

## 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 <sub>F(AV)</sub>	180° conduction, half sine wave			20	A	
					85	°C	
Maximum RMS forward current	I <sub>F(RMS)</sub>				31	A	
Maximum peak, one-cycle forward, non-repetitive surge current	I <sub>FSM</sub>	t = 10 ms	No voltage reappplied	Sinusoidal half wave, initial T <sub>J</sub> = T <sub>J</sub> maximum	450	A	
		t = 8.3 ms			470		
		t = 10 ms	100 % V <sub>RRM</sub> reappplied		380		
		t = 8.3 ms			400		
Maximum I <sup>2</sup> t for fusing	I <sup>2</sup> t	t = 10 ms	No voltage reappplied			1015	A <sup>2</sup> s
		t = 8.3 ms				920	
		t = 10 ms	100 % V <sub>RRM</sub> reappplied			715	
		t = 8.3 ms				650	
Maximum I <sup>2</sup> √t for fusing	I <sup>2</sup> √t	t = 0.1 ms to 10 ms, no voltage reappplied			10 125	A <sup>2</sup> √s	
Low level value of threshold voltage	V <sub>F(TO)1</sub>	(16.7 % × π × I <sub>F(AV)</sub> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> maximum			0.77	V	
High level value of threshold voltage	V <sub>F(TO)2</sub>	(I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> maximum			0.89		
Low level value of forward slope resistance	r <sub>f1</sub>	(16.7 % × π × I <sub>F(AV)</sub> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> maximum			8.5	mΩ	
High level value of forward slope resistance	r <sub>f2</sub>	(I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> maximum			6.7		
Maximum forward voltage drop	V <sub>FM</sub>	I <sub>FM</sub> = 60 A, T <sub>J</sub> = 25 °C, t <sub>p</sub> = 400 μs square pulse Average power = V <sub>F(TO)</sub> × I <sub>F(AV)</sub> + r <sub>f</sub> × (I <sub>F(RMS)</sub> ) <sup>2</sup>			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>	1.3 ± 10 %	Nm
			M5 screw terminals	3 ± 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°	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

