

## 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
	50 Hz	450	
I <sub>FSM</sub>	60 Hz	470	
	50 Hz	1015	A <sup>2</sup> s
	60 Hz	920	
I <sup>2</sup> t		10 125	A <sup>2</sup> s
I <sup>2</sup> √t		2200	V
V <sub>RRM</sub>		-40 to +150	°C
T <sub>J</sub>			

### 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	$I_{FSM}$	$t = 10 \text{ ms}$	No voltage reapplied	Sinusoidal half wave, initial $T_J = T_J$ maximum	450	A			
		$t = 8.3 \text{ ms}$	100 % $V_{RRM}$ reapplied		470				
		$t = 10 \text{ ms}$			380				
		$t = 8.3 \text{ ms}$	100 % $V_{RRM}$ reapplied		400				
Maximum $I^2t$ for fusing	$I^2t$	$t = 10 \text{ ms}$	No voltage reapplied	1015	1015	$\text{A}^2\text{s}$			
		$t = 8.3 \text{ ms}$	100 % $V_{RRM}$ reapplied		920				
		$t = 10 \text{ ms}$			715				
		$t = 8.3 \text{ ms}$	100 % $V_{RRM}$ reapplied		650				
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1 \text{ ms to } 10 \text{ ms, no voltage reapplied}$			10 125	$\text{A}^2\sqrt{\text{s}}$			
Low level value of threshold voltage	$V_{F(TO)1}$	$(16.7 \% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}, T_J \text{ maximum})$			0.77	V			
High level value of threshold voltage	$V_{F(TO)2}$	$(I > \pi \times I_{F(AV)}, T_J \text{ maximum})$			0.89				
Low level value of forward slope resistance	$r_{f1}$	$(16.7 \% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}, T_J \text{ maximum})$			8.5	$\text{m}\Omega$			
High level value of forward slope resistance	$r_{f2}$	$(I > \pi \times I_{F(AV)}, T_J \text{ maximum})$			6.7				
Maximum forward voltage drop	$V_{FM}$	$I_{FM} = 60 \text{ A, } T_J = 25 \text{ °C, } t_p = 400 \mu\text{s square pulse}$ 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	$I_{RRM}$	$T_J = 150 \text{ °C}$			18	mA
RMS isolation voltage	$V_{ISOL}$	50 Hz, circuit to base, all terminals shorted $T_J = 25 \text{ °C, } t = 1 \text{ s}$			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, $\pm 10 \%$ to heatsink terminals		Non-lubricated threads		M3.5 mounting screws <sup>(1)</sup>	$1.3 \pm 10 \%$	Nm
		M5 screw terminals			$3 \pm 10 \%$	
Approximate weight		See dimensions - link at the end of datasheet			54	g
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°		
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

