

## AAP Gen 7 (TO-240AA) Power Modules Standard Diodes, 80 A



AAP Gen 7 (TO-240AA)

### FEATURES

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



**RoHS**  
COMPLIANT

### 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.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	80 A
Type	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 AAP 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.

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$		80	A
	$T_C$	110	°C
$I_{F(RMS)}$		126	A
	50 Hz	1500	
$I_{FSM}$	60 Hz	1570	
	50 Hz	11.25	$kA^2s$
$I^2t$	60 Hz	10.26	
	$I^2\sqrt{t}$	112.5	$kA^2/s$
$V_{RRM}$	Range	400 to 1600	V
$T_{Stg}, T_J$		-40 to +150	°C

**ELECTRICAL SPECIFICATIONS**

<b>VOLTAGE RATINGS</b>				
<b>TYPE NUMBER</b>	<b>VOLTAGE CODE</b>	<b><math>V_{RRM}</math>, MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V</b>	<b><math>V_{RSM}</math>, MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V</b>	<b><math>I_{RRM}</math> MAXIMUM AT <math>T_J = 150^\circ C</math> mA</b>
VS-VSK.71	04	400	500	10
	06	600	700	
	08	800	900	
	10	1000	1100	
	12	1200	1300	
	14	1400	1500	
	16	1600	1700	

<b>FORWARD CONDUCTION</b>							
<b>PARAMETER</b>	<b>SYMBOL</b>	<b>TEST CONDITIONS</b>			<b>VALUES</b>	<b>UNITS</b>	
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave			80	A	
				110	°C		
Maximum RMS forward current	$I_{F(RMS)}$				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	1500		
		$t = 8.3$ ms			1570		
		$t = 10$ ms	100 % $V_{RRM}$ reapplied		1260		
		$t = 8.3$ ms	100 % $V_{RRM}$ reapplied		1320		
Maximum $I^2t$ for fusing	$I^2t$	$t = 10$ ms	No voltage reapplied		11.25	kA <sup>2</sup> s	
		$t = 8.3$ ms			10.26		
		$t = 10$ ms	100 % $V_{RRM}$ reapplied		7.95		
		$t = 8.3$ ms	100 % $V_{RRM}$ reapplied		7.23		
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1$ ms to 10 ms, no voltage reapplied			112.5	kA <sup>2\sqrt{t}</sup>	
Low level value of threshold voltage	$V_{F(TO)1}$	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum			0.73	V	
High level value of threshold voltage	$V_{F(TO)2}$	$(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum			0.83		
Low level value of forward slope resistance	$r_{f1}$	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum			3.22	mΩ	
High level value of forward slope resistance	$r_{f2}$	$(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum			2.89		
Maximum forward voltage drop	$V_{FM}$	$I_{FM} = \pi \times I_{F(AV)}$ , $T_J = 25^\circ C$ , $t_p = 400$ µs square wave			1.6	V	

<b>BLOCKING</b>						
<b>PARAMETER</b>	<b>SYMBOL</b>	<b>TEST CONDITIONS</b>			<b>VALUES</b>	<b>UNITS</b>
Maximum peak reverse leakage current	$I_{RRM}$	$T_J = 150^\circ C$			10	mA
Maximum RMS insulation voltage	$V_{INS}$	50 Hz			3000 (1 min) 3600 (1 s)	V

**THERMAL AND MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Junction and storage temperature range	$T_J, T_{Stg}$		-40 to +150	°C
Maximum internal thermal resistance, junction to case per leg	$R_{thJC}$	DC operation	0.28	°C/W
Typical thermal resistance, case to heatsink per module	$R_{thCS}$	Mounting surface flat, smooth and greased	0.1	
Mounting torque $\pm 10\%$	to heatsink busbar	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.	4 3	Nm
Approximate weight			75 2.7	g oz.
Case style		JEDEC®	AAP Gen 7 (TO-240AA)	

