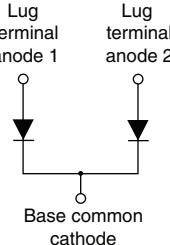


High Performance Schottky Rectifier, 400 A


TO-244


FEATURES

- 175 °C T_J operation
- Center tap module
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- UL approved file E222165 
- Designed and qualified for industrial level
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

DESCRIPTION

The VS-403CNQ... center tap Schottky rectifier module series 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.

PRODUCT SUMMARY	
$I_{F(AV)}$	400 A
V_R	100 V
Package	TO-244
Circuit	Two diodes common cathode

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	400	A
V_{RRM}		100	V
I_{FSM}	$t_p = 5 \mu s$ sine	25 500	A
V_F	200 A _{pk} , $T_J = 125$ °C (per leg)	0.69	V
T_J	Range	-55 to 175	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-403CNQ100PbF	UNITS
Maximum DC reverse voltage	V_R	100	V
Maximum working peak reverse voltage	V_{RWM}		

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current per leg See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 141$ °C, rectangular waveform		200	A
Maximum peak one cycle non-repetitive surge current per leg See fig. 7		$5 \mu s$ sine or 3 μs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	25 500	
Non-repetitive avalanche energy per leg	E_{AS}	10 ms sine or 6 ms rect. pulse		3300	
Repetitive avalanche current per leg	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical		1	A

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	200 A	$T_J = 25 \text{ }^\circ\text{C}$	0.84	V	
		400 A		1.07		
		200 A	$T_J = T_J \text{ maximum}$	0.69		
		400 A		0.82		
Maximum reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25 \text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	6	mA	
		$T_J = 125 \text{ }^\circ\text{C}$		80		
Maximum junction capacitance per leg	C_T	$V_R = 5 \text{ V}_\text{DC}$ (test signal range 100 kHz to 1 MHz) $25 \text{ }^\circ\text{C}$		5500	pF	
Typical series inductance per leg	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/ μ s	

Note

⁽¹⁾ Pulse width < 300 μ s, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}	-55	-	175	$^\circ\text{C}$
Thermal resistance, junction to case per leg	R_{thJC}	-	-	0.19	$^\circ\text{C}/\text{W}$
Thermal resistance, junction to case per module		-	-	0.095	
Thermal resistance, case to heatsink	R_{thCS}	-	0.10	-	
Weight		-	68	-	g
		-	2.4	-	oz.
Mounting torque		35.4 (4)		53.1 (6)	$\text{lbf} \cdot \text{in}$ (N · m)
Mounting torque center hole		30 (3.4)		40 (4.6)	
Terminal torque		30 (3.4)	-	44.2 (5)	
Vertical pull		-	-	80	$\text{lbf} \cdot \text{in}$
2" lever pull		-	-	35	

