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Power Rectifier Diodes (T-Modules), 40 A to 110 A



D-55

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
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level

RoHS COMPLIANT

DESCRIPTION

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.

PRODUCT SUMMARY	
$I_{F(AV)}$	40 A to 110 A
Type	Modules - Diode, High Voltage

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^2t	50 Hz	1630	7100	14 500	20 500	A^2s
	60 Hz	1500	6450	13 500	18 600	
$I^2\sqrt{t}$		16 300	70 700	148 700	204 300	$A^2\sqrt{s}$
V_{RRM}		100 to 1200				V
T_J		- 40 to 150				°C

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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
T40HF... T70HF... T85HF... 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			T40HF	T70HF	T85HF	T110HF	UNITS
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	No voltage reapplied	Sinusoidal half wave, initial T_J = T_J maximum	570	1200	1700	2000	A
		t = 8.3 ms			600	1250	1800	2100	
		t = 10 ms	100 % V_{RRM} reapplied		480	1000	1450	1700	
		t = 8.3 ms			500	1050	1500	1780	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		1630	7100	14 500	20 500	A^2s
		t = 8.3 ms			1500	6450	13 500	18 600	
		t = 10 ms	100 % V_{RRM} reapplied		1150	5000	10 500	14 500	
		t = 8.3 ms			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 reapplied			16 300	70 700	148 700	204 300	$A^2\sqrt{s}$
Low level value of threshold voltage	$V_{F(TO)1}$	(16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), T_J maximum			0.66	0.76	0.68	0.68	V
High level value of threshold voltage	$V_{F(TO)2}$	(I > π x $I_{F(AV)}$), T_J maximum			0.84	0.95	0.90	0.86	
Low level value of forward slope resistance	r_{f1}	(16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), T_J maximum			4.3	2.4	1.76	1.56	mΩ
High level value of forward slope resistance	r_{f2}	(I > π x $I_{F(AV)}$), T_J maximum			3.1	1.7	1.08	1.12	
Maximum forward voltage drop	V_{FM}	I_{FM} = π x $I_{F(AV)}$, T_J = 25 °C, t_p = 400 µs square pulse Average power = $V_{F(TO)}$ x $I_{F(AV)}$ + r_f x $(I_{F(RMS)})^2$			1.30	1.35	1.27	1.35	V

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BLOCKING							
PARAMETER	SYMBOL	TEST CONDITIONS	T40HF	T70HF	T85HF	T110HF	UNITS
Maximum peak reverse leakage current	I_{RRM}	T_J = 150 °C	15	15	20	20	mA
RMS isolation voltage	V_{ISOL}	50 Hz, circuit to base, all terminals shorted T_J = 25 °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		Non-lubricated threads	M3.5 mounting screws (1)	1.3 ± 10 %				Nm
Mounting torque, ± 10 % — terminals			M5 screw terminals	3 ± 10 %				
Approximate weight		See dimensions - link at the end of datasheet		54				g
Case style				T-module (D-55)				

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

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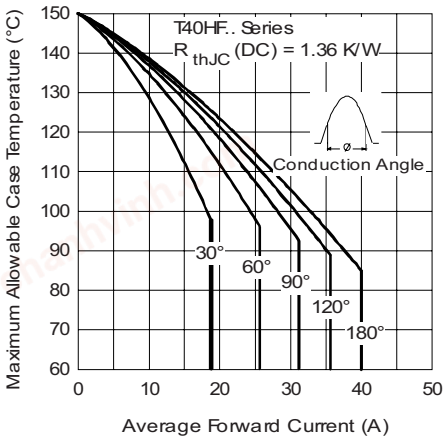

