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Vishay Semiconductors

# Power Rectifier Diodes (T-Modules), 2200 V, 20 A



D-55 (T-module)

PRIMARY CHARACTERISTICS					
I <sub>F(AV)</sub>	20 A				
Type	Modules - diode, high voltage				
V <sub>RRM</sub>	2200 V				
Package	D-55 (T-module)				
Circuit configuration	Single diode				

#### **FEATURES**

- · Electrically isolated base plate
- 2200 V<sub>RRM</sub>
- Industrial standard packaging
- UL approved file E78996



- · Simplified mechanical designs, rapid assembly
- · Large creepage distances
- · Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

#### **DESCRIPTION / APPLICATIONS**

These series of D-55 (T-modules) use standard recovery power rectifier diodes. The semiconductors are electrically isolated from the metal base, allowing common heatsink and compact assembly to be built.

Applications include power supplies, battery charges, welders, motor controls, and solar panel application.

SYMBOL	CHARACTERISTICS	VALUES	UNITS	
	1 11011100	20	A	
I <sub>F(AV)</sub>	T <sub>C</sub>	85	°C	
I <sub>F(RMS)</sub>		31		
1	50 Hz	450	A	
I <sub>FSM</sub>	60 Hz	470		
I <sup>2</sup> t	50 Hz	1015	A <sup>2</sup> s	
1-1	60 Hz	920	A-S	
$I^2\sqrt{t}$		10 125	A <sup>2</sup> √s	
V <sub>RRM</sub>		2200	V	
TJ		-40 to +150	°C	

### **ELECTRICAL SPECIFICATIONS**

VOLTAGE RATINGS							
TYPE NUMBER	VOLTAGE CODE	V <sub>RRM</sub> , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	V <sub>RSM</sub> , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I <sub>RRM</sub> MAXIMUM AT T <sub>J</sub> = 150 °C mA			
VS-T20HF220	22	2200	2250	18			



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FORWARD CONDUCTION						
PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS
Maximum average forward current at case temperature	I <sub>F(AV)</sub>	180° conduction, half sine wave			20 85	A °C
Maximum RMS forward current	I <sub>F(RMS)</sub>				31	A
	. ()	t = 10 ms	No voltage		450	
Maximum peak, one-cycle forward,	١.,	t = 8.3 ms	reapplied		470	٦ ,
non-repetitive surge current	I <sub>FSM</sub>	t = 10 ms	100 % V <sub>RRM</sub>	0	380	A
		t = 8.3 ms	reapplied	Sinusoidal half	400	
		t = 10 ms	No voltage	wave, initial $T_{J} = T_{J} \text{ maximum}$	1015	A <sup>2</sup> s
Maximum I <sup>2</sup> t for fusing	l <sup>2</sup> t	t = 8.3 ms	reapplied		920	
Maximum 1-t for fusing		t = 10 ms	100 % V <sub>RRM</sub>		715	
		t = 8.3 ms	reapplied		650	
Maximum I <sup>2</sup> √t for fusing	I <sup>2</sup> √t	t = 0.1 ms to 10 ms, no voltage reapplied			10 125	A²√s
Low level value of threshold voltage	V <sub>F(TO)1</sub>		(16.7 % x $\pi$ x $I_{F(AV)}$ < I < $\pi$ x $I_{F(AV)}$ ), T <sub>J</sub> maximum			V
High level value of threshold voltage	V <sub>F(TO)2</sub>	$(I > \pi \times I_{F(AV)}), T_J$ maximum			0.89	
Low level value of forward slope resistance	r <sub>f1</sub>	(16.7 % x $\pi$ x $I_{F(AV)}$ < $I$ < $\pi$ x $I_{F(AV)}$ ), $I_{J}$ maximum			8.5	mΩ
High level value of forward slope resistance	r <sub>f2</sub>	$(I > \pi \times I_{F(AV)}), T_J$ maximum			6.7	1
Maximum forward voltage drop	V <sub>FM</sub>	$I_{FM} = 60 \text{ A}$ , $T_J = 25 \text{ °C}$ , $t_p = 400 \mu\text{s}$ square pulse Average power = $V_{F(TO)} \times I_{F(AV)} + r_f \times (I_{F(RMS)})^2$			1.50	V

BLOCKING							
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS			
Maximum peak reverse leakage current	I <sub>RRM</sub>	T <sub>J</sub> = 150 °C	18	mA			
RMS isolation voltage	V <sub>ISOL</sub>	50 Hz, circuit to base, all terminals shorted $T_J = 25  ^{\circ}\text{C}$ , $t = 1  \text{s}$	3500	V			

THERMAL AND MECHANICAL SPECIFICATIONS							
PARAMETER		SYMBOL	TES	T CONDITIONS	VALUES	UNITS	
Maximum junction operating a temperature range	and storage	T <sub>J</sub> , T <sub>Stg</sub>			-40 to +150	°C	
Maximum thermal resistance, per junction	junction to case	$R_{thJC}$	DC operation		2.53	K/W	
Maximum thermal resistance, case to heatsink		R <sub>thCS</sub>	Mounting surface smooth, flat and greased		0.2		
Mounting torque + 10 %	to heatsink		Non-lubricated	M3.5 mounting screws (1)	1.3 ± 10 %	Nm	
Mounting torque, ± 10 % —	terminals		threads M5 screw terminals		3 ± 10 %	INIII	
Approximate weight			See dimensions	- link at the end of datasheet	54	g	
Case style					D-55 (T-m	odule)	

