


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



D-55 (T-module)

### 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](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### 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

### 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.

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
I <sub>F(AV)</sub>		20	A
	T <sub>C</sub>	85	°C
I <sub>F(RMS)</sub>		31	A
I <sub>FSM</sub>	50 Hz	450	
	60 Hz	470	
I <sup>2</sup> t	50 Hz	1015	A <sup>2</sup> s
	60 Hz	920	
I <sup>2</sup> √t		10 125	A <sup>2</sup> √s
V <sub>RRM</sub>		2200	V
T <sub>J</sub>		-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



FORWARD CONDUCTION					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave		20	A
				85	°C
Maximum RMS forward current	$I_{F(RMS)}$			31	A
Maximum peak, one-cycle forward, non-repetitive surge current	$I_{FSM}$	t = 10 ms	No voltage reapplied	450	A
		t = 8.3 ms	No voltage reapplied	470	
		t = 10 ms	100 % $V_{RRM}$ reapplied	380	
		t = 8.3 ms	100 % $V_{RRM}$ reapplied	400	
Maximum $I^2t$ for fusing	$I^2t$	t = 10 ms	No voltage reapplied	1015	A <sup>2</sup> s
		t = 8.3 ms	No voltage reapplied	920	
		t = 10 ms	100 % $V_{RRM}$ reapplied	715	
		t = 8.3 ms	100 % $V_{RRM}$ reapplied	650	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied		10 125	A <sup>2</sup> √s
Low level value of threshold voltage	$V_{F(TO)1}$	(16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$ ), $T_J$ maximum		0.77	V
High level value of threshold voltage	$V_{F(TO)2}$	(I $> \pi \times I_{F(AV)}$ ), $T_J$ maximum		0.89	
Low level value of forward slope resistance	$r_{f1}$	(16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$ ), $T_J$ maximum		8.5	mΩ
High level value of forward slope resistance	$r_{f2}$	(I $> \pi \times I_{F(AV)}$ ), $T_J$ maximum		6.7	
Maximum forward voltage drop	$V_{FM}$	$I_{FM} = 60$ A, $T_J = 25$ °C, $t_p = 400$ μs 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	$I_{RRM}$	$T_J = 150$ °C		18	mA
RMS isolation voltage	$V_{ISOL}$	50 Hz, circuit to base, all terminals shorted $T_J = 25$ °C, t = 1 s		3500	V

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

**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

ΔR CONDUCTION PER JUNCTION											
DEVICES	SINUSOIDAL CONDUCTION AT $T_J$ MAXIMUM					RECTANGULAR CONDUCTION AT $T_J$ MAXIMUM					UNITS
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
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  $R_{thJC}$  when devices operate at different conduction angles than DC