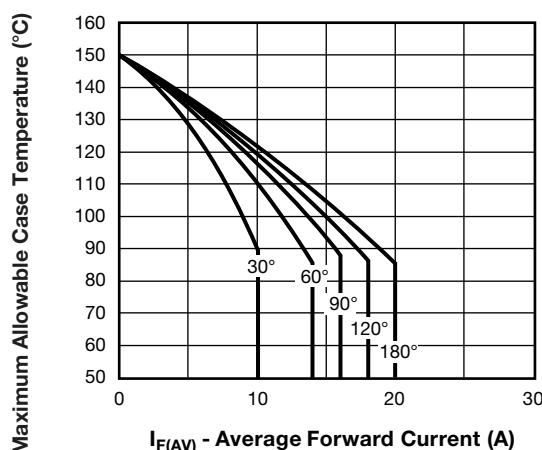


Fig. 1 - Current Ratings Characteristics

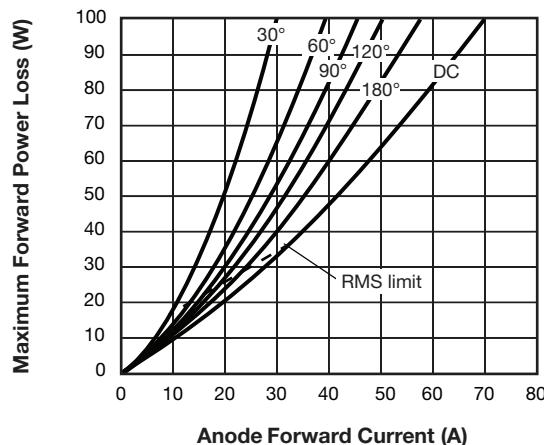


Fig. 4 - Forward Power Loss Characteristics

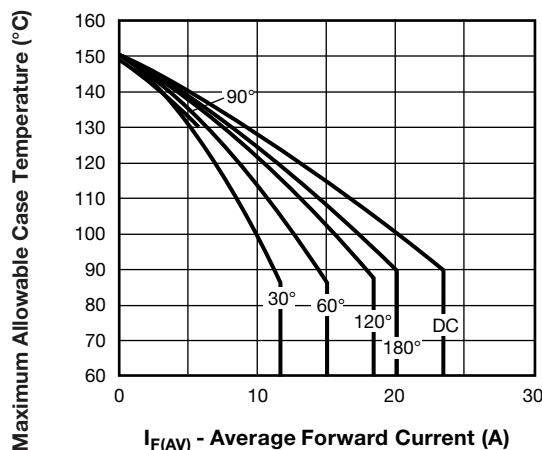


Fig. 2 - Current Ratings Characteristics

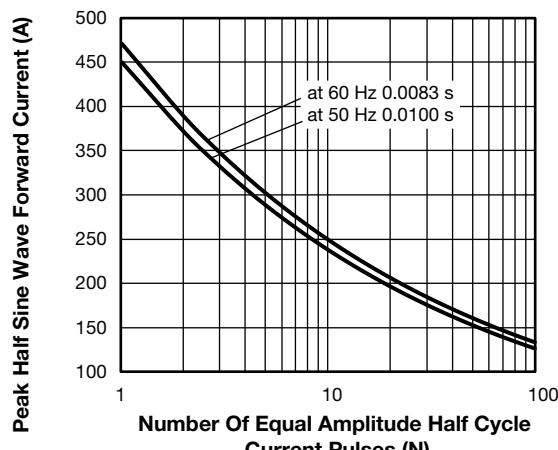


Fig. 5 - Maximum Non-Repetitive Surge Current

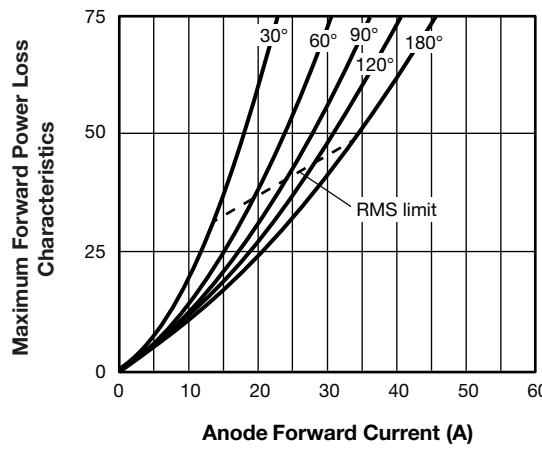


Fig. 3 - Forward Power Loss Characteristics

