Standard Diodes, 60 A/80 A (ADD-A-PAK Generation 5 Power Modules)

ADD-A-PAK

PRODUCT SUMMARY	
$I_{F(AV)}$	60 A/80 A
Type	Modules - Diode, High Voltage

FEATURES

- High voltage
- Industrial standard package
- Thick copper baseplate
- UL E78996 approved
- 3500 V_{RMS} isolating voltage
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level

Pb-free
RoHS COMPLIANT

BENEFITS

- Up to 1600 V
- Full compatible TO-240AA
- High surge capability
- Easy mounting on heatsink
- Al_2O_3 DBC insulator
- Heatsink grounded

MECHANICAL DESCRIPTION

The Generation 5 of ADD-A-PAK module combine the excellent thermal performance obtained by the usage of direct bonded copper substrate with superior mechanical ruggedness, thanks to the insertion of a solid copper baseplate at the bottom side of the device. The Cu baseplate allow an easier mounting on the majority of heatsink with increased tolerance of surface roughness and improve thermal spread.
The Generation 5 of AAP module is manufactured without hard mold, eliminating any possible direct stress on the leads.
The electrical terminals are secured against axial pull-out: they are fixed to the module housing via a click-stop feature already tested and proved as reliable on other Vishay HPP modules.

ELECTRICAL DESCRIPTION

These modules are intended for general purpose high voltage applications such as high voltage regulated power supplies, lighting circuits, temperature and motor speed control circuits, UPS and battery charger.

MAJOR RATINGS AND CHARACTERISTICS				
SYMBOL	CHARACTERISTICS	VSK.56	VSK.71	UNITS
$I_{F(AV)}$	100 °C	60	80	A
$I_{F(RMS)}$		94	126	
I_{FSM}	50 Hz	1600	1790	
	60 Hz	1680	1870	
I^2t	50 Hz	12.89	15.90	kA^2s
	60 Hz	11.76	14.53	
$I^2\sqrt{t}$		128.9	159	$kA^2\sqrt{s}$
V_{RRM}	Range	400 to 1600		V
T_J		- 40 to 150		°C
T_{Stg}				

For technical questions within your region, please contact one of the following:
DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

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
VSK.56 VSK.71	04	400	500	10
	06	600	700	
	08	800	900	
	10	1000	1100	
	12	1200	1300	
	14	1400	1500	
	16	1600	1700	

FORWARD CONDUCTION

PARAMETER	SYMBOL	TEST CONDITIONS			VSK.56	VSK.71	UNITS
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave			60	80	A
					100	100	°C
Maximum RMS forward current	$I_{F(RMS)}$	DC at 92 °C case temperature			94	126	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	1600	1790	
		t = 8.3 ms			1680	1870	
		t = 10 ms	100 % V_{RRM} reapplied		1350	1500	
		t = 8.3 ms			1420	1570	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		12.89	15.90	kA^2s
		t = 8.3 ms			11.76	14.53	
		t = 10 ms	100 % V_{RRM} reapplied		9.12	11.25	
		t = 8.3 ms			8.32	10.23	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied			128.9	159.0	$kA^2\sqrt{s}$
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			0.96	0.83	V
High level value of threshold voltage	$V_{F(TO)2}$	($I > \pi$ x $I_{F(AV)}$), $T_J = T_J$ maximum			1.03	0.92	
Low level value of forward slope resistance	r_{f1}	(16.7 % x π x $I_{F(AV)} < I < \pi$ x $I_{F(AV)}$), $T_J = T_J$ maximum			2.81	2.68	mΩ
High level value of forward slope resistance	r_{f2}	($I > \pi$ x $I_{F(AV)}$), $T_J = T_J$ maximum			2.48	2.40	
Maximum forward voltage drop	V_{FM}	$I_{FM} = \pi$ x $I_{F(AV)}$, T_J = 25 °C, t_p = 400 µs square wave			1.51	1.50	V

BLOCKING

PARAMETER	SYMBOL	TEST CONDITIONS	VSK.56	VSK.71	UNITS
Maximum peak reverse leakage current	I_{RRM}	T_J = 150 °C	10		mA
RMS insulation voltage	V_{INS}	50 Hz, circuit to base, all terminals shorted	3500 (1 s)		V

THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES		UNITS
			VSK.56	VSK.71	
Junction and storage temperature range	T_J, T_{Stg}		- 40 to 150		°C
Maximum thermal resistance, junction to case per junction	R_{thJC}	DC operation	0.5	0.4	K/W
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface flat, smooth and greased	0.1		K/W
Mounting torque ± 10 % to heatsink		A mounting compound is recommended and the torque should be rechecked after a period of 3 hours to allow for the spread of the compound.	5		Nm
Mounting torque ± 10 % busbar			4		Nm
Approximate weight			110		g
			4		oz.
Case style		JEDEC	ADD-A-PAK (TO-240AA)		

ΔR CONDUCTION PER JUNCTION											
DEVICES	SINE HALF WAVE CONDUCTION					RECTANGULAR WAVE CONDUCTION					UNITS
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
VSK.56	0.11	0.13	0.16	0.22	0.32	0.09	0.14	0.17	0.23	0.32	°C/W
VSK.71	0.06	0.08	0.11	0.14	0.21	0.06	0.09	0.11	0.15	0.21	°C/W

Note

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

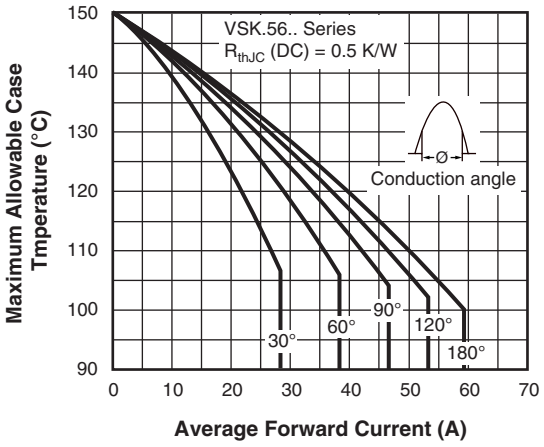

Fig. 1 - Current Ratings Characteristics

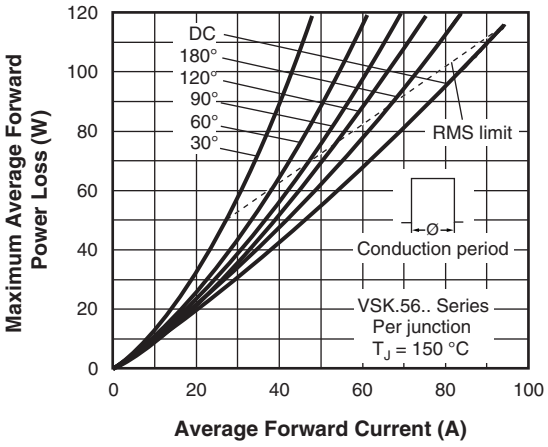

Fig. 4 - Foward Power Loss Characteristics

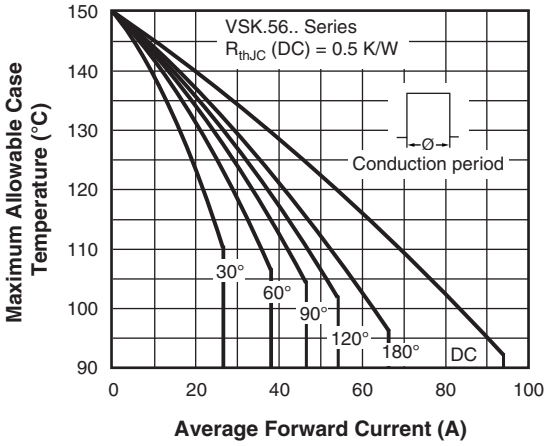

Fig. 2 - Current Ratings Characteristics

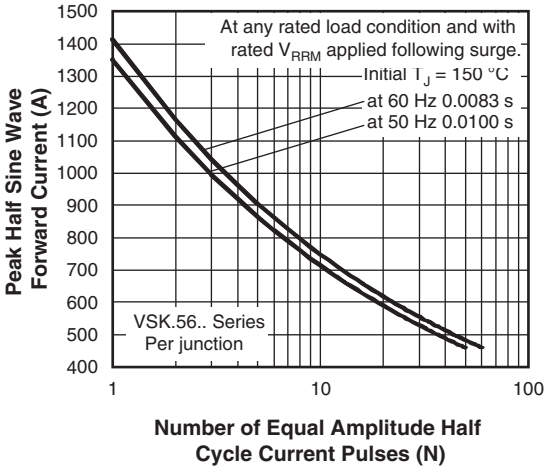

Fig. 5 - Maximum Non-Repetitive Surge Current

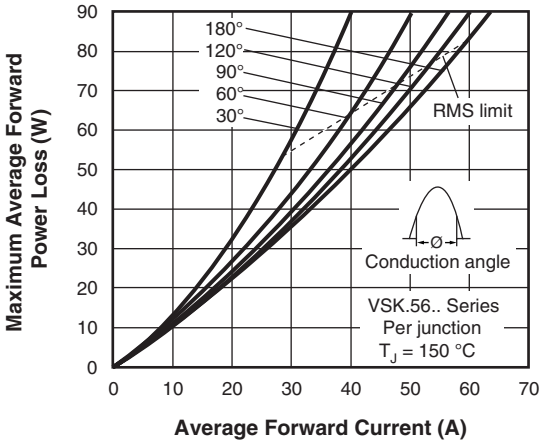

Fig. 3 - Forward Power Loss Characteristics

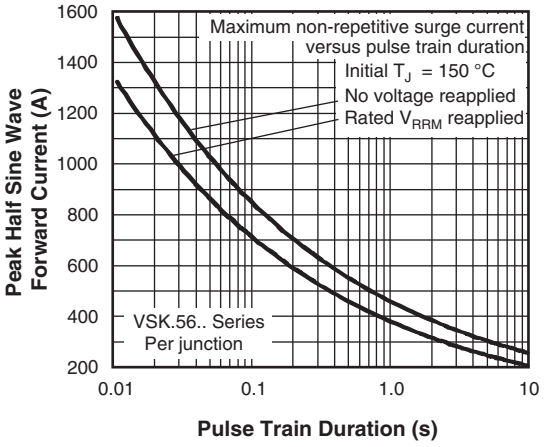

Fig. 6 - Maximum Non-Repetitive Surge Current

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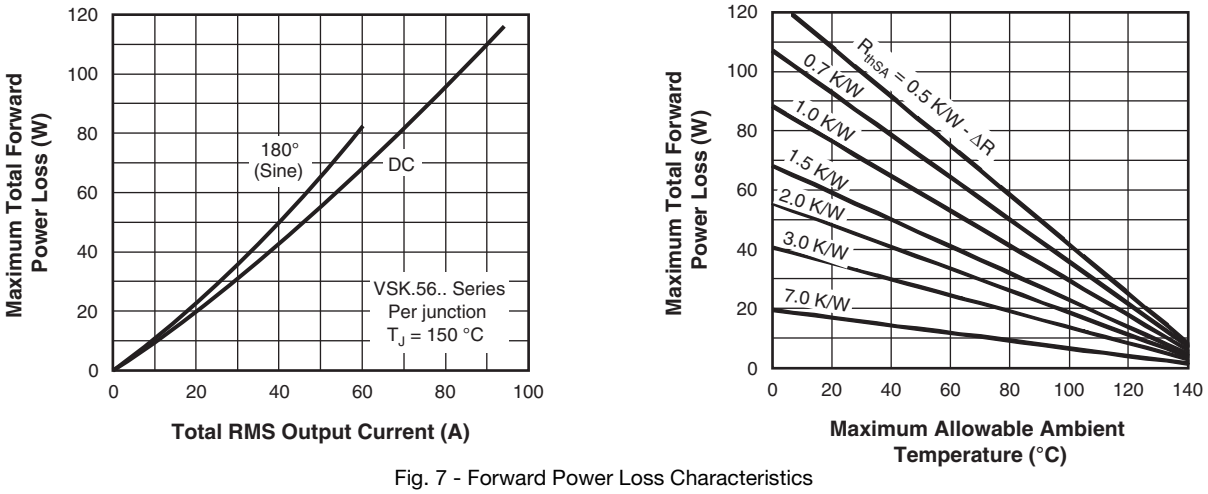