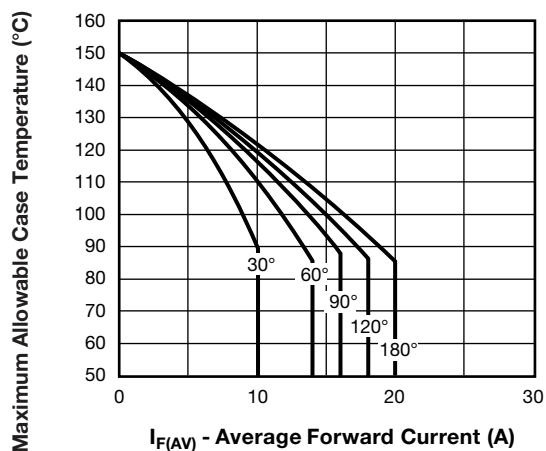


Fig. 1 - Current Ratings Characteristics

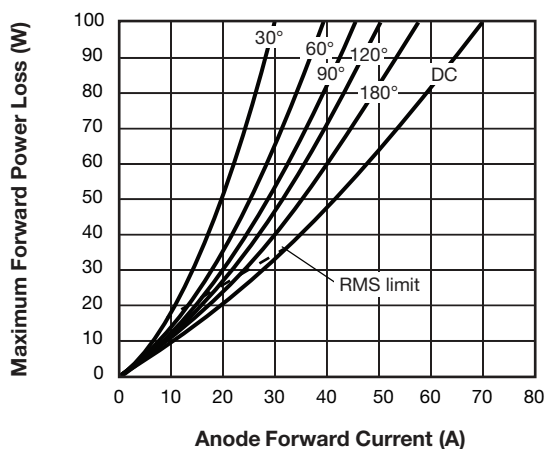


Fig. 4 - Forward Power Loss Characteristics

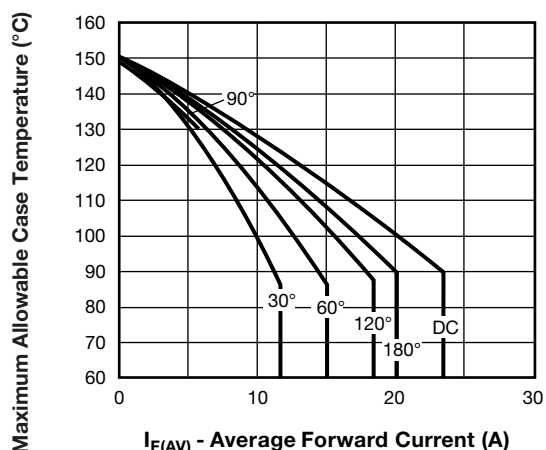


Fig. 2 - Current Ratings Characteristics

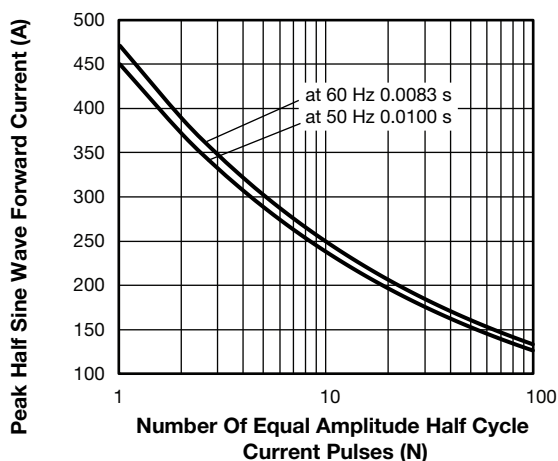


Fig. 5 - Maximum Non-Repetitive Surge Current

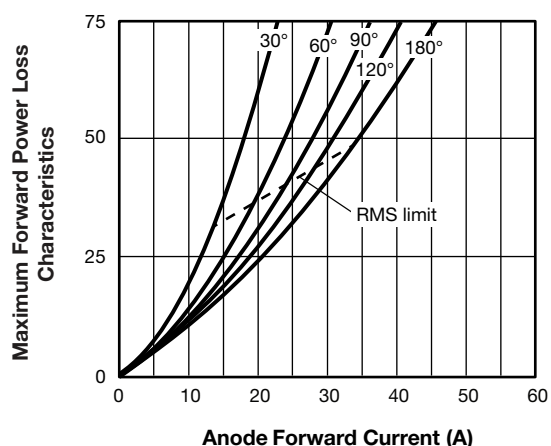


Fig. 3 - Forward Power Loss Characteristics

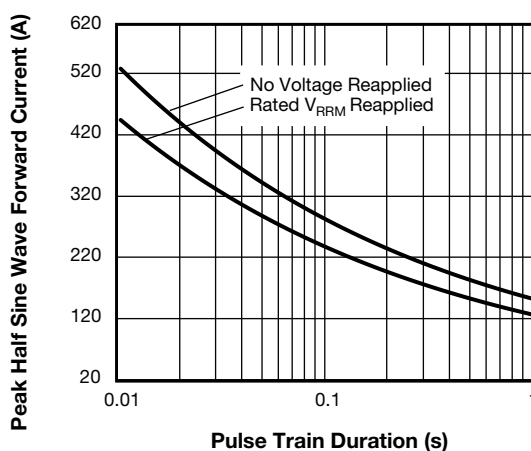


Fig. 6 - Maximum Non-Repetitive Surge Current

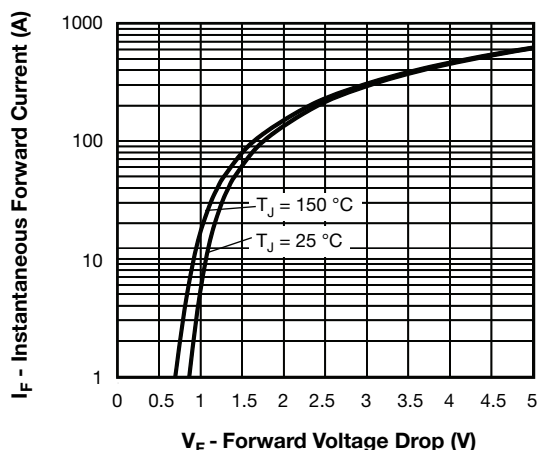


Fig. 7 - Forward Voltage Drop Characteristics

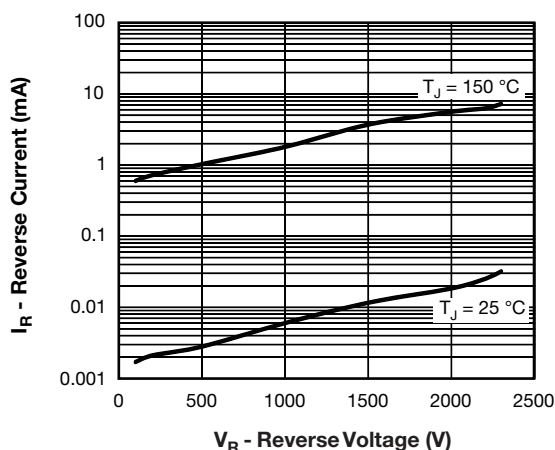
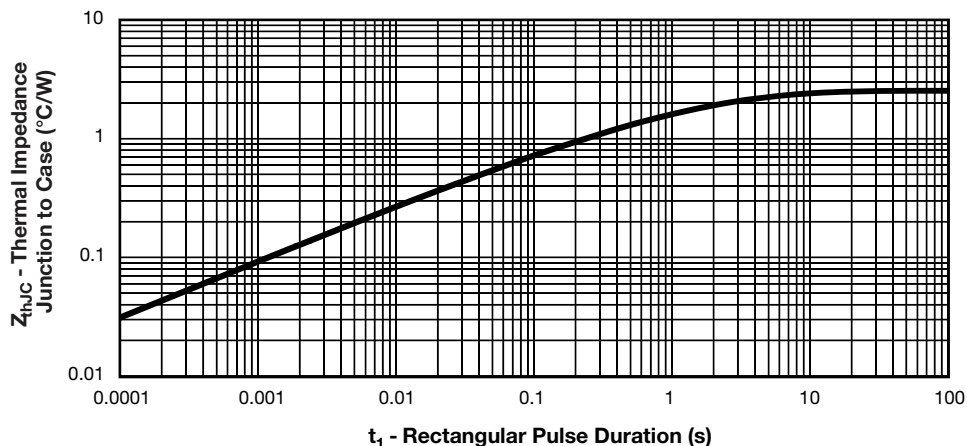


