Schottky Rectifier, 400 A

ADD-A-PAK

FEATURES

- 175 °C T_J operation
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- UL pending
- Totally lead (Pb)-free, RoHS compliant
- Designed and qualified for industrial level

Pb-free
RoHS
COMPLIANT

PRODUCT SUMMARY	
$I_{F(AV)}$	400 A

MECHANICAL DESCRIPTION

The Generation 5 of ADD-A-PAK module combine the excellent thermal performance obtained by the usage of direct bonded copper substrate with superior mechanical ruggedness, thanks to the insertion of a solid copper baseplate at the bottom side of the device.
The Cu baseplate allow an easier mounting on the majority of heatsink with increased tolerance of surface roughness and improved thermal spread.
The Generation 5 of ADD-A-PAK module is manufactured without hard mold, eliminating in this way any possible direct stress on the leads.
The electrical terminals are secured against axial pull-out: they are fixed to the module housing via a click-stop feature already tested and proved as reliable on other Vishay HPP modules.

DESCRIPTION

The VSKCS409.. 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}		150	V
I_{FSM}	t_p = 5 µs sine	20 000	A
V_F	200 Apk, T_J = 125 °C	0.79	V
T_J	Range	- 55 to 175	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VSKCS409/150P	UNITS
Maximum DC reverse voltage	V_R	150	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 = 94 °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	20 000	
			10 ms sine or 6 ms rect. pulse		2300	
Non-repetitive avalanche energy		E_{AS}	T_J = 25 °C, I_{AS} = 1.8 Amps, L = 1 mH		15	mJ
Repetitive avalanche current		I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by T_J maximum V_A = 1.5 x V_R typical		1	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM} (1)	200 A	T_J = 25 °C	0.98	V
		400 A		1.23	
		200 A	T_J = 125 °C	0.79	
		400 A		1.03	
Maximum reverse leakage current	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	6	mA
		T_J = 125 °C		85	
Maximum junction capacitance	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °C		6000	pF
Typical series inductance	L_S	From top of terminal hole to mounting plane		5.0	nH
Maximum voltage rate of change	dV/dt	Rated V_R		10 000	V/µs
RMS insulation voltage	V_{INS}	50 Hz, circuit to base, all terminals shorted (1 s)		3500	V

Note
(1) Pulse width < 300 µs, Duty cycle < 2 %

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	0.36	°C/W
Maximum thermal resistance, case to heatsink		R_{thCS}	Mounting surface, smooth and greased	0.1	
Approximate weight				110	g
				4	oz.
Mounting torque ± 10 %	to heatsink			5	Nm
	busbar			4	
Case style			JEDEC	TO-240AA	