Fig. 7 - Forward Power Loss Characteristics

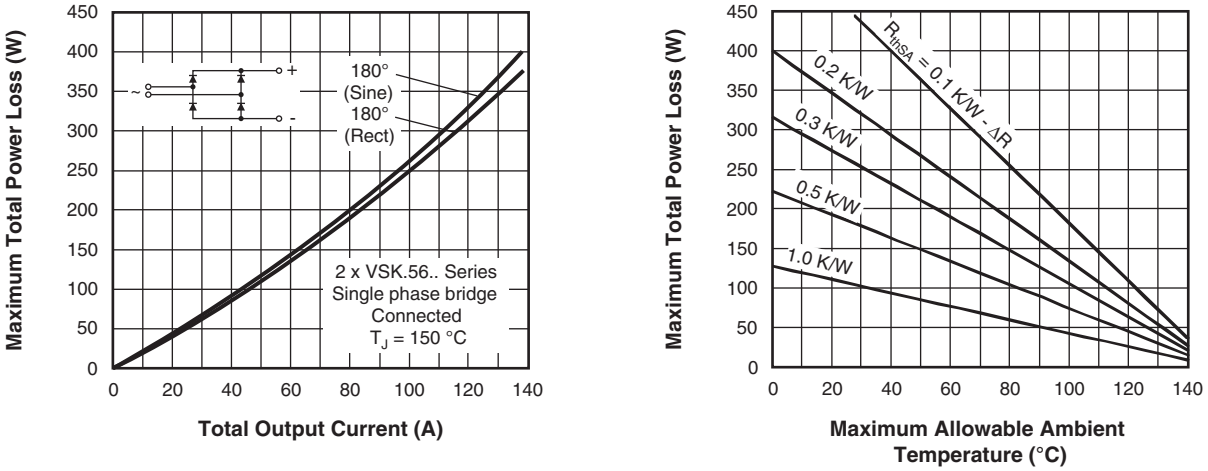

Fig. 8 - Forward Power Loss Characteristics

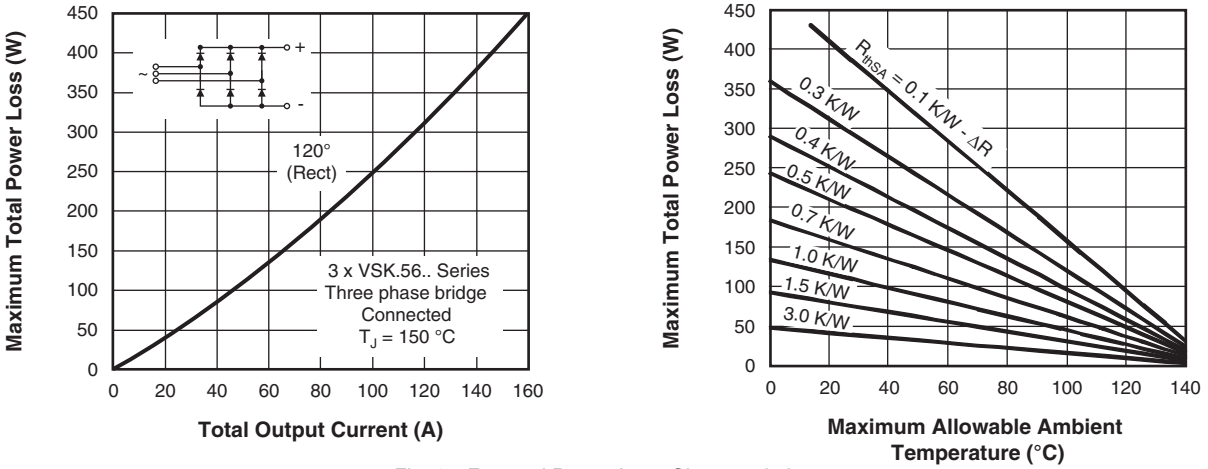

Fig. 9 - Forward Power Loss Characteristics

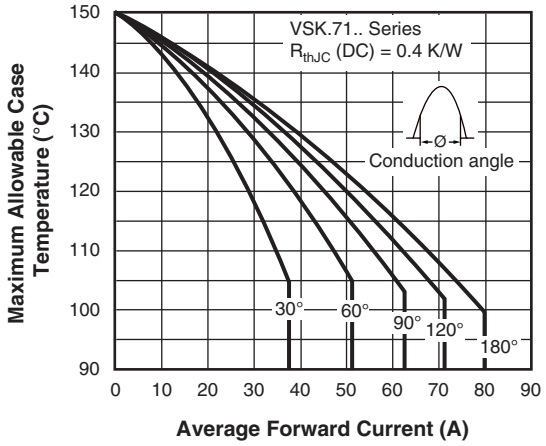

Fig. 10 - Current Ratings Characteristics

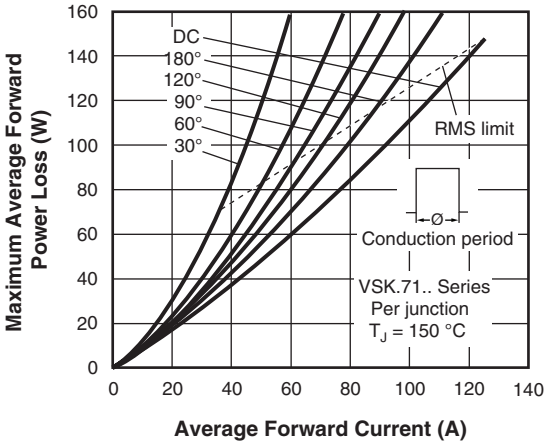

Fig. 13 - Forward Power Loss Characteristics

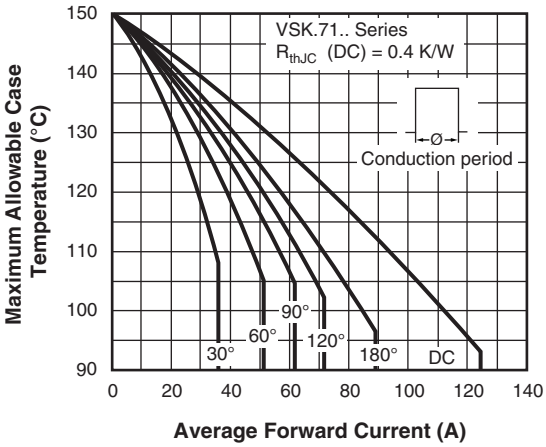