 **$\Delta R$  CONDUCTION PER JUNCTION**

DEVICES	SINE HALF WAVE CONDUCTION					RECTANGULAR WAVE CONDUCTION					UNITS
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
VSK.71	0.075	0.088	0.113	0.155	0.228	0.06	0.094	0.12	0.158	0.23	°C/W

**Note**

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

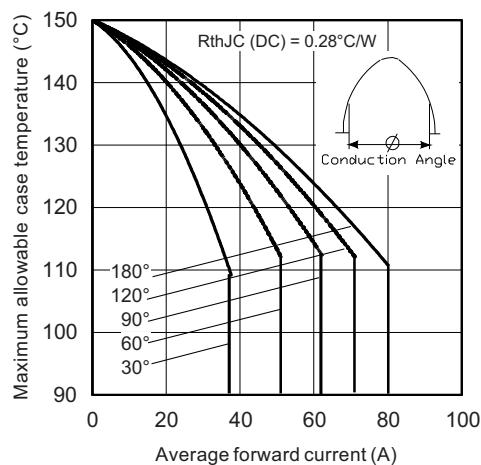


Fig. 1 - Current Ratings Characteristics

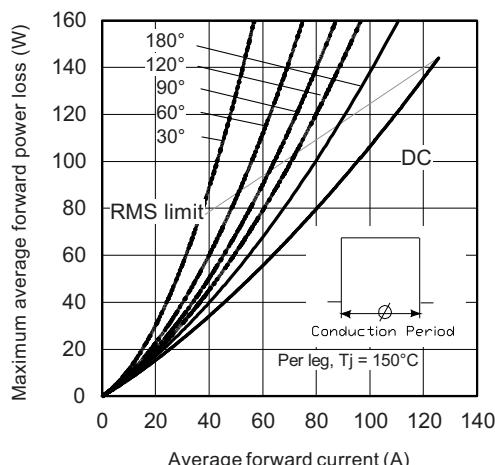


Fig. 4 - Foward Power Loss Characteristics

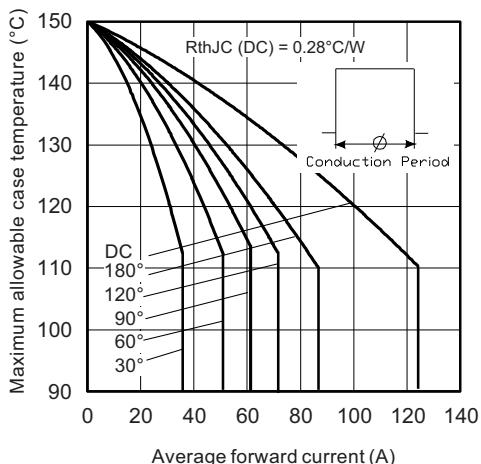


Fig. 2 - Current Ratings Characteristics

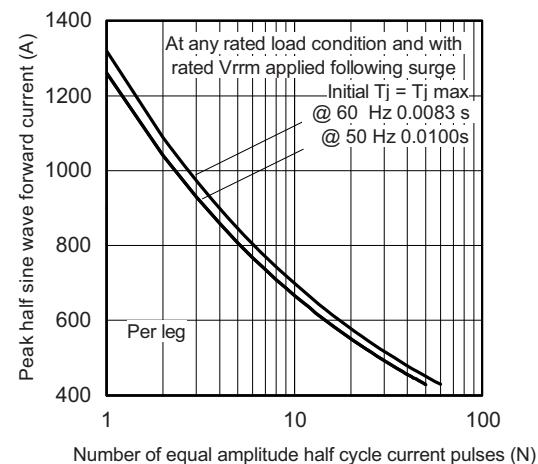


