



IRK. 320 SERIES High Voltage Diode/Diode

FEATURES

- ❖ High voltage.
- ❖ Electrically isolated base plate.
- ❖ 3000 V_{RMS} isolating voltage.
- ❖ Industrial standard package.
- ❖ Simplified mechanical designs, rapid assembly.
- ❖ High surge capability.
- ❖ Large creepage distances.
- ❖ Aluminum Nitride

DESCRIPTION

This IRK series of Power Modules uses power diodes in three basic configurations. The semiconductors are electrically isolated from the metal base, allowing common heatsinks and compact assemblies to be built. They can be interconnected to form single phase or three phase bridges. These modules are intended for general purpose applications such as battery chargers, welders and plating equipment.

MAJOR RATINGS & CHARACTERISTICS

Parameters	IRK.320	Units
$I_{T(AV)}$ @ $T_c = 100^\circ\text{C}$	320	A
$I_{T(RMS)}$	502	A
I_{TSM} @ 50 Hz	7000	A
I^2t @ 50 Hz	511	kA ² s
I^2t	5110	kA ² /s
V _{PIV} range	Up to 1600	V
T _c	-40 to 150	°C

POWER MODULES

IRK.320 SERIES

ELECTRICAL SPECIFICATION

VOLTAGE RATINGS

Type Number	Voltage Code	V_{RRM} , max. repetitive peak reverse and off-state voltage blocking voltage V	V_{RSM} , max. non-repetitive peak reverse voltage V	I_{RRM} max. @ 150°C mA
IRK.320	460	4600	4700	50
	480	4800	4900	50
	500	5000	5100	50
	520	5200	5300	50
	540	5400	5500	50
	580	5800	5900	50
	600	6000	6100	50
	620	6200	6300	50
	640	6400	6500	50

FORWARD CONDUCTION

	Parameters	IRK.320	Units	Conditions
$I_{F(AV)}$	Max. average forward current	320	A	180°C conduction, half sine wave
	@ case temperature	100	°C	
$I_{F(RMS)}$	Max. RMS forward current	502	A	as AC switch
I_{FM}	Max. peak, one cycle forward non-repetitive surge current	7000	A	Sinusoidal half wave, Initial $T_J = T_J$ max.
I^2t	Maximum I^2t for fusing	511	kA ² s	
$I^2\delta t$	Maximum $I^2\delta t$ for fusing	5110	kA ² µs	$t = 0.1$ to 10ms. No voltage reapplied.
$V_{T(ON)}$	Threshold voltage	0.95	V	$T_J = T_J$ max.
r_{θ}	Forward slope resistance	1.10	mΩ	$T_J - T_J$ max.
V_{FD}	Max. forward voltage drop	2.40	V	$I_{FD} = \pi \times I_{F(AV)}$; $T_J = T_J$ max.; 180° conduction AV. power = $V_{T(ON)} \times I_{F(AV)} - r_{\theta} \times (I_{F(RMS)})^2$

POWER MODULES

IRK. 320SERIES

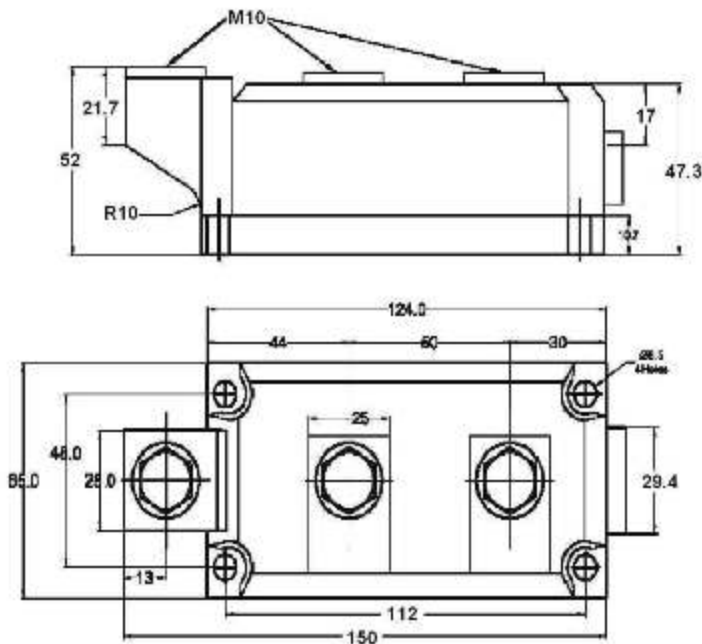
THERMAL AND MECHANICAL SPECIFICATIONS

Parameters	IRK.320	Units	Conditions	
T_{j}	Junction operating temperature	-40 to 135	°C	
T_{stb}	Storage temperature range	-40 to 150	°C	
$R_{\theta j-c}$	Max. internal thermal resistance, junction to case	0.068	K/W IRKD, /IRKJ, /IRKC. Per junction, DC operation	
$R_{\theta c-s}$	Thermal resistance, case to heatsink	0.20	K/W Mounting surface flat, smooth and greased	
T	Mounting torque $\pm 10\%$	Module to heatsink	4 to 8 Nm	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.
		Busbar to module	8 to 10 Nm	
Wt	Approximate weight	800	g	

