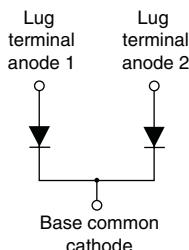


Schottky Rectifier, 400 A



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
- Lead (Pb)-free
- Designed and qualified for industrial level



DESCRIPTION

The 409CNQ... 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	135/150 V

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	400	A
V_{RRM}	Range	135/150	V
I_{FSM}	$t_p = 5 \mu s$ sine	20 000	A
V_F	200 Apk, $T_J = 125$ °C (per leg)	0.75	V
T_J	Range	- 55 to 175	°C

VOLTAGE RATINGS				
PARAMETER	SYMBOL	409CNQ135PbF	409CNQ150PbF	UNITS
Maximum DC reverse voltage	V_R	135	150	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 $T_C = 129$ °C, rectangular waveform		200	A
Maximum peak one cycle non-repetitive surge current per leg See fig. 7		5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	400	
Non-repetitive avalanche energy per leg	E_{AS}	10 ms sine or 6 ms rect. pulse		20 000	
Repetitive avalanche current per leg	I_{AR}	$T_J = 25$ °C, $I_{AS} = 5.5$ A, $L = 1$ mH		2300	
		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	$T_J = 25 \text{ }^\circ\text{C}$	1.13	V	
		400 A		1.46		
		200 A	$T_J = 125 \text{ }^\circ\text{C}$	0.75		
		400 A		0.89		
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	
		$T_J = 125 \text{ }^\circ\text{C}$		85		
Maximum junction capacitance per leg	C_T	$V_R = 5 \text{ V}_{\text{DC}}$ (test signal range 100 kHz to 1 MHz) $25 \text{ }^\circ\text{C}$		6000	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.
		35.4 (4)		53.1 (6)	$\text{lbf} \cdot \text{in}$ (N · m)
Mounting torque		30 (3.4)		40 (4.6)	
Mounting torque center hole		30 (3.4)	-	44.2 (5)	
Terminal torque		-	-	80	$\text{lbf} \cdot \text{in}$
Vertical pull		-	-	35	
2" lever pull		-	-		

