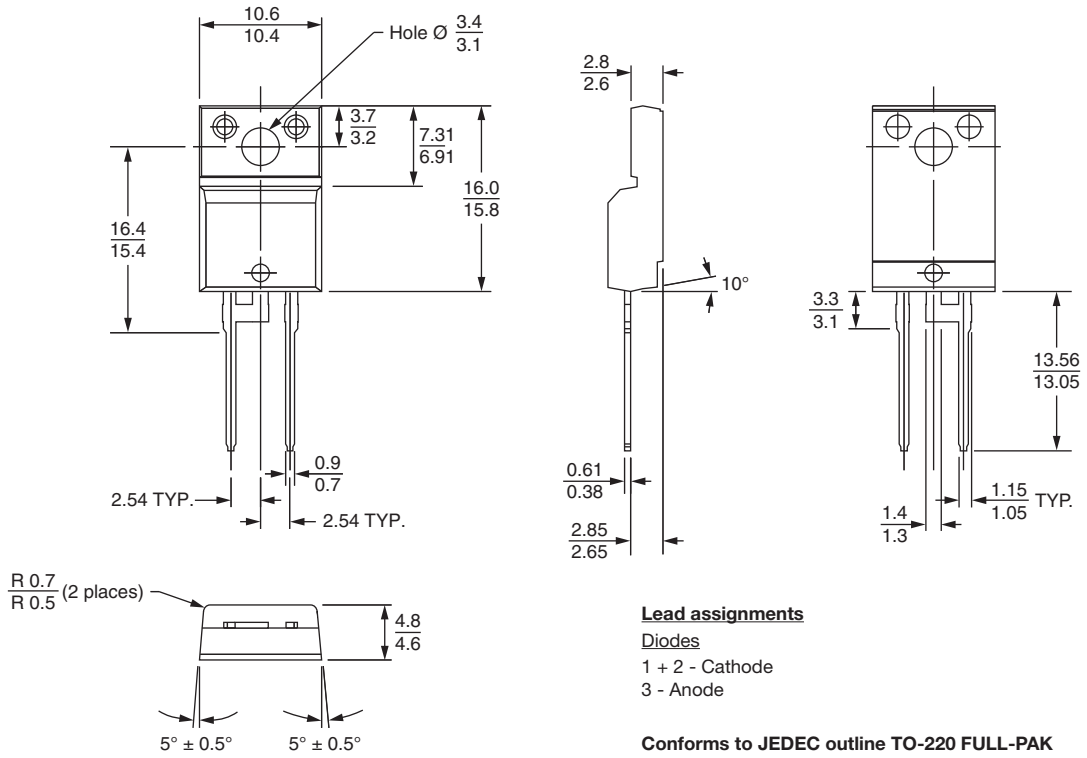
DIMENSIONS in millimeters



Lead assignments

Diodes

1 + 2 - Cathode

3 - Anode

Conforms to JEDEC outline TO-220 FULL-PAK

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