Bulletin I27106 rev. B 02/02

International
IOR Rectifier

T..HF SERIES

POWER RECTIFIER DIODES

T-Modules

40 A
70 A
85 A
110 A

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

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^2t	50Hz	1630	7100	14500	20500	A^2s
	60Hz	1500	6450	13500	18600	A^2s
$I^2\sqrt{t}$		16300	70700	148700	204300	$A^2\sqrt{s}$
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°C µ A
	10	100	150	
T40HF..	20	200	300	
T70HF..	40	400	500	
T85HF..	60	600	700	100
T110HF..	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	40	70	85	110	A	180° conduction, half sine wave		
	@ Case temperature	85	85	85	85	°C			
$I_{F(RMS)}$	Max. RMS forward current	63	110	134	173	A			
I_{FSM}	Max. peak, one-cycle	570	1200	1700	2000	A	t = 10ms	No voltage	
	forward, non-repetitive	600	1250	1800	2100		t = 8.3ms	reapplied	
	surge current	480	1000	1450	1700		t = 10ms	100% V_{RRM}	
		500	1050	1500	1780		t = 8.3ms	reapplied	Sinusoidal half wave,
I^2t	Maximum I^2t for fusing	1630	7100	14500	20500	A^2s	t = 10ms	No voltage	Initial $T_J = T_J$ max.
		1500	6450	13500	18600		t = 8.3ms	reapplied	
		1150	5000	10500	14500		t = 10ms	100% V_{RRM}	
		1050	4570	9600	13200		t = 8.3ms	reapplied	
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	16300	70700	148700	204300	$A^2\sqrt{s}$	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 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 max.		
r_{f1}	Low level value of forward slope resistance	4.3	2.4	1.76	1.56	mΩ	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, @ T_J 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 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°C, tp = 400 µs square pulse 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°C
V_{INS}	RMS isolation voltage	3500	3500	3500	3500	V	50Hz, circuit to base, all terminals shorted T_J = 25°C, t = 1s

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	

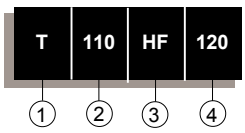
Thermal and Mechanical Specifications

	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	1.3 ± 10%				Nm	M3.5 mounting screws **(2)**	non lubricated threads
		terminals	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

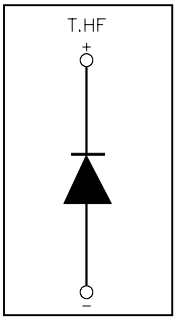
Ordering Information Table

Device Code

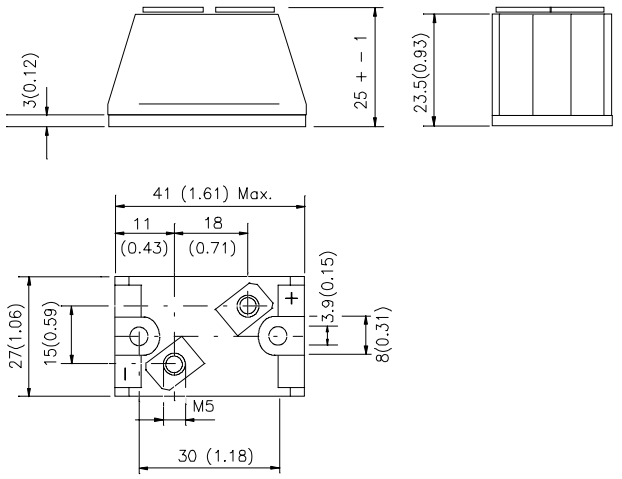


1 - Module type
2 - Current rating
3 - Circuit configuration **
4 - Voltage code : code x 10 = V_{RRM}

Circuit configuration **



Outline Table



All dimensions in millimeters (inches)

