

# AAP Gen 7 (TO-240AA) Power Modules Schottky Rectifier, 400 A



AAP Gen 7 (TO-240AA)

PRIMARY CHARACTERISTICS				
I <sub>F(AV)</sub>	400 A			
$V_{R}$	60 V			
Package	AAP Gen 7 (TO-240AA)			
Circuit configuration	Two diodes common cathode			

#### **MECHANICAL DESCRIPTION**

The AAP Gen 7, 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**

- 150 °C T<sub>J</sub> operation
- Low forward voltage drop
- High frequency operation
- Low thermal resistance
- UL approved file E78996
- · Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912"><u>www.vishay.com/doc?99912</u></a>

#### **BENEFITS**

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

#### **ELECTRICAL DESCRIPTION / APPLICATIONS**

The VS-VSKCS408/060 Schottky rectifier common cathode has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature.

Typical applications are in high current switching power supplies, plating power supplies, UPS systems, converters, freewheeling diodes, welding, and reverse battery protection.

MAJOR RATINGS AND CHARACTERISTICS					
SYMBOL	CHARACTERISTICS	VALUES	UNITS		
I <sub>F(AV)</sub>	Rectangular waveform	400	Α		
V <sub>RRM</sub>		60	V		
I <sub>FSM</sub>	t <sub>p</sub> = 5 μs sine	25 500	Α		
V <sub>F</sub>	200 A <sub>pk</sub> , T <sub>J</sub> = 125 °C	0.71	V		
TJ	Range	-55 to +150	°C		

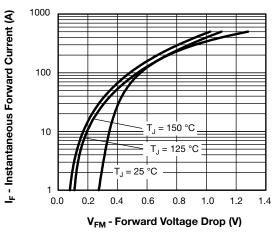
VOLTAGE RATINGS				
PARAMETER	SYMBOL	VS-VSKCS408/060	UNITS	
Maximum DC reverse voltage	$V_{R}$	60	V	
Maximum working peak reverse voltage	$V_{RWM}$	00	V	



ABSOLUTE MAXIMUM RATINGS						
PARAMETER		SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average	per module	I <sub>F(AV)</sub> 50 % duty cycle at T <sub>C</sub> = 102 °C, rectangular waveform			400	
forward current	per leg	I <sub>F(AV)</sub>	50 % duty cycle at 1 <sub>C</sub> = 102 °C, rectangular wavelorm		200	
Maximum peak one cycle		5 μs sine or 3 μs rect. pulse	Following any rated load condition and with	25 500	Α	
non-repetitive surge current		IFSM	10 ms sine or 6 ms rect. pulse	rated V <sub>RRM</sub> applied	3300	
Non-repetitive avalanche energ	У	E <sub>AS</sub>	$T_J = 25 ^{\circ}\text{C},  I_{AS} = 5.5 \text{A},  L = 1 \text{mH}$		mJ	
Repetitive avalanche current		I <sub>AR</sub>	Current decaying linearly to zero in 1 $\mu$ s Frequency limited by $T_J$ maximum $V_A = 1.5 \text{ x } V_R$ typical		А	

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
	V <sub>FM</sub>	200 A	T <sub>J</sub> = 25 °C	0.74	V
Maximum forward voltage drop		400 A		1.09	
waximum forward voltage drop		200 A	T <sub>J</sub> = 125 °C	0.71	
		400 A		1.02	
Maximum vayayaa laaka aa ayyyaat	I <sub>RM</sub>	T <sub>J</sub> = 25 °C	V <sub>R</sub> = Rated V <sub>R</sub>	2.2	mA
Maximum reverse leakage current		T <sub>J</sub> = 125 °C		1000	mA
Maximum junction capacitance	C <sub>T</sub>	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz), 25 °C		11 000	рF
Typical series inductance	L <sub>S</sub>	Measured lead to lead 5 mm from package body		5.0	nΗ
Maximum voltage rate of change	dV/dt	Rated V <sub>R</sub>		10 000	V/µs
Maximum RMS insulation voltage	V <sub>INS</sub>	50 Hz		3000 (1 min) 3600 (1 s)	V