BLOCKING

Parameter	IRK.320	Units	Conditions
I_{RPM}	Max. peak reverse leakage current	50	mA $T_j = 150^\circ\text{C}$
V_{NS}	RMS isolation voltage	3000	V 50 Hz, circuit to base, all terminals shorted, $t = 1\text{sec}$

OUTLINE DIAGRAM



POWER MODULES

IRK.250, .270, .320SERIES

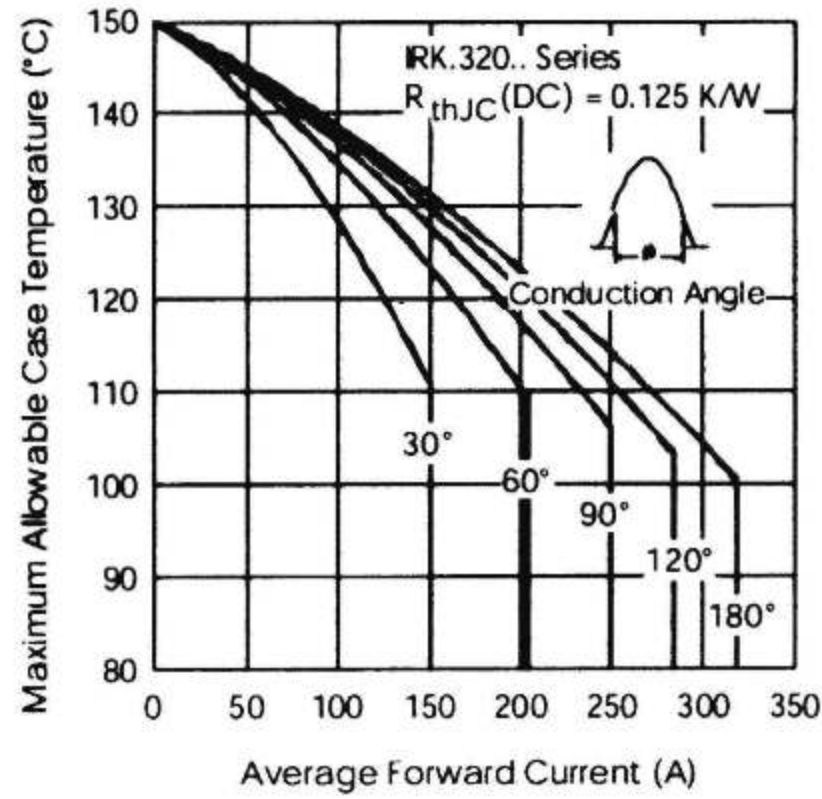


Fig.1-CurrentRatingsCharacteristics

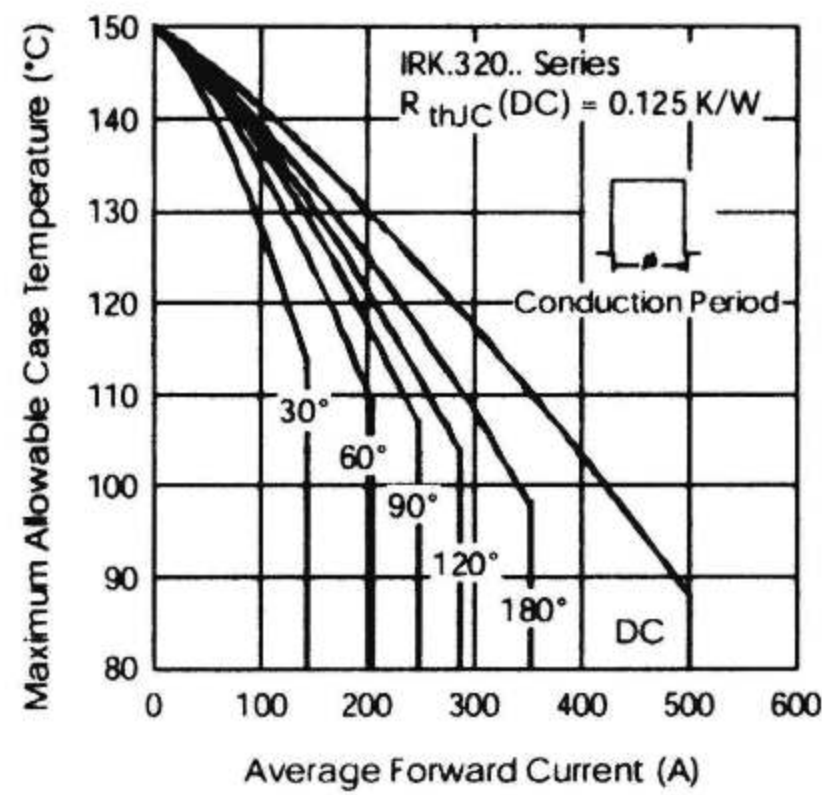


Fig.2 -CurrentRatingsCharacteristics

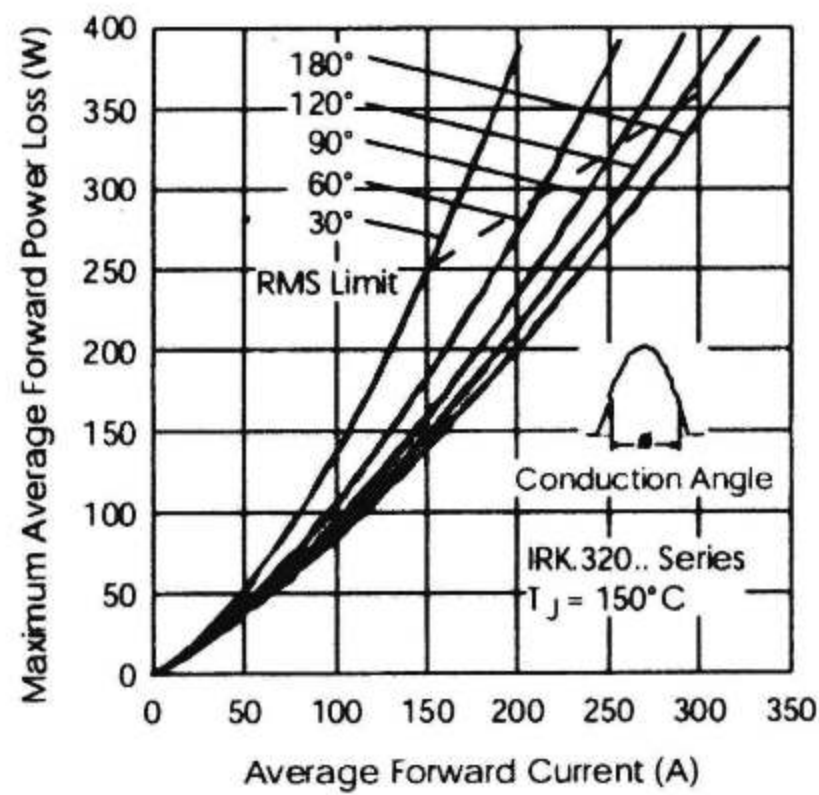


