

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



D-55 (T-module)

FEATURES

- Electrically isolated base plate
- 2200 V_{RRM}
- 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


RoHS
COMPLIANT

PRIMARY CHARACTERISTICS

I _{F(AV)}	20 A
Type	Modules - diode, high voltage
V _{RRM}	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 _{F(AV)}		20	A
	T _C	85	°C
I _{F(RMS)}		31	A
I _{FSM}	50 Hz	450	
	60 Hz	470	
I ² t	50 Hz	1015	A ² s
	60 Hz	920	
I ² √t		10 125	A ² √s
V _{RRM}		2200	V
T _J		-40 to +150	°C

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS

TYPE NUMBER	VOLTAGE CODE	V _{RRM} , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	V _{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I _{RRM} MAXIMUM AT T _J = 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 ² 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 ² √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 ⁽¹⁾ 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

⁽¹⁾ 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

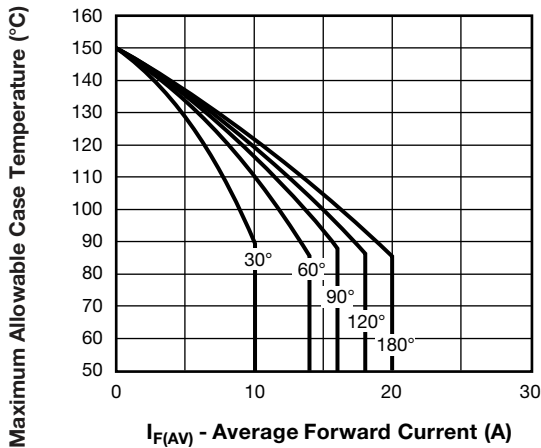


Fig. 1 - Current Ratings Characteristics

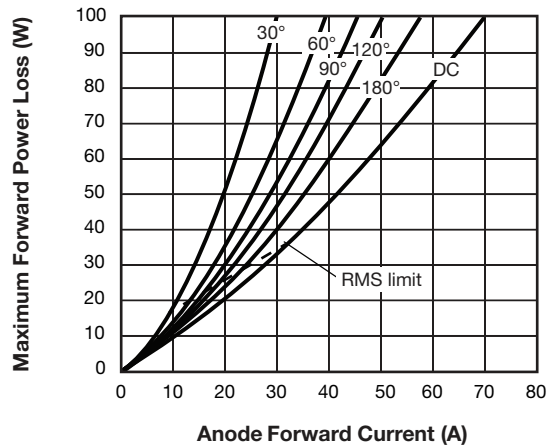


Fig. 4 - Forward Power Loss Characteristics

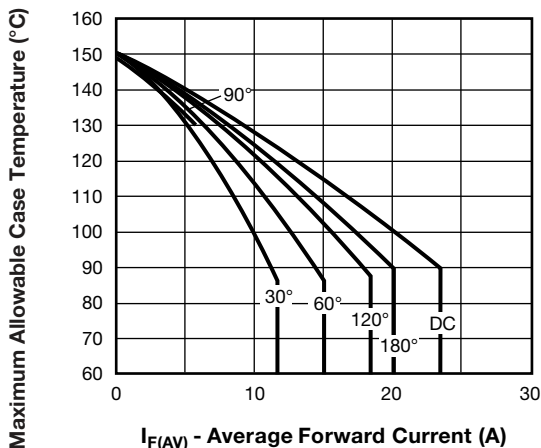


Fig. 2 - Current Ratings Characteristics

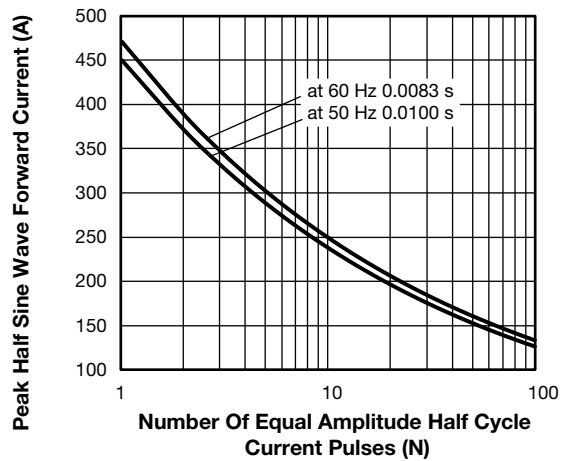


Fig. 5 - Maximum Non-Repetitive Surge Current

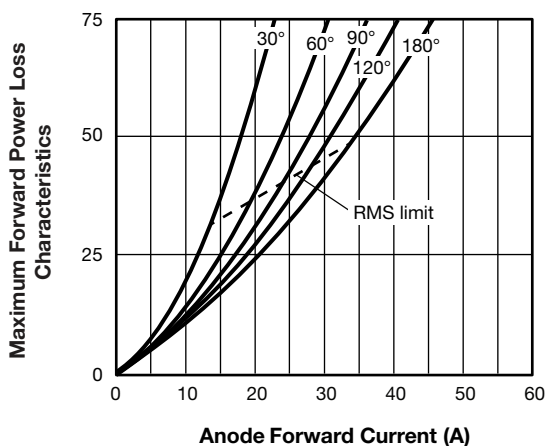


Fig. 3 - Forward Power Loss Characteristics

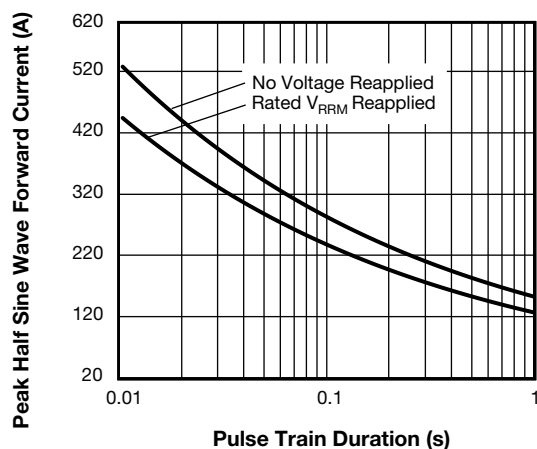


Fig. 6 - Maximum Non-Repetitive Surge Current