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	)	T <sub>J</sub> , T <sub>Stg</sub>		-55 to +150	°C
Maximum thermal resistance, junction to case per leg		R <sub>thJC</sub>	DC operation	0.26	°C/W
Typical thermal resistance, case to heatsink per module		R <sub>thCS</sub>		0.1	C/VV
Approximate weight				75	g
Approximate weight				2.7	oz.
Mounting torque ± 10 % to heatsink busbar	to heatsink	sink	A mounting compound is recommended and the torque should be rechecked after a period of 3 h to allow for the	4	Nm
		spread of the compound.	3	INIII	
Case style			JEDEC®	TO-240AA co	mpatible





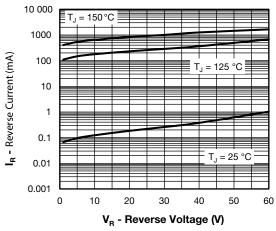


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

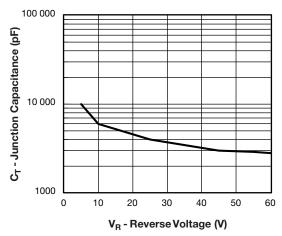


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

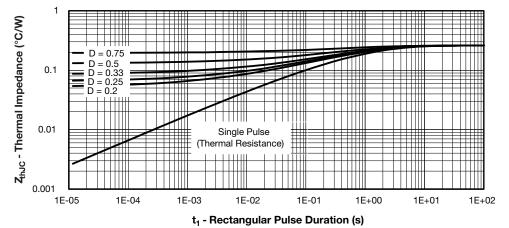


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

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## Vishay Semiconductors

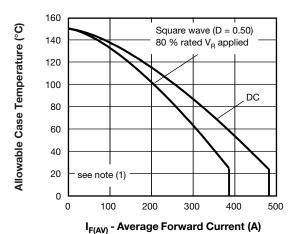


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

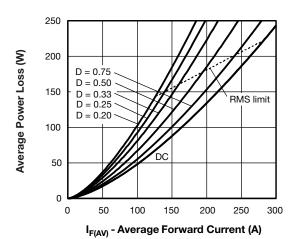


Fig. 6 - Forward Power Loss Characteristics

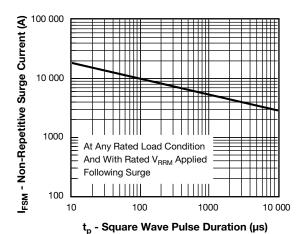


Fig. 7 - Maximum Non-Repetitive Surge Current

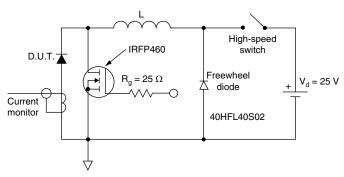


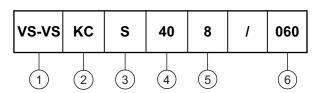
Fig. 8 - Unclamped Inductive Test Circuit

#### Note

 $^{(1)}$  Formula used: T<sub>C</sub> = T<sub>J</sub> - (Pd + Pd<sub>REV</sub>) x R<sub>th,JC</sub>; Pd = forward power loss = I<sub>F(AV)</sub> x V<sub>FM</sub> at (I<sub>F(AV)</sub>/D) (see fig. 6); Pd<sub>REV</sub> = inverse power loss = V<sub>R1</sub> x I<sub>R</sub> (1 - D); I<sub>R</sub> at V<sub>R1</sub> = 80 % rated V<sub>R</sub>

#### **ORDERING INFORMATION TABLE**

**Device code** 



1 - VS-VS = Vishay Semiconductors product

**2** - Circuit configuration:

KC = ADD-A-PAK - 2 diodes common cathode

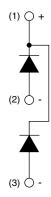
S = Schottky diode

4 - Average rating (x 10)

5 - Product silicon identification

Voltage rating (060 = 60 V)

#### **CIRCUIT CONFIGURATION**



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



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

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





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