

## ADD-A-PAK Generation VII Power Modules Schottky Rectifier, 200 A


**ADD-A-PAK**

### PRODUCT SUMMARY

$I_{F(AV)}$	200 A
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### MECHANICAL DESCRIPTION

The ADD-A-PAK generation VII, 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

- 175 °C  $T_J$  operation
- Low forward voltage drop
- High frequency operation
- Low thermal resistance
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified for industrial level


**RoHS**  
COMPLIANT

### BENEFITS

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

### ELECTRICAL DESCRIPTION

The VSKDS409/150 Schottky rectifier doubler module has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175 °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
$I_{F(AV)}$	Rectangular waveform	200	A
$V_{RRM}$		150	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	20 000	A
$V_F$	200 Apk, $T_J = 125^\circ C$	0.85	V
$T_J$	Range	- 55 to 175	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	VSKDS409/150	UNITS
Maximum DC reverse voltage	$V_R$	150	V
Maximum static peak reverse voltage	$V_{RRM}$		

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	50 % duty cycle at $T_C = 105^\circ C$ , rectangular waveform	200	A
Maximum peak one cycle non-repetitive surge current	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	20 000	
		10 ms sine or 6 ms rect. pulse	2300	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25^\circ C$ , $I_{AS} = 1.8 A$ , $L = 10 mH$	15	mJ
Repetitive avalanche current	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	1	A
Maximum dynamic peak reverse voltage	$V_{AV}$	$T_J = 25^\circ C$ , $I_{AS} = 1.8 A$ , $L = 10 mH$	170	V

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V <sub>FM</sub>	200 A	T <sub>J</sub> = 25 °C	1.03	V
		400 A		1.33	
		200 A	T <sub>J</sub> = 125 °C	0.85	
		400 A		1.13	
Maximum reverse leakage current	I <sub>RM</sub>	T <sub>J</sub> = 25 °C	V <sub>R</sub> = Rated V <sub>R</sub>	6	mA
		T <sub>J</sub> = 125 °C		85	
Maximum junction capacitance	C <sub>T</sub>	V <sub>R</sub> = 5 V <sub>DC</sub> (test signal range 100 kHz to 1 MHz), 25 °C		6000	pF
Typical series inductance	L <sub>S</sub>	Measured lead to lead 5 mm from package body		5.0	nH
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)	V
				3600 (1 s)	

**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 175	°C
Maximum thermal resistance, junction to case per leg	R <sub>thJC</sub>	DC operation	0.32	°C/W
Typical thermal resistance, case to heatsink per module	R <sub>thCS</sub>		0.1	
Approximate weight			75	g
			2.7	oz.
Mounting torque ± 10 % to heatsink busbar		A mounting compound is recommended and the torque should be rechecked after a period of 3 h to allow for the spread of the compound.	4	Nm
			3	
Case style		JEDEC	TO-240AA compatible	