Fig. 5 - Maximum Non-Repetitive Surge Current

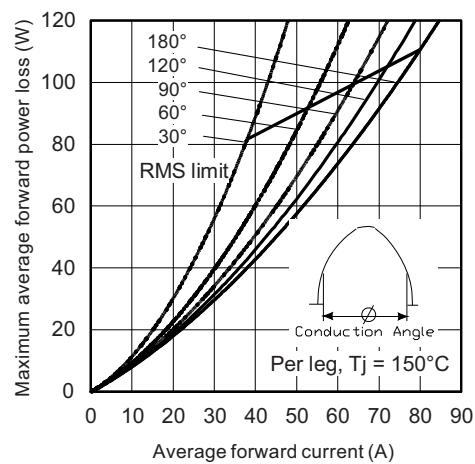


Fig. 3 - Forward Power Loss Characteristics

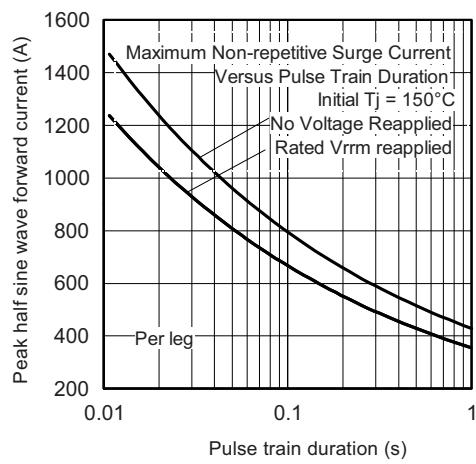


Fig. 6 - Maximum Non-Repetitive Surge Current

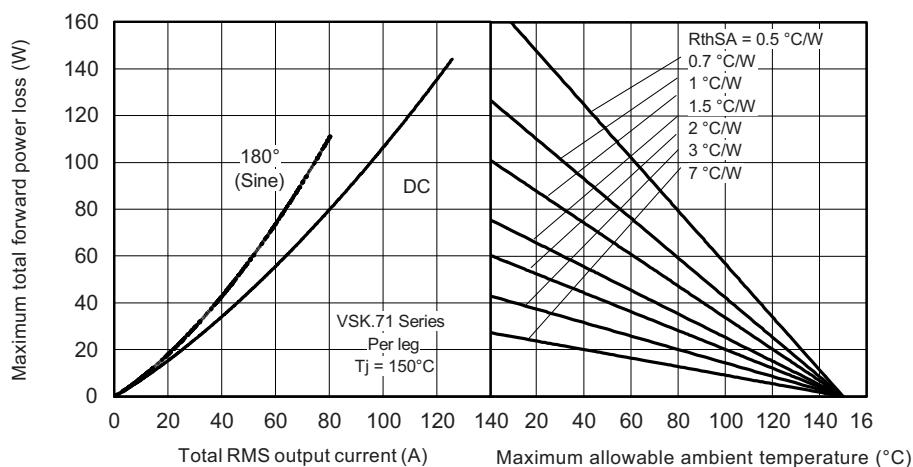


Fig. 7 - Forward Power Loss Characteristics

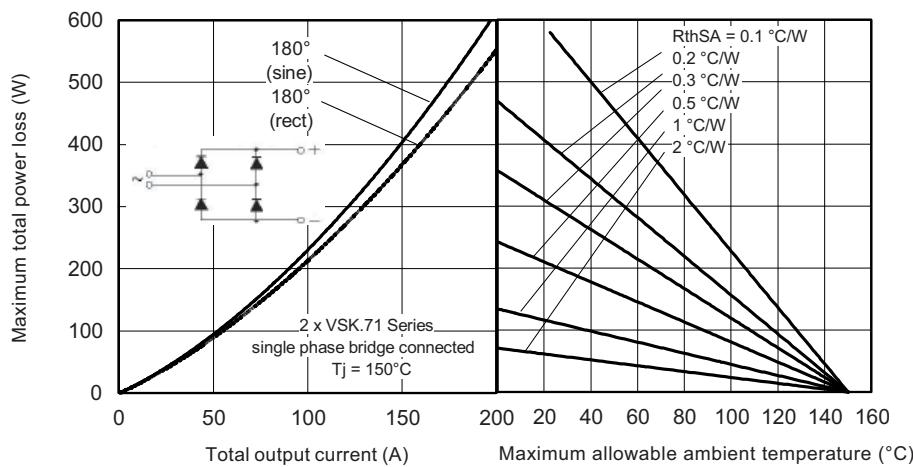


Fig. 8 - Forward Power Loss Characteristics

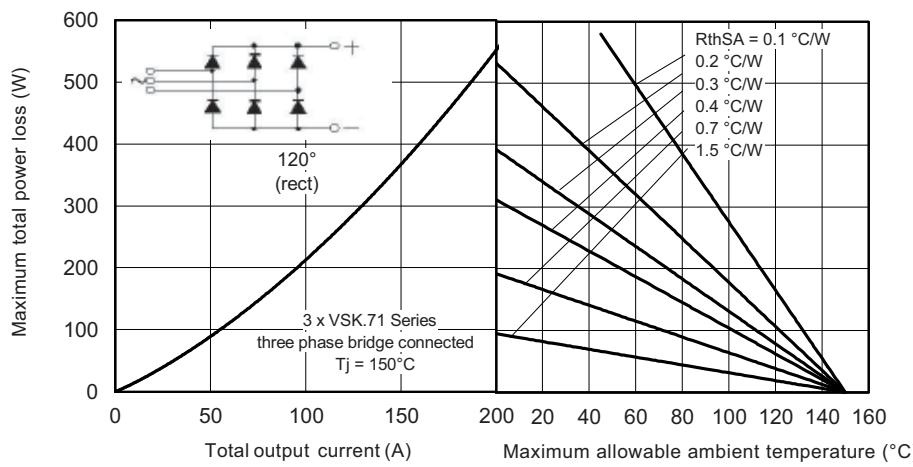


Fig. 9 - Forward Power Loss Characteristics

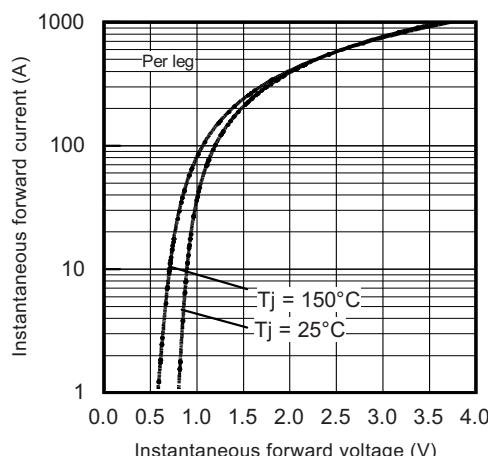


Fig. 10 - Forward Voltage Characteristics

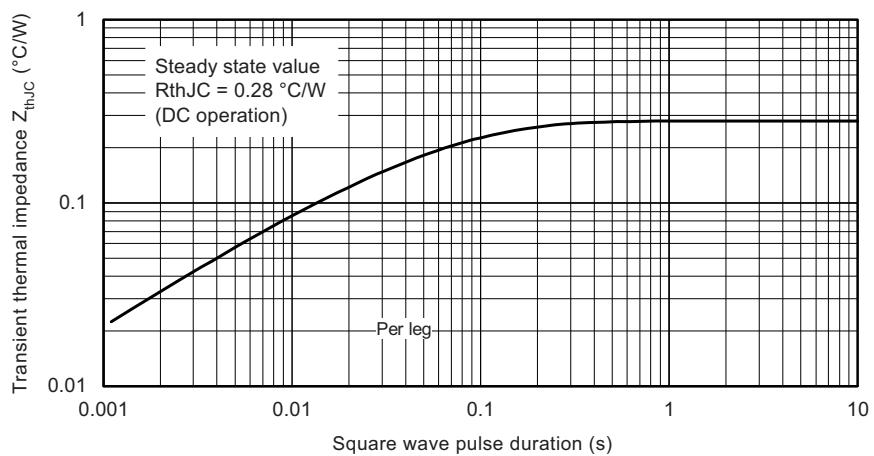


Fig. 11 - Thermal Impedance  $Z_{thJC}$  Characteristics