#### Note

<sup>(1)</sup> A mounting compound is recommended and the torque should be rechecked after a period of about 3 hours to allow for the spread of the compound

△R CONDUCTION PER JUNCTION											
DEVICES	SINUSOIDAL CONDUCTION AT T <sub>J</sub> MAXIMUM				RECTANGULAR CONDUCTION AT T <sub>J</sub> MAXIMUM				UNITS		
DEVICES	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	UNITS
T20HF	0.29	0.34	0.43	0.64	1.10	0.20	0.35	0.47	0.67	1.11	K/W

### Note

Table shows the increment of thermal resistance R<sub>thJC</sub> when devices operate at different conduction angles than DC

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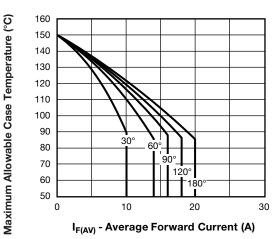
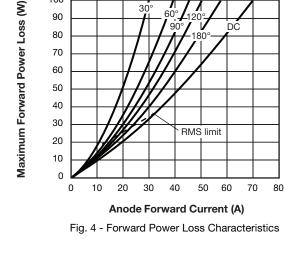


Fig. 1 - Current Ratings Characteristics



100

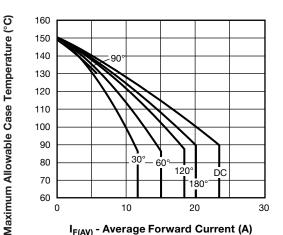


Fig. 2 - Current Ratings Characteristics

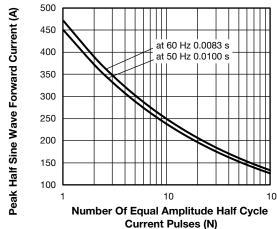


Fig. 5 - Maximum Non-Repetitive Surge Current

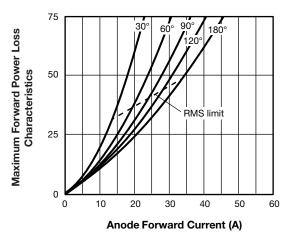


Fig. 3 - Forward Power Loss Characteristics

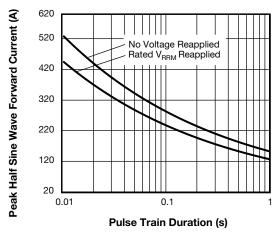


Fig. 6 - Maximum Non-Repetitive Surge Current

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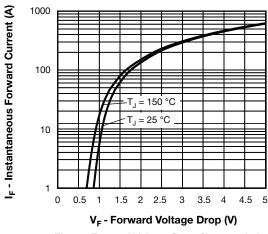


Fig. 7 - Forward Voltage Drop Characteristics

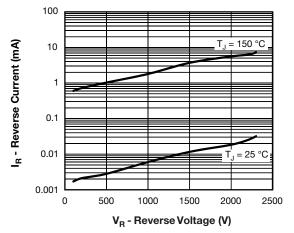


Fig. 8 - Typical Values of Reverse Current vs. Reverse Voltage

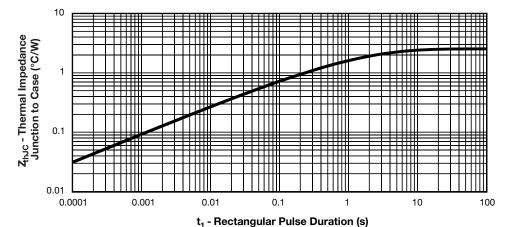
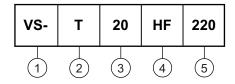


Fig. 9 - Maximum Thermal Impedance Z<sub>thJC</sub> Characteristics

### **ORDERING INFORMATION TABLE**

### Device code



1 - Vishay Semiconductors product

2 - Module type

3 - Current rating

4 - Circuit configuration (see Circuit Configuration table)

Voltage code x 10 = V<sub>RRM</sub>

CIRCUIT CONFIGURATION							
CIRCUIT DESCRIPTION	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING					
Single diode	HF	2 0 0 1					

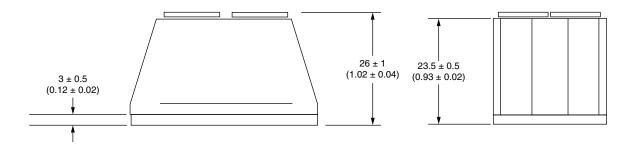
LINKS TO RELATED DOCUMENTS				
Dimensions	www.vishay.com/doc?95313			

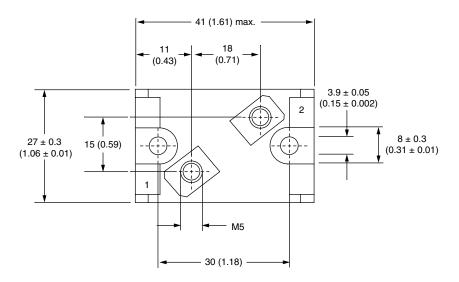


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# **D-55 T-Module Diode Standard and Fast Recovery**

### **DIMENSIONS** in millimeters (inches)





### Note

• 1 = Anode 2 = Cathode



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