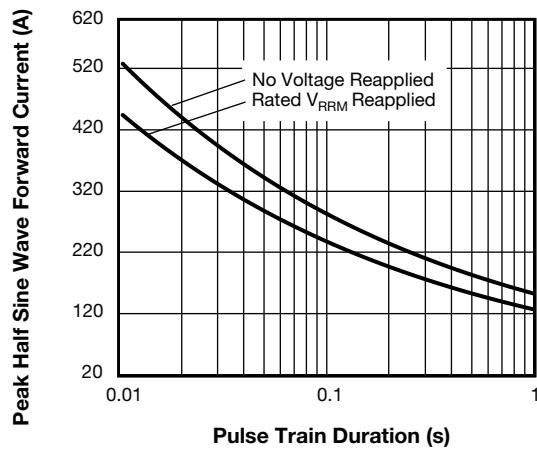


Fig. 6 - Maximum Non-Repetitive Surge Current

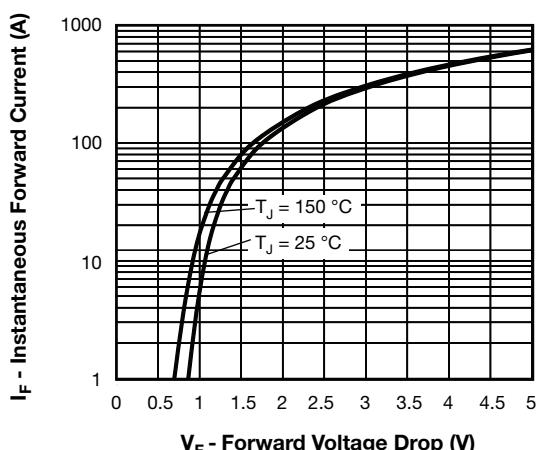


Fig. 7 - Forward Voltage Drop Characteristics

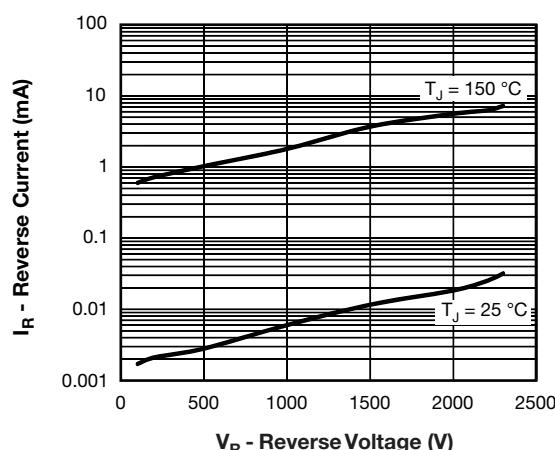


Fig. 8 - Typical Values of Reverse Current vs. Reverse Voltage

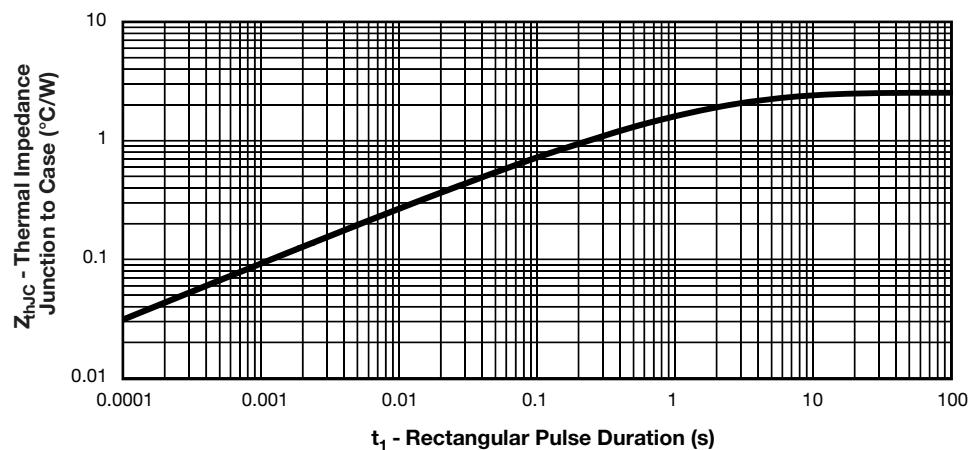


Fig. 9 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

## ORDERING INFORMATION TABLE

Device code	VS-	T	20	HF	220
	(1)	(2)	(3)	(4)	(5)

