

ADD-A-PAK Generation VII Power Modules Schottky Rectifier, 400 A



ADD-A-PAK

PRODUCT SUMMARY

$I_F(AV)$	400 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
- UL pending
- 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 VSKCS401.. Schottky rectifier common cathode 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	400	A
V_{RRM}		45	V
I_{FSM}	$t_p = 5 \mu s$ sine	29 000	A
V_F	200 Apk, $T_J = 125^\circ C$	0.69	V
T_J	Range	- 55 to 175	$^\circ C$

VOLTAGE RATINGS

PARAMETER	SYMBOL	VSKCS401/045	UNITS
Maximum DC reverse voltage	V_R	45	V
Maximum working peak reverse voltage	V_{RWM}		

ABSOLUTE MAXIMUM RATINGS							
PARAMETER		SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum average forward current	per module	$I_{F(AV)}$	50 % duty cycle at $T_C = 120\text{ }^{\circ}\text{C}$, rectangular waveform		400	A	
	per leg				200		
Maximum peak one cycle non-repetitive surge current		I_{FSM}	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	29 000		
			10 ms sine or 6 ms rect. pulse		3400		
Non-repetitive avalanche energy		E_{AS}	$T_J = 25\text{ }^{\circ}\text{C}$, $I_{AS} = 24\text{ A}$, $L = 1\text{ mH}$		270		mJ
Repetitive avalanche current		I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical		40		A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V _{FM}	200 A	T _J = 25 °C	0.72	V
		400 A		0.98	
		200 A	T _J = 125 °C	0.69	
		400 A		0.96	
Maximum reverse leakage current	I _{RM}	T _J = 25 °C	V _R = Rated V _R	20	mA
		T _J = 125 °C		180	
Maximum junction capacitance	C _T	V _R = 5 V _{DC} (test signal range 100 kHz to 1 MHz), 25 °C		10 300	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	V/μs
Maximum RMS insulation voltage	V _{INS}	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 _J , T _{Stg}		- 55 to 175	°C
Maximum thermal resistance, junction to case per leg	R _{thJC}	DC operation	0.26	°C/W
Typical thermal resistance, case to heatsink per module	R _{thCS}		0.1	
Approximate weight			75	g
			2.7	oz.
Mounting torque ± 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
	busbar		3	
Case style		JEDEC	TO-240AA compatible	