Fig. 1 - Current Ratings Characteristics

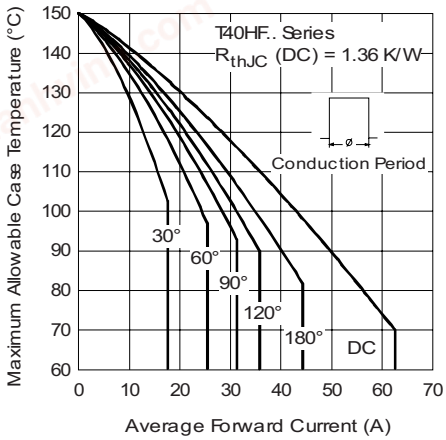

Fig. 2 - Current Ratings Characteristics

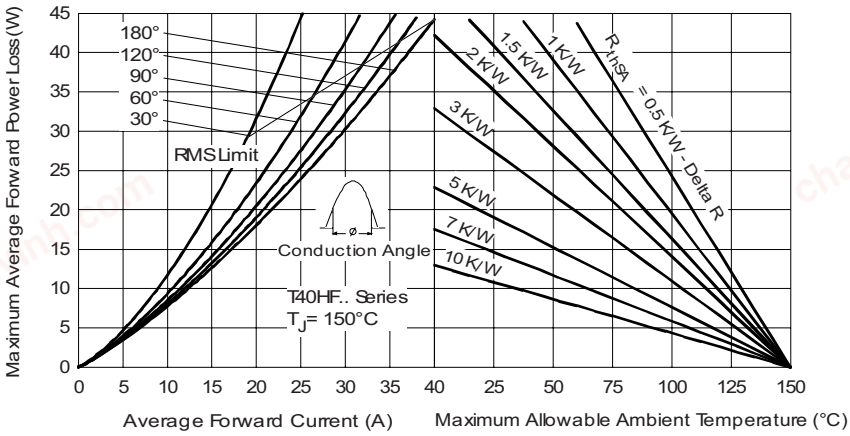

Fig. 3 - Forward Power Loss Characteristics

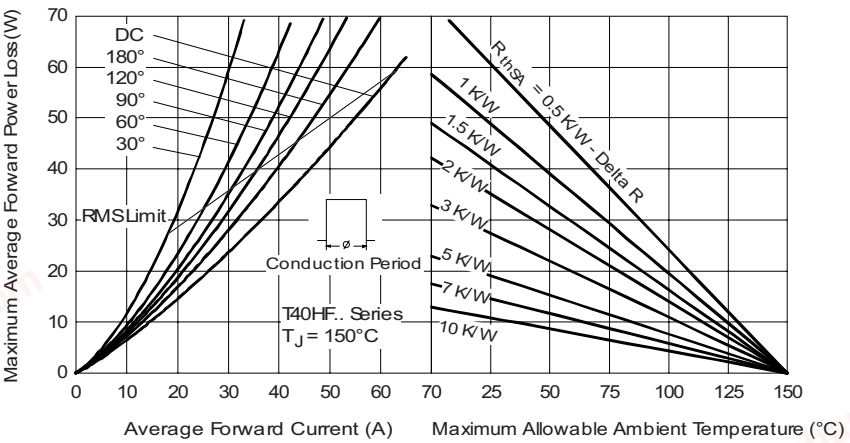

Fig. 4 - Forward Power Loss Characteristics

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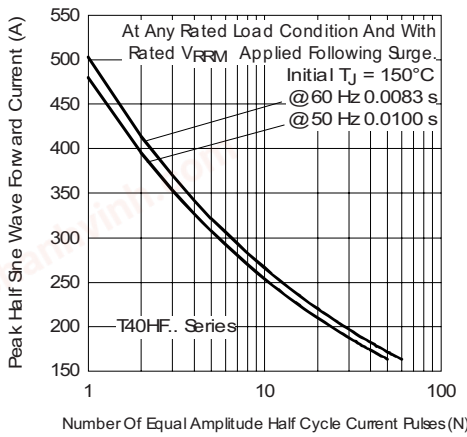

