IRK.250, .270, .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.250	IRK.270	IRK.320	Units
$I_{F(AV)}$	@ T_C = 100°C	250	270	320	A
$I_{F(RMS)}$		393	424	502	A
I_{FSM}	@ 50 Hz	7015	8920	10110	A
I^2t	@ 50 Hz	246	398	511	kA^2s
$I^2\sqrt{t}$		2460	3980	5110	$kA^2\sqrt{s}$
V_{RRM} range		Up to 1600	Up to 1600	Up to 1600	V
T_J		-40 to 135			°C

IRK.250, .270, .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.250 IRK.270 IRK.320	04	400	500	50
	06	600	700	50
	08	800	900	50
	10	1000	1100	50
	12	1200	1300	50
	14	1400	1500	50
	16	1600	1700	50

FORWARD CONDUCTION

	Parameters	IRK.250	IRK.270	IRK.320	Units	Conditions	
$I_{F(AV)}$	Max. average forward current	250	270	320	A	180°C conduction, half sine wave	
	@ case temperature	100	100	100	°C		
$I_{F(RMS)}$	Max. RMS forward current	393	424	502	A	as AC switch	
I_{FSM}	Max. peak, one cycle forward non-repetitive surge current	7015	8920	10110	A	t = 10ms	Sinusoidal half wave, Initial $T_J = T_J$ max.
I^2t	Maximum I^2t for fusing	246	398	511	kA^2s	t = 10ms	
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	2460	3980	5110	$kA^2\sqrt{s}$	t = 0.1 to 10ms. No voltage reapplied.	
$V_{F(TO)}$	Threshold voltage	0.79	0.74	0.69	V	$T_J = T_J$ max.	
r_t	Forward slope resistance	0.63	0.94	0.59	mΩ	$T_J = T_J$ max.	
V_{FM}	Max. forward voltage drop	1.29	1.48	1.28	V	$I_{FM} = \pi \times I_{F(AV)}$, $T_J = T_J$ max., 180° conduction AV. power = $V_{F(TO)} \times I_{F(AV)} + r_1 \times (I_{F(RMS)})^2$	