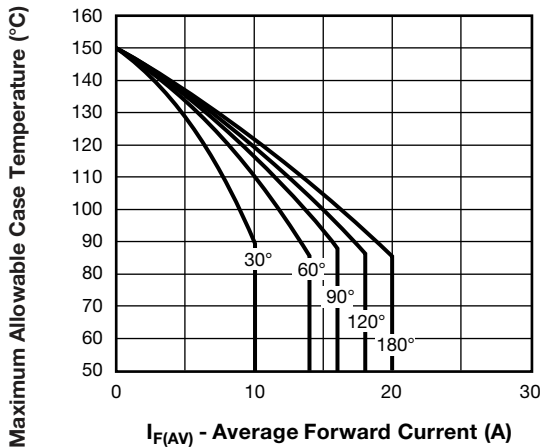


Fig. 1 - Current Ratings Characteristics

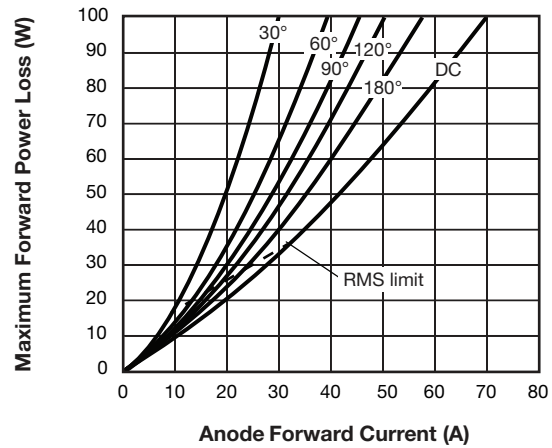


Fig. 4 - Forward Power Loss Characteristics

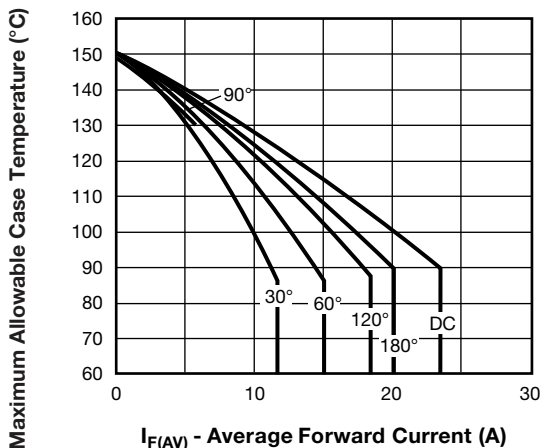


Fig. 2 - Current Ratings Characteristics

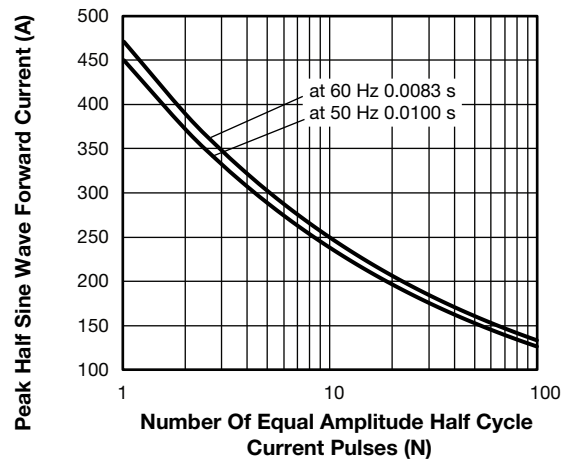


Fig. 5 - Maximum Non-Repetitive Surge Current

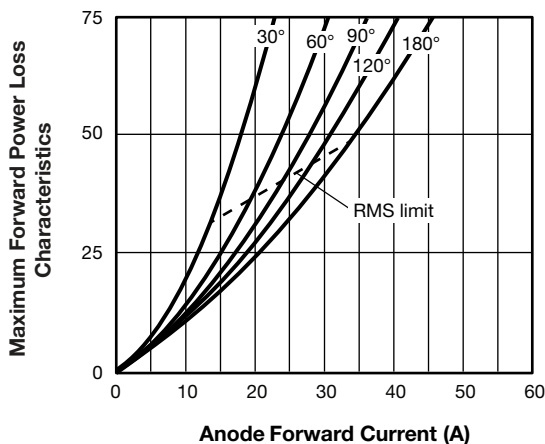


Fig. 3 - Forward Power Loss Characteristics

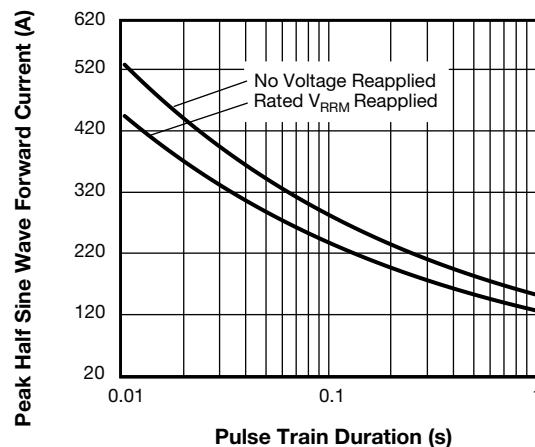


Fig. 6 - Maximum Non-Repetitive Surge Current