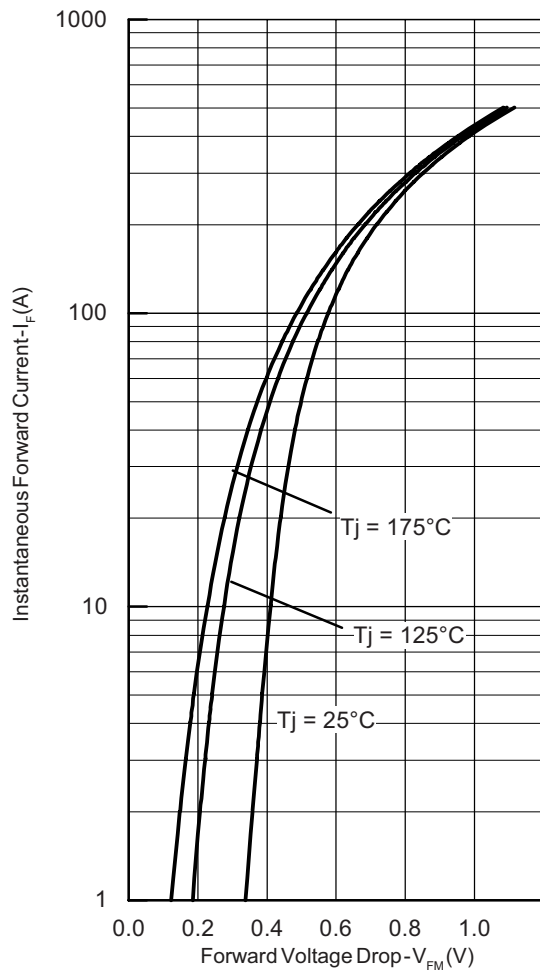


Fig. 1 - Maximum Forward Voltage Drop Characteristics

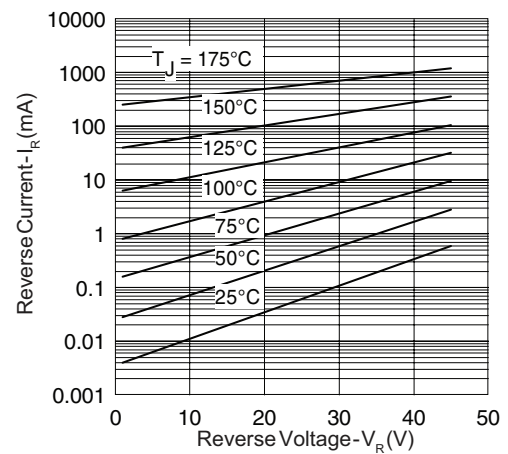


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

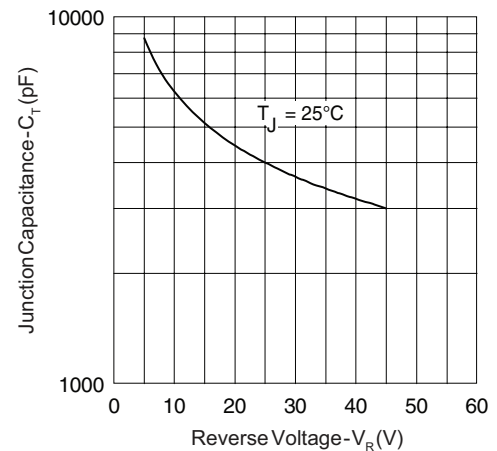


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

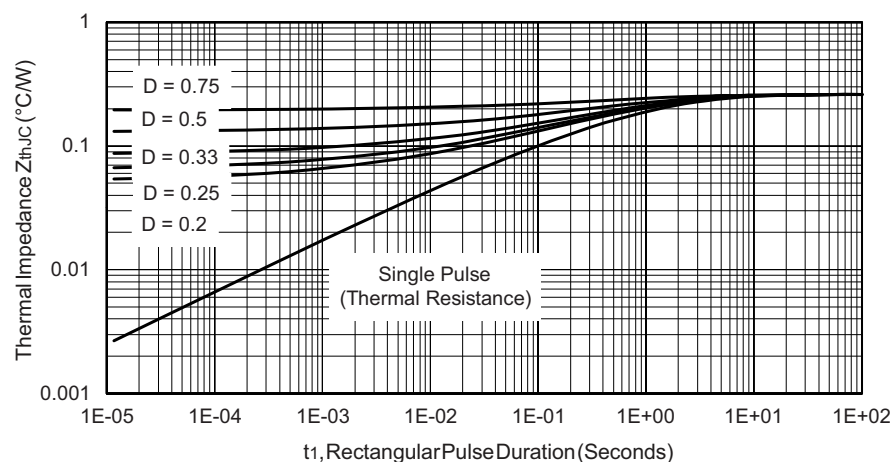


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

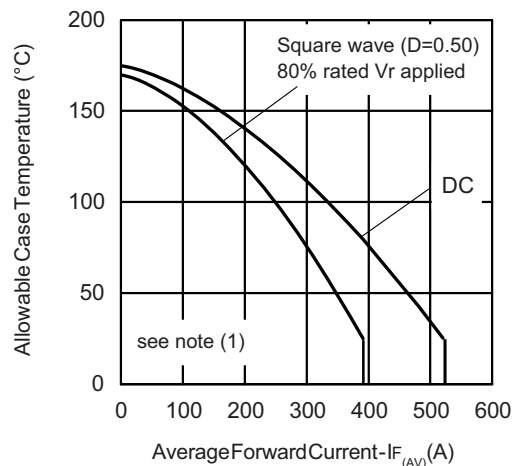


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

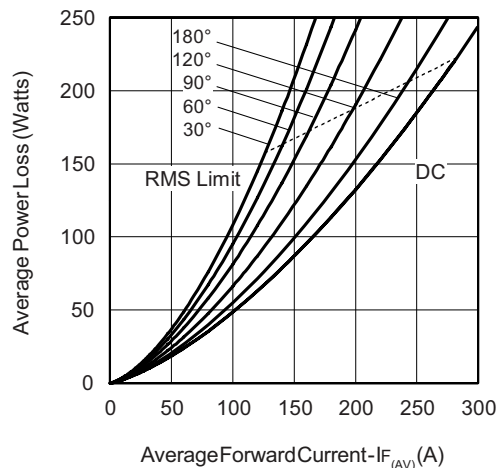


Fig. 6 - Forward Power Loss Characteristics

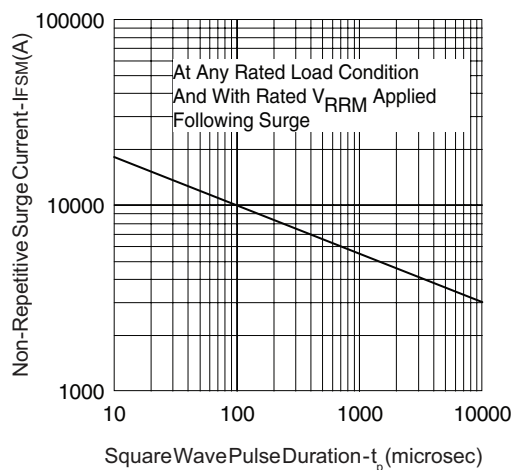


Fig. 7 - Maximum Non-Repetitive Surge Current

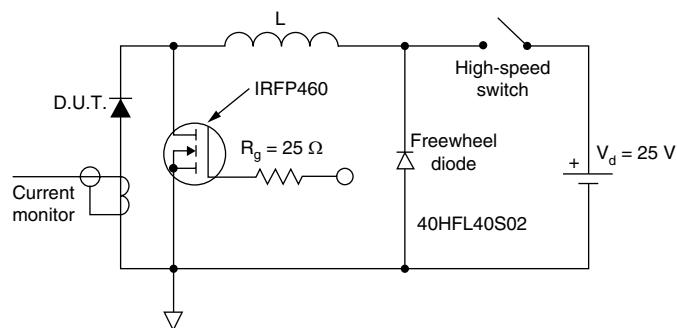


Fig. 8 - Unclamped Inductive Test Circuit

Note

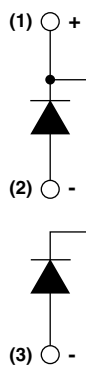
- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 P_{dREV} = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at $V_{R1} = 80\%$ rated V_R

ORDERING INFORMATION TABLE

Device code	VS	KC	S	40	1	/	045
	①	②	③	④	⑤		⑥

- 1** - Vishay HPP
- 2** - Circuit configuration:
KC = ADD-A-PAK - 2 diodes/common cathode
- 3** - S = Schottky diode
- 4** - Average rating (x 10)
- 5** - Product silicon identification
- 6** - Voltage rating (045 = 45 V)

CIRCUIT CONFIGURATION



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

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