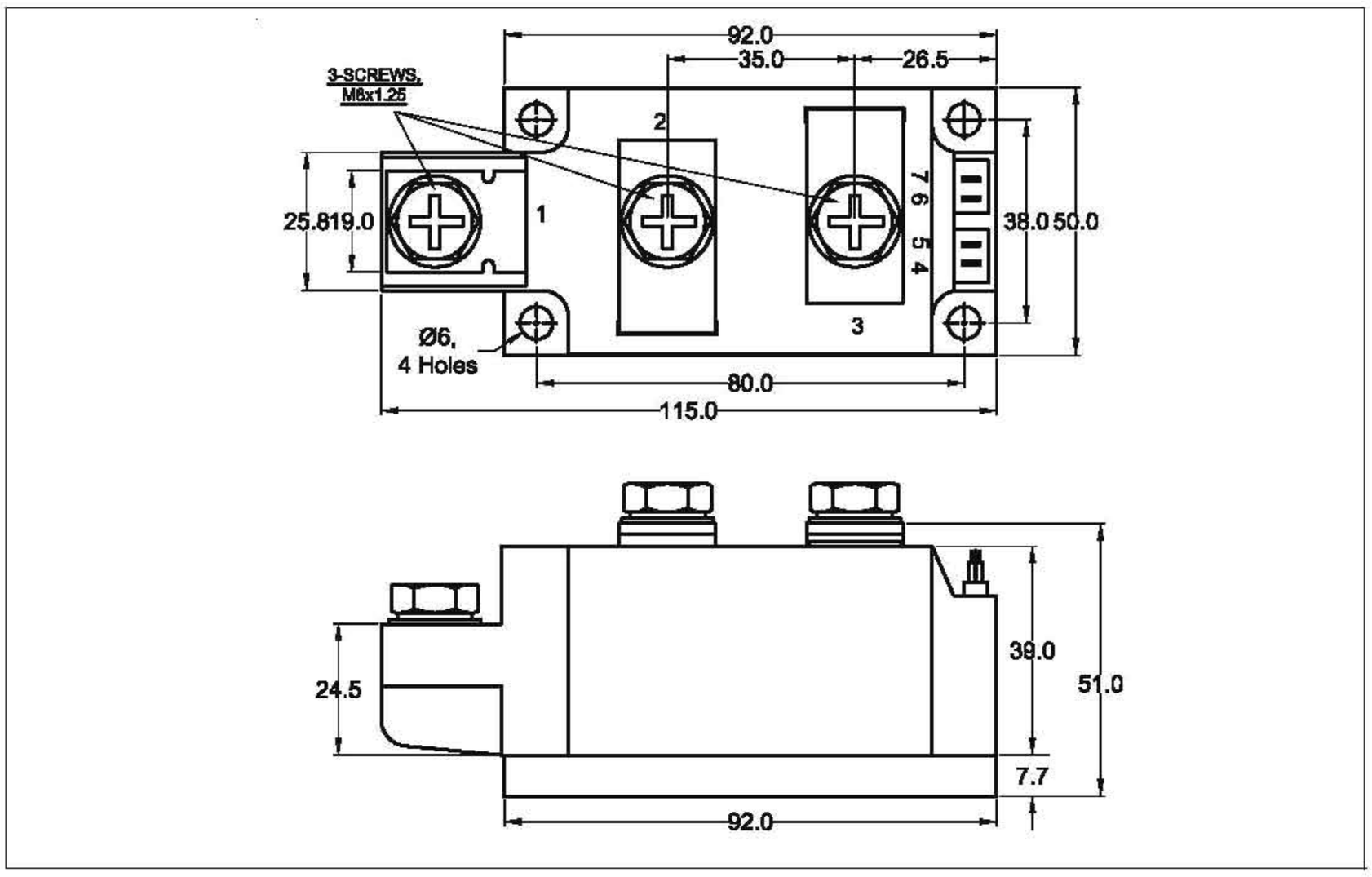
THERMAL AND MECHANICAL SPECIFICATIONS

	Parameters		IRK.250	IRK.270	IRK.320	Units	Conditions	
T_J	Junction operating temperature		-40 to 135			°C		
T_{stg}	Storage temperature range		-40 to 150			°C		
R_{thj-c}	Max. internal thermal resistance, junction to case		0.16	0.125	0.125	K/W	IRKD../IRKJ../IRKC..	Per junction, DC operation
R_{thC-S}	Thermal resistance, case to heatsink		0.02	0.02	0.02	K/W	Mounting surface flat, smooth and greased	
T	Mounting torque ±10%	Module to heatsink	4 to 6			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		

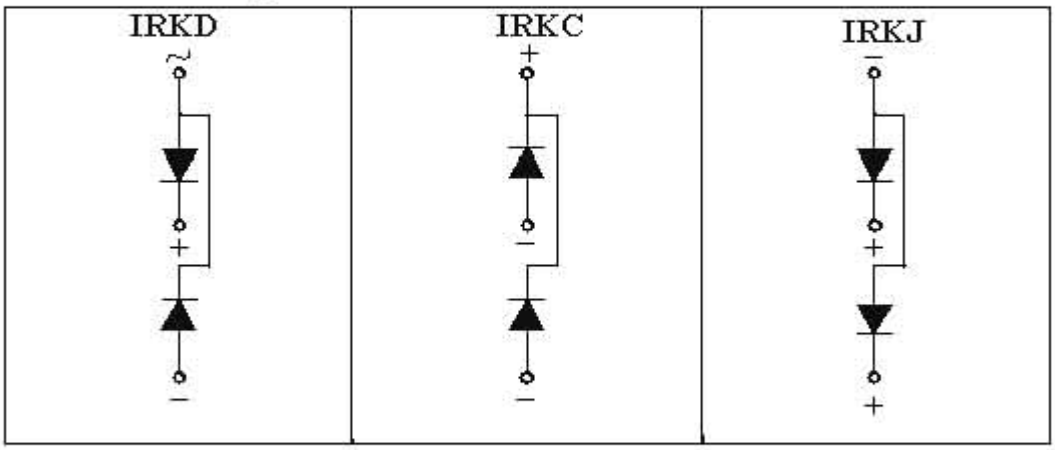
BLOCKING

	Parameter	IRK.250	IRK.270	IRK.320	Units	Conditions
I_{RRM}	Max. peak reverse leakage current	50	50	50	mA	T_J = 150°C
V_{INS}	RMS isolation voltage	3000	3000	3000	V	50 Hz,circuit to base,all terminals shorted, t=1sec