Fig. 5 - Maximum Non-Repetitive Surge Current

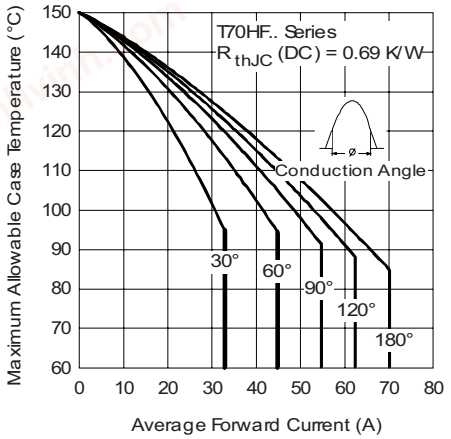

Fig. 7 - Current Ratings Characteristics

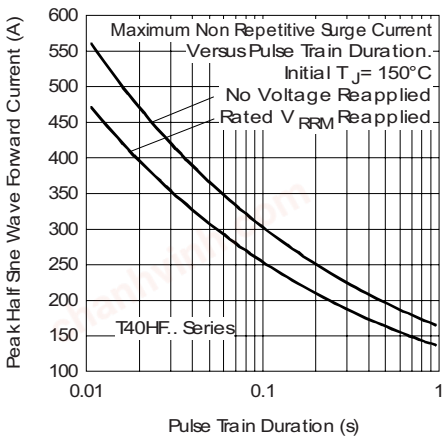

Fig. 6 - Maximum Non-Repetitive Surge Current

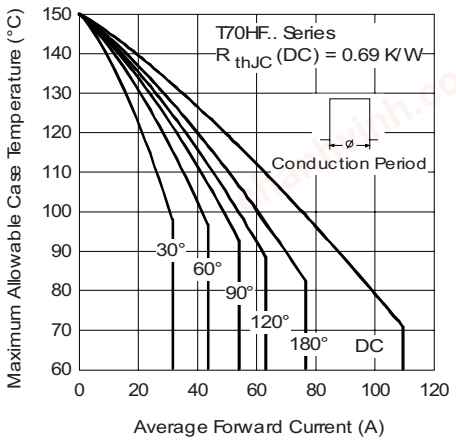

Fig. 8 - Current Ratings Characteristics

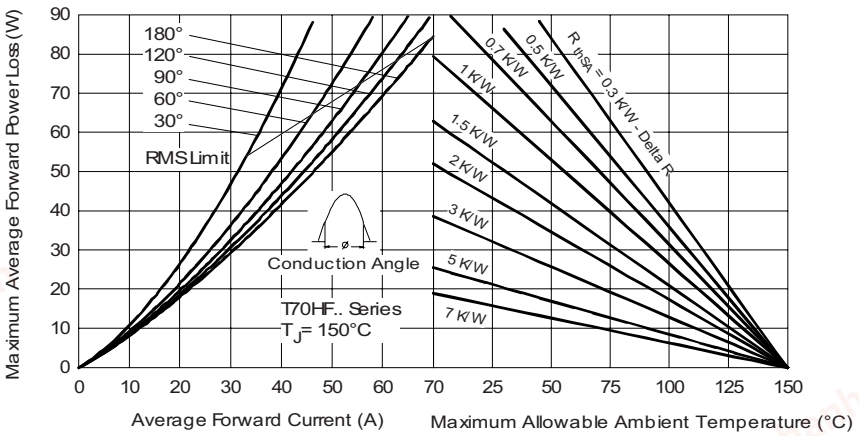

Fig. 9 - Forward Power Loss Characteristics

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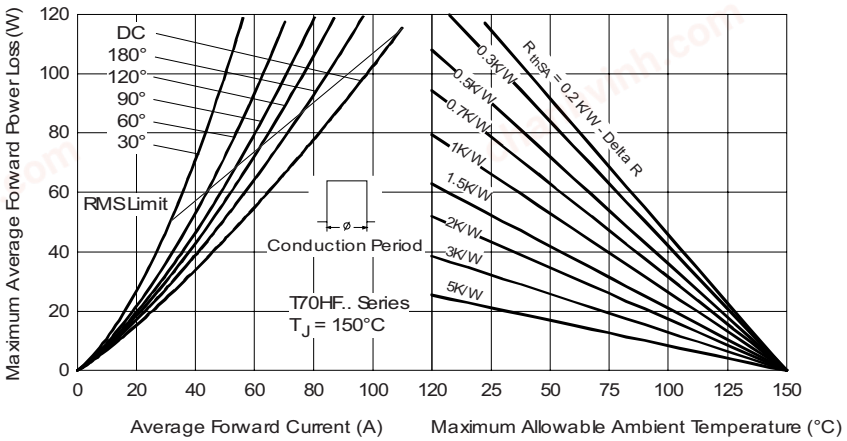

