Standard Recovery Diodes, 250 A to 320 A (MAGN-A-PAK Power Modules)

MAGN-A-PAK

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
- UL approved file E78996
- Designed and qualified for industrial level
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free

RoHS COMPLIANT

PRODUCT SUMMARY	
$I_{F(AV)}$	250 A to 320 A
Type	Modules - Diode, High Voltage
Package	MAGN-A-PAK
Circuit	Two SCRs doubler circuit

DESCRIPTION

This new VS-VSK series of MAGN-A-PAKs uses high voltage power diodes in two 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 and the single diode module can be used in conjunction with the thyristor modules as a freewheel diode. These modules are intended for general purpose applications such as battery chargers, welders and plating equipment and where high voltage and high current are required (motor drives, etc.).

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VSK.250..	VSK.270..	VSK.320..	UNITS
$I_{F(AV)}$		250	270	320	A
	T_C	100	100	100	°C
$I_{F(RMS)}$		393	424	502	A
I_{FSM}	50 Hz	7015	8920	10 110	
	60 Hz	7345	9430	10 580	
I^2t	50 Hz	246	398	511	kA^2s
	60 Hz	225	363	466	
$I^2\sqrt{t}$		2460	3980	5110	$kA^2\sqrt{s}$
V_{RRM}		400 to 3000			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} MAXIMUM AT 150 °C mA
VS-VSK.250 VS-VSK.270 VS-VSK.320	04	400	500	50
	08	800	900	
	12	1200	1300	
	16	1600	1700	
	20	2000	2100	
VS-VSK.270	30	3000	3100	

FORWARD CONDUCTION									
PARAMETER	SYMBOL	TEST CONDITIONS			VSK.250	VSK.270	VSK.320	UNITS
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave			250	270	320	A
					100	100	100	°C
Maximum RMS forward current	$I_{F(RMS)}$	As AC switch			393	424	502	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	7015	8920	10 110	
		t = 8.3 ms			7345	9340	10 580	
		t = 10 ms	100 % V_{RRM} reapplied		5900	7500	8500	
		t = 8.3 ms			6180	7850	8900	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		246	398	511	kA^2s
		t = 8.3 ms			225	363	466	
		t = 10 ms	100 % V_{RRM} reapplied		174	281	361	
		t = 8.3 ms			159	257	330	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied			2460	3980	5110	$kA^2\sqrt{s}$
Low level value of threshold voltage	$V_{F(TO)1}$	(16.7 % x π x $I_{F(AV)} < I < \pi$ x $I_{F(AV)}$), $T_J = T_J$ maximum			0.79	0.74	0.69	V
High level value of threshold voltage	$V_{F(TO)2}$	($I > \pi$ x $I_{F(AV)}$), $T_J = T_J$ maximum			0.92	0.87	0.86	
Low level forward slope resistance	r_{f1}	(16.7 % x π x $I_{F(AV)} < I < \pi$ x $I_{F(AV)}$), $T_J = T_J$ maximum			0.63	0.94	0.59	mΩ
High level forward slope resistance	r_{f2}	($I > \pi$ x $I_{F(AV)}$), $T_J = T_J$ maximum			0.49	0.81	0.44	
Maximum forward voltage drop	V_{FM}	$I_{FM} = \pi$ x $I_{F(AV)}$, $T_J = T_J$ maximum, 180° conduction Average power = $V_{F(TO)}$ x $I_{F(AV)}$ + r_f x $(I_{F(RMS)})^2$			1.29	1.48	1.28	V

BLOCKING				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum peak reverse leakage current	I_{RRM}	T_J = 150 °C	50	mA
RMS insulation voltage	V_{INS}	50 Hz, circuit to base, all terminals shorted, t = 1 s	3000	V

THERMAL AND MECHANICAL SPECIFICATIONS							
PARAMETER		SYMBOL	TEST CONDITIONS	VALUES			UNITS
				VSK.250	VSK.270	VSK.320	
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	0.16	0.125		K/W
Maximum resistance, case to heatsink per module		R_{thCS}	Mounting surface flat, smooth and greased	0.035			
Mounting torque ± 10 %	MAP to heatsink		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.	4 to 6			Nm
	busbar to MAP			8 to 10			
Approximate weight				800			g
				30			oz.
Case style				MAGN-A-PAK			

ΔR CONDUCTION PER JUNCTION											
DEVICE	SINUSOIDAL CONDUCTION AT T_J MAXIMUM					RECTANGULAR CONDUCTION AT T_J MAXIMUM					UNITS
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
VSK.250	0.009	0.010	0.014	0.020	0.032	0.007	0.011	0.015	0.021	0.033	K/W
VSK.270	0.008	0.012	0.014	0.020	0.032	0.007	0.011	0.015	0.020	0.033	
VSK.320	0.008	0.010	0.013	0.020	0.032	0.007	0.011	0.015	0.020	0.033	

