

## ADD-A-PAK Generation VII Power Modules Schottky Rectifier, 440 A


**ADD-A-PAK**

### FEATURES

- 150 °C  $T_J$  operation
- Low forward voltage drop
- High frequency operation
- Low thermal resistance
- UL approved file E78996 
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified for industrial level



### BENEFITS

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

### ELECTRICAL DESCRIPTION

The VSKJS440/030 Schottky rectifier common anode 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.

### PRODUCT SUMMARY

$I_{F(AV)}$	440 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.

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	440	A
$V_{RRM}$		30	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	27 000	A
$V_F$	200 Apk, $T_J = 125$ °C	0.61	V
$T_J$	Range	- 55 to 150	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	VSKJS440/030	UNITS
Maximum DC reverse voltage	$V_R$	30	V
Maximum working peak reverse voltage	$V_{RWM}$		

<b>ABSOLUTE MAXIMUM RATINGS</b>						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum average forward current	$I_{F(AV)}$	50 % duty cycle at $T_J = 97^\circ\text{C}$ , rectangular waveform		440	A	
				220		
Maximum peak one cycle non-repetitive surge current	$I_{FSM}$	5 $\mu\text{s}$ sine or 3 $\mu\text{s}$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied	27 000		
		10 ms sine or 6 ms rect. pulse		3000		
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25^\circ\text{C}$ , $I_{AS} = 20 \text{ A}$ , $L = 1 \text{ mH}$		198	$\text{mJ}$	
Repetitive avalanche current	$I_{AR}$	Current decaying linearly to zero in 1 $\mu\text{s}$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical		44	A	

<b>ELECTRICAL SPECIFICATIONS</b>						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop	$V_{FM}$	220 A	$T_J = 25^\circ\text{C}$	0.68	V	
		440 A		1.0		
		220 A	$T_J = 125^\circ\text{C}$	0.61		
		440 A		0.93		
Maximum reverse leakage current	$I_{RM}$	$T_J = 25^\circ\text{C}$	$V_R = \text{Rated } V_R$	20	mA	
		$T_J = 125^\circ\text{C}$		1120		
Maximum junction capacitance	$C_T$	$V_R = 5 \text{ V}_{\text{DC}}$ (test signal range 100 kHz to 1 MHz), $25^\circ\text{C}$		14 800	pF	
Typical series inductance	$L_S$	Measured lead to lead 5 mm from package body		5.0	nH	
Maximum voltage rate of change	$dV/dt$	Rated $V_R$		10 000	$\text{V}/\mu\text{s}$	
Maximum RMS insulation voltage	$V_{INS}$	50 Hz		3000 (1 min) 3600 (1 s)	V	

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction and storage temperature range	$T_J$ , $T_{Stg}$			- 55 to 150	$^\circ\text{C}$
Maximum thermal resistance, junction to case per leg	$R_{thJC}$	DC operation		0.26	$^\circ\text{C}/\text{W}$
Typical thermal resistance, case to heatsink per module	$R_{thCS}$			0.1	
Approximate weight				75	g
				2.7	oz.
Mounting torque $\pm 10\%$	to heatsink	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	