OUTLINE DIAGRAM



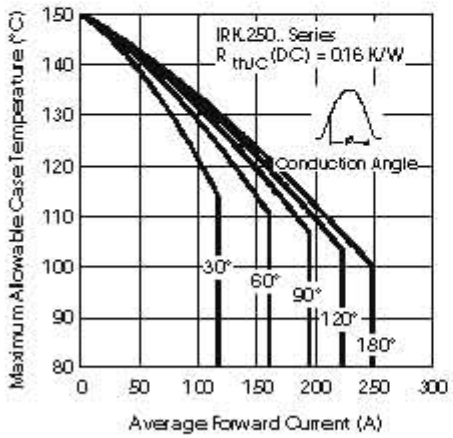
Circuit Configuration Table

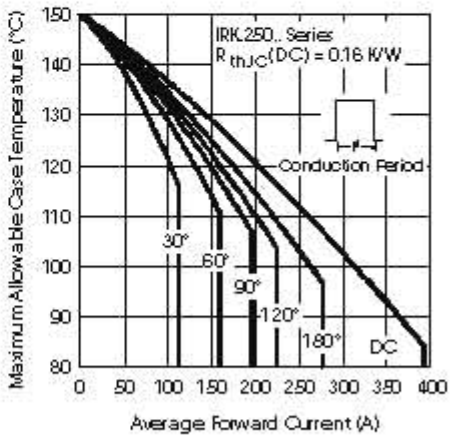


Ordering Information Table

IRK	D	250	/	16
①	②	③		④

① - **Module type**
② - **Circuit configuration (See Circuit Configuration table)**
③ - **Current Code**
④ - **Voltage Code (See Voltage Ratings table)**