Note

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

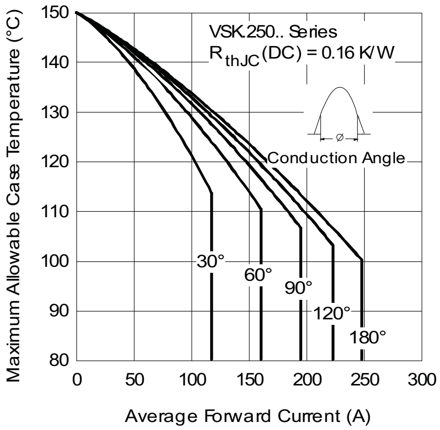


Fig. 1 - Current Ratings Characteristics

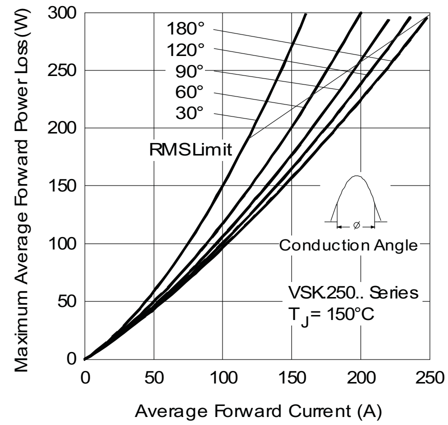


Fig. 3 - Forward Power Loss Characteristics

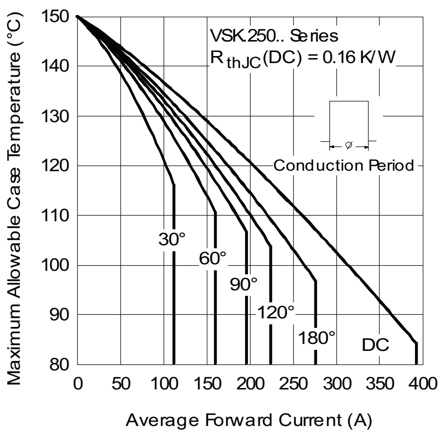


Fig. 2 - Current Ratings Characteristics

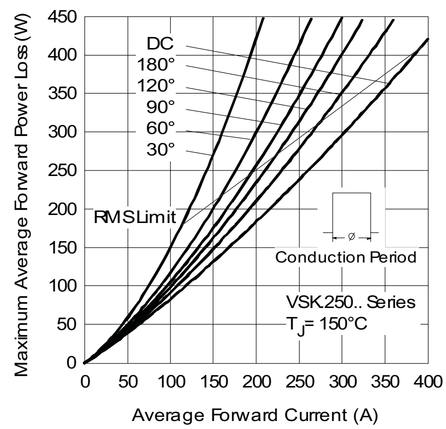


Fig. 4 - Forward Power Loss Characteristics

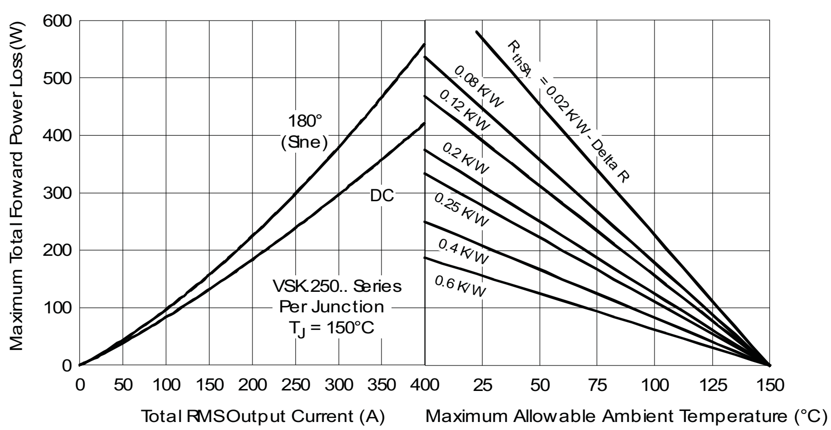


Fig. 5 - Forward Power Loss Characteristics

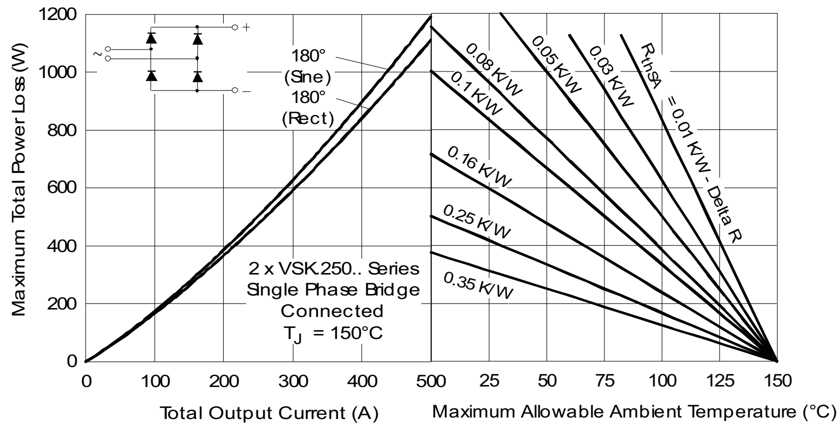


Fig. 6 - Forward Power Loss Characteristics

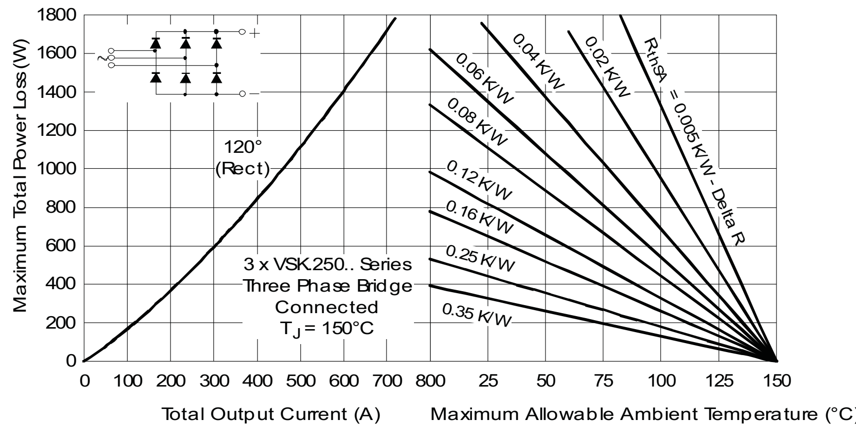