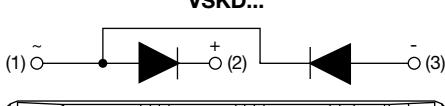
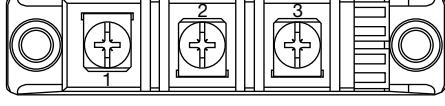
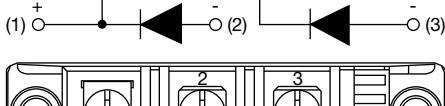
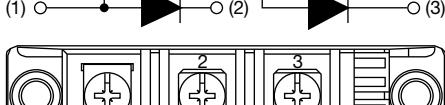
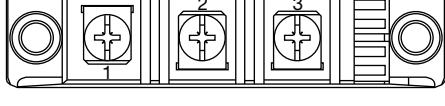
## ORDERING INFORMATION TABLE

Device code	VS-VS	K	D	71	/	16
1						
2						
3						
4						
5						
1	-	Vishay Semiconductors product				
2	-	Module type				
3	-	Circuit configuration (see Circuit Configuration table)				
4	-	Current code (80 A)				
5	-	Voltage code (see Voltage Ratings table)				

### Note

- To order the optional hardware go to [www.vishay.com/doc?95172](http://www.vishay.com/doc?95172)