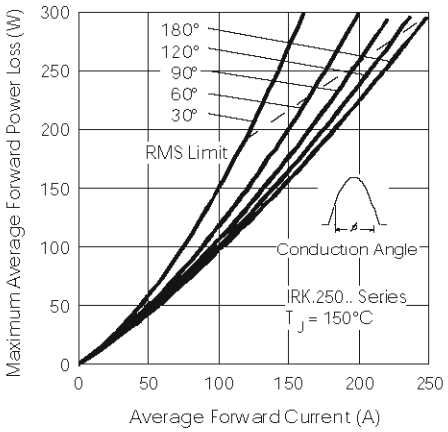


Fig.3- Forward Power Loss Characteristics

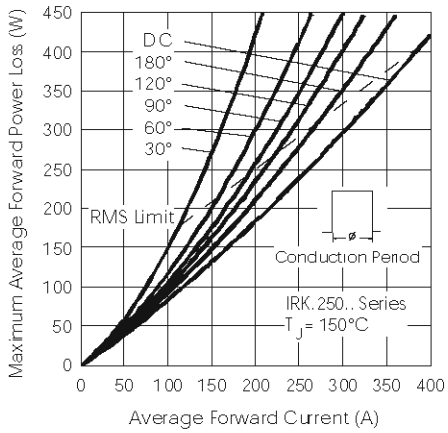


Fig.4- Forward Power Loss Characteristics

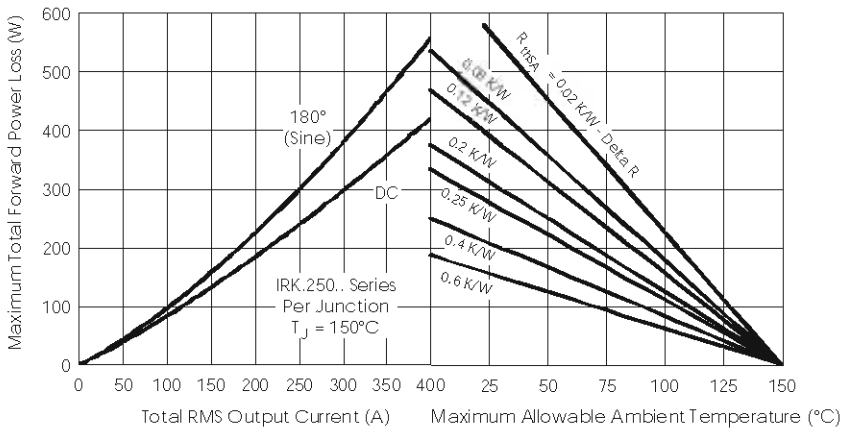


Fig.5- Forward Power Loss Characteristics

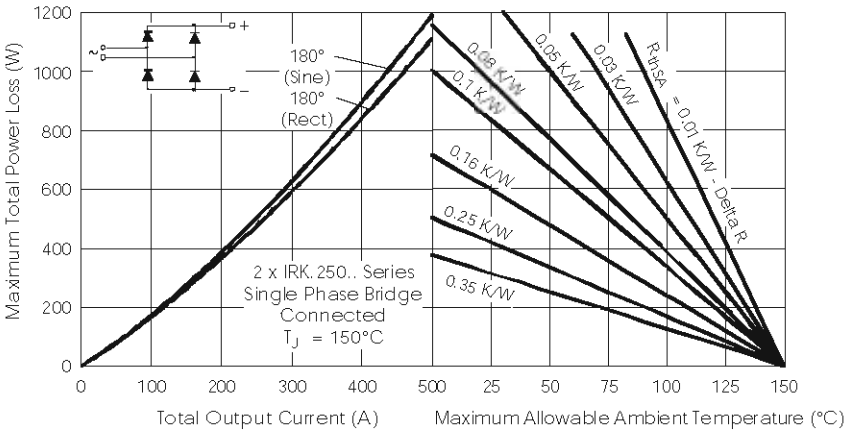


Fig. 6 - Forward Power Loss Characteristics

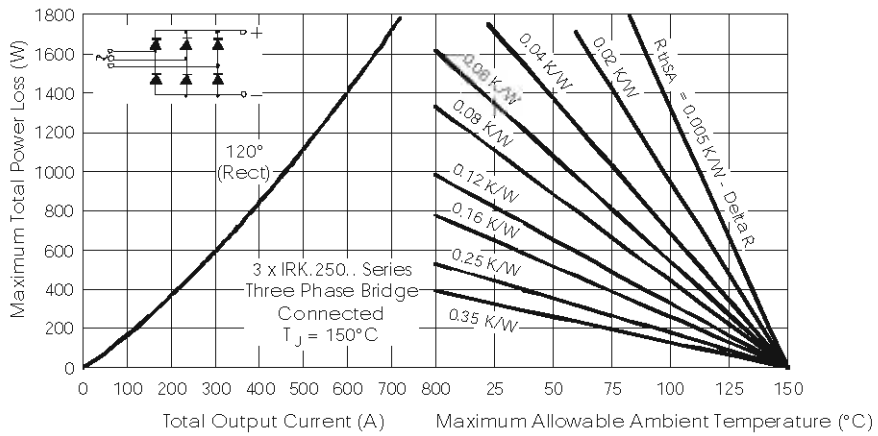


Fig.7 - Forward Power Loss Characteristics

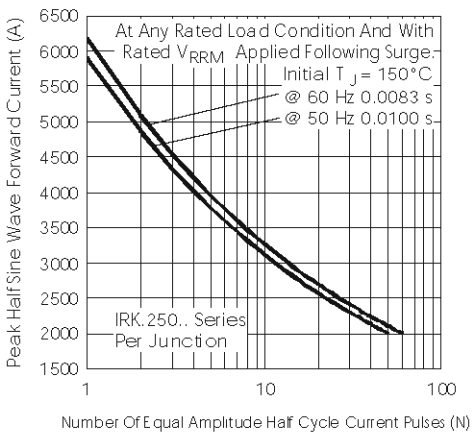


Fig.8 - Maximum Non-Repetitive Surge Current

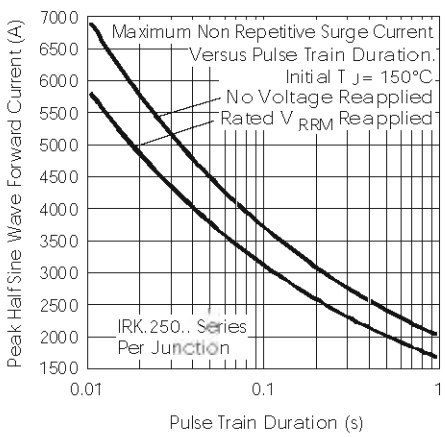