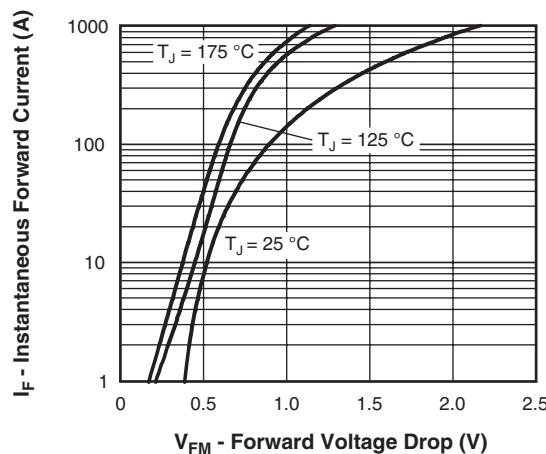


Fig. 1 - Maximum Forward Voltage Drop Characteristics

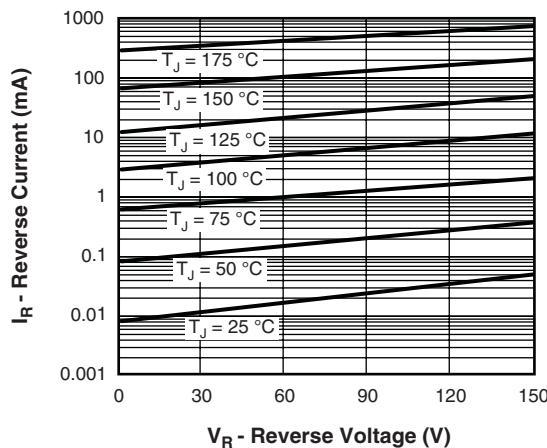


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

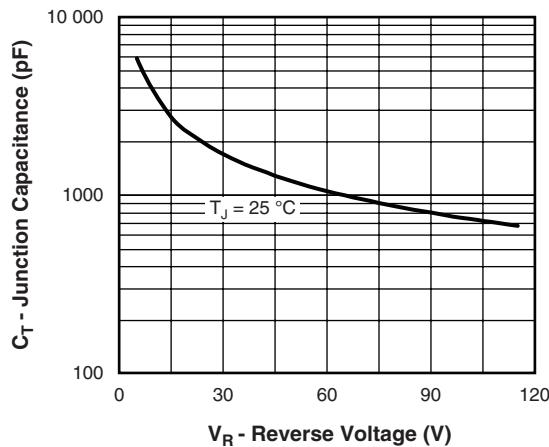
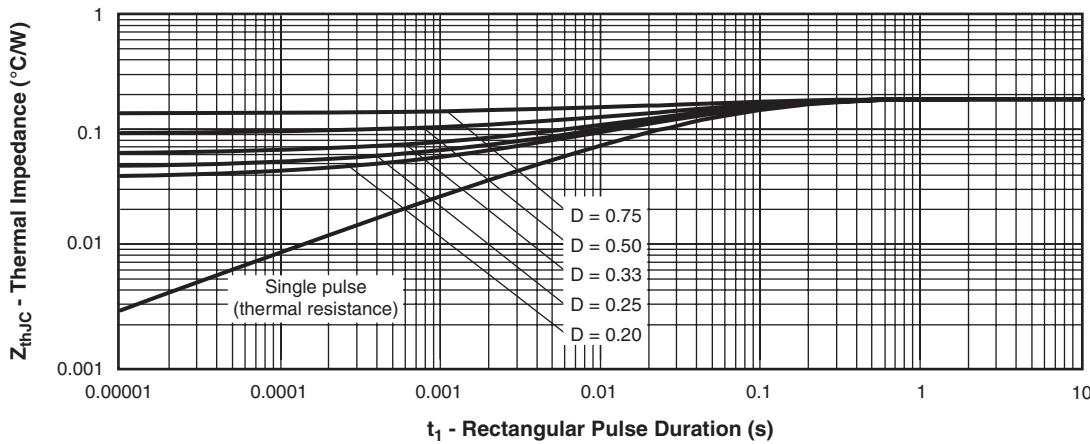