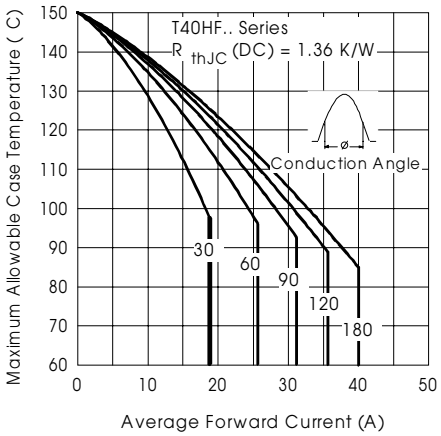


Fig. 1 - Current Ratings Characteristics

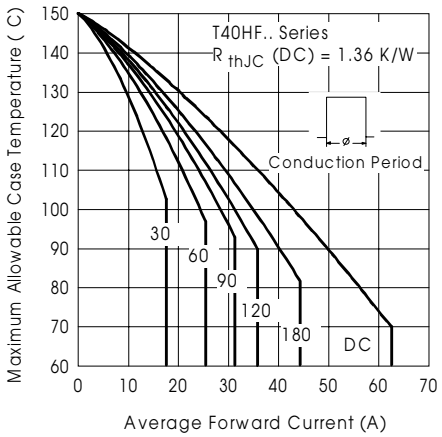


Fig. 2 - Current Ratings Characteristics

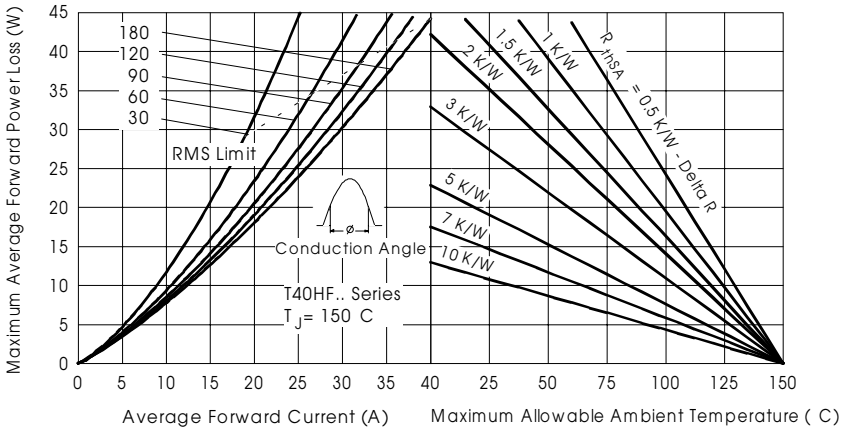


Fig. 3 - Forward Power Loss Characteristics

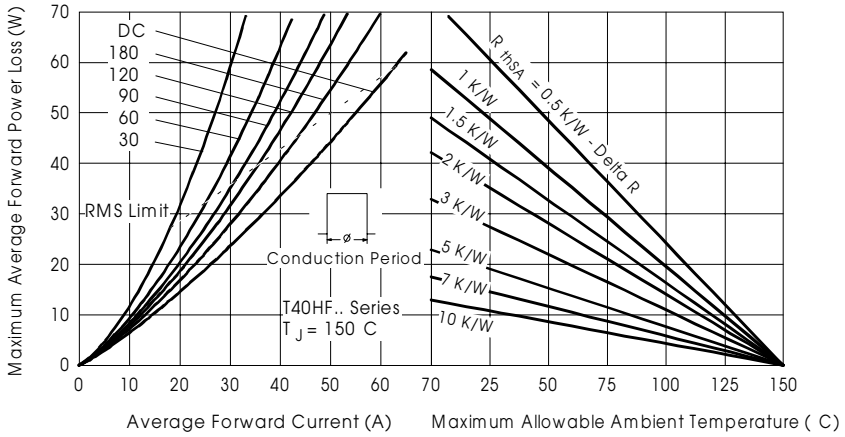


Fig. 4 - Forward Power Loss Characteristics

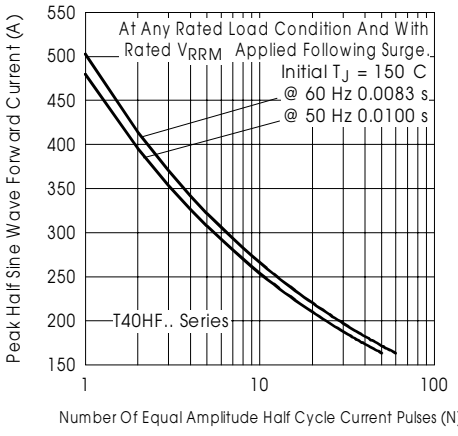


Fig. 5 - Maximum Non-Repetitive Surge Current

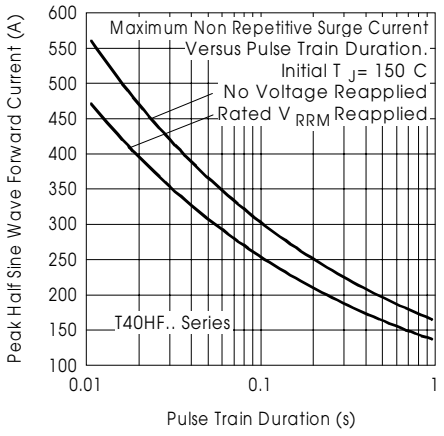