Fig.9 - Maximum Non-Repetitive Surge Current

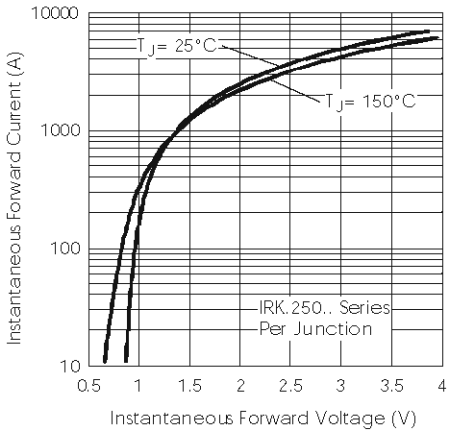


Fig. 10 - Forward Voltage Drop Characteristics

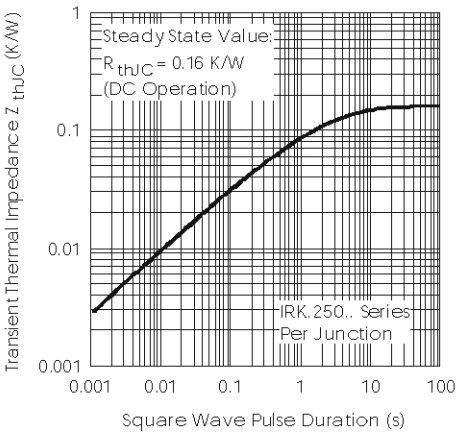


Fig. 11 - Thermal Impedance Z_{thJC} Characteristics

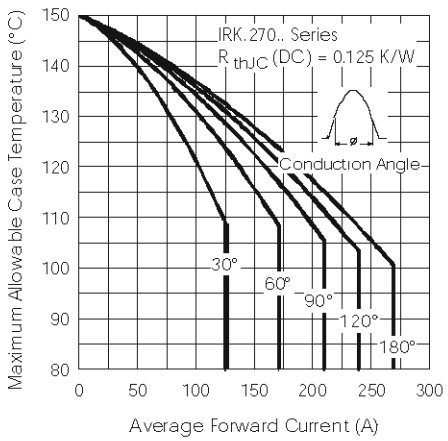


Fig.12- Current Ratings Characteristics

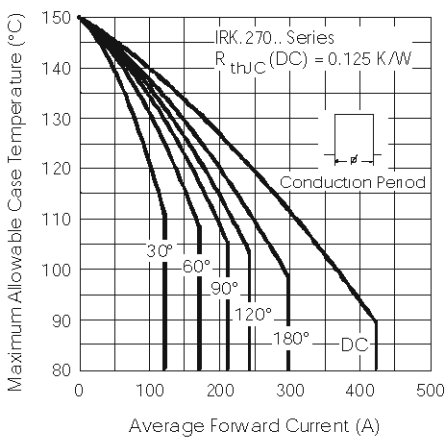


Fig.13- Current Ratings Characteristics

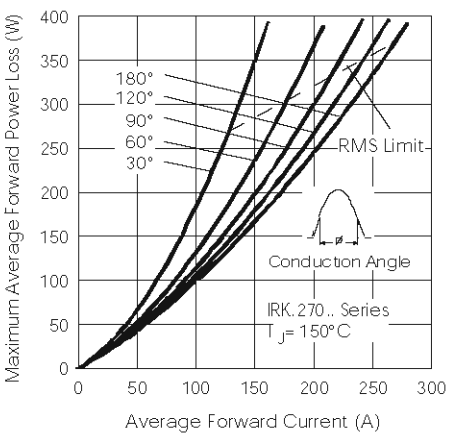


Fig.14- Forward Power Loss Characteristics

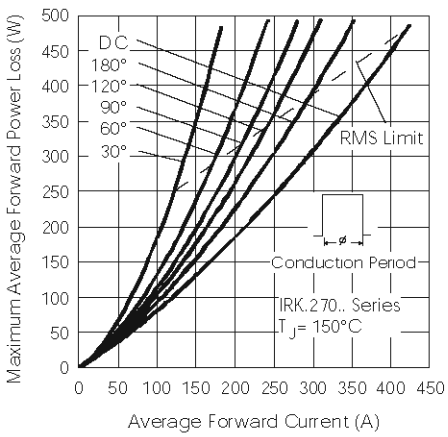