Fig. 8 - Typical Values of Reverse Current vs. Reverse Voltage


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

## ORDERING INFORMATION TABLE

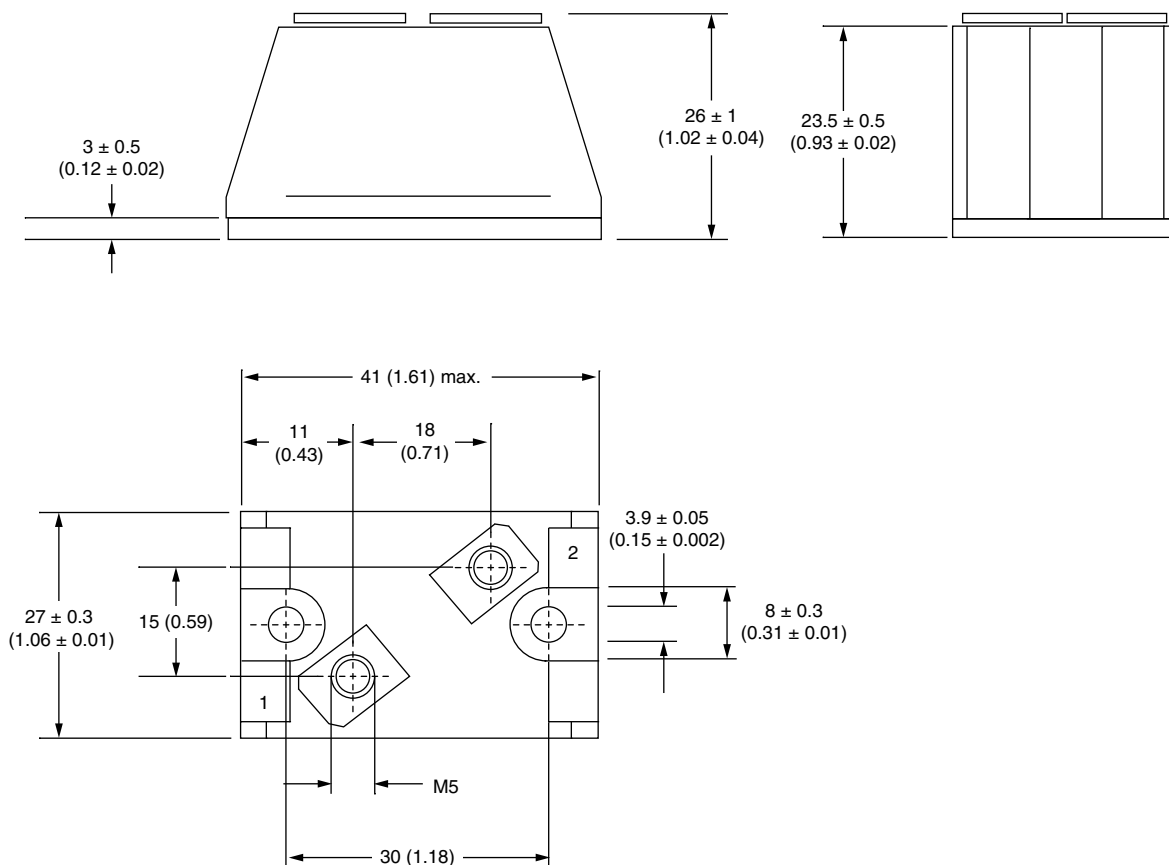
Device code	VS-	T	20	HF	220
	①	②	③	④	⑤
①	- Vishay Semiconductors product				
②	- Module type				
③	- Current rating				
④	- Circuit configuration (see Circuit Configuration table)				
⑤	- Voltage code x 10 = $V_{RRM}$				

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

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



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.