

POWER RECTIFIER DIODES

T-Modules

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 

40 A
70 A
85 A
110 A

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.

Major Ratings and Characteristics

Parameters		T40HF	T70HF	T85HF	T110HF	Units
I _{F(AV)}		40	70	85	110	A
I _{F(RMS)}		63	110	134	173	°C
I _{FSM}	50Hz	570	1200	1700	2000	A
	60Hz	600	1250	1800	2100	A
i ² _t	50Hz	1630	7100	14500	20500	A ² s
	60Hz	1500	6450	13500	18600	A ² s
i ² _t		16300	70700	148700	204300	A ² √s
V _{RRM} range		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} max. $T_J = @ 25^{\circ}\text{C}$ 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

Parameters	T40HF	T70HF	T85HF	T110HF	Units	Conditions
$I_{F(AV)}$ Max. average fwd current @ Case temperature	40 85	70 85	85 85	110 85	A $^{\circ}\text{C}$	180° conduction, half sine wave
$I_{F(RMS)}$ Max. RMS forward current	63	110	134	173	A	
I_{FSM} Max. peak, one-cycle forward, non-repetitive surge current	570 600 480 500	1200 1250 1000 1050	1700 1800 1450 1500	2000 2100 1700 1780	A	$t = 10\text{ms}$ No voltage $t = 8.3\text{ms}$ reapplied $t = 10\text{ms}$ 100% V_{RRM} $t = 8.3\text{ms}$ reapplied Sinusoidal half wave, Initial $T_J = T_{J\text{max}}$.
I^2t Maximum I^2t for fusing	1630 1500 1150 1050	7100 6450 5000 4570	14500 13500 10500 9600	20500 18600 14500 13200	A^2s	$t = 10\text{ms}$ No voltage $t = 8.3\text{ms}$ reapplied $t = 10\text{ms}$ 100% V_{RRM} $t = 8.3\text{ms}$ reapplied
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	16300	70700	148700	204300	$\text{A}^2\sqrt{\text{s}}$	$t = 0.1$ to 10ms , no voltage reapplied
$V_{F(TO)1}$ Low level value of threshold voltage	0.66	0.76	0.68	0.68	V	$(16.7\% \times \pi \times I_{F(AV)}) < I < \pi \times I_{F(AV)}$, @ $T_J\text{max}$.
$V_{F(TO)2}$ High level value of threshold voltage	0.84	0.95	0.90	0.86		$(I > \pi \times I_{F(AV)})$, @ $T_J\text{max}$.
r_{f1} Low level value of forward slope resistance	4.3	2.4	1.76	1.56	$\text{m}\Omega$	$(16.7\% \times \pi \times I_{F(AV)}) < I < \pi \times I_{F(AV)}$, @ $T_J\text{max}$.
r_{f2} High level value of forward slope resistance	3.1	1.7	1.08	1.12		$(I > \pi \times I_{F(AV)})$, @ $T_J\text{max}$.
V_{FM} Max. forward voltage drop	1.30	1.35	1.27	1.35	V	$I_{FM} = \pi \times I_{F(AV)}$, $T_J = 25^{\circ}\text{C}$, $t_p = 400\mu\text{s}$ square pulse $\text{Av. power} = V_{F(TO)} \times I_{F(AV)} + r_f \times (I_{F(RMS)})^2$

Blocking

Parameters	T40HF	T70HF	T85HF	T110HF	Units	Conditions
I_{RRM} Max. peak reverse leakage current	15	15	20	20	mA	$T_J = 150^{\circ}\text{C}$
V_{INS} RMS isolation voltage	3500	3500	3500	3500	V	50Hz, circuit to base, all terminals shorted $T_J = 25^{\circ}\text{C}$, $t = 1\text{s}$

ΔR Conduction (per Junction)

(The following table shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC)

Devices	Sinusoidal conduction @ T_J max.					Rectangular conduction @ T_J max.					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	