Fig.15- Forward Power Loss Characteristics

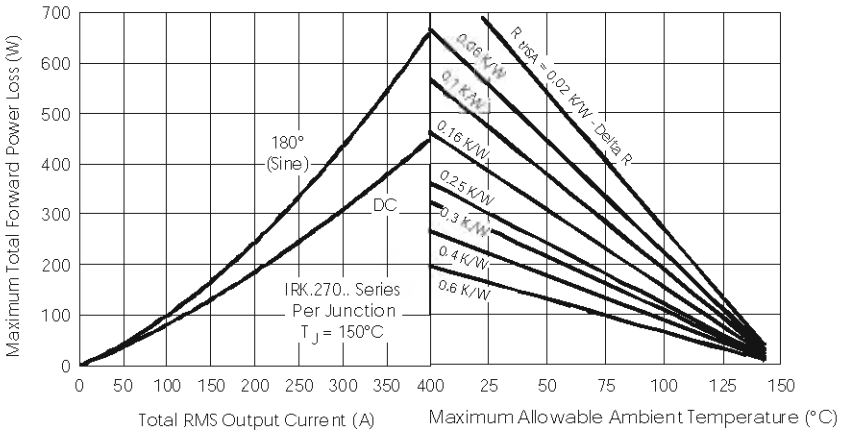


Fig. 16 - Forward Power Loss Characteristics

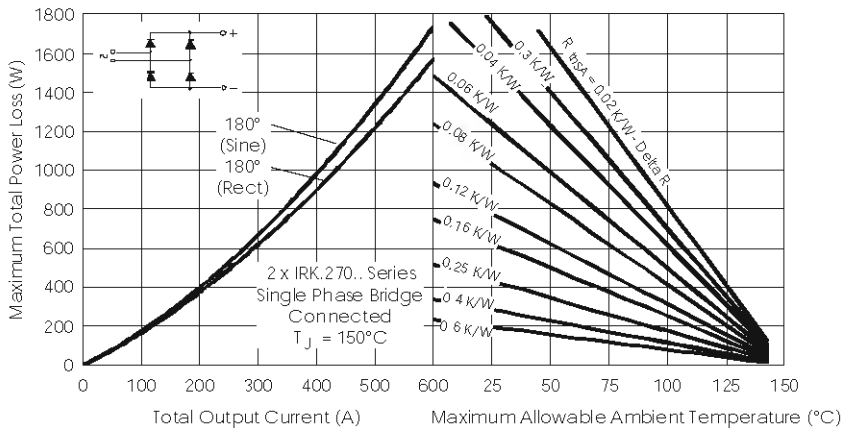


Fig.17 - Forward Power Loss Characteristics

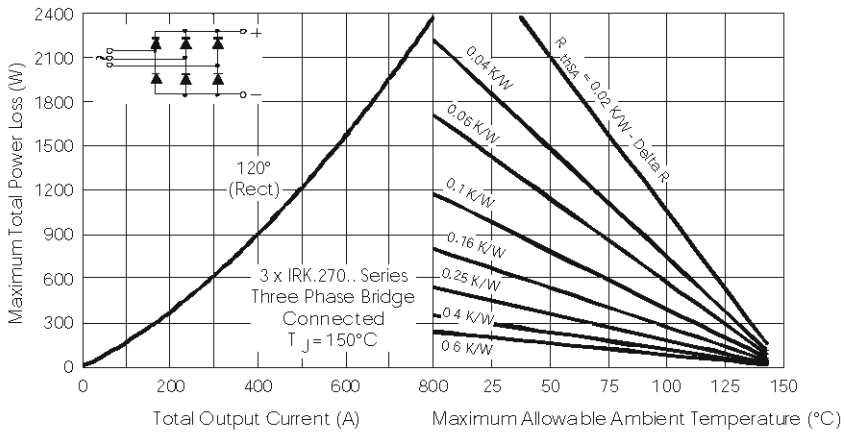


Fig.18 - Forward Power Loss Characteristics

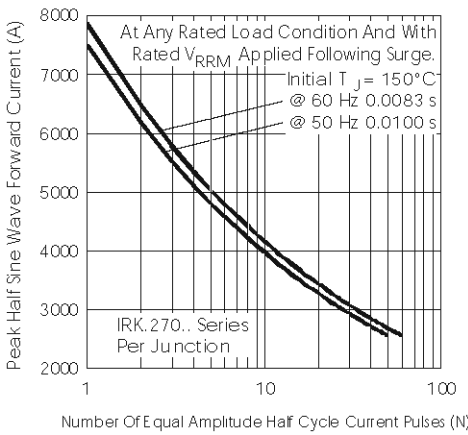


Fig. 19 - Maximum Non-Repetitive Surge Current

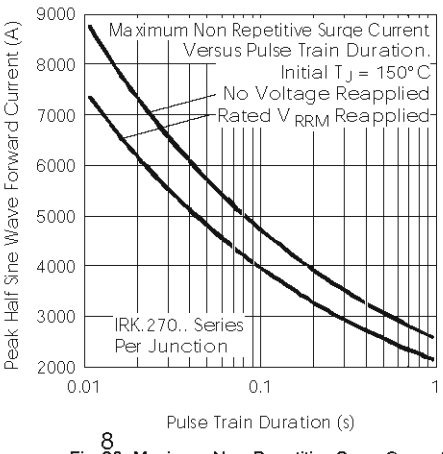


Fig. 20 - Maximum Non-Repetitive Surge Current

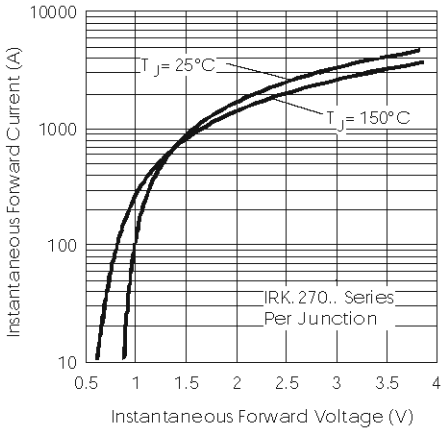


Fig.21- Forward Voltage Drop Characteristics