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

409CNQ...PbF Series

Vishay High Power Products Schottky Rectifier, 400 A

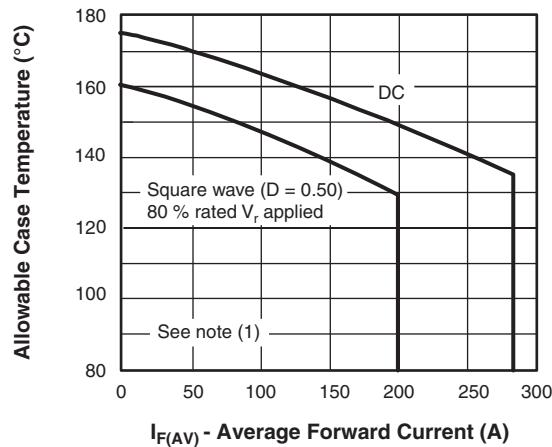


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

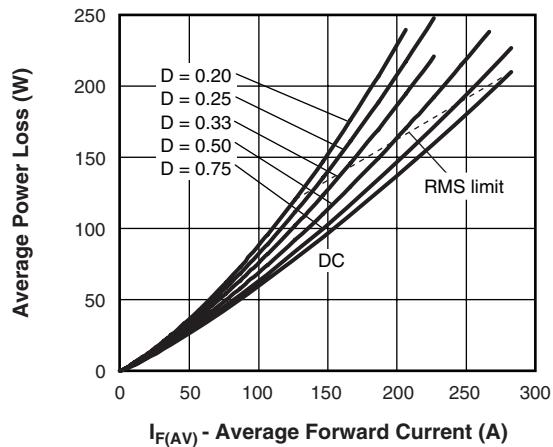


Fig. 6 - Forward Power Loss Characteristics

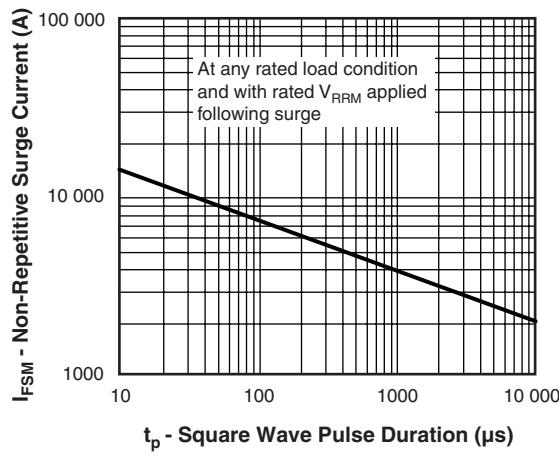


Fig. 7 - Maximum Non-Repetitive Surge Current

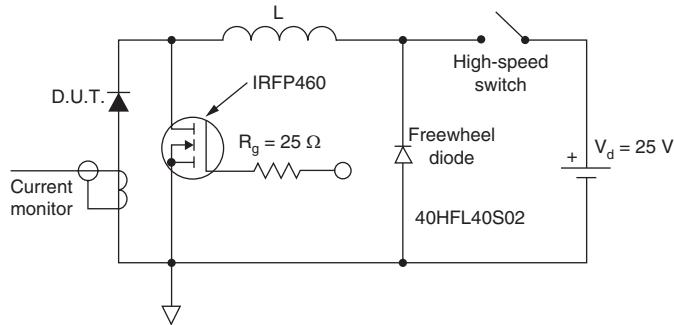


Fig. 8 - Unclamped Inductive Test Circuit

Note

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

ORDERING INFORMATION TABLE

Device code	40	9	C	N	Q	135	PbF
	1	2	3	4	5	6	7

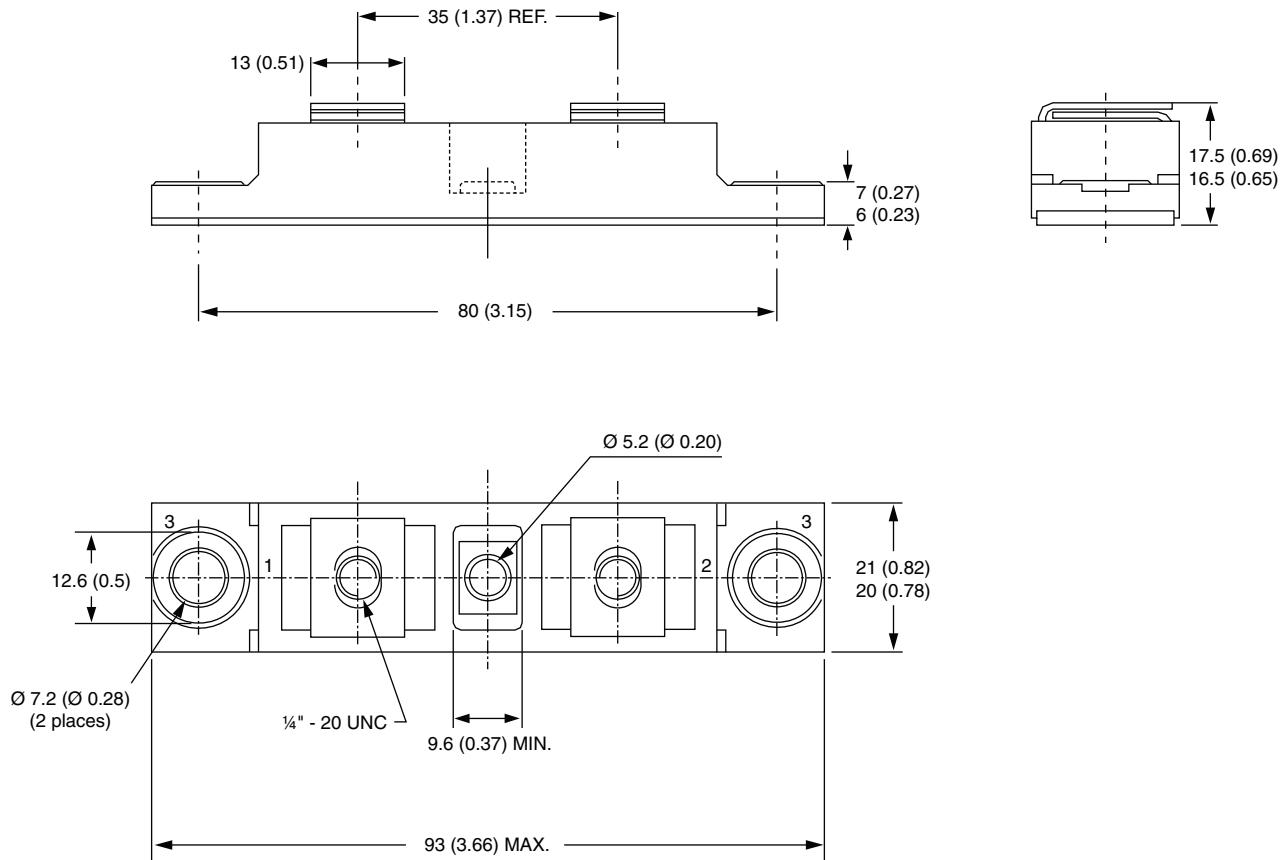
1	- Average current rating (x 10)
2	- Product silicon identification
3	- C = Circuit configuration
4	- N = Not isolated
5	- Q = Schottky rectifier diode
6	- Voltage ratings
7	- Lead (Pb)-free

135 = 135 V
150 = 150 V

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95021

TO-244

DIMENSIONS in millimeters (inches)



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