Fig.3 - Forward Power Loss Characteristics

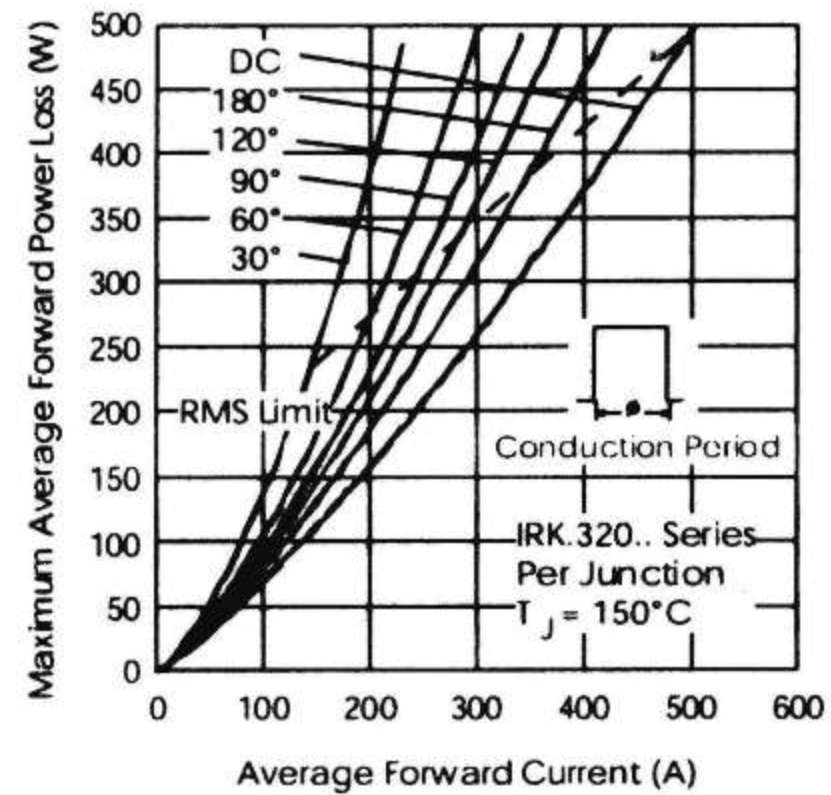


Fig.4 - Forward Power Loss Characteristics

POWER MODULES

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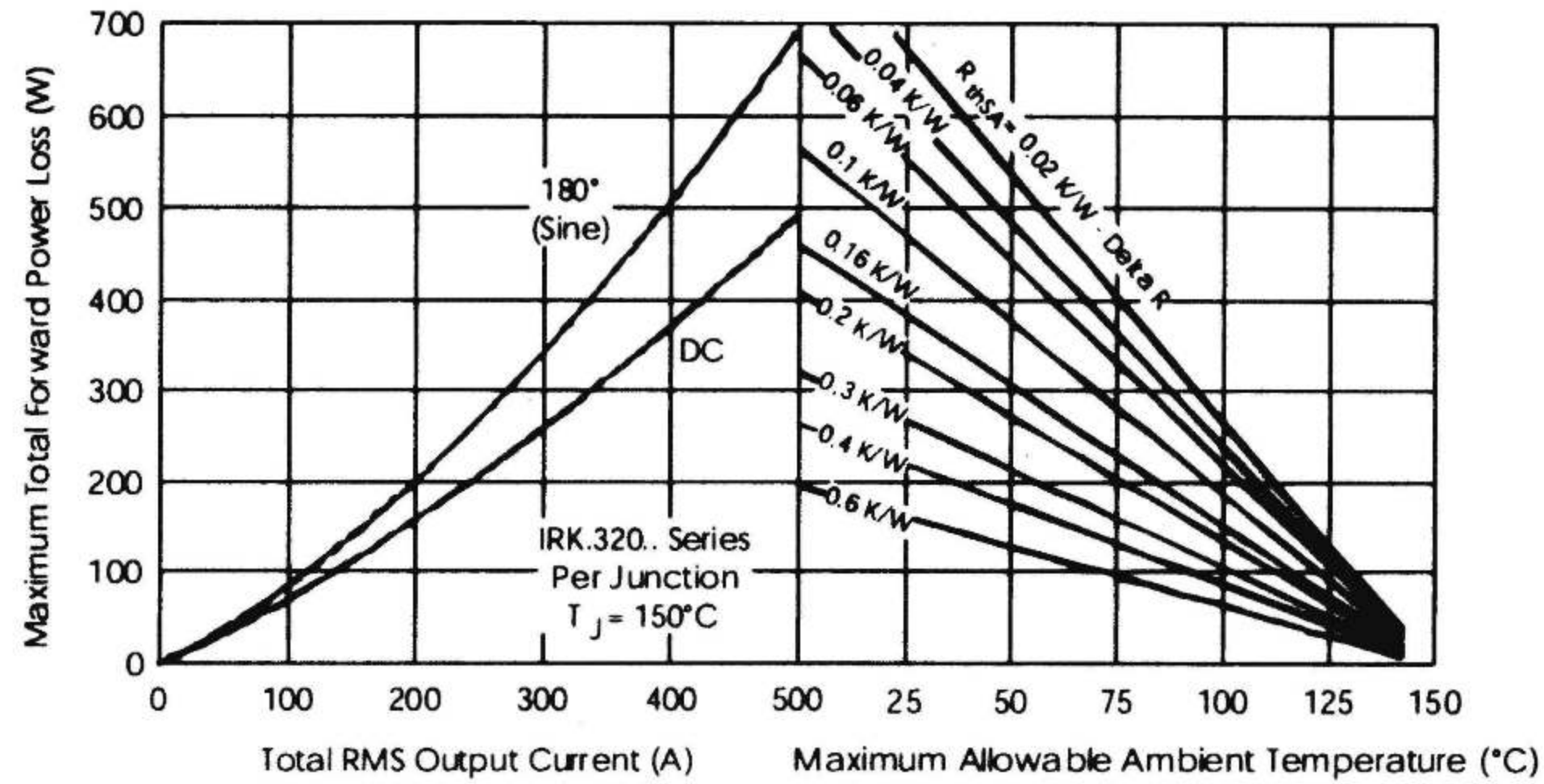