Thermal and Mechanical Specifications

Parameters	T40HF	T70HF	T85HF	T110HF	Units	Conditions
T _J Max. junction operating temperature range	-40 to 150				°C	
T _{stg} Max. storage temperature range	-40 to 150				°C	
R _{thJC} Max. thermal resistance, junction to case	1.36	0.69	0.62	0.47	K/W	DC operation, per junction
R _{thCS} Max. thermal resistance, case to heatsink	0.2				K/W	Mounting surface smooth, flat and greased
T Mounting torque ± 10% to heatsink terminals	1.3 ± 10%				Nm	M3.5 mounting screws (2) non lubricated threads
	3 ± 10%					M5 screw terminals
wt Approximate weight	54				g	See outline table
Case style	D-56					T type

(2) 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

Ordering Information Table

Device Code T 110 HF 120 1 2 3 4 1 - Module type 2 - Current rating 3 - Circuit configuration ** 4 - Voltage code : code x 10 = V_{RRM}	Circuit configuration **
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T..HF Series

Bulletin I27106 rev. B 02/02

Outline Table

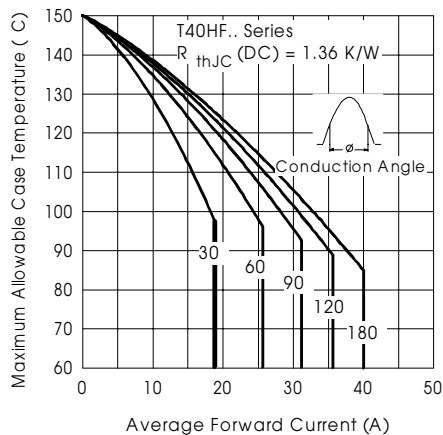
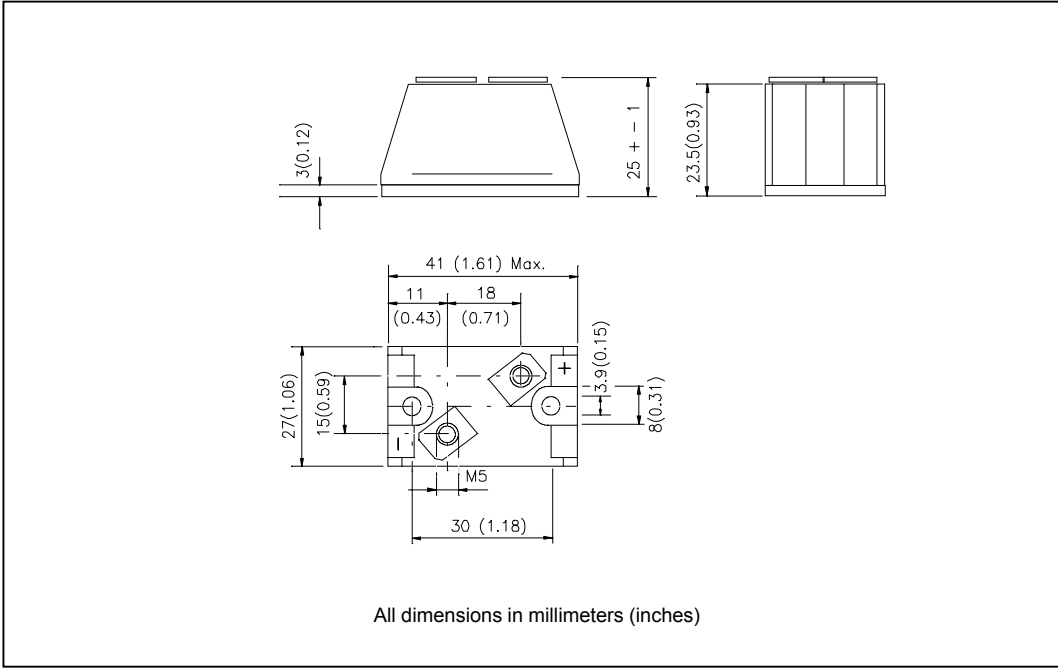