Fig. 7 - Forward Power Loss Characteristics

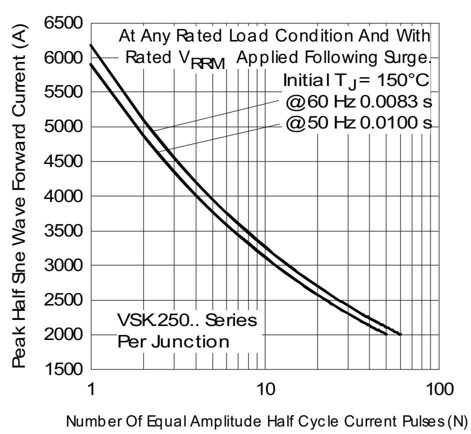


Fig. 8 - Maximum Non-Repetitive Surge Current

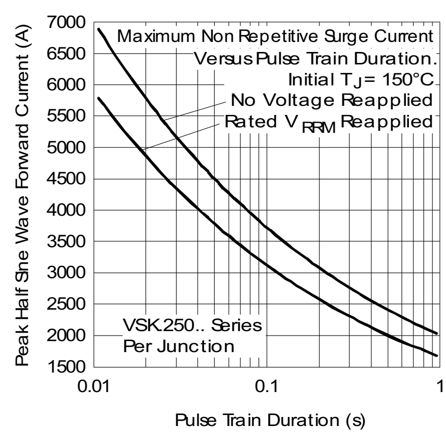


Fig. 9 - Maximum Non-Repetitive Surge Current

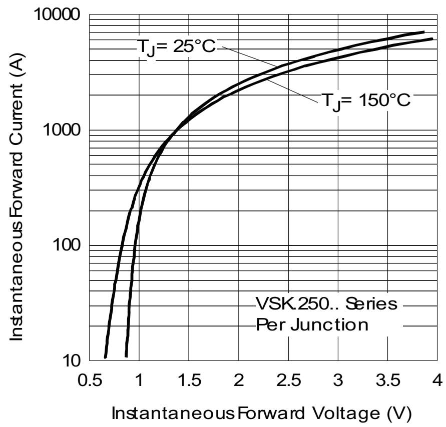


Fig. 10 - Forward Voltage Drop Characteristics

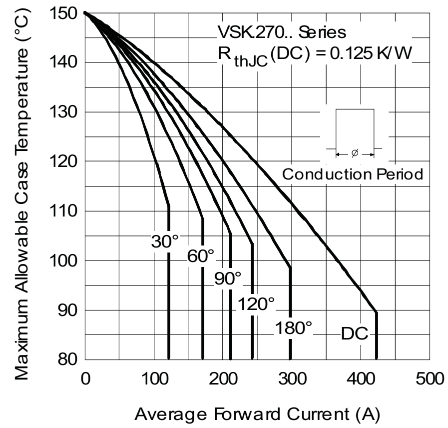


Fig. 13 - Current Ratings Characteristics

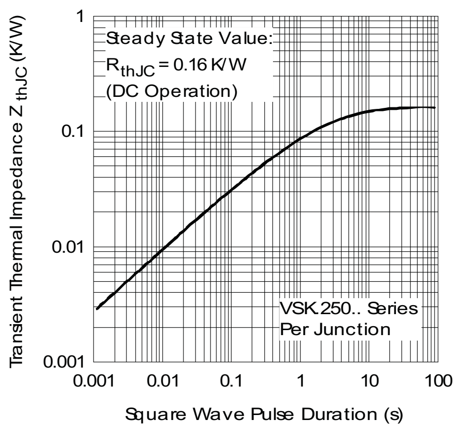


Fig. 11 - Thermal Impedance Z_{thJC} Characteristics

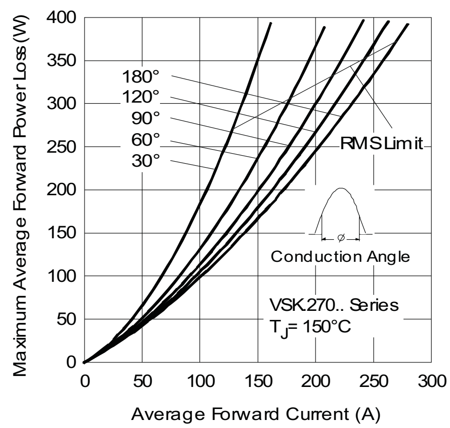


Fig. 14 - Forward Power Loss Characteristics