Fig.5 - Forward Power Loss Characteristics

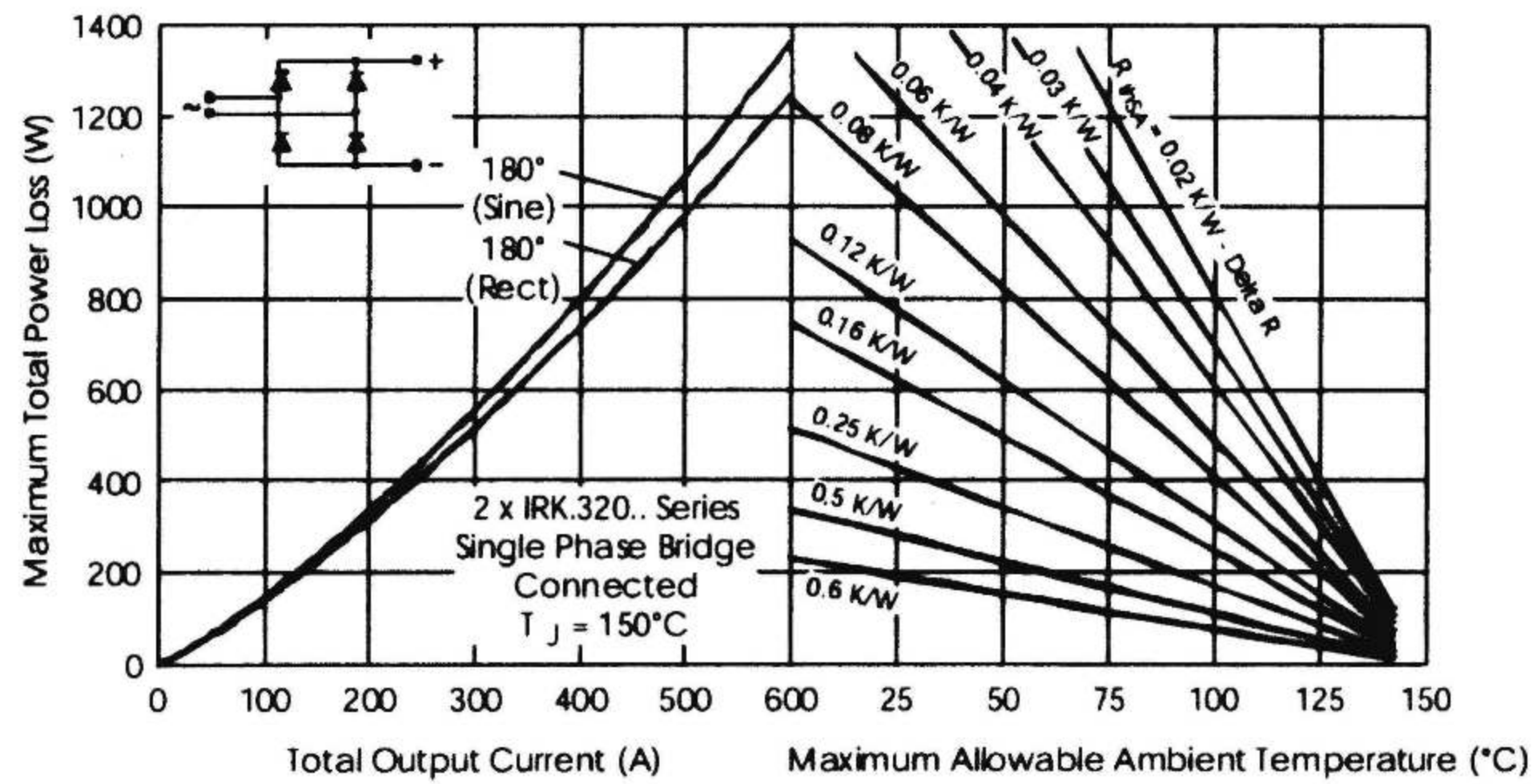


Fig.6 - Forward Power Loss Characteristics

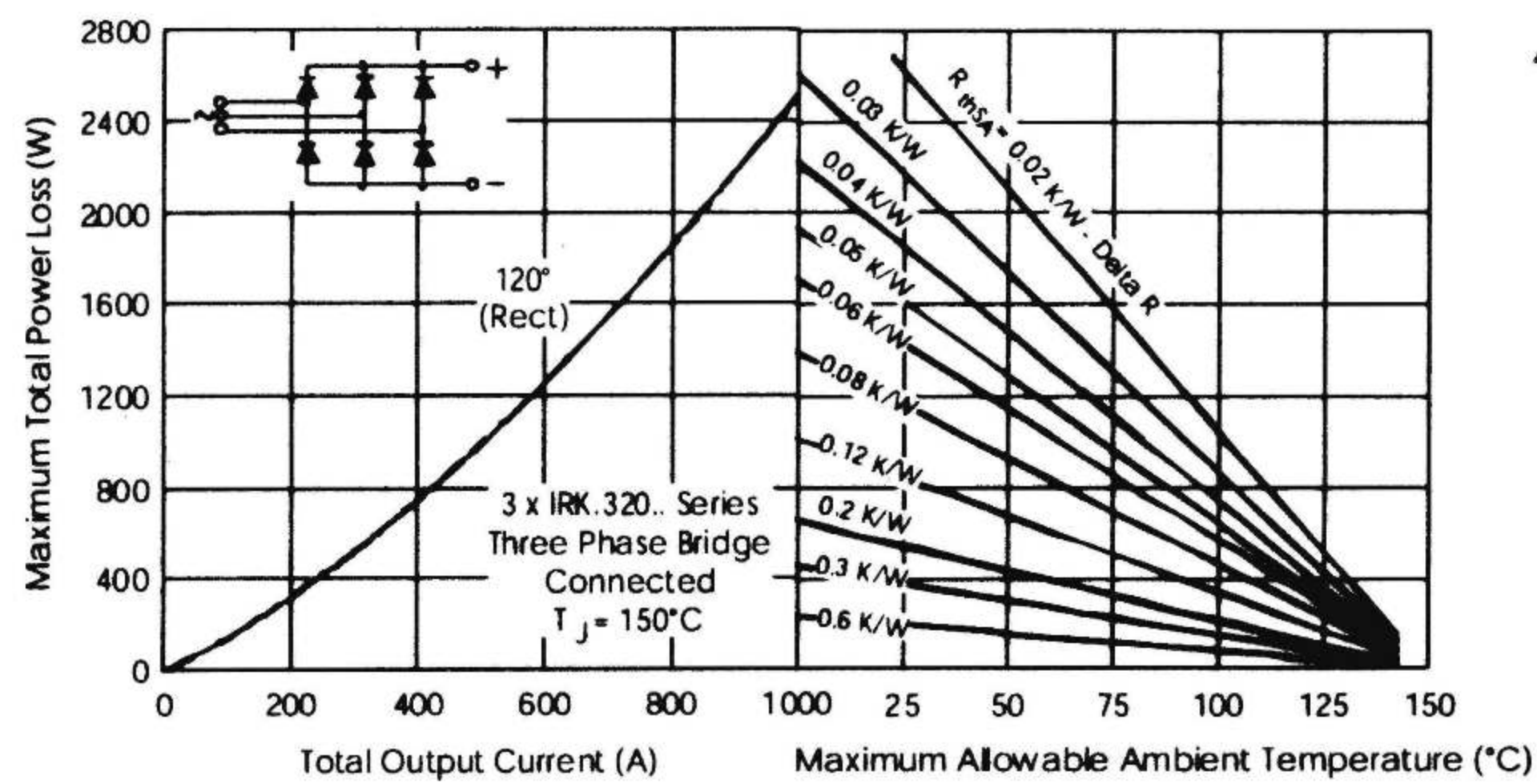