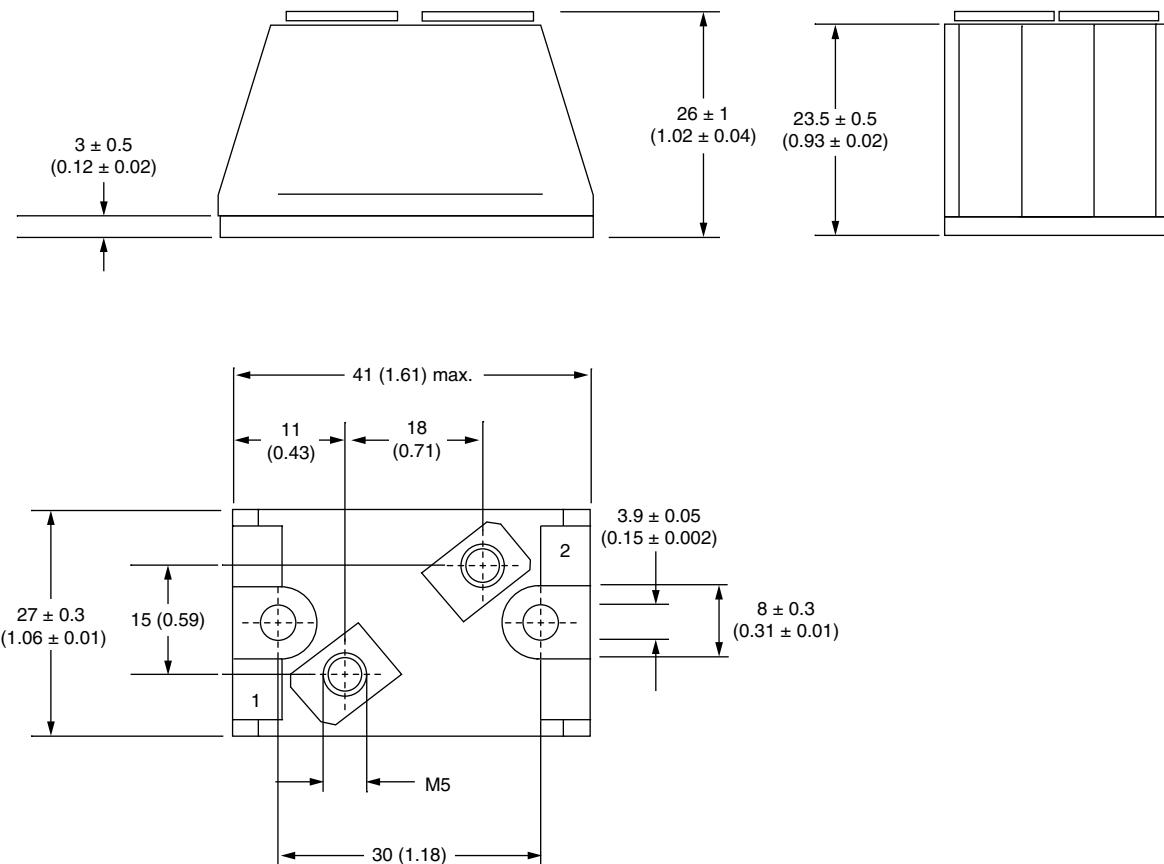
- 1** - Vishay Semiconductors product
- 2** - Module type
- 3** - Current rating
- 4** - Circuit configuration (see Circuit Configuration table)
- 5** - Voltage code x 10 =  $V_{RRM}$

CIRCUIT CONFIGURATION		
CIRCUIT DESCRIPTION	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Single diode	HF	

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc295313">www.vishay.com/doc295313</a>

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

**DIMENSIONS** in millimeters (inches)



**Note**

- 1 = Anode
- 2 = Cathode

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