VS-VSKD91.., VS-VSKC91.., VS-VSKJ91.., VS-VSKE91.. Series



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COMPLIANT

## AAP Gen 7 (TO-240AA) **Power Modules Standard Diodes, 100 A**



ADD-A-PAK

PRIMARY CHARACTERISTICS						
I <sub>F(AV)</sub> 100 A						
Туре	Modules - diode, high voltage					
Package	AAP Gen 7 (TO-240AA)					
Circuit configuration	Two diodes doubler circuit, two diodes common cathode, two diodes common anode, single diode					

## **MECHANICAL DESCRIPTION**

The AAP Gen 7 (TO-240AA), new generation of ADD-A-PAK module, combines the excellent thermal performances obtained by the usage of exposed direct bonded copper substrate, with advanced compact simple package solution and simplified internal structure with minimized number of interfaces.

## **FEATURES**

- High voltage
- Industrial standard package
- UL approved file E78996
- · Low thermal resistance
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

### **BENEFITS**

- · Excellent thermal performances obtained by the usage of exposed direct bonded copper substrate
- Up to 1600 V
- High surge capability
- · Easy mounting on heatsink

## **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	VALUES	UNITS			
		100	A			
I <sub>F(AV)</sub>	T <sub>C</sub>	112	C°			
I <sub>F(RMS)</sub>		157				
1	50 Hz	2020	А			
I <sub>FSM</sub>	60 Hz	2115				
l <sup>2</sup> t	50 Hz	20.41	kA <sup>2</sup> s			
1-1	60 Hz	18.63	KA-S			
l²√t		204.1	kA²√s			
V <sub>RRM</sub>	Range	400 to 1600	V			
T <sub>Stg</sub>		-40 to +150	C°			
TJ		-40 to +150	°C			

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## **ELECTRICAL SPECIFICATIONS**

VOLTAGE RATINGS							
TYPE NUMBER	VOLTAGE CODE	V <sub>RRM</sub> , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	V <sub>RSM</sub> , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I <sub>RRM</sub> MAXIMUM AT T <sub>J</sub> = 150 °C mA			
	04	400	500				
	06	600	700				
	08	800	900				
VS-VSK.91	10	1000	1100	10			
	12	1200	1300				
	14	1400	1500				
	16	1600	1700				

FORWARD CONDUCTION						
PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS
Maximum average forward current	Iran	180° condu	ction, half sine	wave	100	А
at case temperature	I <sub>F(AV)</sub>		ction, nan sine	wave	112	°C
Maximum RMS forward current	I <sub>F(RMS)</sub>				157	
		t = 10 ms	No voltage		2020	
Maximum peak, one-cycle forward,		t = 8.3 ms	reapplied		2115	А
non-repetitive surge current	I <sub>FSM</sub>	t = 10 ms	100 % V <sub>RRM</sub>		1700	
		t = 8.3 ms	reapplied	Sinusoidal half wave,	1780	
	l <sup>2</sup> t	t = 10 ms	No voltage	initial $T_J = T_J$ maximum	20.41	kA <sup>2</sup> s
Maximum 1 <sup>2</sup> t for fusing		t = 8.3 ms	reapplied		18.63	
Maximum I <sup>2</sup> t for fusing		t = 10 ms	100 % V <sub>RRM</sub>		14.44	
		t = 8.3 ms	reapplied		13.18	
Maximum I²√t for fusing	l²√t	t = 0.1 ms to 10 ms, no voltage reapplied			204.1	kA²√s
Low level value of threshold voltage	V <sub>F(TO)1</sub>	(16.7 % x π	$x I_{F(AV)} < I < \pi x$	(I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum	0.76	v
High level value of threshold voltage	V <sub>F(TO)2</sub>	$(I > \pi \times I_{F(AV)}), T_J = T_J \text{ maximum}$			0.89	v
Low level value of forward slope resistance	r <sub>f1</sub>	(16.7 % x $\pi$ x $I_{F(AV)}$ < I < $\pi$ x $I_{F(AV)}$ ), T <sub>J</sub> = T <sub>J</sub> maximum			2.4	mΩ
High level value of forward slope resistance	r <sub>f2</sub>	$(I > \pi x I_{F(AV)}), T_J = T_J maximum$			2.05	11122
Maximum forward voltage drop	V <sub>FM</sub>	$I_{FM} = \pi \times I_{F(r)}$	<sub>AV)</sub> , T <sub>J</sub> = 25 °C,	t <sub>p</sub> = 400 μs square wave	1.55	V