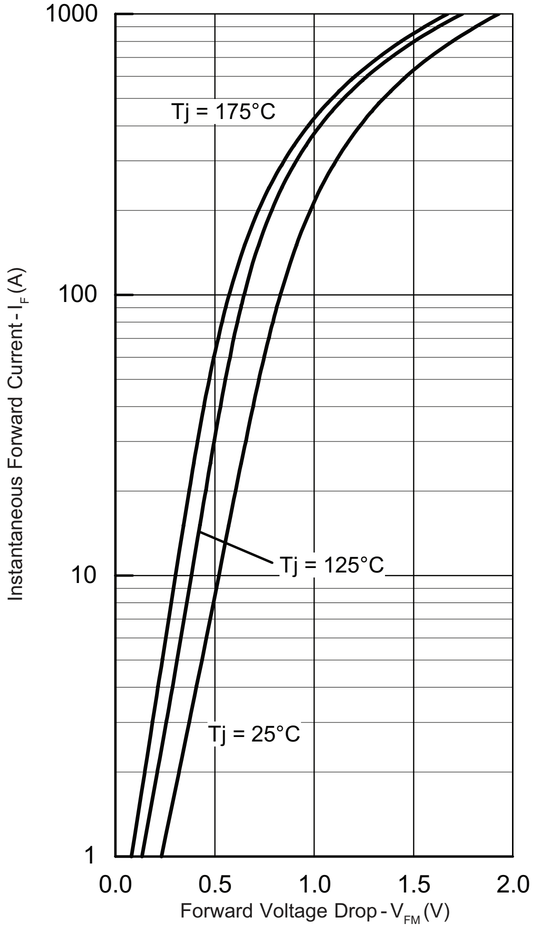


Fig. 1 - Maximum Forward Voltage Drop Characteristics

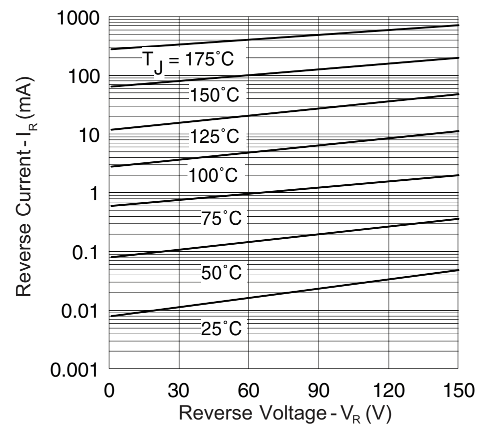


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

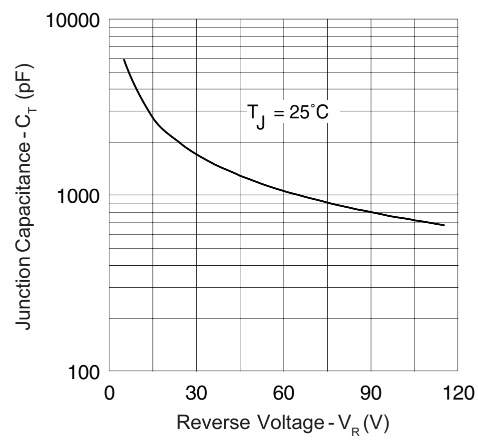


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

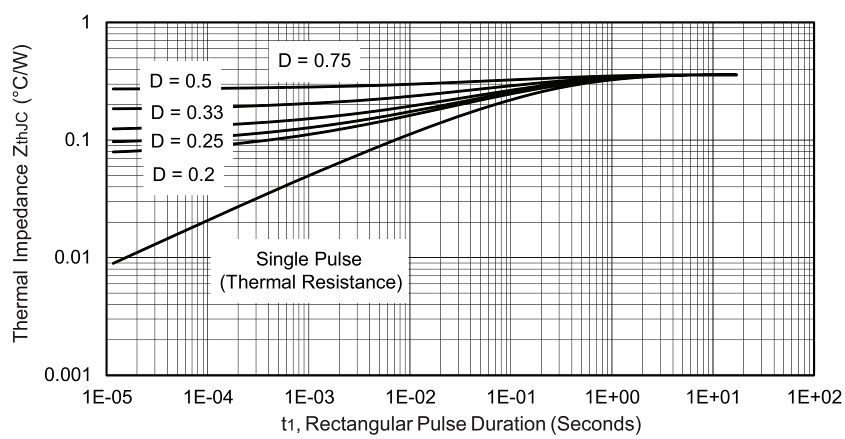


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

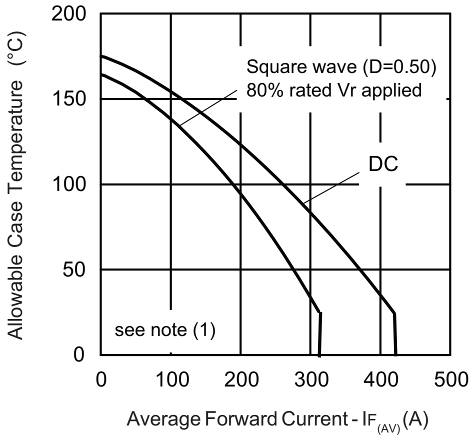


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

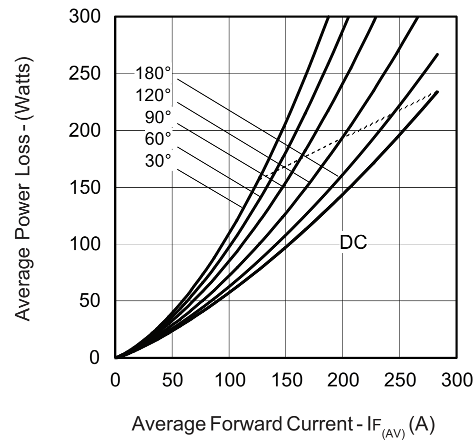


Fig. 6 - Forward Power Loss Characteristics

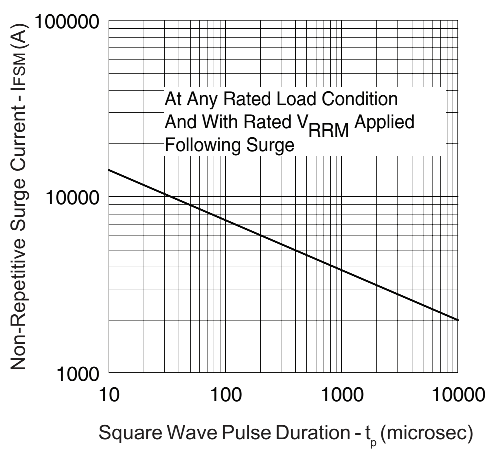


Fig. 7 - Maximum Non-Repetitive Surge Current

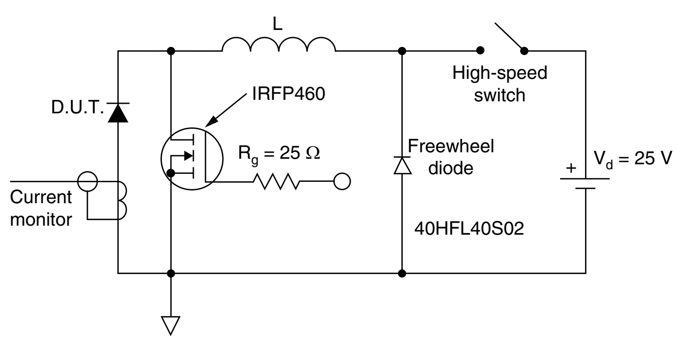


Fig. 8 - Unclamped Inductive Test Circuit

Note

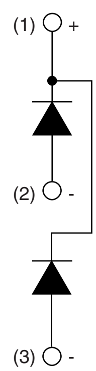
(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
Pd_{REV} = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = 80 % rated V_R

ORDERING INFORMATION TABLE

Device code	VS	KC	S	40	9	/	150	P
	1	2	3	4	5		6	7

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 (150 = 150 V)
7 - Lead (Pb)-free

CIRCUIT CONFIGURATION



LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95174

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