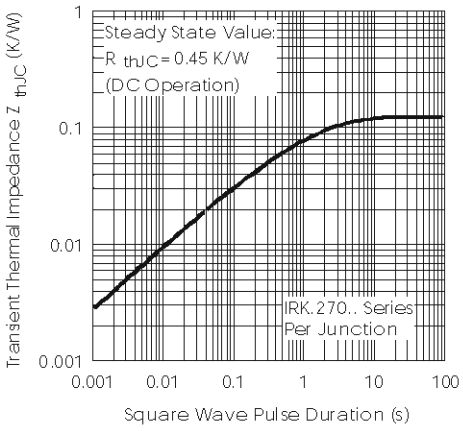


Fig. 22 - Thermal Impedance Z_{thJC} Characteristics

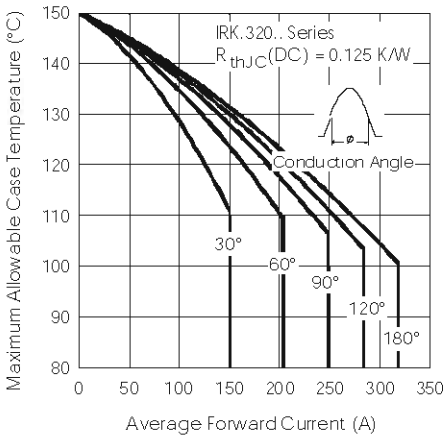


Fig.23- Current Ratings Characteristics

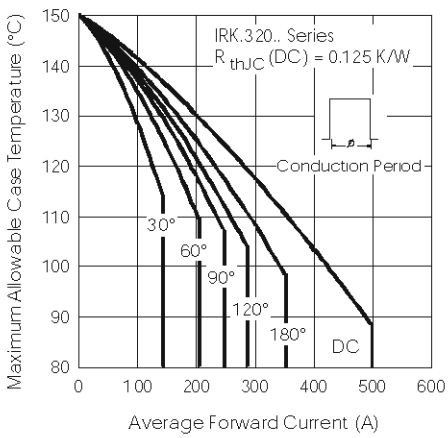


Fig.24- Current Ratings Characteristics

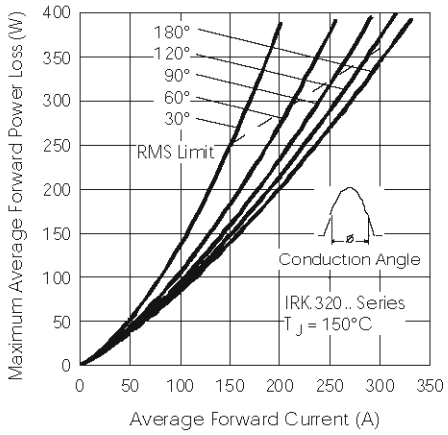


Fig. 25 - Forward Power Loss Characteristics

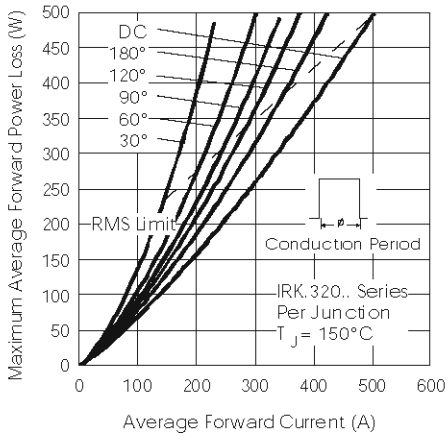


Fig. 26 - Forward Power Loss Characteristics

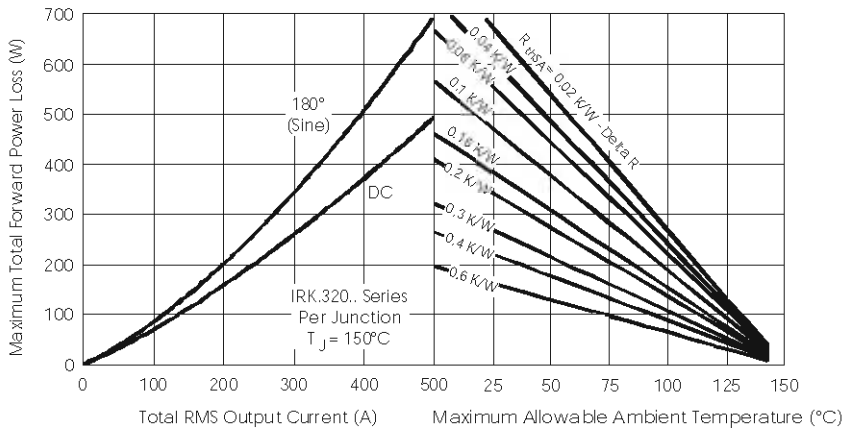


Fig. 27 - Forward Power Loss Characteristics