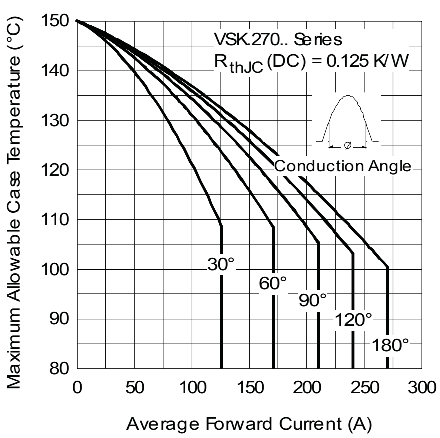


Fig. 12 - Current Ratings Characteristics

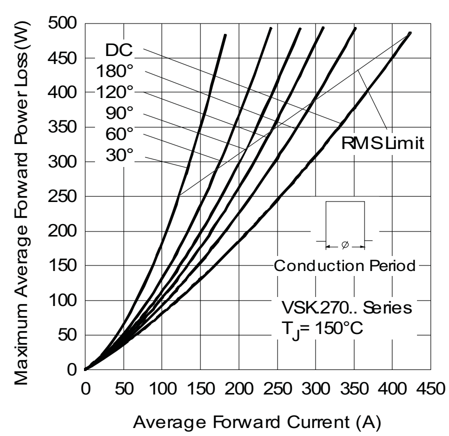


Fig. 15 - Forward Power Loss Characteristics

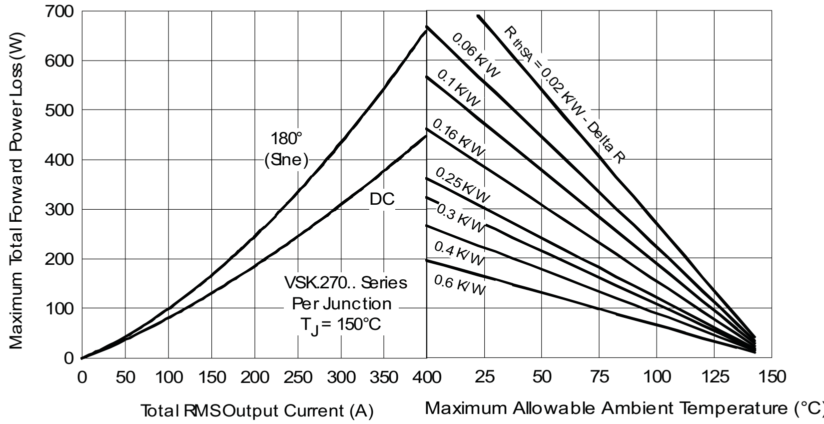


Fig. 16 - Forward Power Loss Characteristics

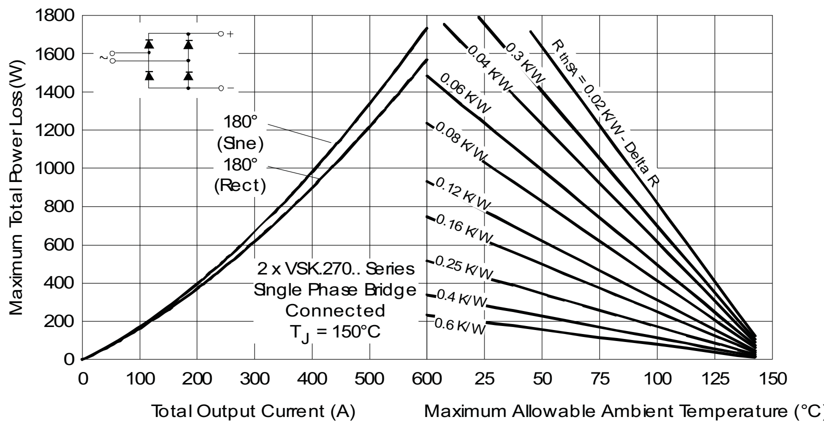


Fig. 17 - Forward Power Loss Characteristics

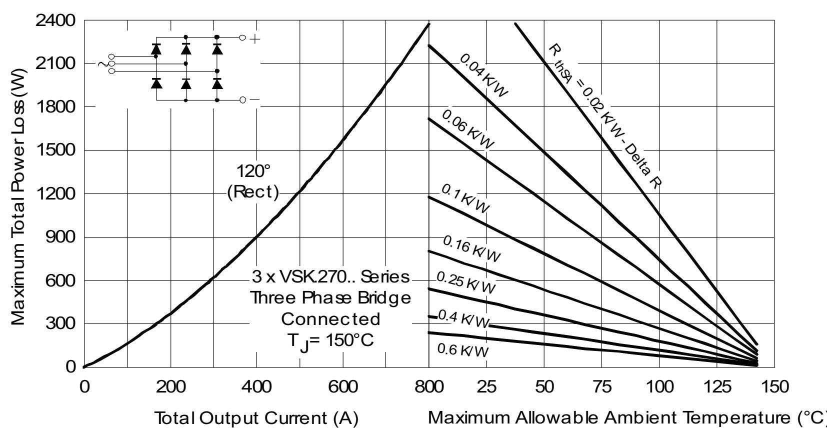


Fig. 18 - Forward Power Loss Characteristics

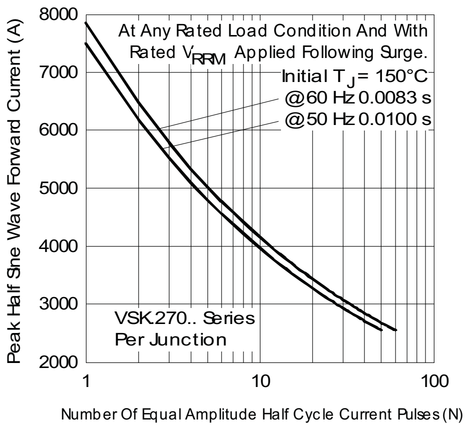


Fig. 19 - Maximum Non-Repetitive Surge Current

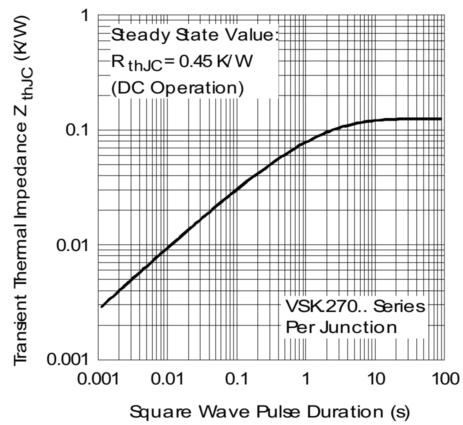


Fig. 22 - Thermal Impedance Z_{thJC} Characteristics