Fig. 10 - Forward Power Loss Characteristics

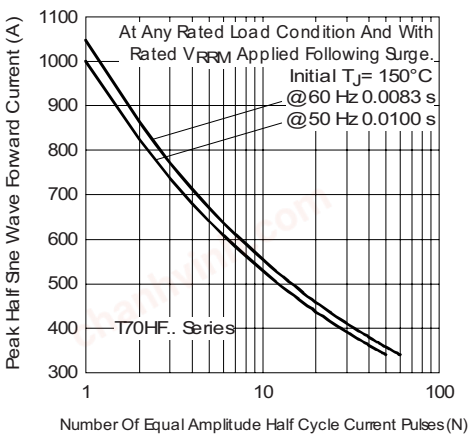

Fig. 11 - Maximum Non-Repetitive Surge Current

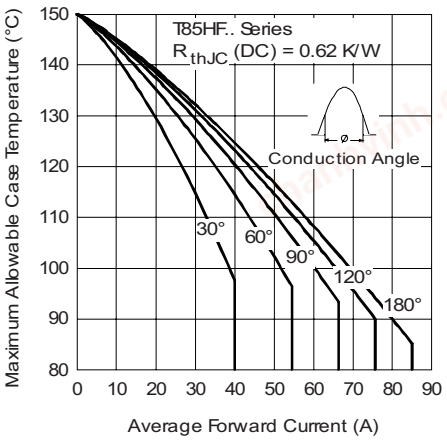

Fig. 13 - Current Ratings Characteristics

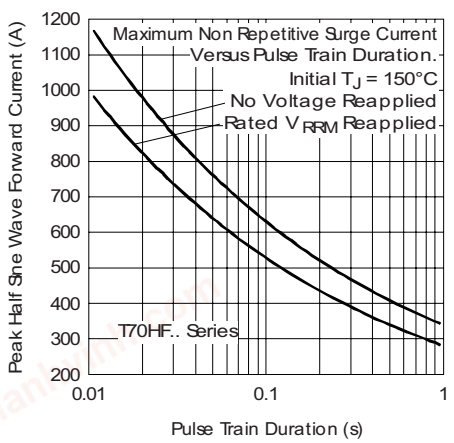

Fig. 12 - Maximum Non-Repetitive Surge Current

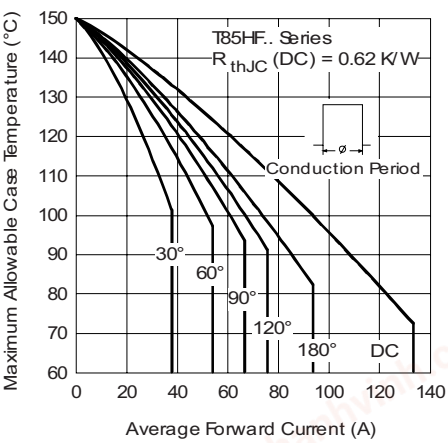

Fig. 14 - Current Ratings Characteristics

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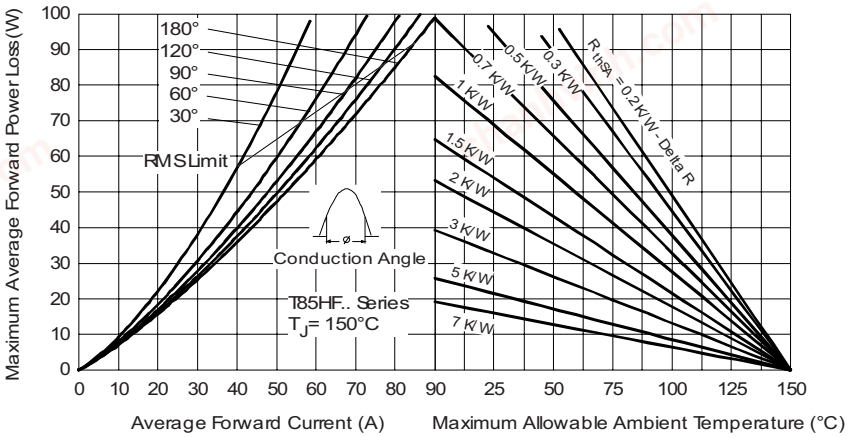