Fig. 1 - Current Ratings Characteristics

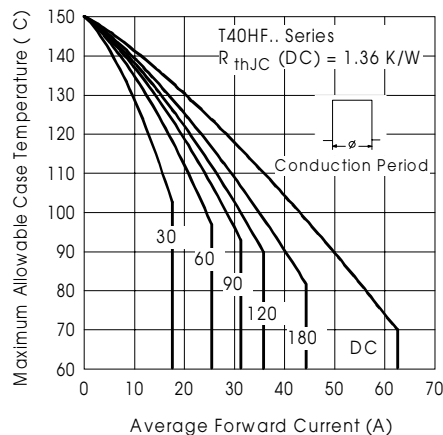


Fig. 2 - Current Ratings Characteristics

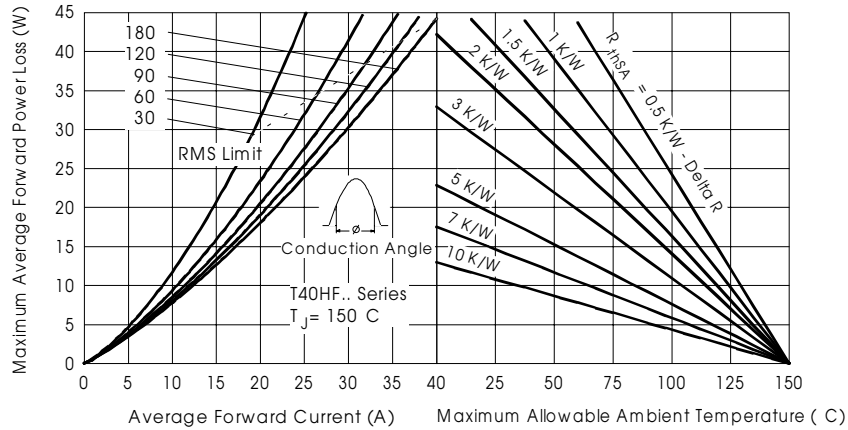


Fig. 3 - Forward Power Loss Characteristics

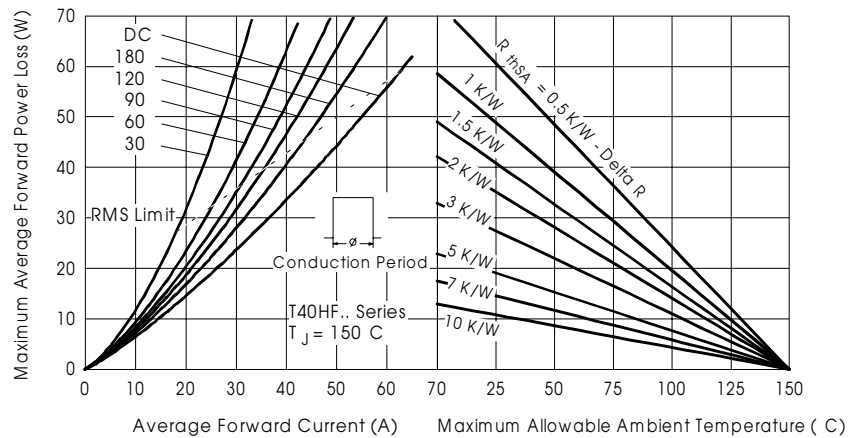


Fig. 4 - Forward Power Loss Characteristics

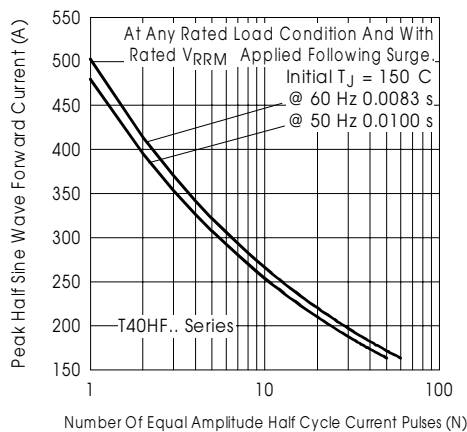


Fig. 5 - Maximum Non-Repetitive Surge Current

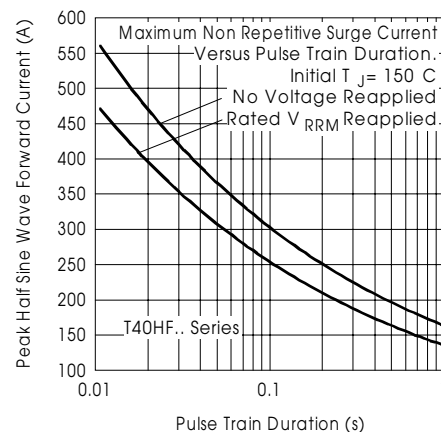


Fig. 6 - Maximum Non-Repetitive Surge Current