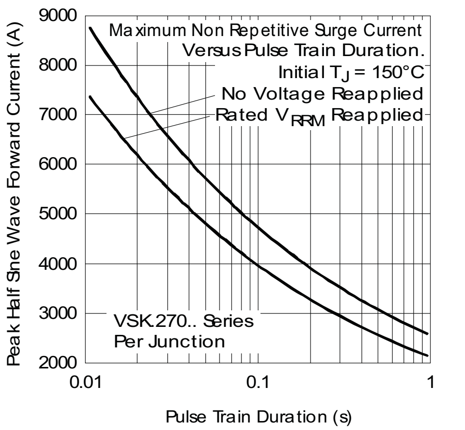


Fig. 20 - Maximum Non-Repetitive Surge Current

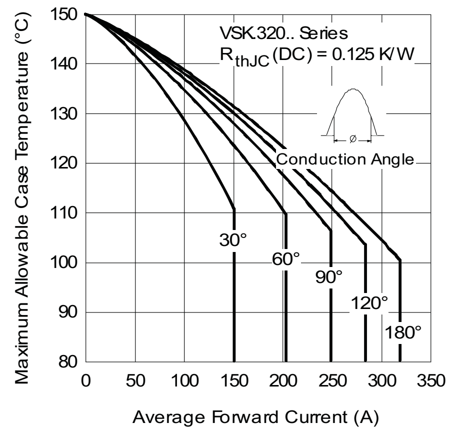


Fig. 23 - Current Ratings Characteristics

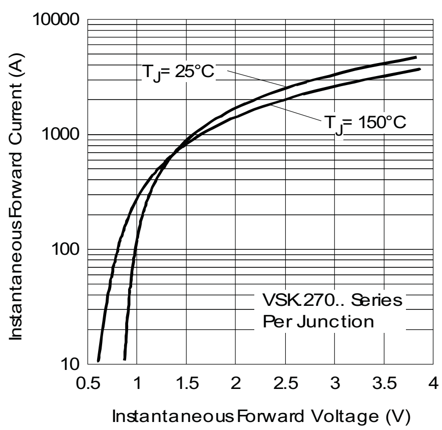


Fig. 21 - Forward Voltage Drop Characteristics

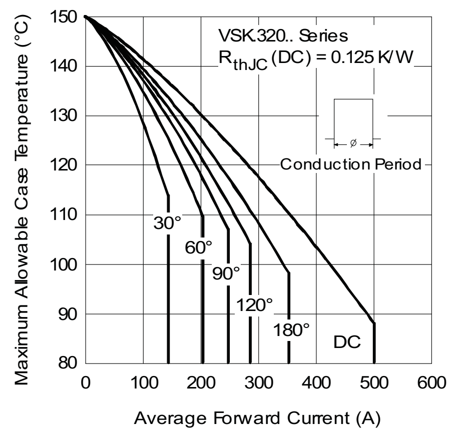


Fig. 24 - Current Ratings Characteristics

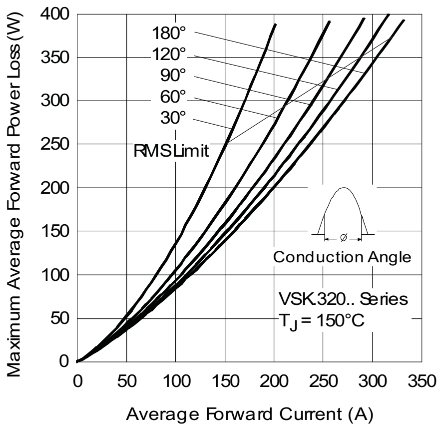


Fig. 25 - Forward Power Loss Characteristics

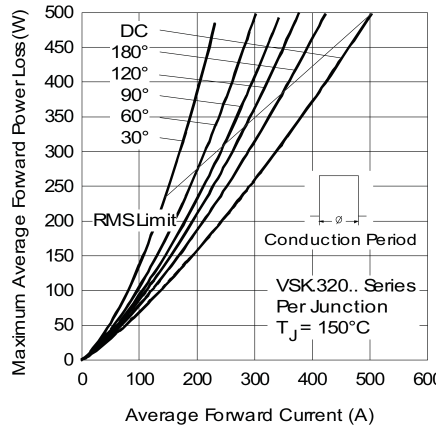


Fig. 26 - Forward Power Loss Characteristics

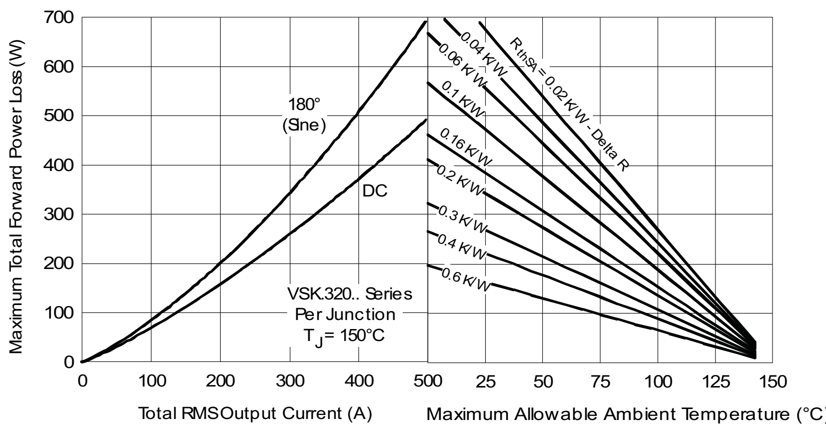


Fig. 27 - Forward Power Loss Characteristics