Fig. 15 - Forward Power Loss Characteristics

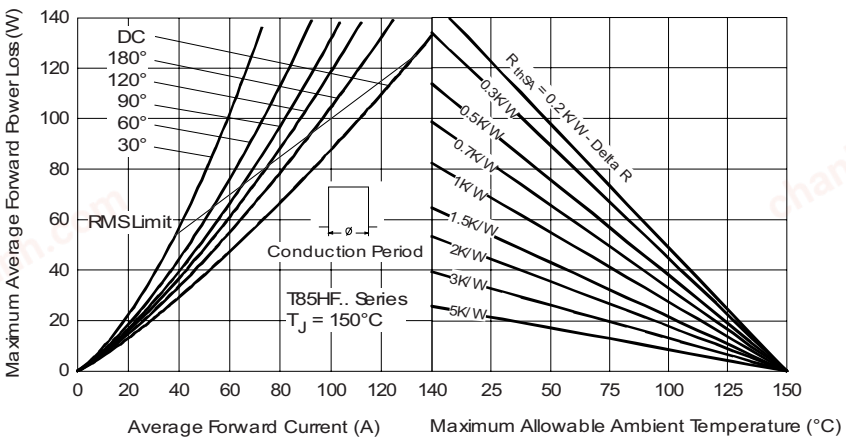

Fig. 16 - Forward Power Loss Characteristics

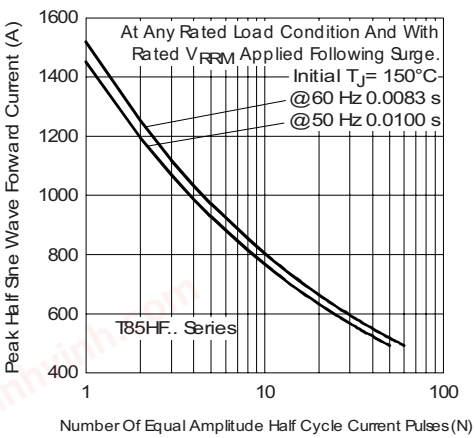

Fig. 17 - Maximum Non-Repetitive Surge Current

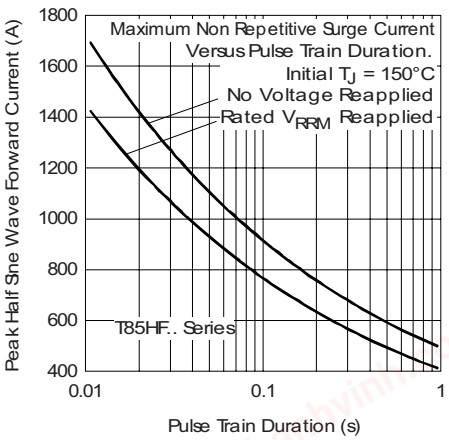

Fig. 18 - Maximum Non-Repetitive Surge Current

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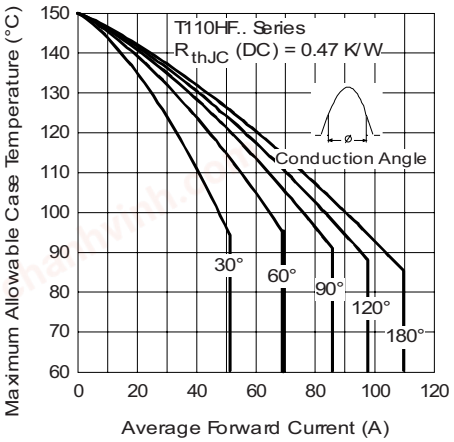