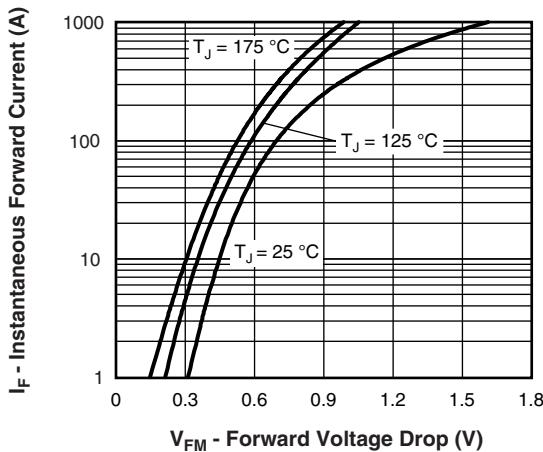


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

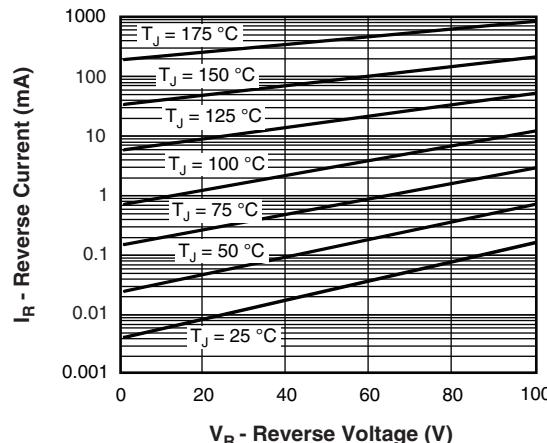


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

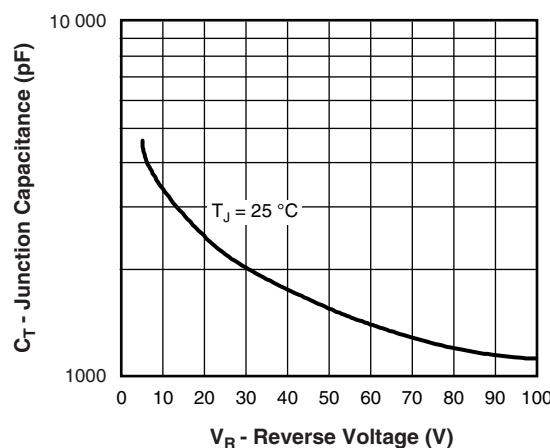


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

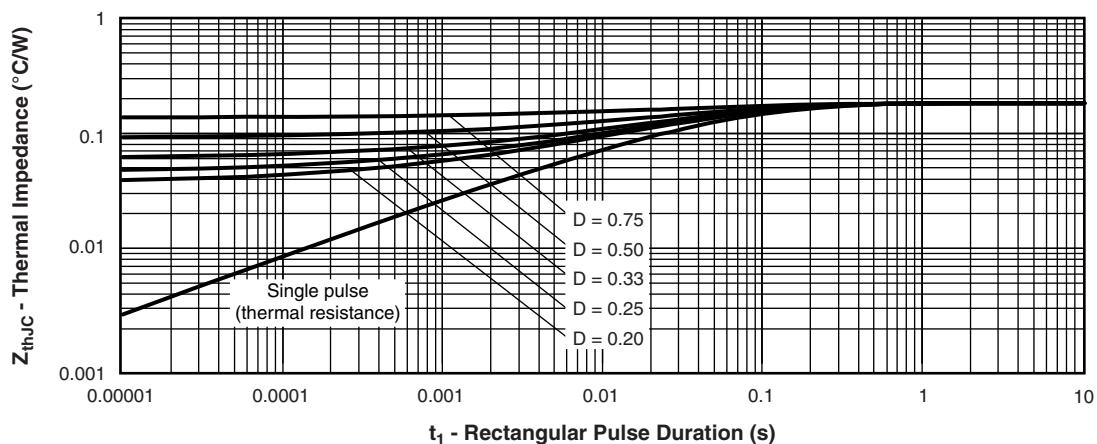


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

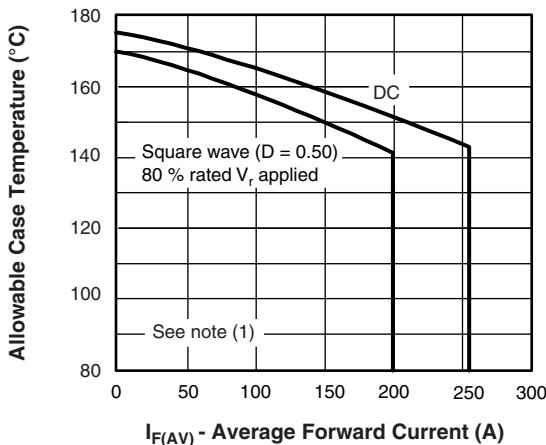


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

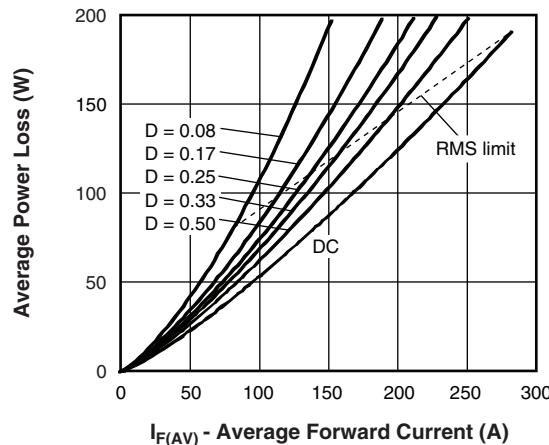


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

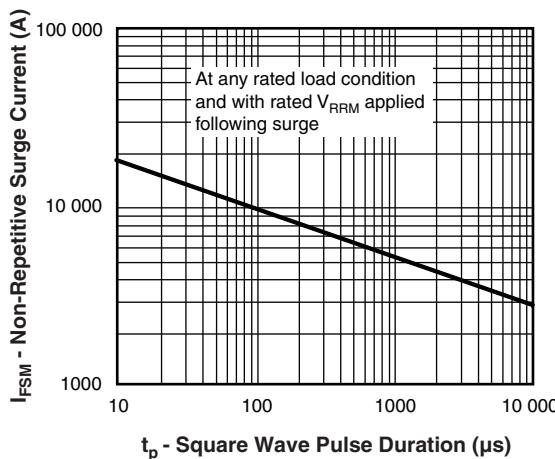


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

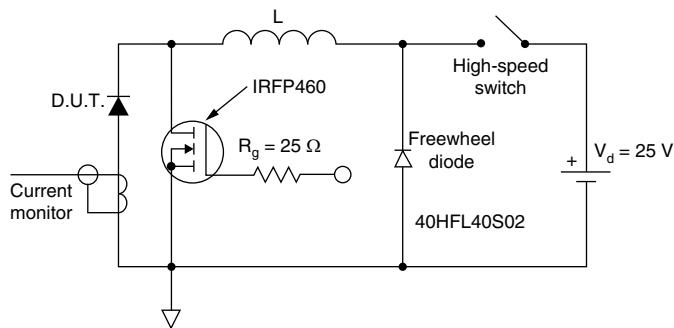