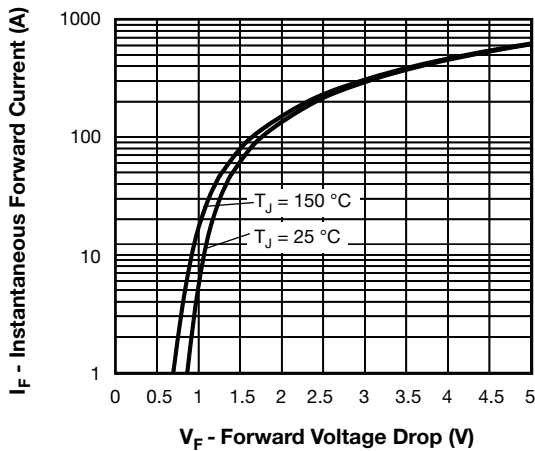


Fig. 7 - Forward Voltage Drop Characteristics

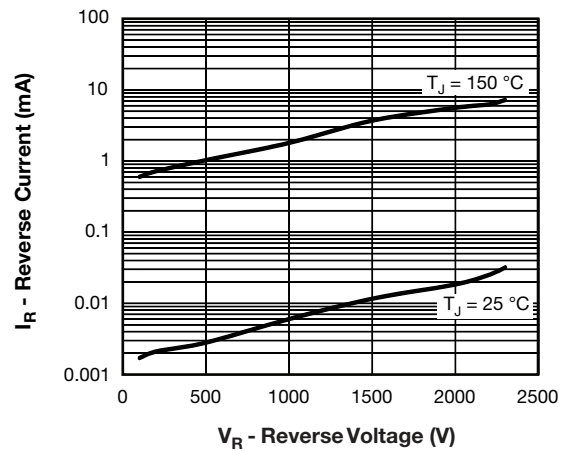
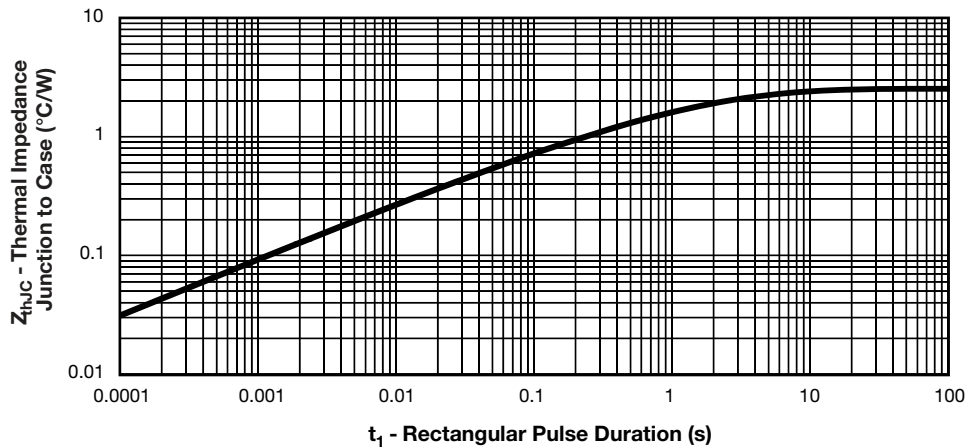


Fig. 8 - Typical Values of Reverse Current vs. Reverse Voltage


 Fig. 9 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>T</b>	<b>20</b>	<b>HF</b>	<b>220</b>
	①	②	③	④	⑤
	<b>1</b>	-	Vishay Semiconductors product		
	<b>2</b>	-	Module type		
	<b>3</b>	-	Current rating		
	<b>4</b>	-	Circuit configuration (see Circuit Configuration table)		
	<b>5</b>	-	Voltage code x 10 = $V_{RRM}$		