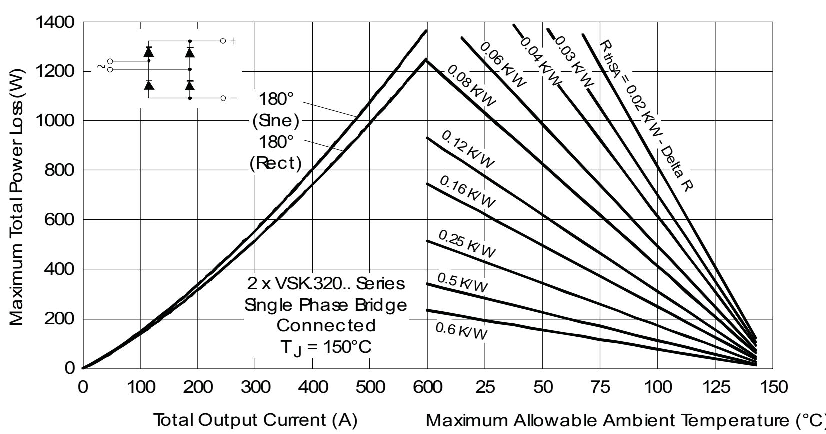


Fig. 28 - Forward Power Loss Characteristics

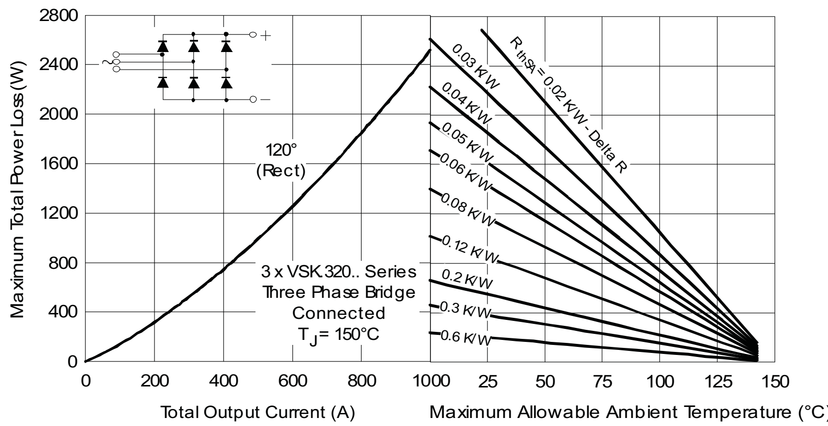


Fig. 29 - Forward Power Loss Characteristics

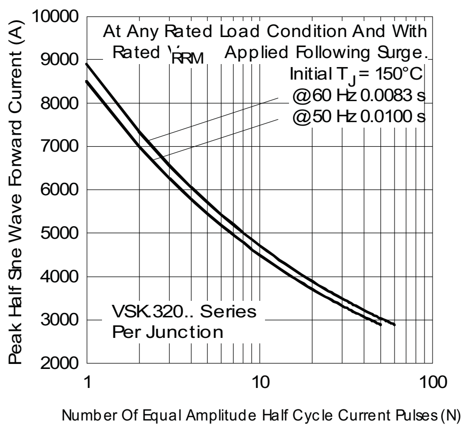


Fig. 30 - Maximum Non-Repetitive Surge Current

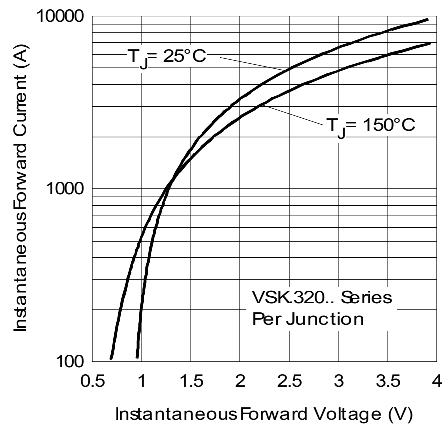


Fig. 32 - Forward Voltage Drop Characteristics

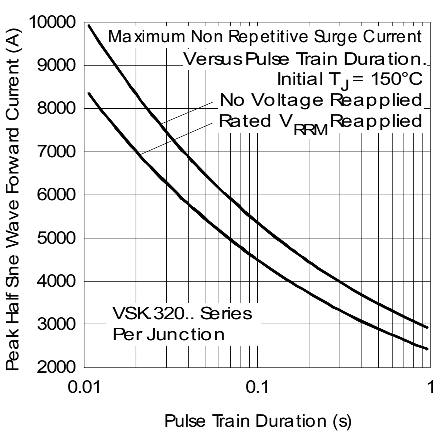


Fig. 31 - Maximum Non-Repetitive Surge Current

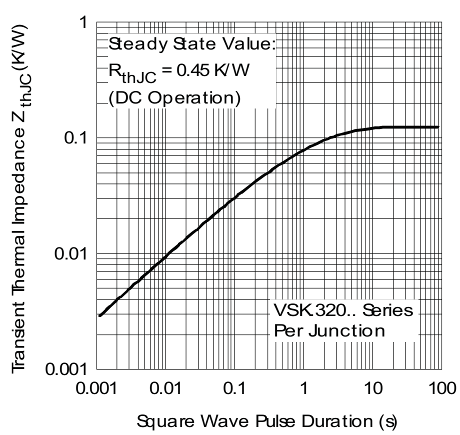


Fig. 33 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code	VS-	VSK	D	320	-	24	PbF