Fig. 6 - Maximum Non-Repetitive Surge Current

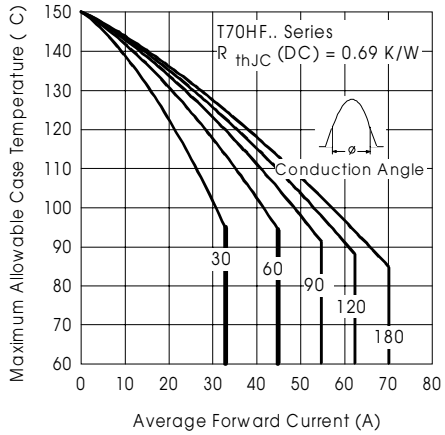


Fig. 7 - Current Ratings Characteristics

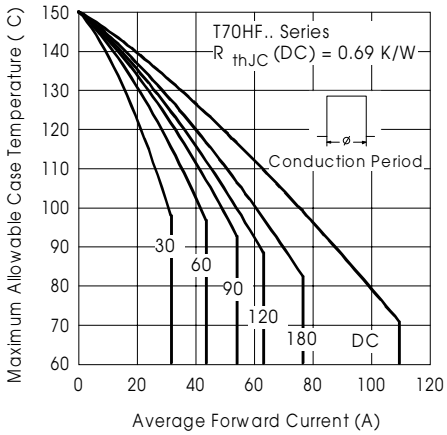


Fig. 8 - Current Ratings Characteristics

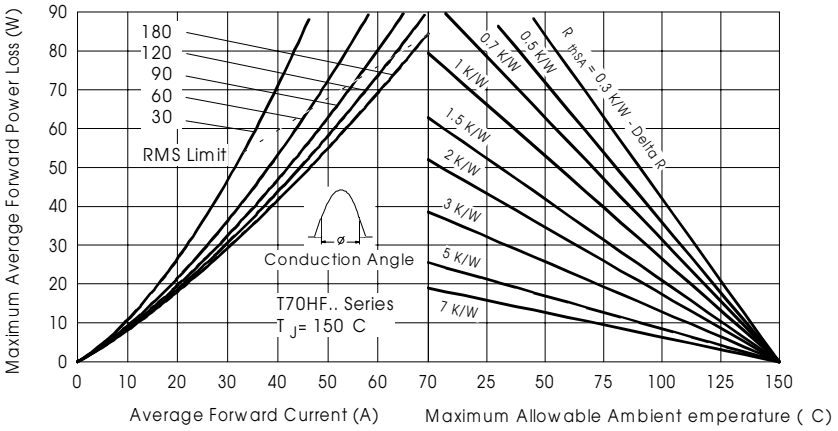


Fig. 9 - Forward Power Loss Characteristics

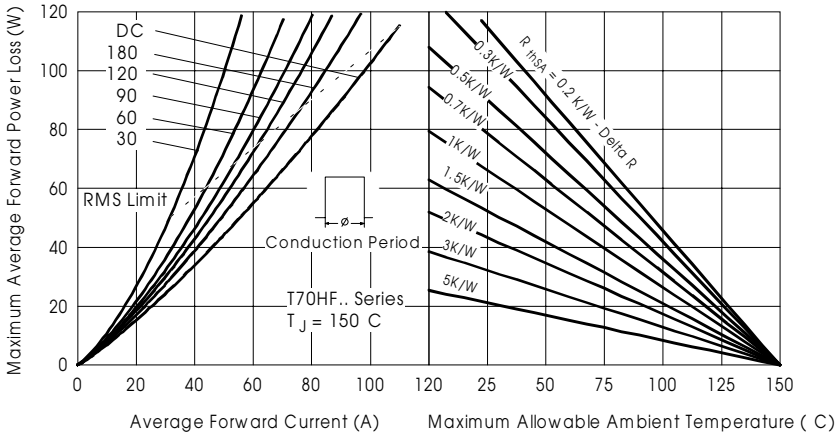


Fig. 10 - Forward Power Loss Characteristics

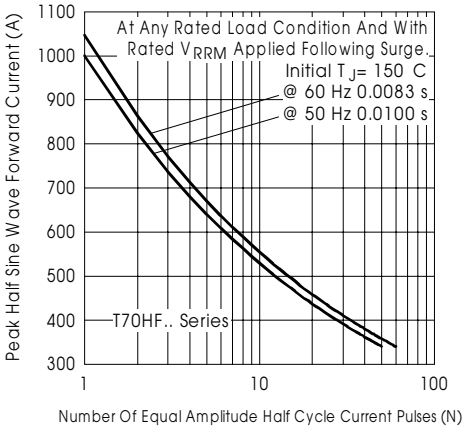