BLOCKING							
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS			
Maximum peak reverse leakage current	I <sub>RRM</sub>	T <sub>J</sub> = 150 °C	10	mA			
Maximum RMS insulation voltage	V <sub>INS</sub>	50 Hz	3000 (1 min) 3600 (1 s)	V			

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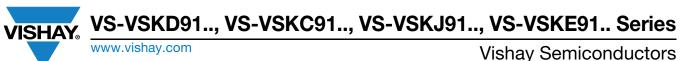
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THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Junction and storage temp	erature range	T <sub>J</sub> , T <sub>Stg</sub>		-40 to +150	°C	
Maximum internal thermal resistance, junction to case per leg		R <sub>thJC</sub>	DC operation 0.22		°C/W	
Typical thermal resistance, case to heatsink per module		R <sub>thCS</sub>	Mounting surface flat, smooth, and greased	0.1	0/11	
Mounting torque + 10.0/	to heatsink		A mounting compound is recommended and the	4	Nime	
Mounting torque ± 10 % -	busbar		torque should be rechecked after a period of 3 hours to allow for the spread of the compound.	3	Nm	
Approximate weight				75	g	
Approximate weight				2.7	oz.	
Case style			JEDEC®	AAP Gen 7	(TO-240AA)	

DEVICES	SINE HALF WAVE CONDUCTION					RECTANGULAR WAVE CONDUCTION				UNITS	
DEVICES	180°	120°	90°	60°	30°	180°	120°	90°	60°	<b>30</b> °	UNITS
VSK.91	0.057	0.068	0.087	0.12	0.177	0.045	0.073	0.093	0.123	0.178	°C/W

#### Note

Table shows the increment of thermal resistance R<sub>thJC</sub> when devices operate at different conduction angles than DC



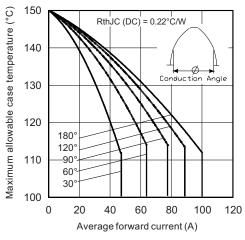
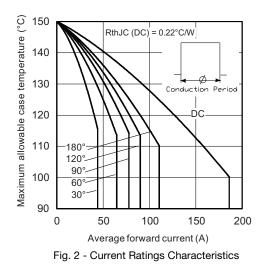
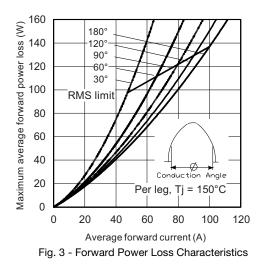
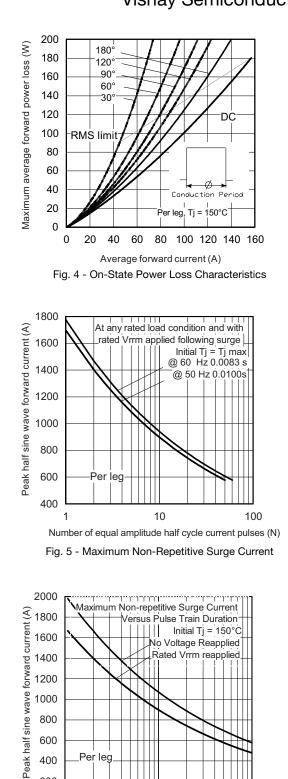
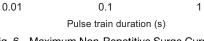