T..HF Series

Bulletin I27106 rev. B 02/02

International
IOR Rectifier

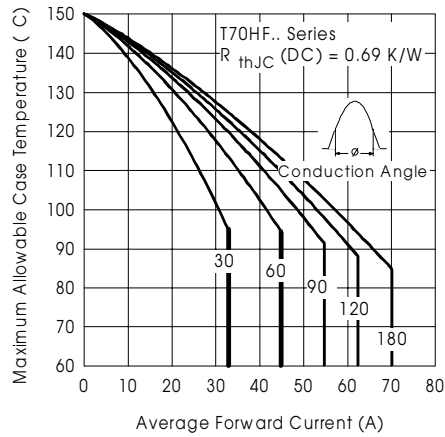


Fig. 7 - Current Ratings Characteristics

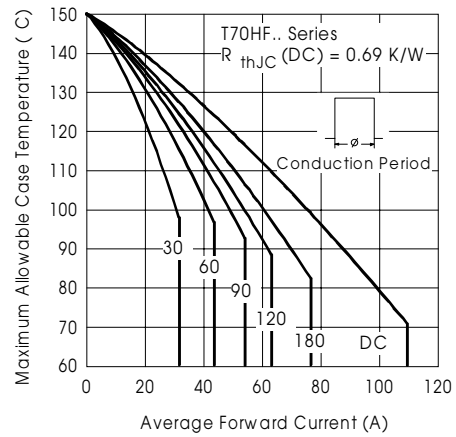


Fig. 8 - Current Ratings Characteristics

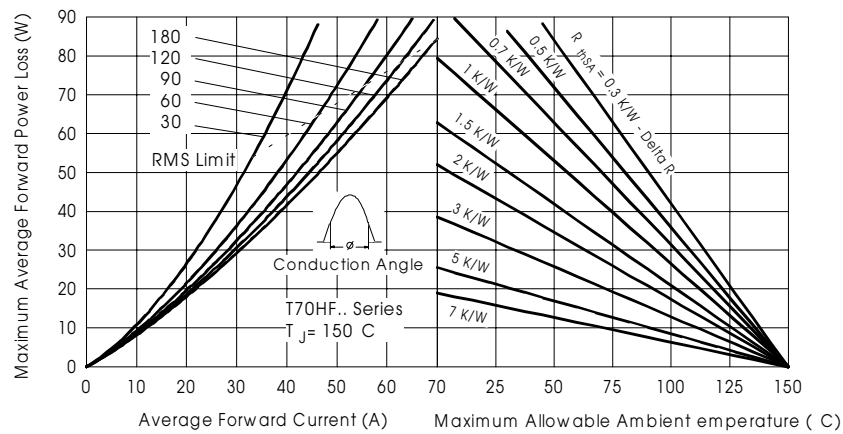


Fig. 9 - Forward Power Loss Characteristics

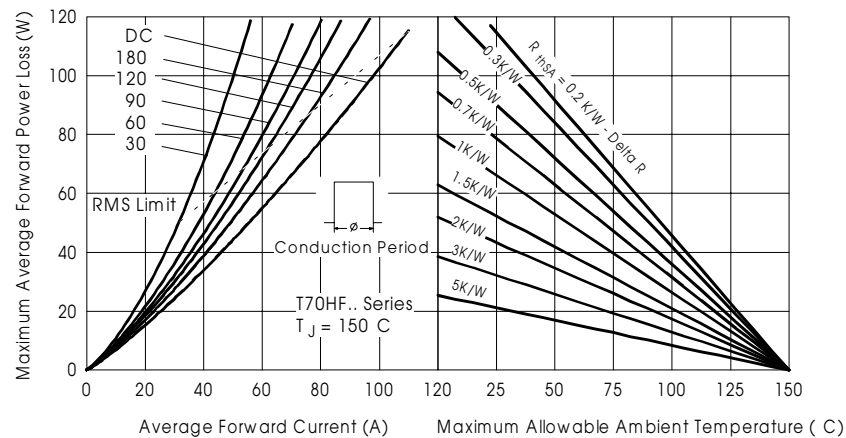


Fig. 10 - Forward Power Loss Characteristics

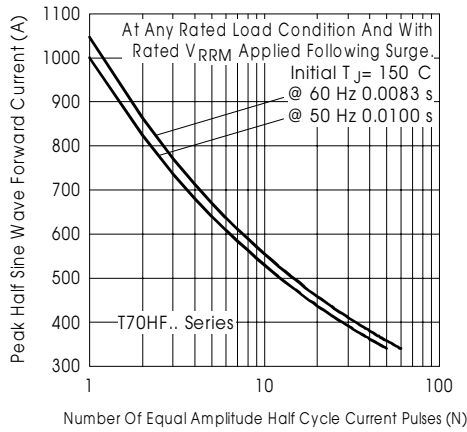


Fig. 11 - Maximum Non-Repetitive Surge Current