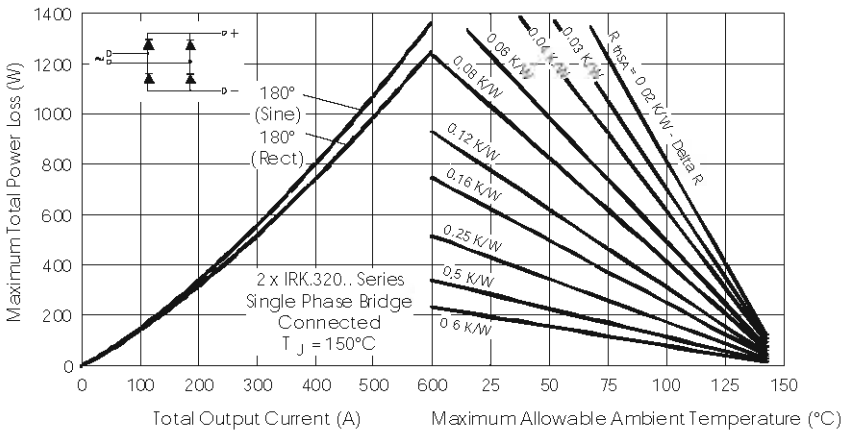


Fig. 28 - Forward Power Loss Characteristics

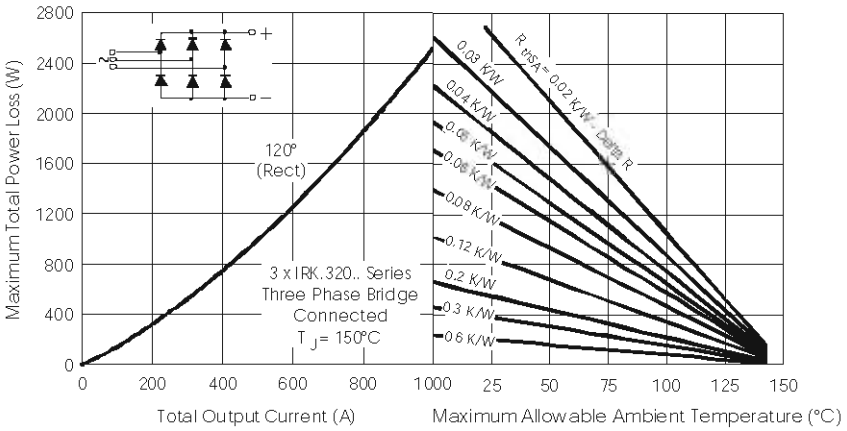


Fig. 29 - Forward Power Loss Characteristics

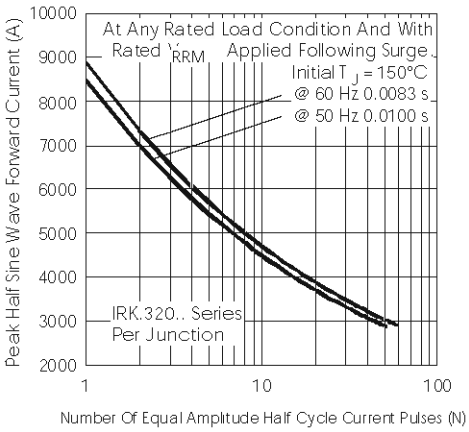


Fig.30-MaximumNon-RepetitiveSurgeCurrent

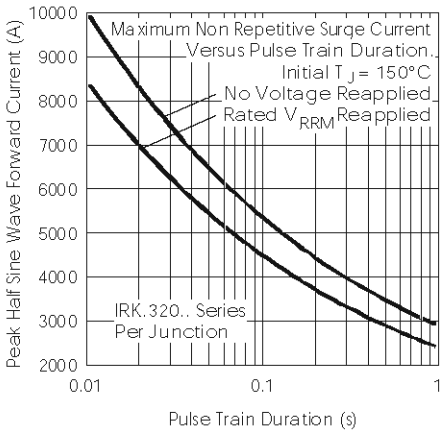


Fig.31-MaximumNon-RepetitiveSurgeCurrent

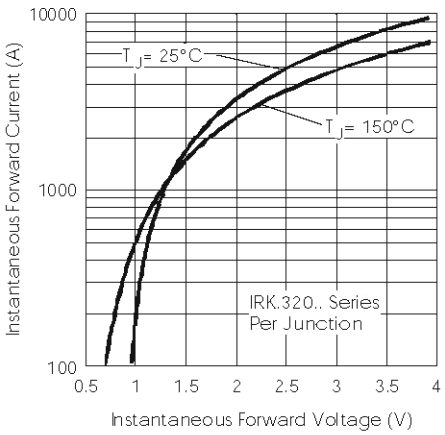


Fig.32- ForwardVoltageDropCharacteristics

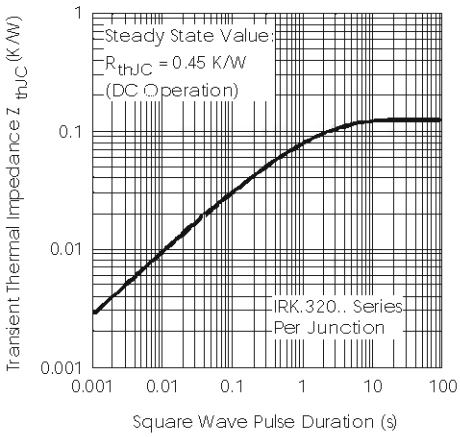


Fig. 33- Thermal Impedeance Z_{thJC} Characteristics

Last Update : Sep 2002