Fig. 1 - Current Ratings Characteristics











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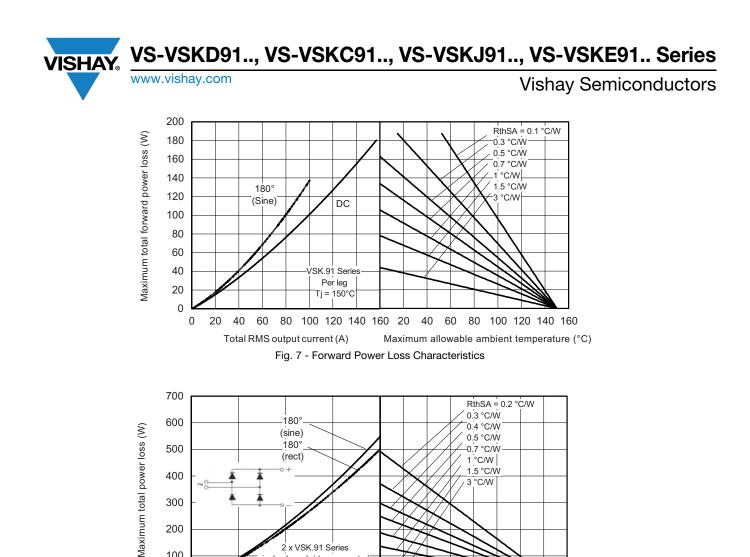
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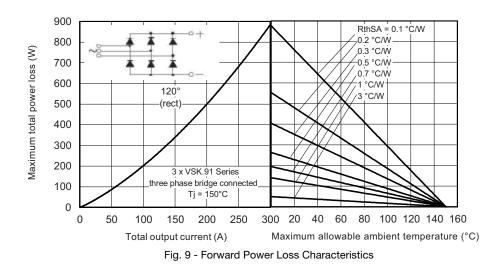
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single phase bridge connected Tj = 150°C

150

40

200 20

Fig. 8 - Forward Power Loss Characteristics

60 80 100 120 140 160

Maximum allowable ambient temperature (°C)

100

Total output current (A)

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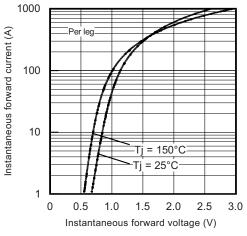


Fig. 10 - Forward Voltage Characteristics

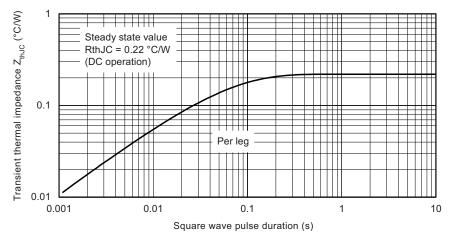


Fig. 11 - Thermal Impedance Z<sub>thJC</sub> Characteristics

## **ORDERING INFORMATION TABLE**

**Device code** Κ D 91 vs-vs 1 16 2 (3) (4) (5) 1 Vishay Semiconductors product 2 3 4 Module type Circuit configuration (see Circuit Configuration table) Current code (100 A) 5 Voltage code (see Voltage Ratings table)

#### Note

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

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CIRCUIT CONFIGURATION						
CIRCUIT DESCRIPTION	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING				
Two diodes doubler circuit	D					
Two diodes common cathode	С					
Two diodes common anode	J					
Single diode	E					

LINKS TO RELATED DOCUMENTS				
Dimensions	www.vishay.com/doc?95369			

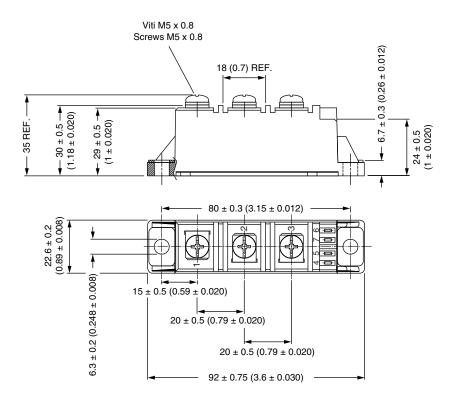
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## **ADD-A-PAK Generation VII - Diode**

## **DIMENSIONS** in millimeters (inches)





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