Fig. 11 - Maximum Non-Repetitive Surge Current

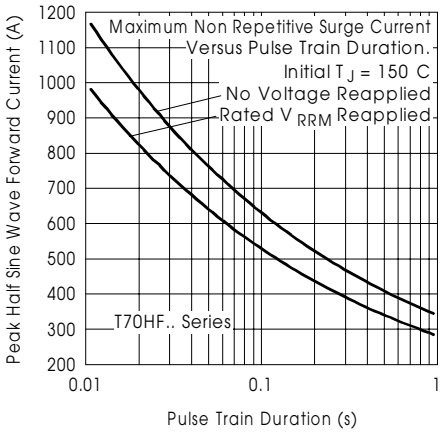


Fig. 12 - Maximum Non-Repetitive Surge Current

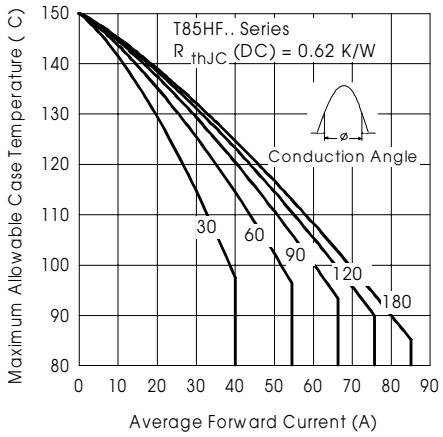


Fig. 13 - Current Ratings Characteristics

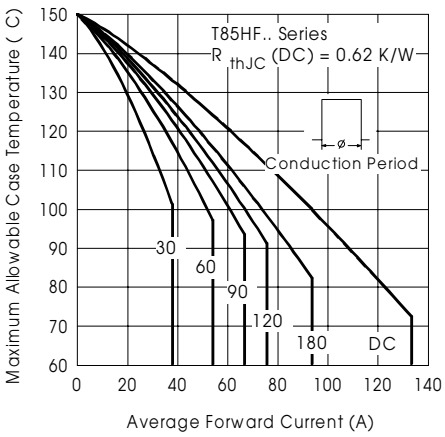


Fig. 14 - Current Ratings Characteristics

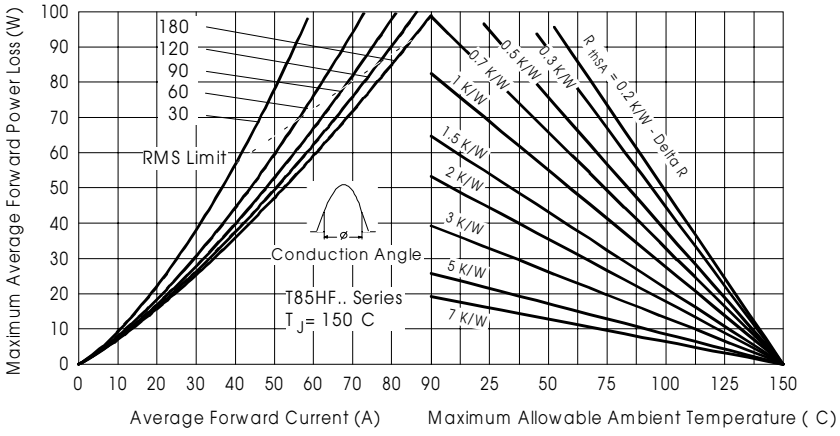


Fig. 15 - Forward Power Loss Characteristics

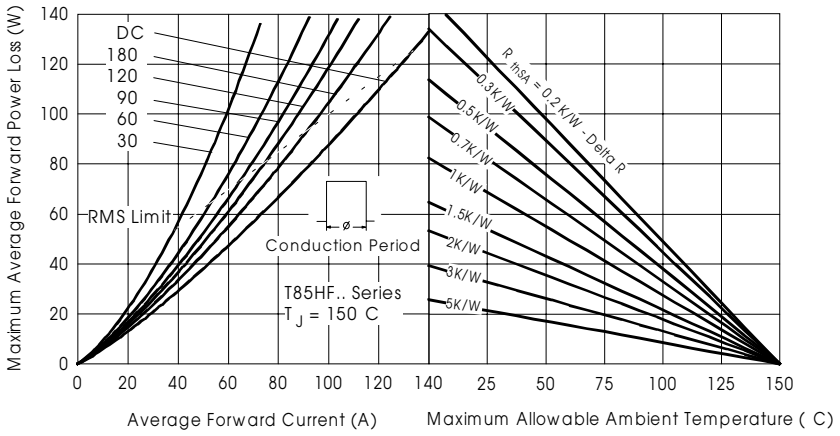