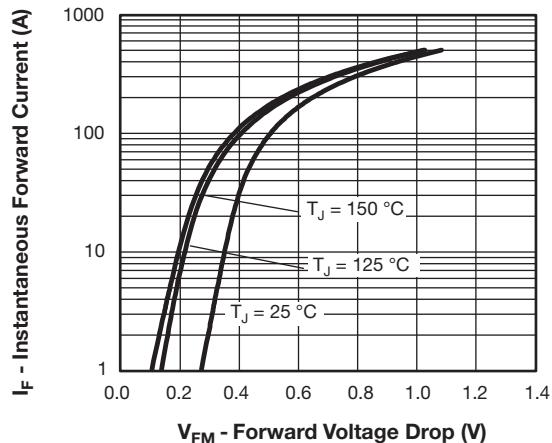


Fig. 1 - Maximum Forward Voltage Drop Characteristics

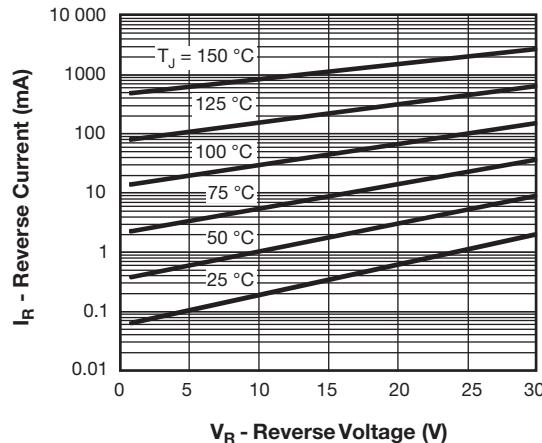


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

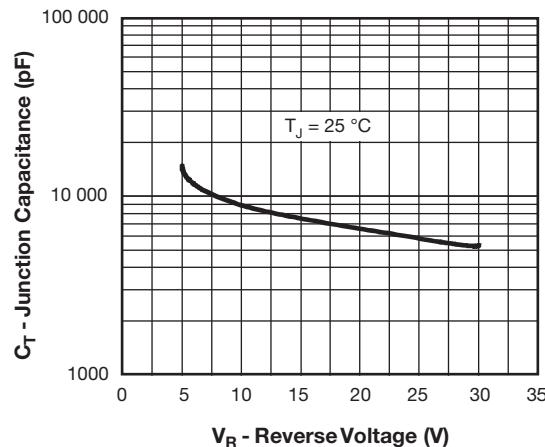


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

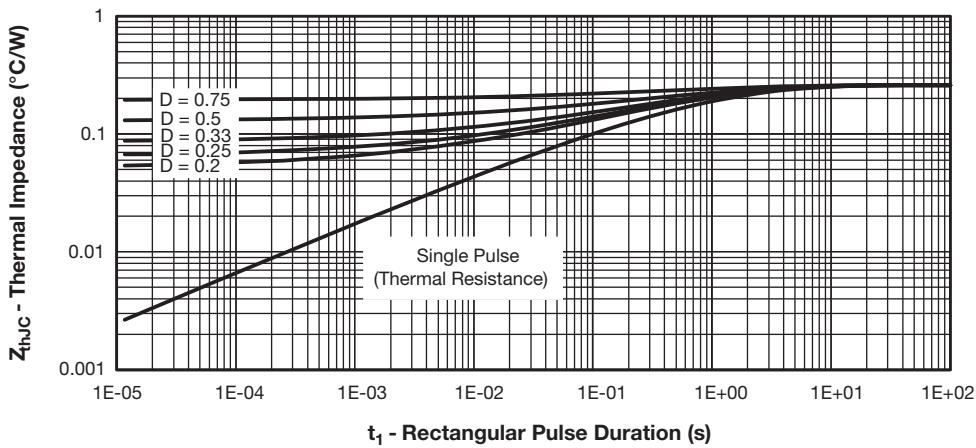


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

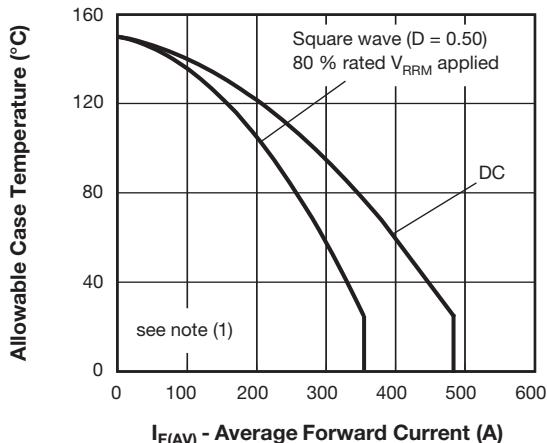


Fig. 5 - Maximum Allowable Case Temperature vs.  
Average Forward Current

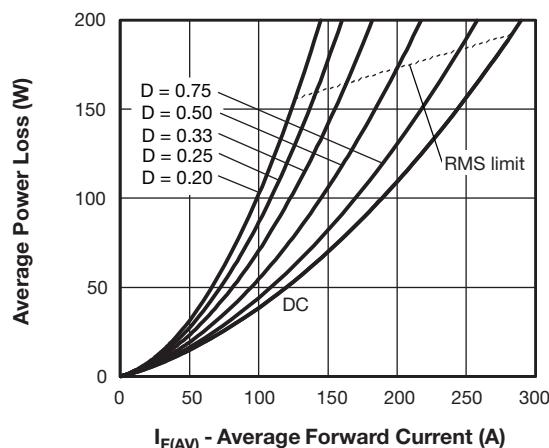


Fig. 6 - Forward Power Loss Characteristics

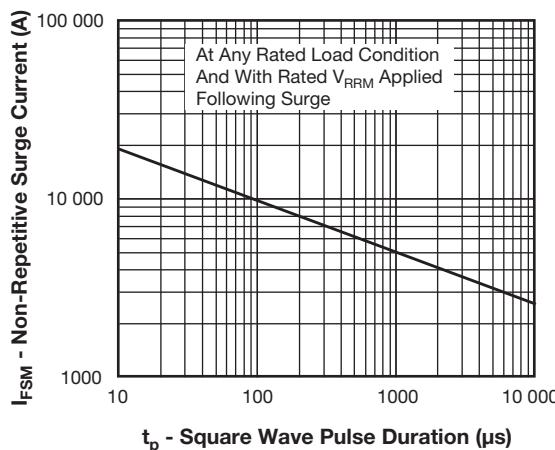


Fig. 7 - Maximum Non-Repetitive Surge Current