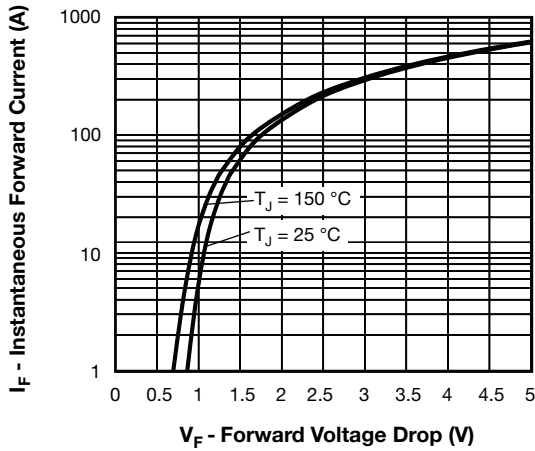


Fig. 7 - Forward Voltage Drop Characteristics

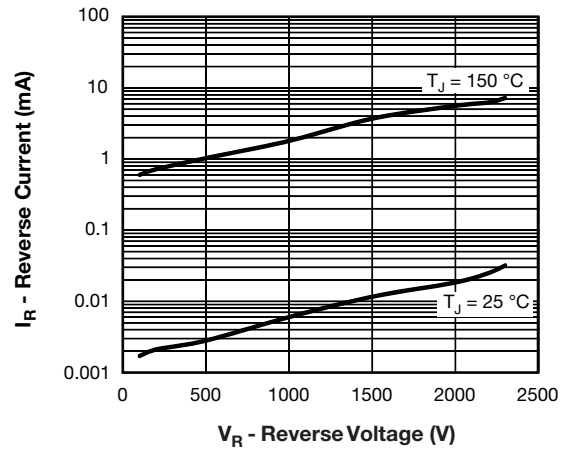


Fig. 8 - Typical Values of Reverse Current vs. Reverse Voltage

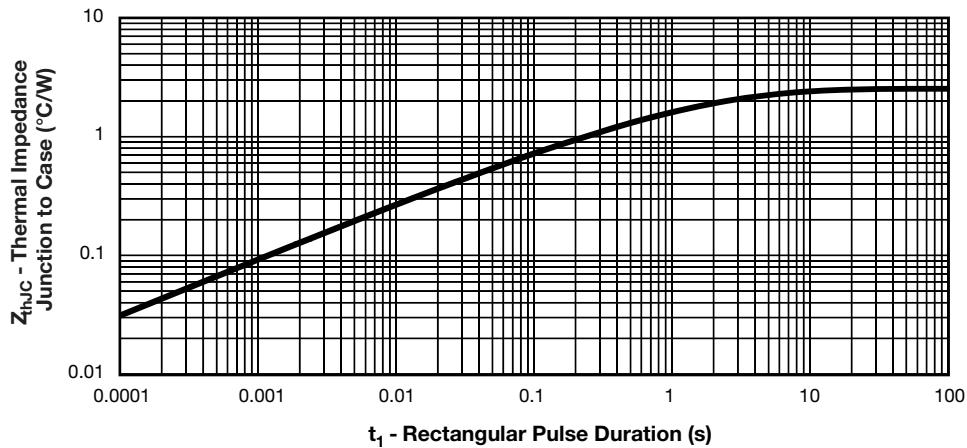


Fig. 9 - Maximum Thermal Impedance Z_{thJC} Characteristics

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}			

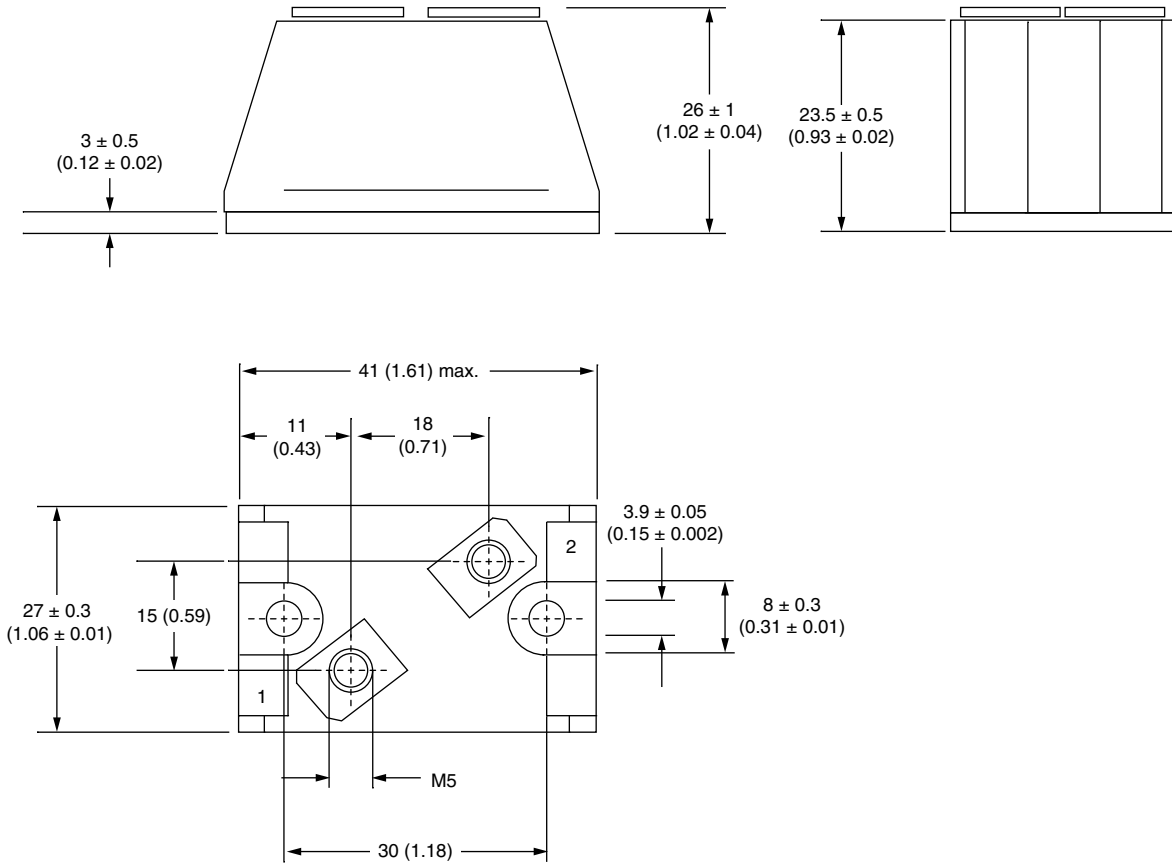
CIRCUIT CONFIGURATION		
CIRCUIT DESCRIPTION	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Single diode	HF	

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



D-55 T-Module Diode Standard and Fast Recovery

DIMENSIONS in millimeters (inches)



Note

- 1 = Anode
- 2 = Cathode



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