Fig.7 - Forward Power Loss Characteristics

POWER MODULES

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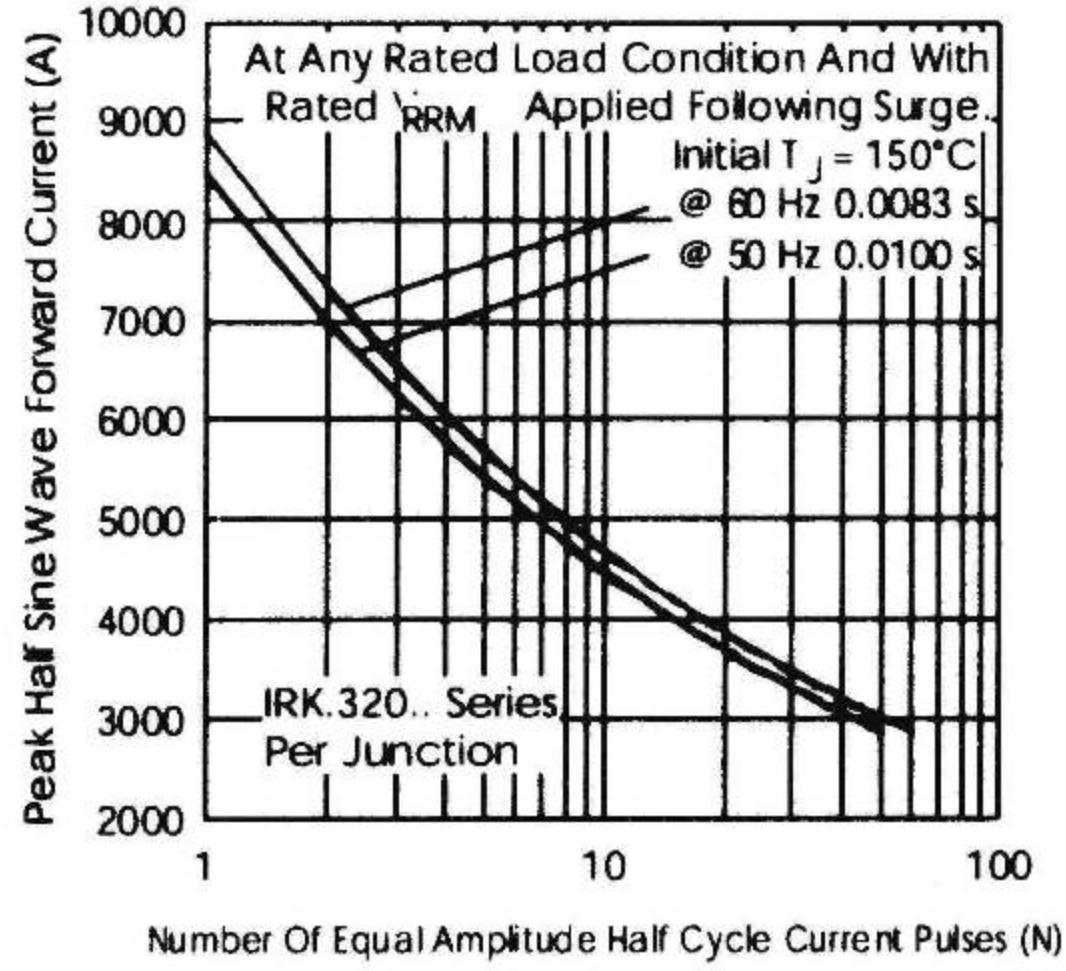