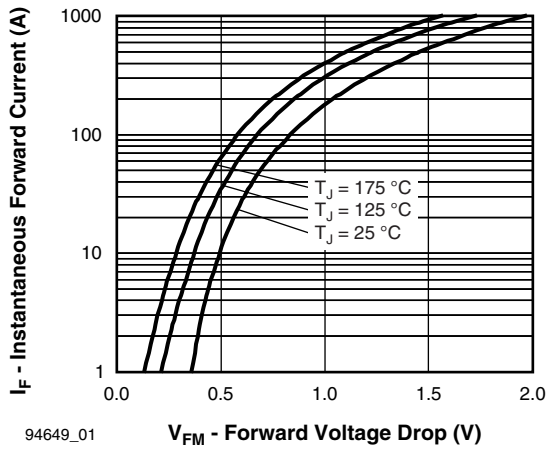


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

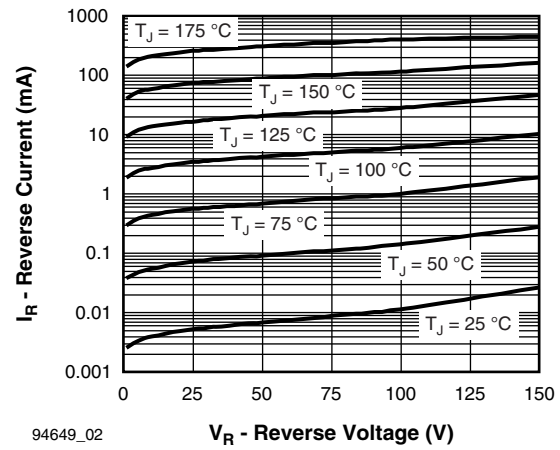


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

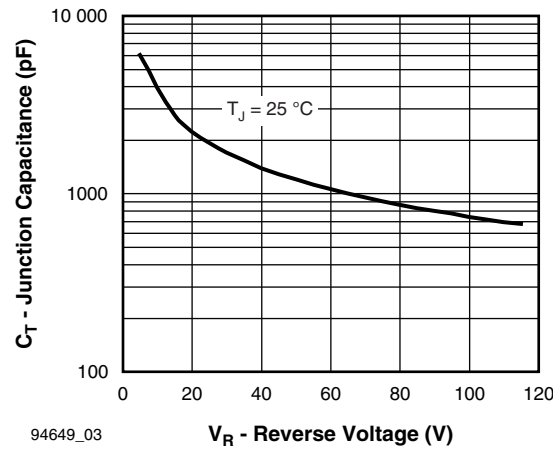


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

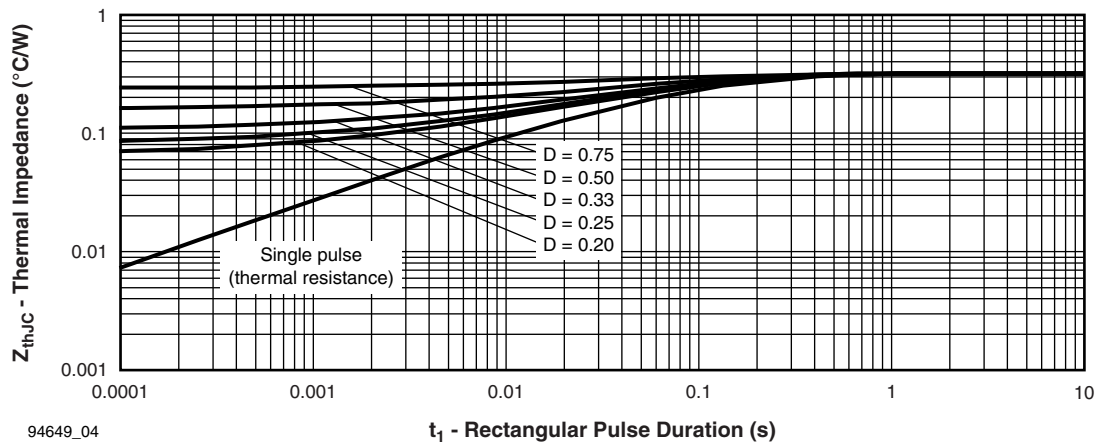


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Diode)

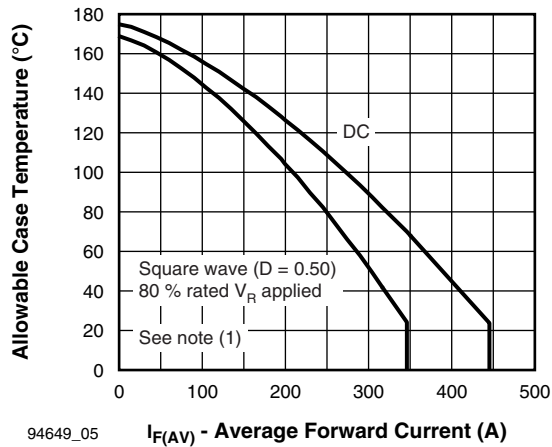


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

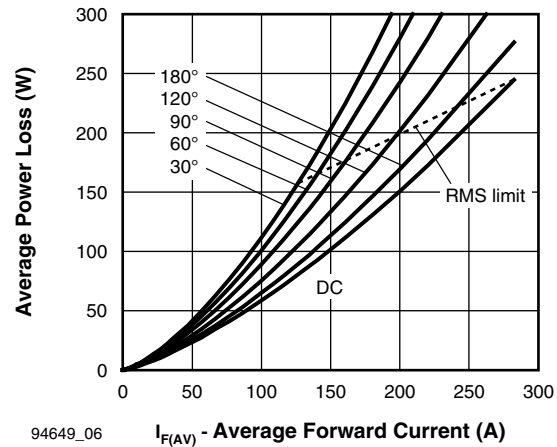


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

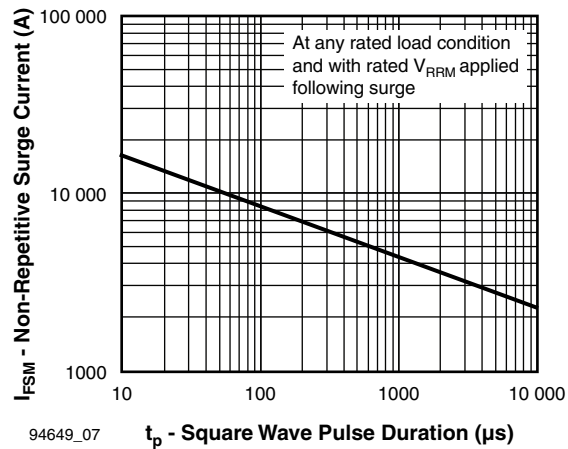


Fig. 7 - Maximum Non-Repetitive Surge Current

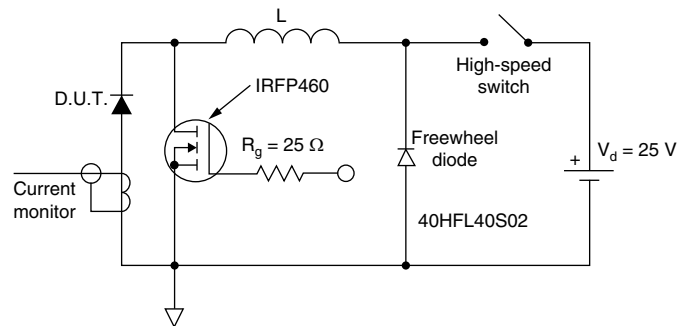


Fig. 8 - Unclamped Inductive Test Circuit

#### Note

- (1) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;  
 $P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{d_{REV}}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$

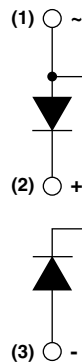
**ORDERING INFORMATION TABLE**

Device code	<b>VS</b>	<b>KD</b>	<b>S</b>	<b>40</b>	<b>9</b>	<b>/</b>	<b>150</b>
	1	2	3	4	5		6

- 1** - Vishay Semiconductors product
- 2** - Circuit configuration:  
KD = ADD-A-PAK - 2 diodes in series
- 3** - S = Schottky diode
- 4** - Average current rating (40 = 400 A) <sup>(1)</sup>
- 5** - Product silicon identification
- 6** - Voltage rating (150 = 150 V)

**Note**

<sup>(1)</sup> For KD configuration average current rating per module is 200 A

**CIRCUIT CONFIGURATION**


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)





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