Fig. 8 - Unclamped Inductive Test Circuit

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

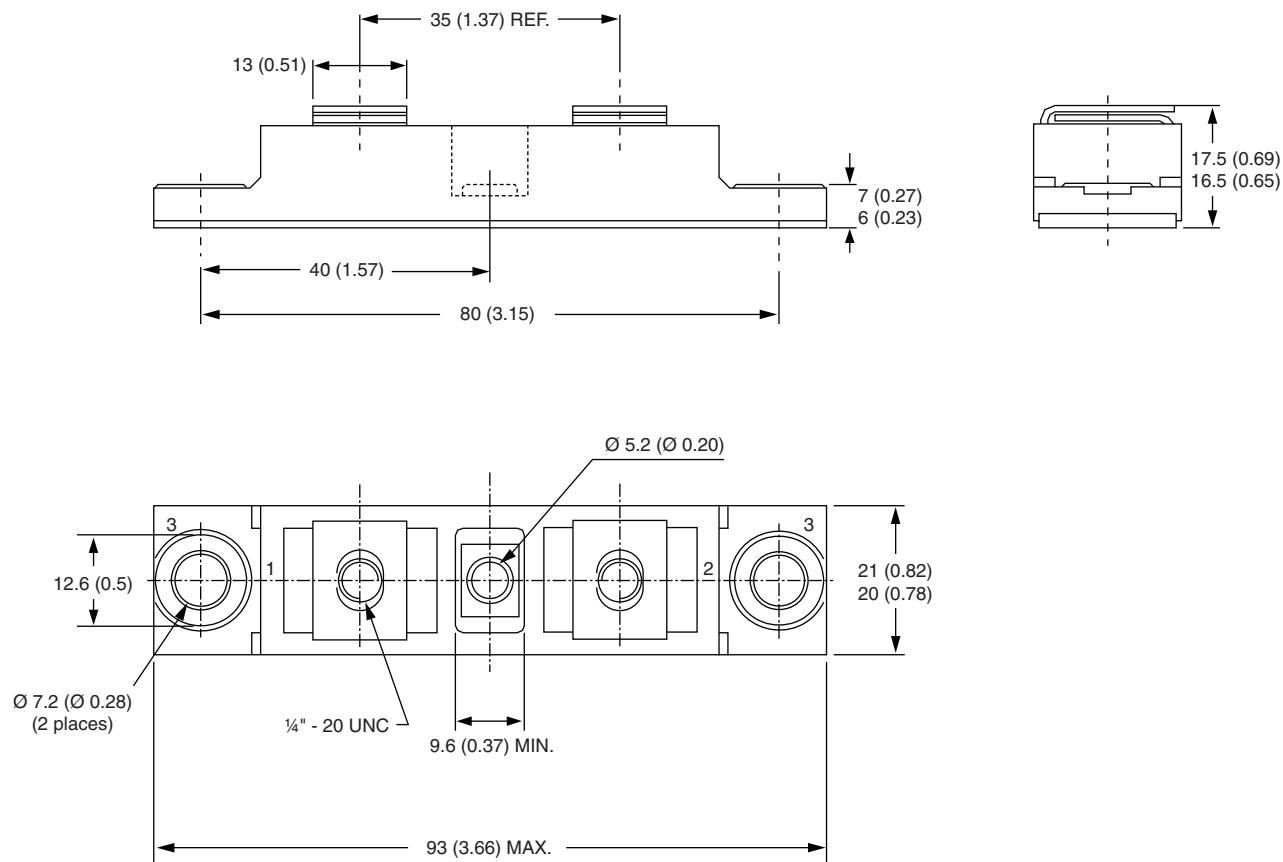
Device code	VS-	40	3	C	N	Q	100	PbF
	1	2	3	4	5	6	7	8
	[1]	- Vishay Semiconductors product						
	[2]	- Average current rating (x 10)						
	[3]	- Product silicon identification						
	[4]	- C = Circuit configuration						
	[5]	- N = Not isolated						
	[6]	- Q = Schottky rectifier diode						
	[7]	- Voltage rating (100 = 100 V)						
	[8]	- Lead (Pb)-free						

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?95021
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TO-244

DIMENSIONS in millimeters (inches)



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