**CIRCUIT CONFIGURATION**

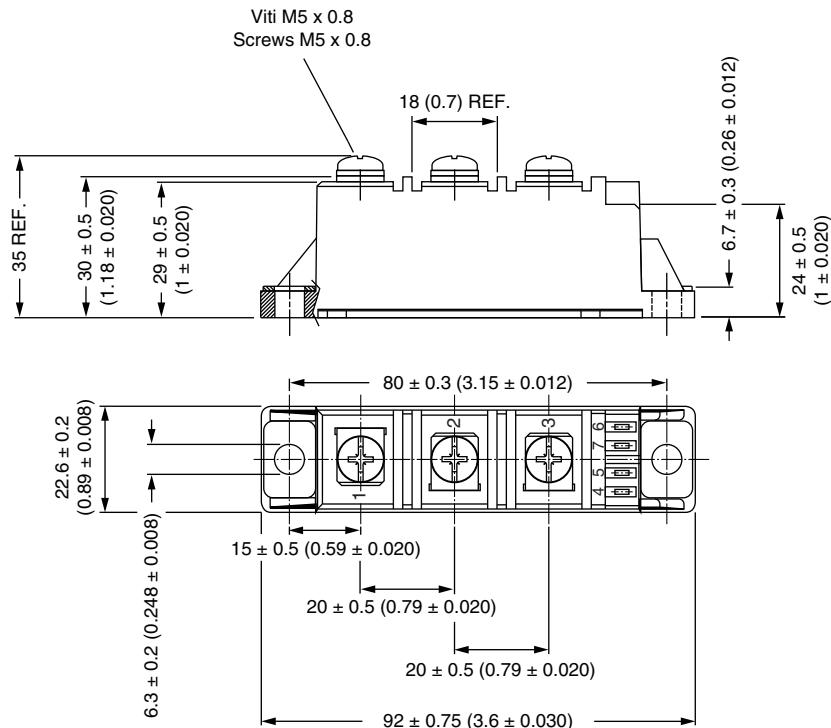
CIRCUIT DESCRIPTION	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two diodes doubler circuit	D	<p><b>VSKD...</b></p>  
Two diodes common cathode	C	<p><b>VSKC...</b></p>  
Two diodes common anode	J	<p><b>VSKJ...</b></p>  
Single diode	E	<p><b>VSKE...</b></p>  

**LINKS TO RELATED DOCUMENTS**

Dimensions	<a href="http://www.vishay.com/doc?95369">www.vishay.com/doc?95369</a>
------------	--

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

#### DIMENSIONS in millimeters (inches)



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.