Fig. 19 - Current Ratings Characteristics

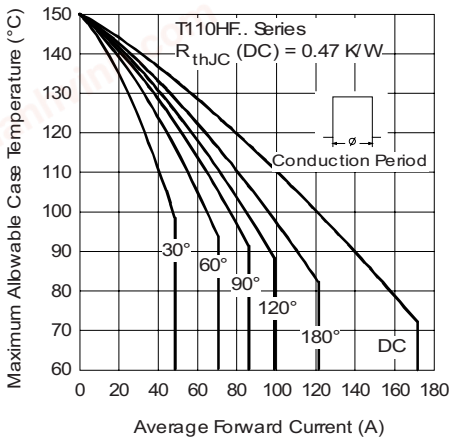

Fig. 20 - Current Ratings Characteristics

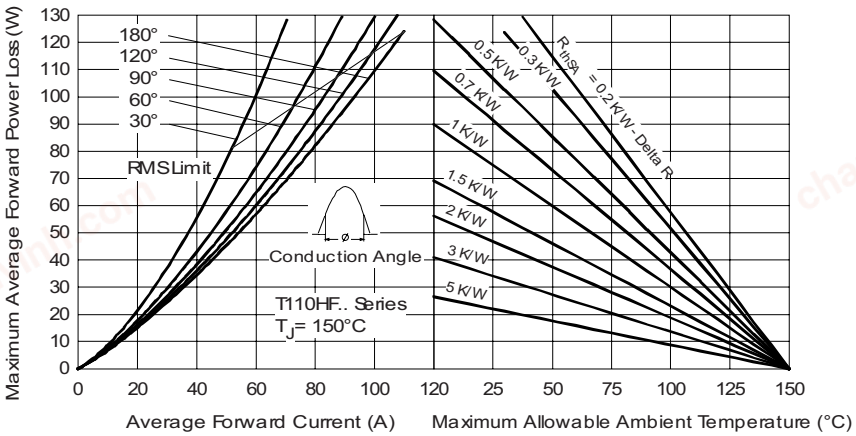

Fig. 21 - Forward Power Loss Characteristics

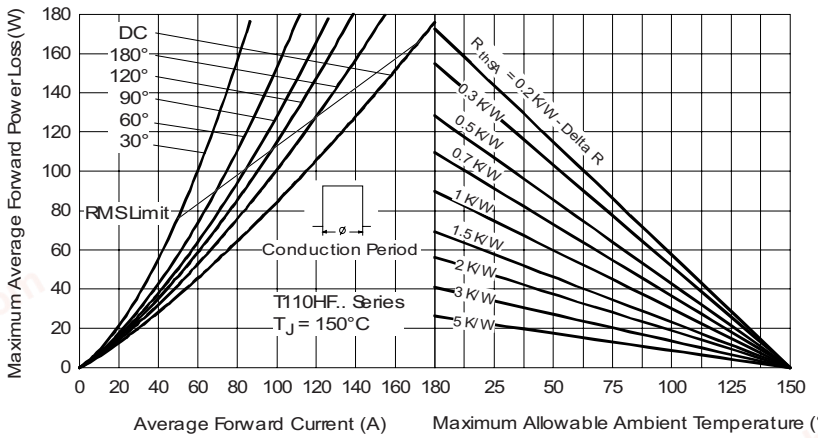

Fig. 22 - Forward Power Loss Characteristics

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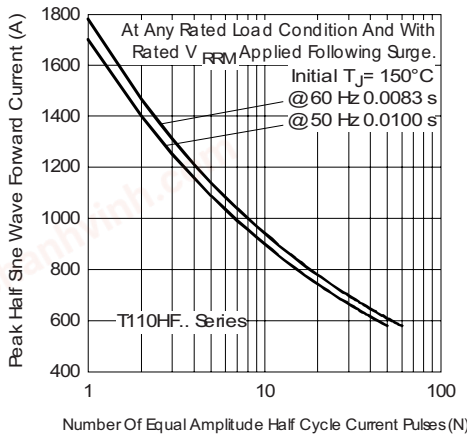