Fig. 11 - Current Ratings Characteristics

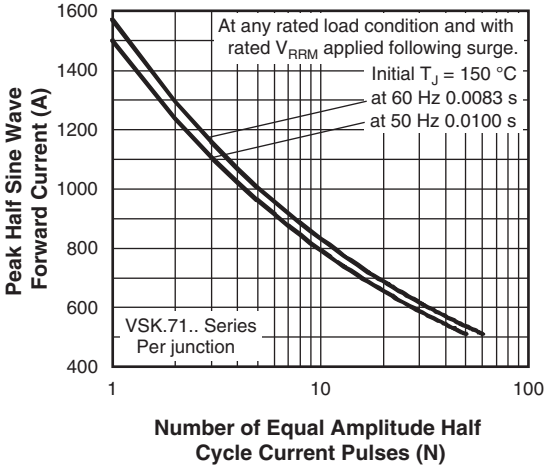

Fig. 14 - Maximum Non-Repetitive Surge Current

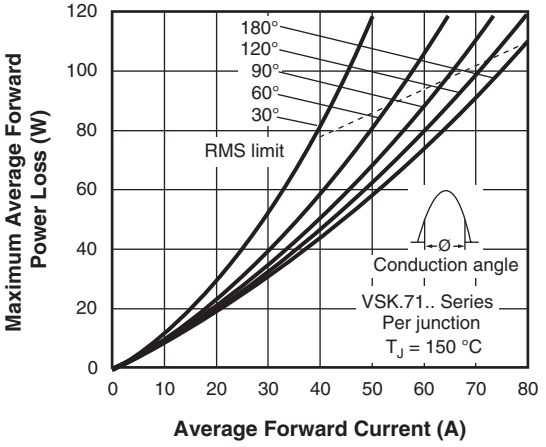

Fig. 12 - Forward Power Loss Characteristics

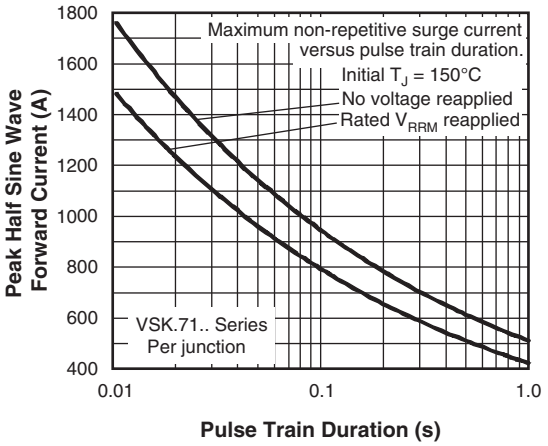

Fig. 15 - Maximum Non-Repetitive Surge Current

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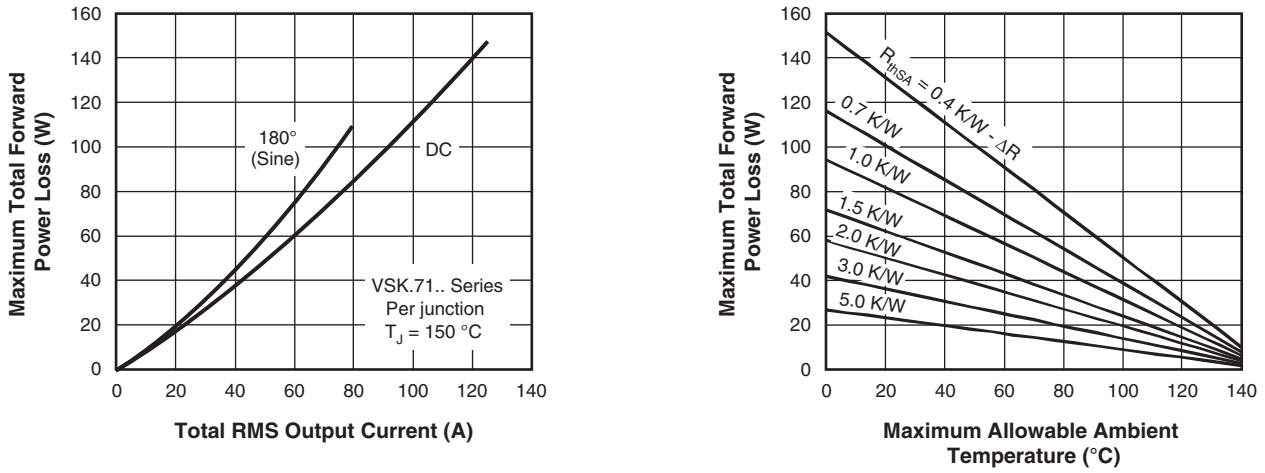