Fig.8 - Maximum Non-Repetitive Surge Current

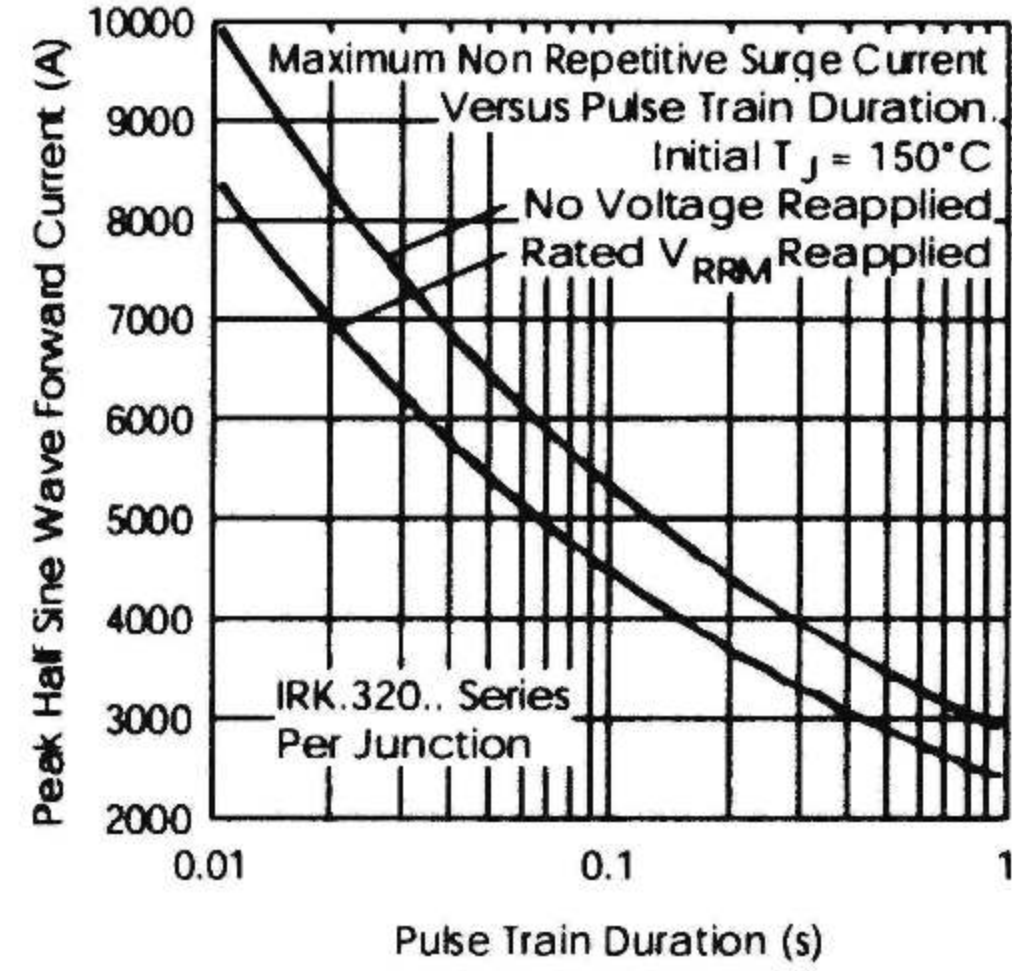


Fig.10 - Maximum Non-Repetitive Surge Current

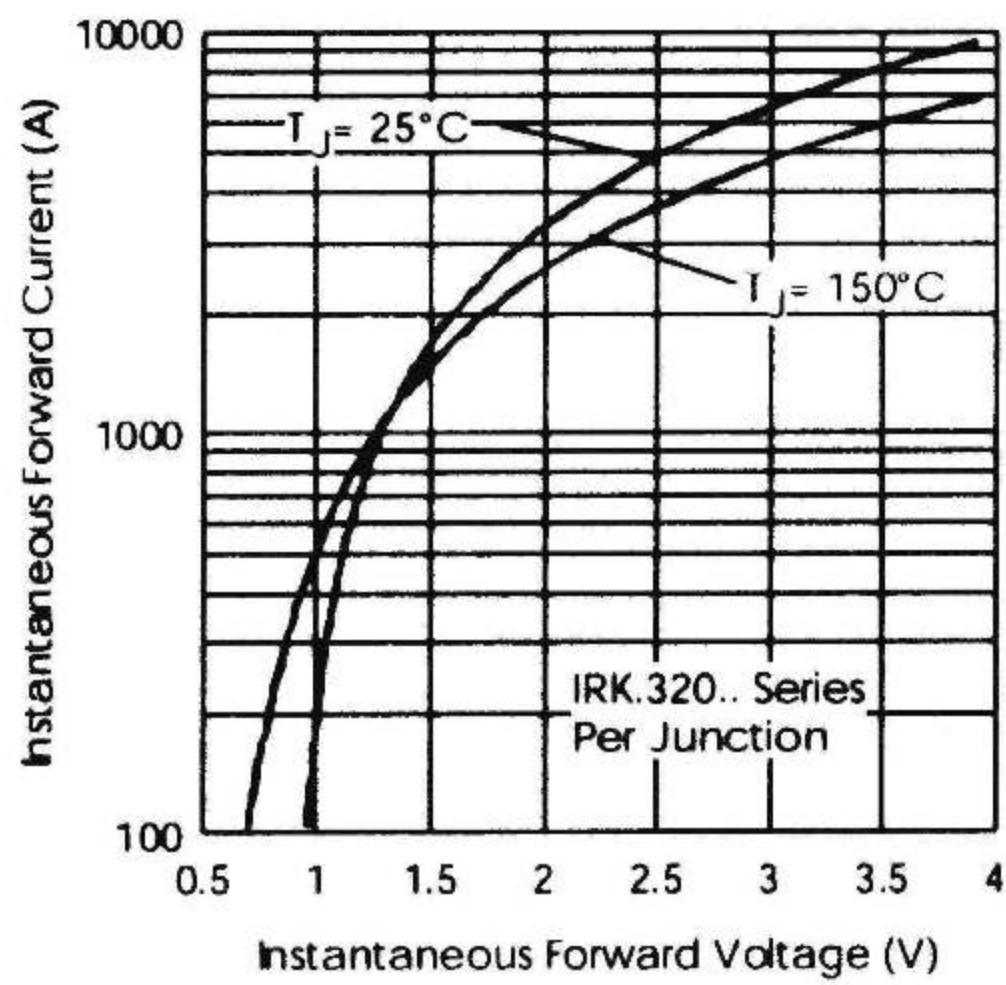