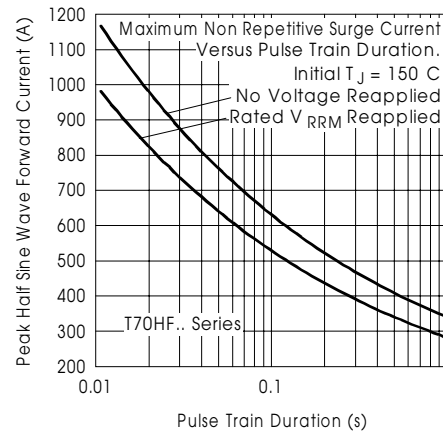


Fig. 12 - Maximum Non-Repetitive Surge Current

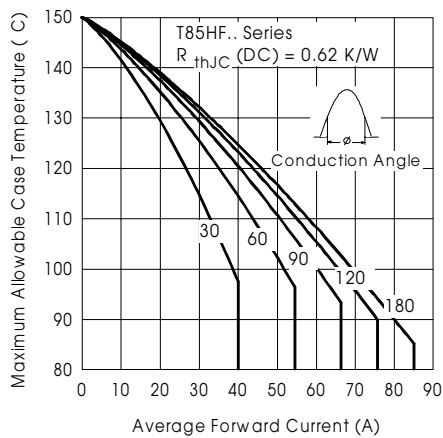


Fig. 13 - Current Ratings Characteristics

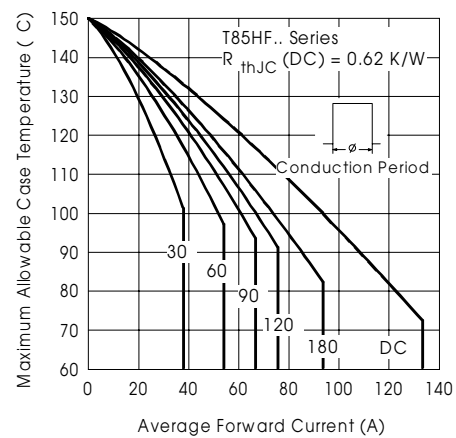


Fig. 14 - Current Ratings Characteristics

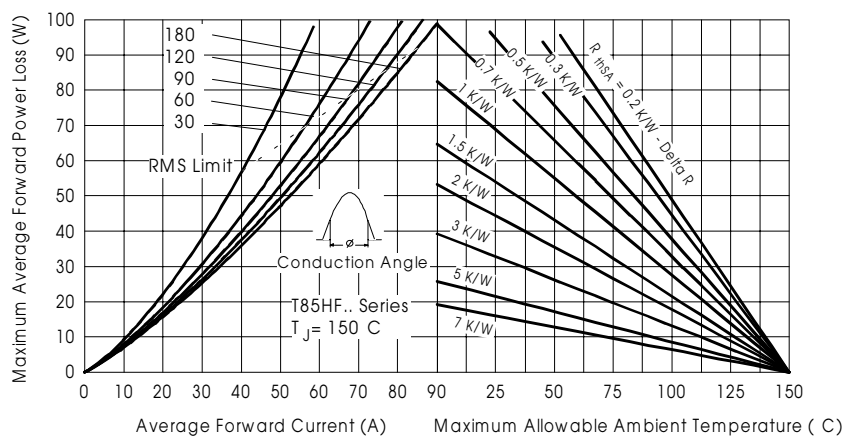


Fig. 15 - Forward Power Loss Characteristics

T..HF Series

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International
IR Rectifier

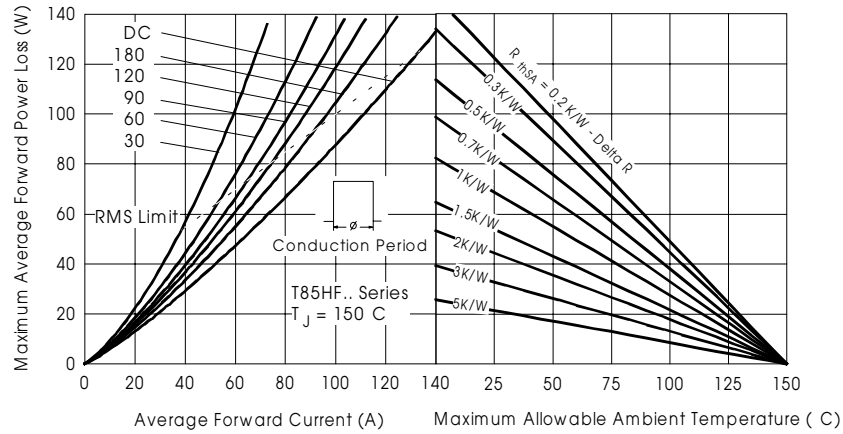