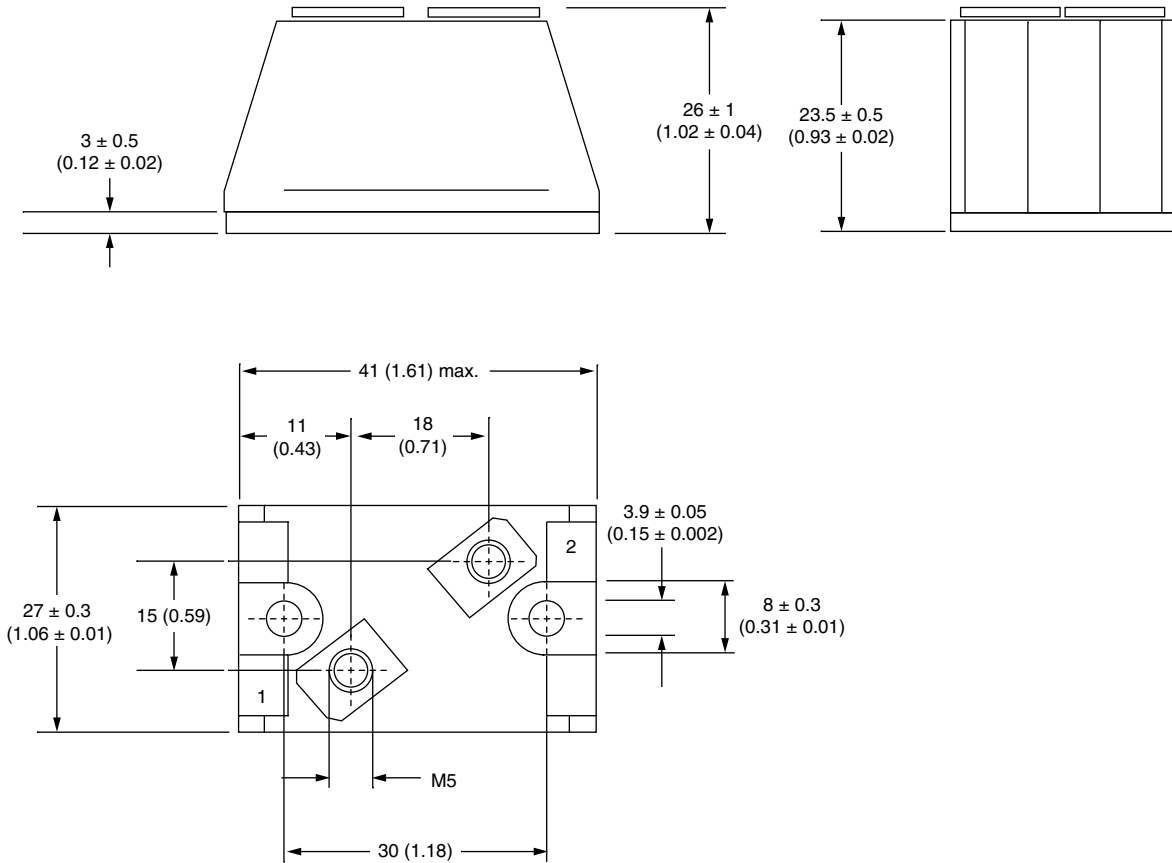
<b>CIRCUIT CONFIGURATION</b>		
<b>CIRCUIT DESCRIPTION</b>	<b>CIRCUIT CONFIGURATION CODE</b>	<b>CIRCUIT DRAWING</b>
Single diode	HF	

<b>LINKS TO RELATED DOCUMENTS</b>	
Dimensions	<a href="http://www.vishay.com/doc?95313">www.vishay.com/doc?95313</a>



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

**DIMENSIONS** in millimeters (inches)



**Note**

- 1 = Anode
- 2 = Cathode



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