Fig. 16 - Forwad Power Loss Characteristics

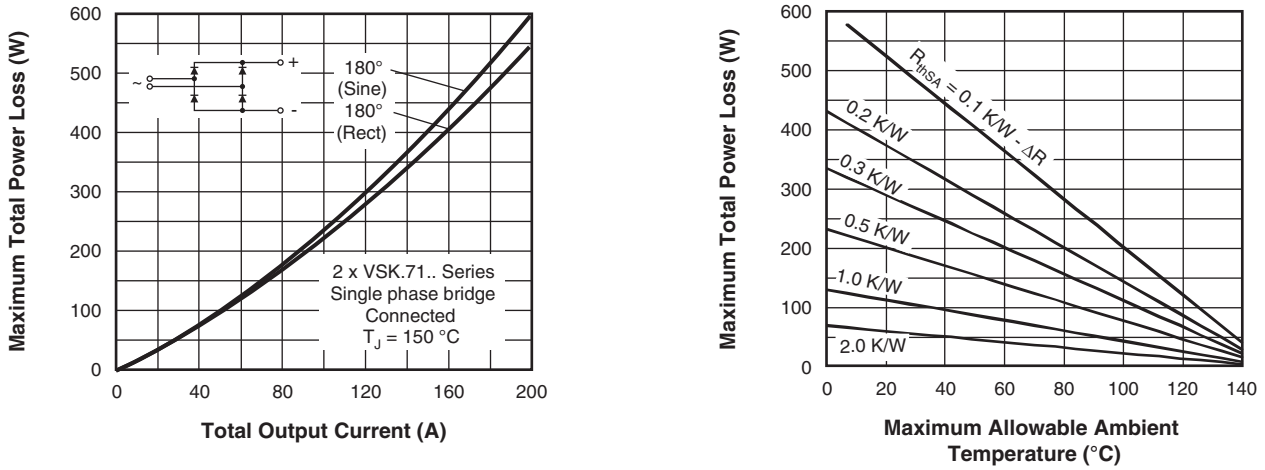


Fig. 17 - Forward Power Loss Characteristics

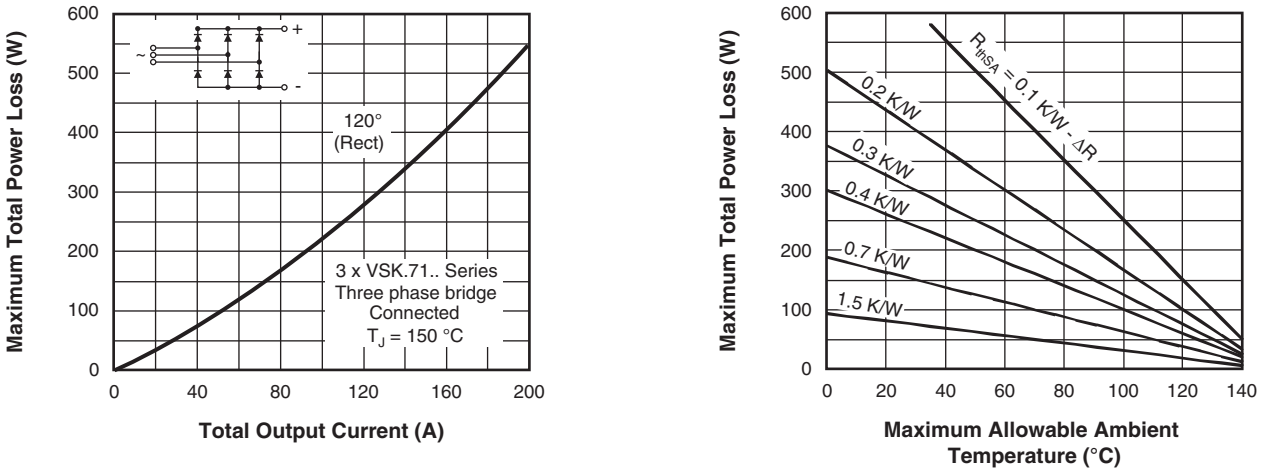


Fig. 18 - Forward Power Loss Characteristics

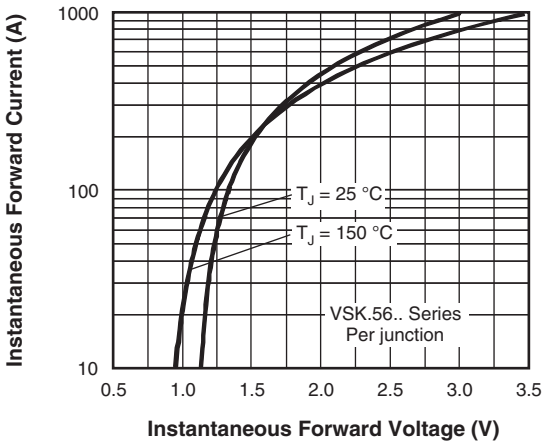


Fig. 19 - Forward Voltage Drop Characteristics

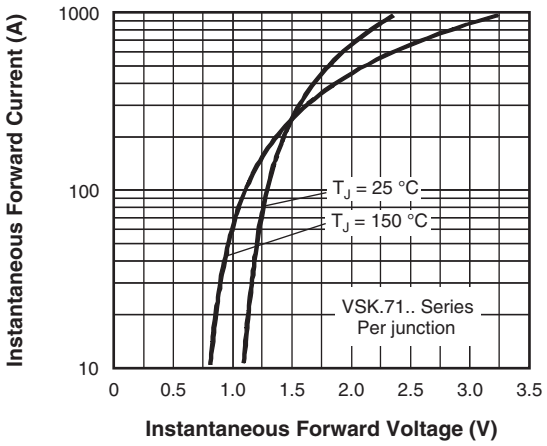


Fig. 20 - Forward Voltage Drop Characteristics

