



Power Rectifiers Diodes (T-modules), 40 A to 110 A



D-55 (T-module)

FEATURES

- Electrically isolated base plate
- Types up to 1200 V_{RRM}
- 3500 V_{RMS} isolating voltage
- Simplified mechanical designs, rapid assembly
- High surge capability
- Large creepage distances
- UL E78996 approved 
- 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)}	40 A to 110 A
Type	Modules - diode, high voltage
V _{RRM}	100 V to 1200 V
Package	D-55 (T-module)
Circuit configuration	Single diode

DESCRIPTION / APPLICATIONS

These series of 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 general industrial current rectification.

MAJOR RATINGS AND CHARACTERISTICS						
SYMBOL	CHARACTERISTICS	T40HF	T70HF	T85HF	T110HF	UNITS
I _{F(AV)}		40	70	85	110	A
	T _C	85	85	85	85	°C
I _{F(RMS)}		63	110	134	173	A
I _{FSM}	50 Hz	570	1200	1700	2000	A
	60 Hz	600	1250	1800	2100	
I ² _t	50 Hz	1630	7100	14 500	20 500	A ² s
	60 Hz	1500	6450	13 500	18 600	
I ² √t		16 300	70 700	148 700	204 300	A ² √s
V _{RRM}		100 to 1200				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 = 25 °C μA
VS-T40HF... VS-T70HF... VS-T85HF... VS-T110HF...	10	100	150	100
	20	200	300	
	40	400	500	
	60	600	700	
	80	800	900	
	100	1000	1100	
	120	1200	1300	



FORWARD CONDUCTION									
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES				UNITS	
				T40HF	T70HF	T85HF	T110HF		
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave		40	70	85	110	A	
				85	85	85	85	°C	
Maximum RMS forward current	$I_{F(RMS)}$			63	110	134	173	A	
Maximum peak, one-cycle forward, non-repetitive surge current	I_{FSM}	t = 10 ms t = 8.3 ms	No voltage reappplied	Sinusoidal half wave, initial $T_J = T_J$ maximum	570	1200	1700	2000	A
					600	1250	1800	2100	
					480	1000	1450	1700	
					500	1050	1500	1780	
Maximum I^2t for fusing	I^2t	t = 10 ms t = 8.3 ms	No voltage reappplied		1630	7100	14 500	20 500	A ² s
					1500	6450	13 500	18 600	
					1150	5000	10 500	14 500	
					1050	4570	9600	13 200	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reappplied		16 300	70 700	148 700	204 300	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		0.66	0.76	0.68	0.68	V	
High level value of threshold voltage	$V_{F(TO)2}$	$(I > \pi \times I_{F(AV)})$, T_J maximum		0.84	0.95	0.90	0.86		
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		4.3	2.4	1.76	1.56	mΩ	
High level value of forward slope resistance	r_{f2}	$(I > \pi \times I_{F(AV)})$, T_J maximum		3.1	1.7	1.08	1.12		
Maximum forward voltage drop	V_{FM}	$I_{FM} = \pi \times I_{F(AV)}$, $T_J = 25\text{ °C}$, $t_p = 400\ \mu\text{s}$ square pulse Average power = $V_{F(TO)} \times I_{F(AV)} + r_f \times (I_{F(RMS)})^2$		1.30	1.35	1.27	1.35	V	

BLOCKING							
PARAMETER	SYMBOL	TEST CONDITIONS	T40HF	T70HF	T85HF	T110HF	UNITS
Maximum peak reverse leakage current	I_{RRM}	$T_J = 150\text{ °C}$	15	15	20	20	mA
RMS isolation voltage	V_{ISOL}	50 Hz, circuit to base, all terminals shorted $T_J = 25\text{ °C}$, t = 1 s	3500	3500	3500	3500	V

THERMAL AND MECHANICAL SPECIFICATIONS								
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES				UNITS
				T40HF	T70HF	T85HF	T110HF	
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		1.36	0.69	0.62	0.47	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⁾	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

⁽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°	
T40HF...	0.12	0.14	0.18	0.27	0.46	0.09	0.15	0.20	0.28	0.46	K/W
T70HF...	0.09	0.11	0.14	0.20	0.35	0.07	0.11	0.15	0.21	0.35	
T85HF...	0.08	0.09	0.12	0.18	0.31	0.06	0.10	0.13	0.19	0.31	
T110HF...	0.05	0.07	0.09	0.14	0.23	0.05	0.08	0.10	0.15	0.24	

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. 2 - Current Ratings Characteristics