	1	2	3	4		5	6

1 - Vishay Semiconductors product

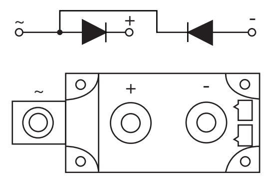
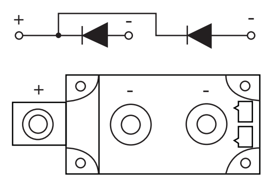
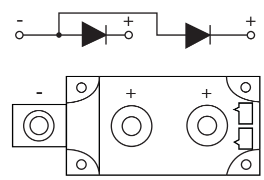
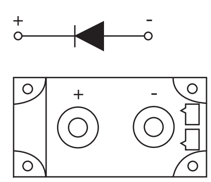
2 - Module type

3 - Circuit configuration (see Circuit Configuration table)

4 - Current rating: $I_{F(AV)}$ rounded

5 - Voltage code x 100 = V_{RRM} (see Voltage Ratings table)

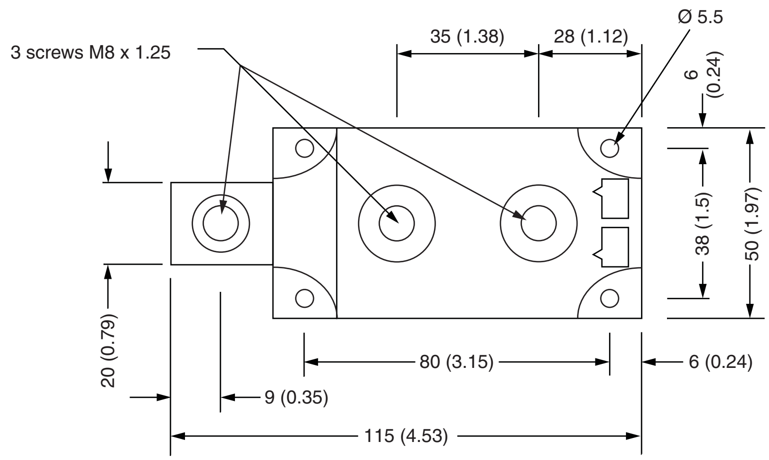
6 - Lead (Pb)-free

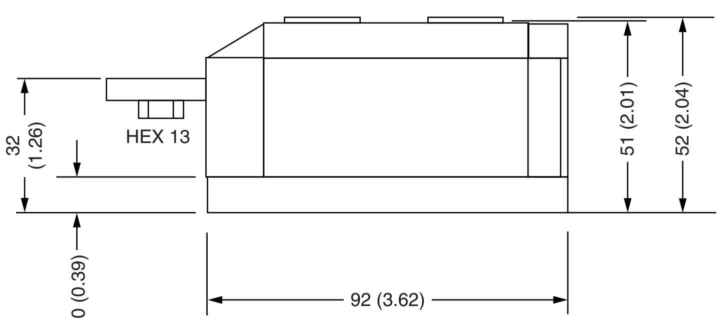
CIRCUIT CONFIGURATION		
CIRCUIT DESCRIPTION	**CIRCUIT CONFIGURATION CODE**	**CIRCUIT DRAWING**
Two diodes doubler circuit	D	**VSKD...** 
Two diodes common cathodes	C	**VSKC...** 
Two diodes common anodes	J	**VSKJ...** 
Single diode	E	**VSKE...** 

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95086

MAGN-A-PAK

DIMENSIONS in millimeters (inches)





Notes

- Dimensions are nominal
- Full engineering drawings are available on request
- UL identification number for gate and cathode wire: UL 1385
- UL identification number for package: UL 94 V-0

Disclaimer

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Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

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