Fig. 16 - Forward Power Loss Characteristics

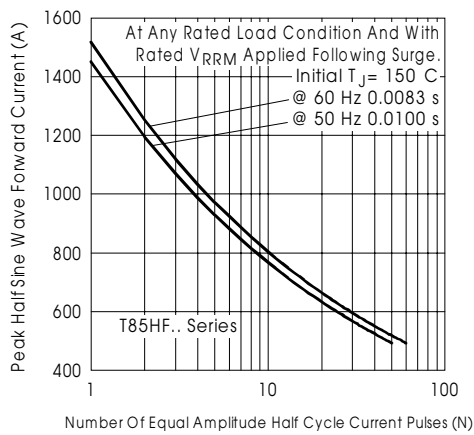


Fig. 17 - Maximum Non-Repetitive Surge Current

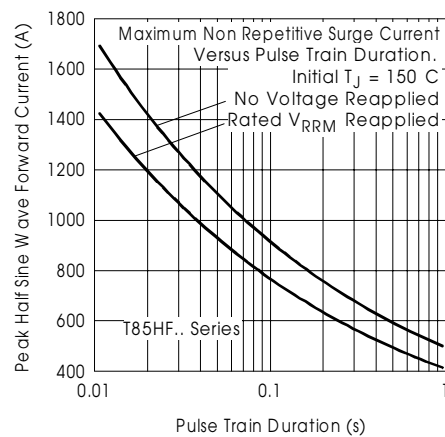


Fig. 18 - Maximum Non-Repetitive Surge Current

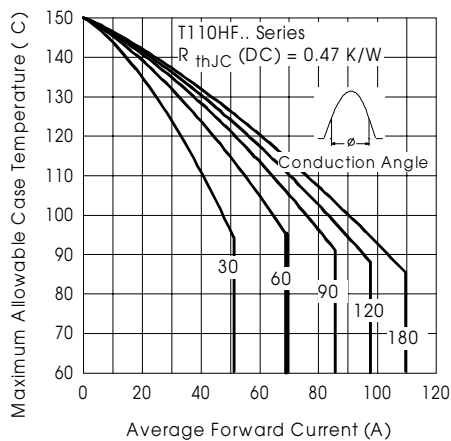


Fig. 19 - Current Ratings Characteristics

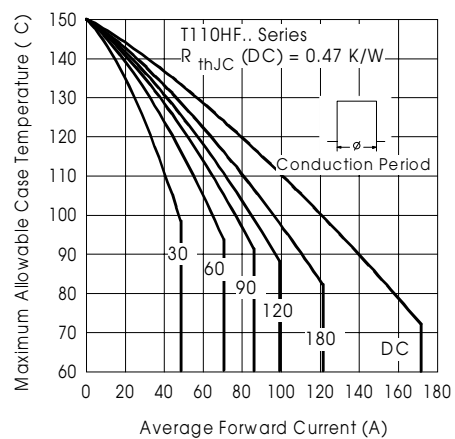


Fig. 20 - Current Ratings Characteristics

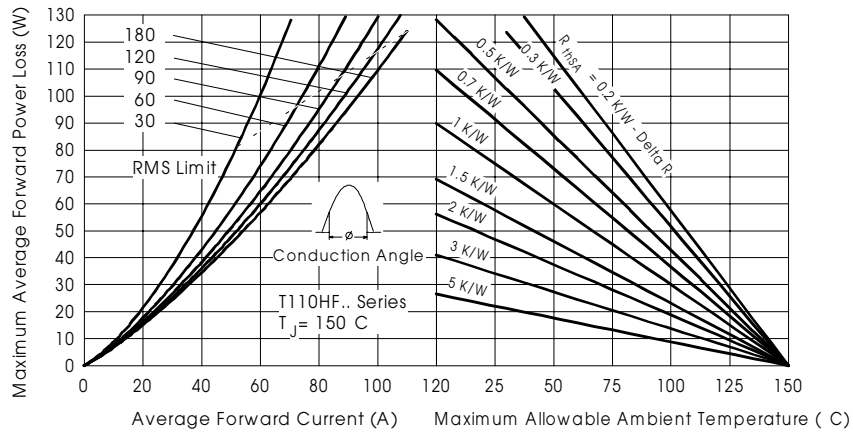


Fig. 21 - Forward Power Loss Characteristics