Fig. 3 - Forward Power Loss Characteristics

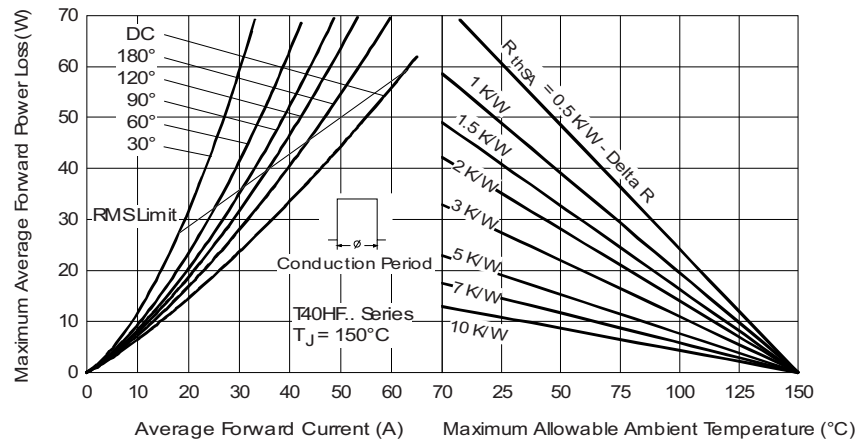


Fig. 4 - Forward Power Loss Characteristics



Fig. 5 - Maximum Non-Repetitive Surge Current

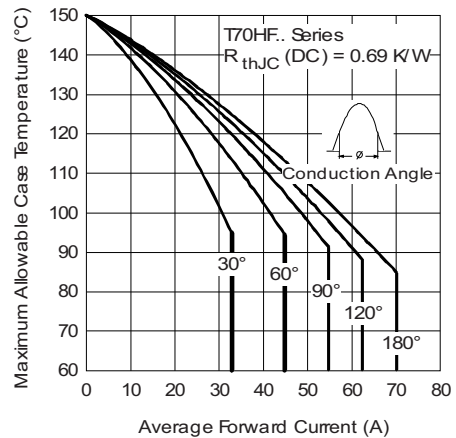


Fig. 7 - Current Ratings Characteristics



Fig. 6 - Maximum Non-Repetitive Surge Current

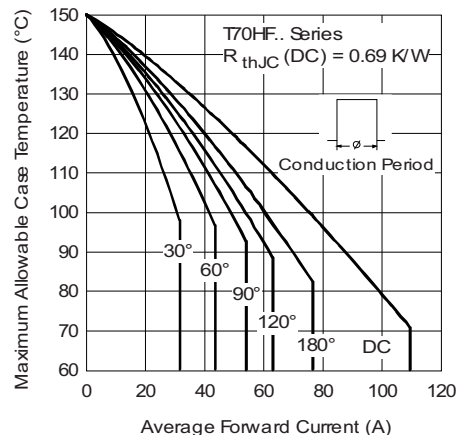


Fig. 8 - Current Ratings Characteristics



Fig. 9 - Forward Power Loss Characteristics



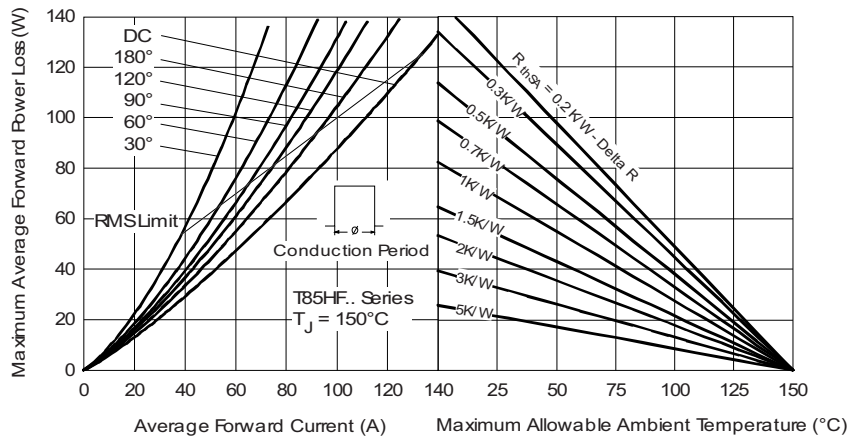
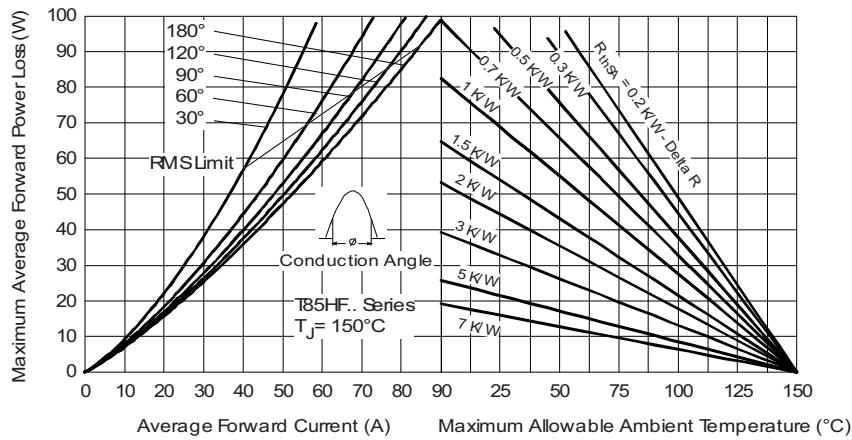
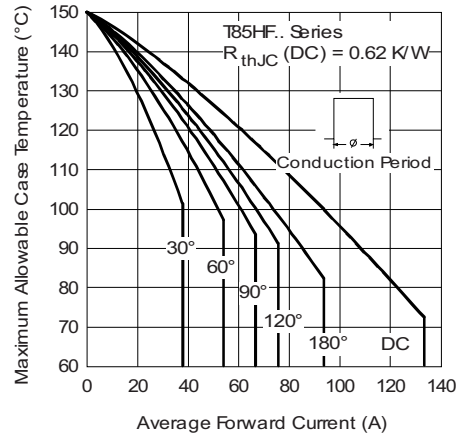
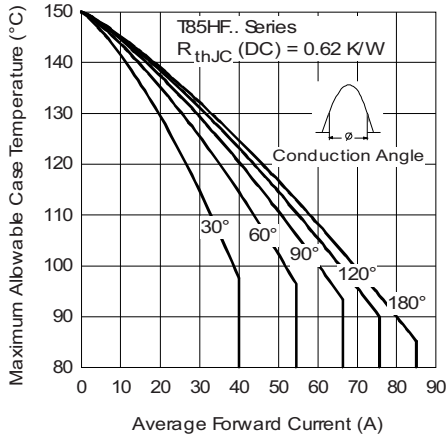
Fig. 10 - Forward Power Loss Characteristics