Fig. 16 - Forward Power Loss Characteristics

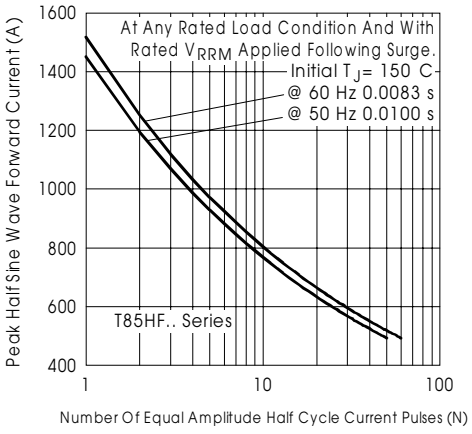


Fig. 17 - Maximum Non-Repetitive Surge Current

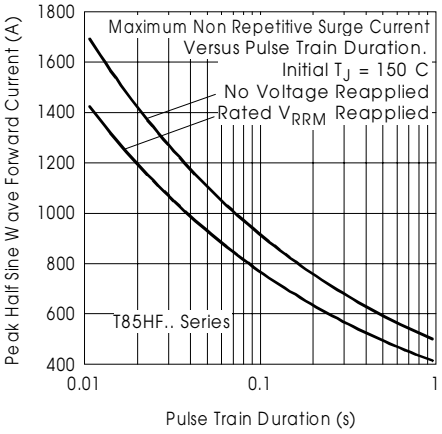


Fig. 18 - Maximum Non-Repetitive Surge Current

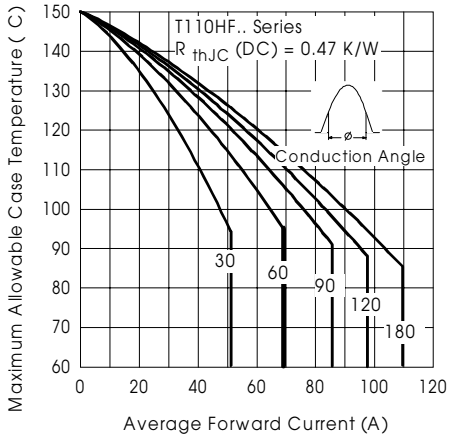


Fig. 19 - Current Ratings Characteristics

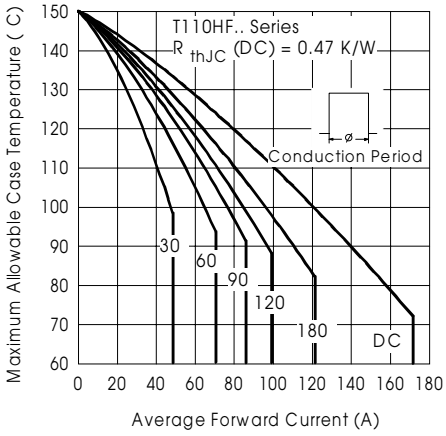


Fig. 20 - Current Ratings Characteristics

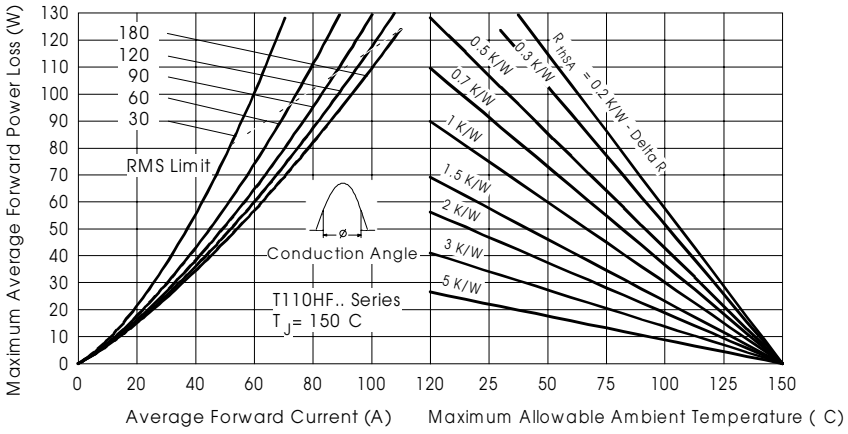


Fig. 21 - Forward Power Loss Characteristics