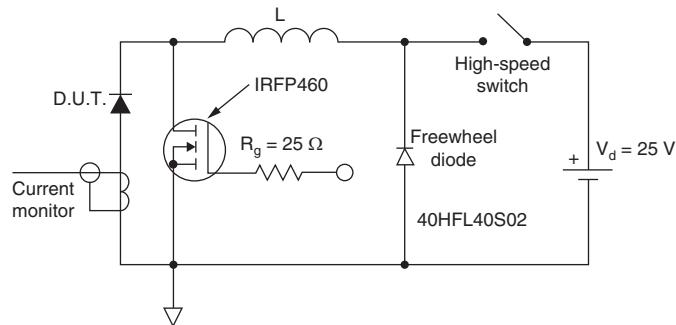


Fig. 8 - Unclamped Inductive Test Circuit

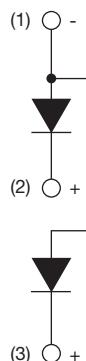
#### Note

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

**ORDERING INFORMATION TABLE**

Device code	VS	KJ	S	44	0	/	030
	1	2	3	4	5		6

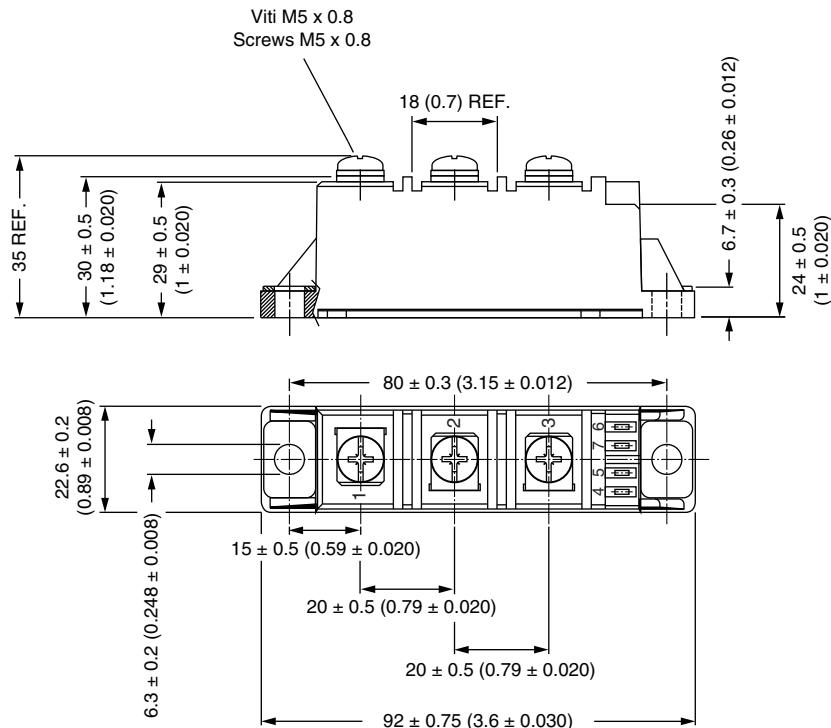
- 1** - Vishay Semiconductors product
- 2** - Circuit configuration:  
KJ = ADD-A-PAK - 2 diodes/common anode
- 3** - S = Schottky diode
- 4** - Average rating (x 10)
- 5** - Product silicon identification
- 6** - Voltage rating (030 = 30 V)

**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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