Fig. 11 - Maximum Non-Repetitive Surge Current



Fig. 12 - Maximum Non-Repetitive Surge Current



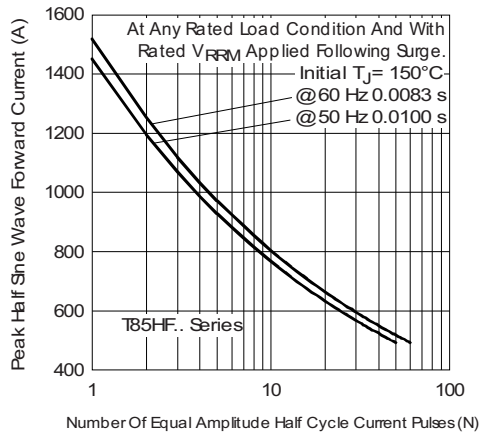


Fig. 17 - Maximum Non-Repetitive Surge Current



Fig. 19 - Current Ratings Characteristics



Fig. 18 - Maximum Non-Repetitive Surge Current

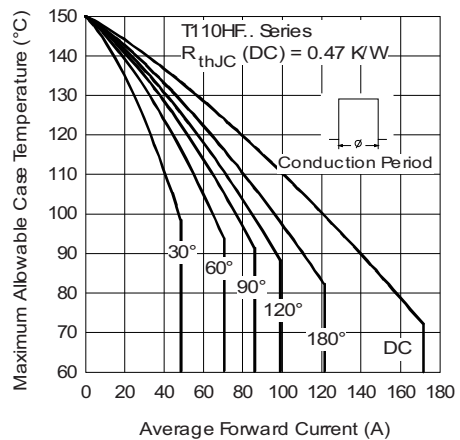


Fig. 20 - Current Ratings Characteristics

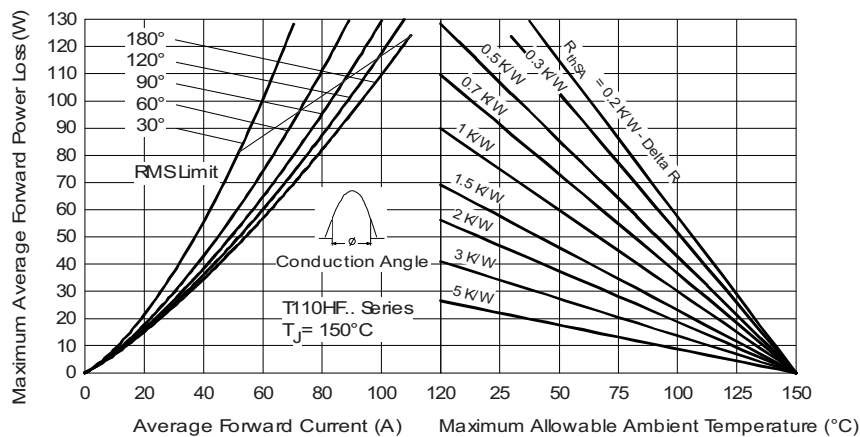


Fig. 21 - Forward Power Loss Characteristics



Fig. 22 - Forward Power Loss Characteristics



Fig. 23 - Maximum Non-Repetitive Surge Current



Fig. 25 - Forward Voltage Drop Characteristics



Fig. 24 - Maximum Non-Repetitive Surge Current



Fig. 26 - Forward Voltage Drop Characteristics



Fig. 27 - Forward Voltage Drop Characteristics



Fig. 28 - Forward Voltage Drop Characteristics



Fig. 29 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code	VS-	T	110	HF	120
	①	②	③	④	⑤
	1	2	3	4	5
	-	-	-	-	-
	Vishay Semiconductors product	Module type	Current rating	Circuit configuration (see Circuit Configuration table)	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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