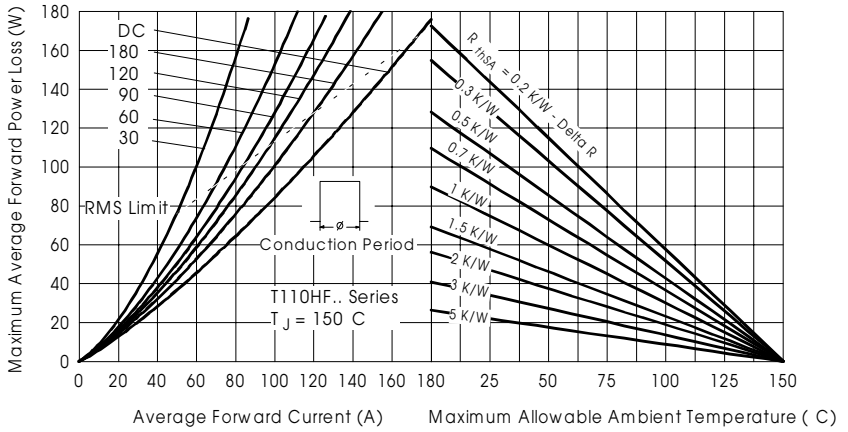


Fig. 22 - Forward Power Loss Characteristics

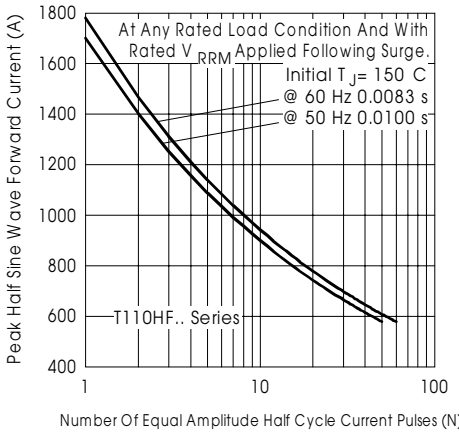


Fig. 23 - Maximum Non-Repetitive Surge Current

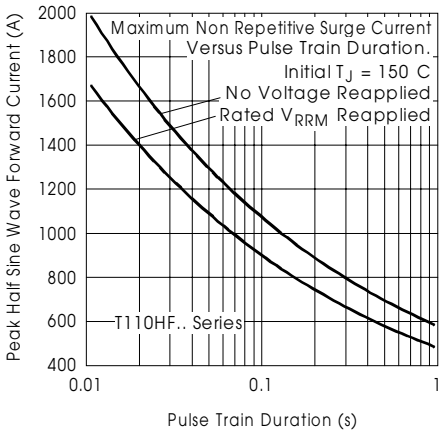


Fig. 24 - Maximum Non-Repetitive Surge Current

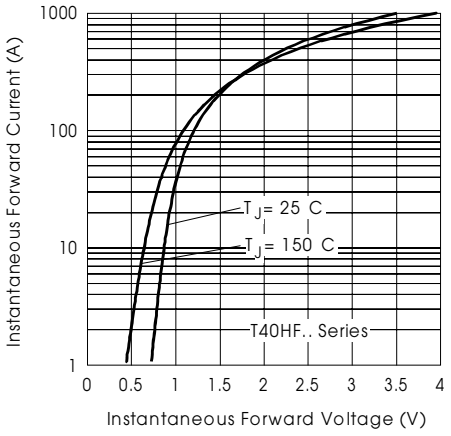


Fig. 25 - Forward Voltage Drop Characteristics

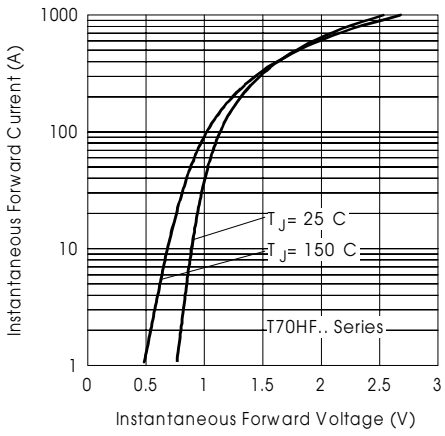


Fig. 26 - Forward Voltage Drop Characteristics