Fig. 23 - Maximum Non-Repetitive Surge Current

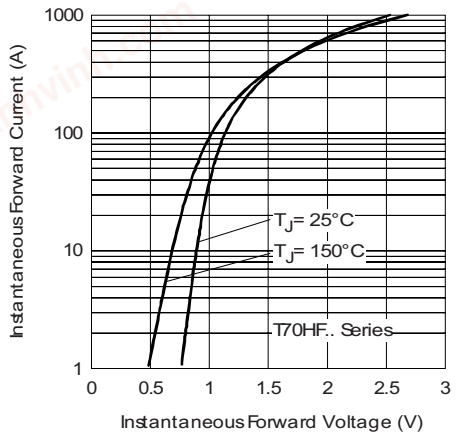

Fig. 26 - Forward Voltage Drop Characteristics

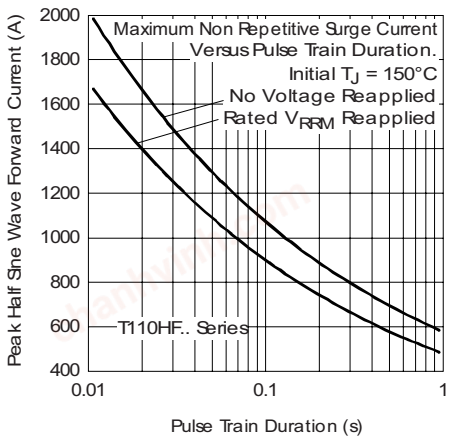

Fig. 24 - Maximum Non-Repetitive Surge Current

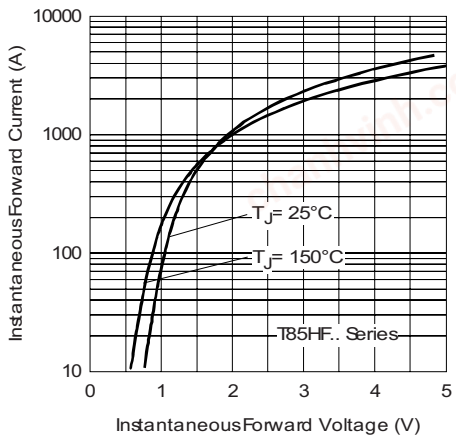

Fig. 27 - Forward Voltage Drop Characteristics

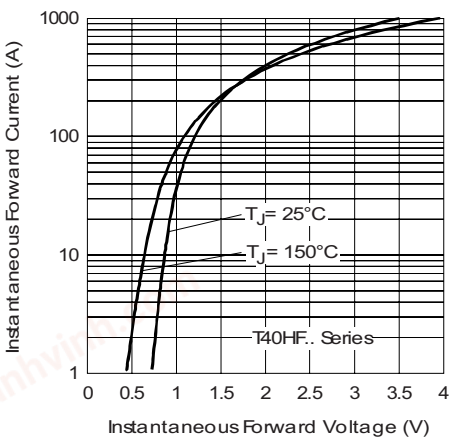

Fig. 25 - Forward Voltage Drop Characteristics

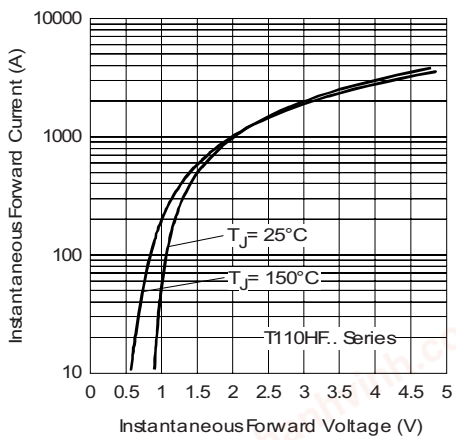

Fig. 28 - Forward Voltage Drop Characteristics

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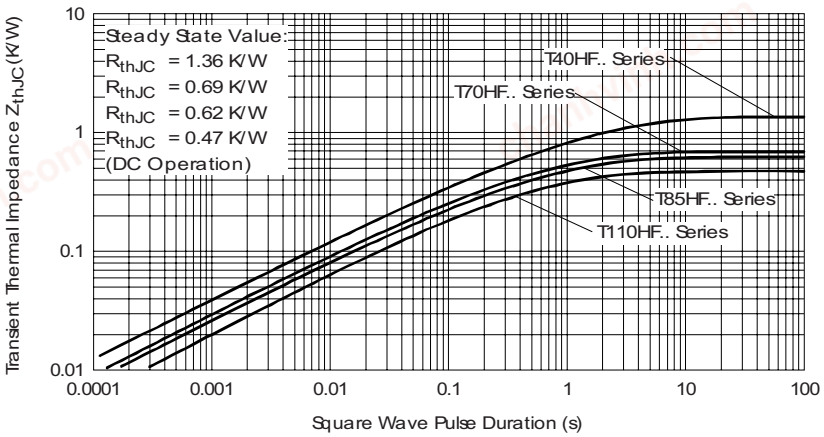

Fig. 29 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code

T	110	HF	120
1	2	3	4

- 1 - Module type
- 2 - Current rating
- 3 - Circuit configuration (see Circuit Configuration table)
- 4 - 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

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