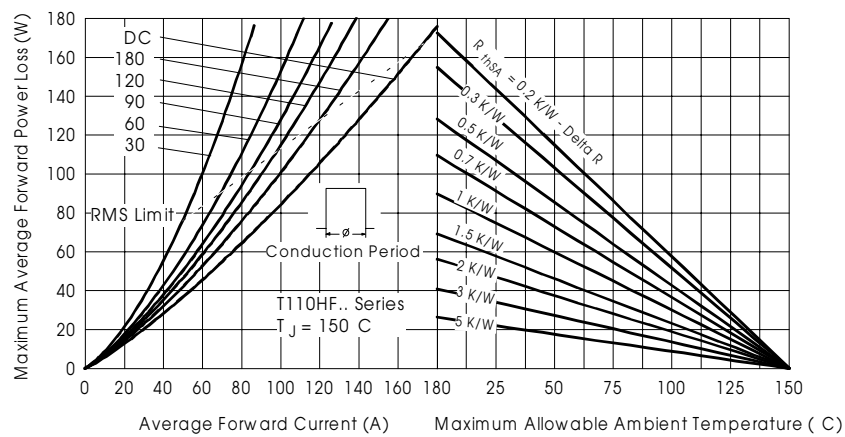


Fig. 22 - Forward Power Loss Characteristics

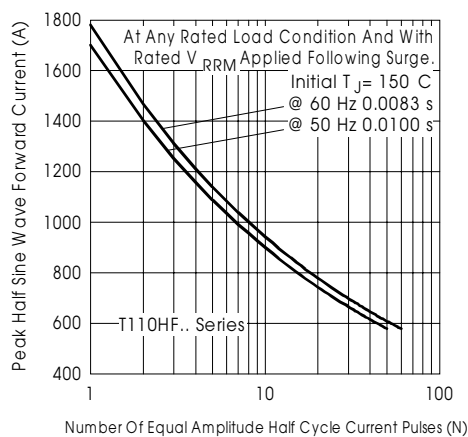


Fig. 23 - Maximum Non-Repetitive Surge Current

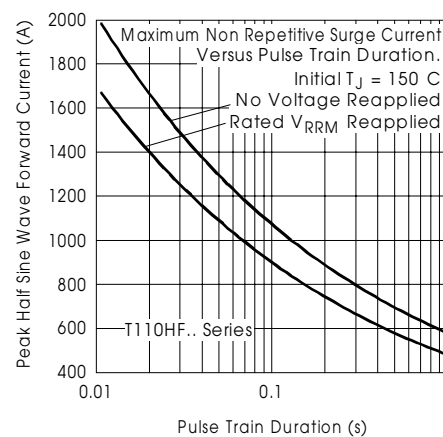


Fig. 24 - Maximum Non-Repetitive Surge Current

T..HF Series

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International
IRF Rectifier

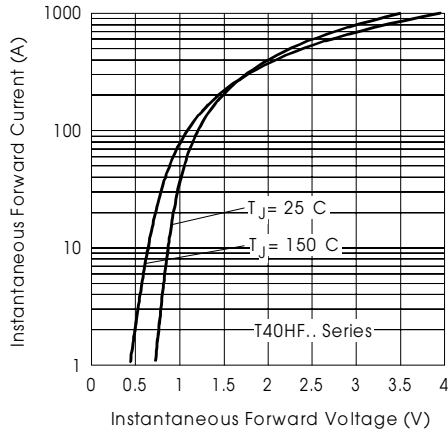


Fig. 25 - Forward Voltage Drop Characteristics