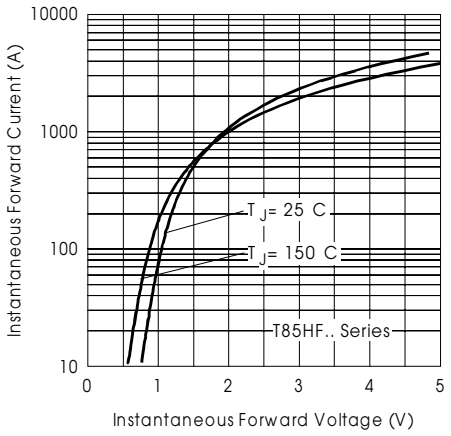


Fig. 27 - Forward Voltage Drop Characteristics

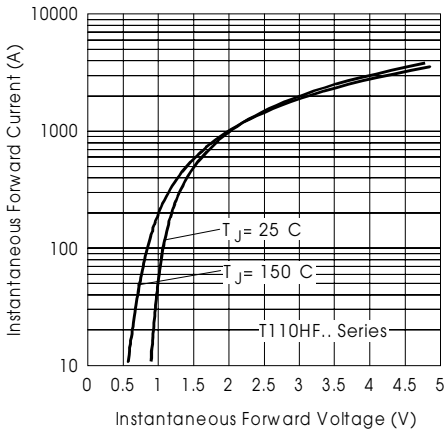


Fig. 28 - Forward Voltage Drop Characteristics

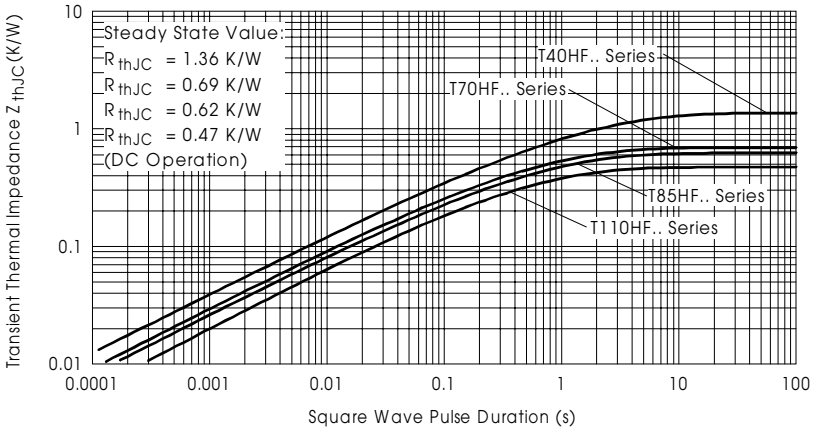


Fig. 29 - Thermal Impedance Z_{thJC} Characteristics

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

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
Visit us at www.irf.com for sales contact information. 02/02