Fig.9 - Forward Voltage Drop Characteristics

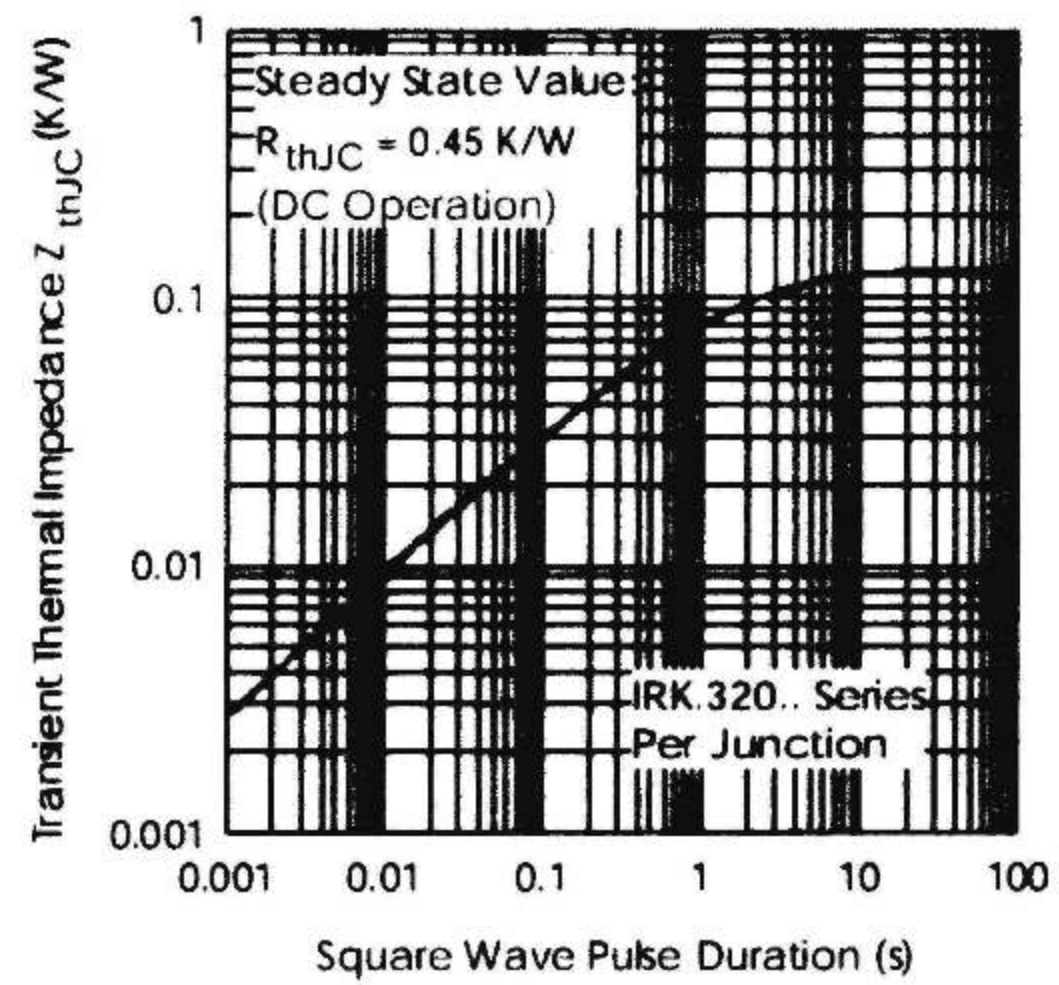


Fig.11 - Thermal Impedance Z_{thJC} Characteristics