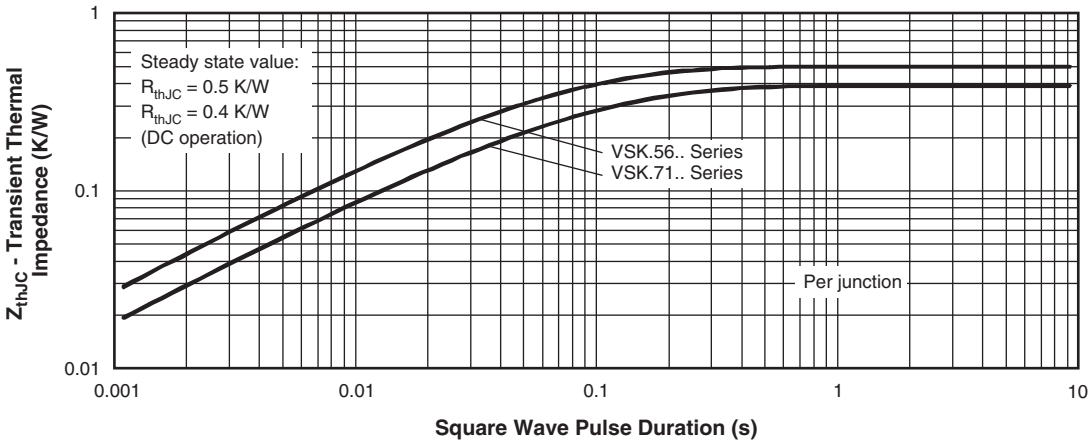


Fig. 21 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

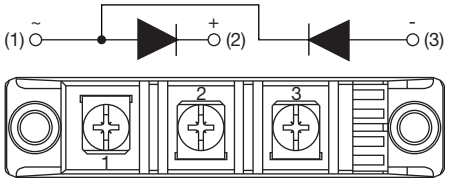
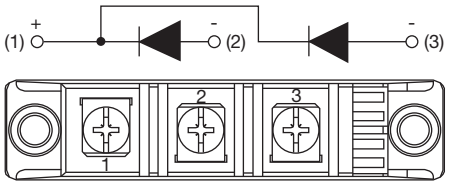
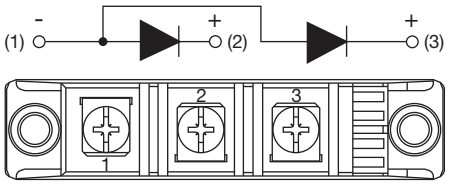
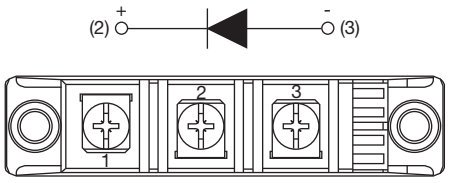
Device code

VSK	D	71	/	16	P
1	2	3		4	5

1	-	Module type
2	-	Circuit configuration (see Circuit Configuration table)