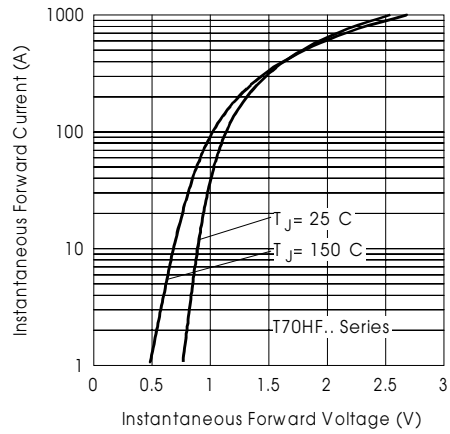


Fig. 26 - Forward Voltage Drop Characteristics

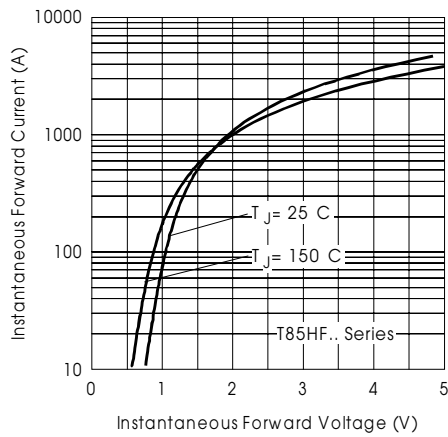


Fig. 27 - Forward Voltage Drop Characteristics

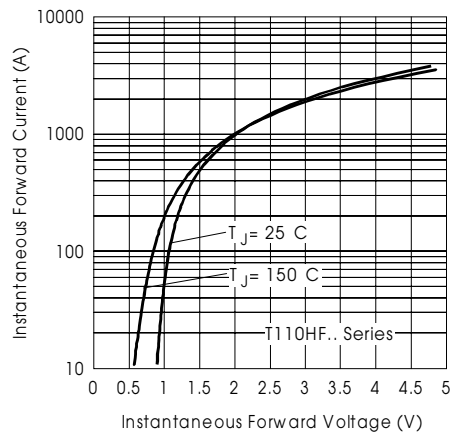


Fig. 28 - Forward Voltage Drop Characteristics

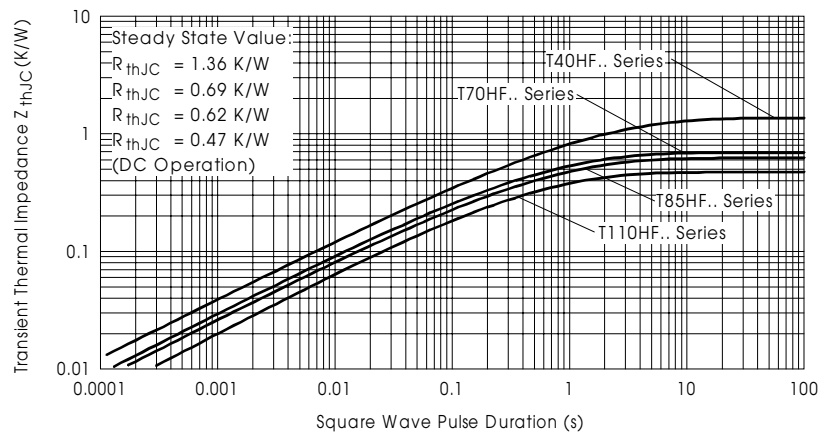


Fig. 29 - Thermal Impedance Z_{thJC} Characteristics

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

International
IOR Rectifier

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