3	-	Current code
4	-	Voltage code (see Voltage Ratings table)
5	-	P = Lead (Pb)-free

Note

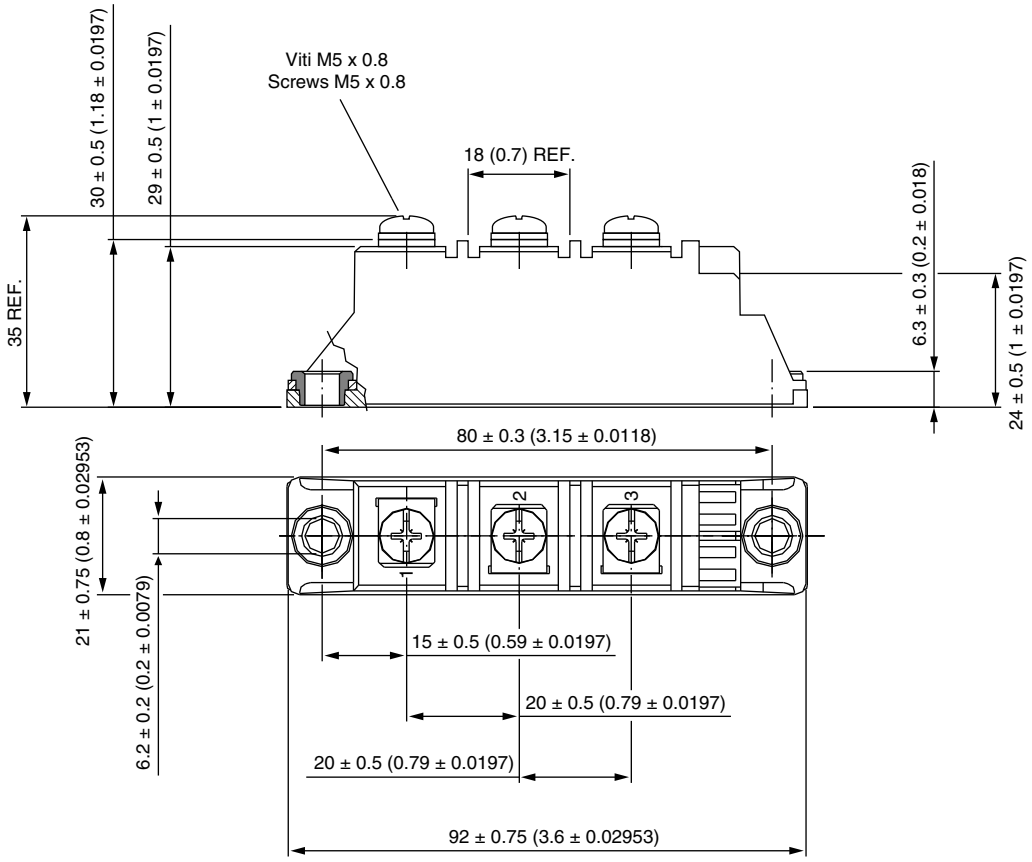
- To order the optional hardware go to www.vishay.com/doc?95172

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?95015

ADD-A-PAK Diode

DIMENSIONS in millimeters (inches)



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