VS-201CNQ050PbF

High Performance Schottky Rectifier, 200 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
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	200 A
V_R	50 V
Package	TO-244
Circuit configuration	Two diodes common cathode

DESCRIPTION / APPLICATIONS

The VS-201CNQ050PbF center tap Schottky rectifier module 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, converters, freewheeling diodes, welding, and reverse battery protection.

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	200	A
V_{RRM}		50	V
I_{FSM}	t_p = 5 μs sine	16 000	A
V_F	100 A_{pk}, T_J = 125 °C (per leg)	0.58	V
T_J	Range	-55 to +175	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	201CNQ050PbF	UNITS
Maximum DC reverse voltage	V_R	50	V
Maximum working peak reverse voltage	V_{RWM}		

ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current See fig. 5	per device	$I_{F(AV)}$	50 % duty cycle at T_C = 146 °C, rectangular waveform		200	A
	per leg				100	
Maximum peak one cycle non-repetitive surge current per leg See fig. 7		I_{FSM}	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	16 000	A
			10 ms sine or 6 ms rect. pulse		2000	
Non-repetitive avalanche energy per leg		E_{AS}	T_J = 25 °C, I_{AS} = 17 A, L = 1 mH		145	mJ
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 x V_R typical		20	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**VALUES**	**UNITS**
Maximum forward voltage drop per leg See fig. 1	V_{FM} (1)	100 A	T_J = 25 °C	0.67	V
		200 A		0.81	
		100 A	T_J = 125 °C	0.58	
		200 A		0.71	
Maximum reverse leakage current per leg See fig. 2	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	10	mA
		T_J = 125 °C		90	
Maximum junction capacitance per leg	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °C		5200	pF
Typical series inductance per leg	L_S	From top of terminal hole to mounting plane		7.0	nH
Maximum voltage rate of change	dV/dt	Rated V_R		10 000	V/µs

Note

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

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER		**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Maximum junction and storage temperature range		T_J, T_{Stg}	- 55	-	175	°C
Thermal resistance, junction to case	per leg	R_{thJC}	-	-	0.38	°C/W
	per module		-	-	0.19	
Thermal resistance, case to heatsink		R_{thCS}	-	0.10	-	
Weight			-	68	-	g
				2.4		oz.
Mounting torque			35.4 (4)	-	53.1 (6)	lbf · in (N · m)
Mounting torque center hole			30 (3.4)	-	40 (4.6)	
Terminal torque			30 (3.4)	-	44.2 (5)	
Vertical pull			-	-	80	lbf · in
2" lever pull			-	-	35	

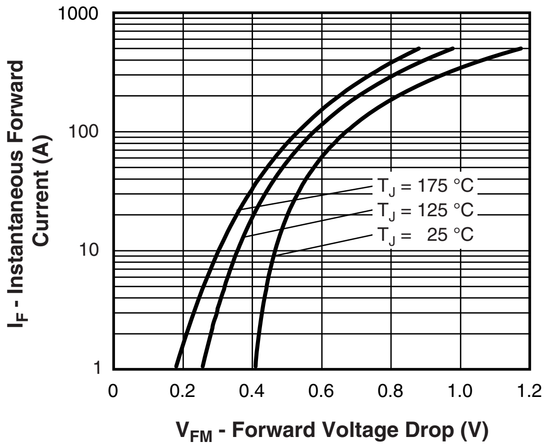

Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

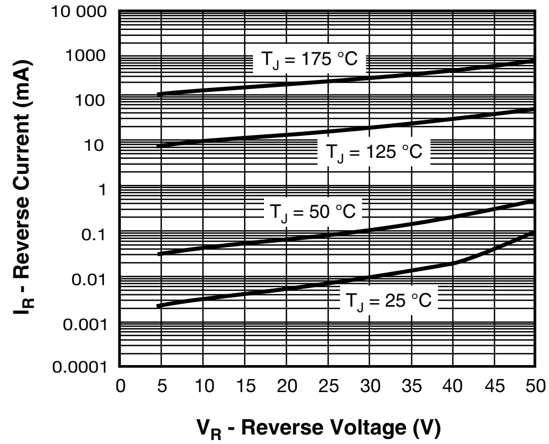

Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

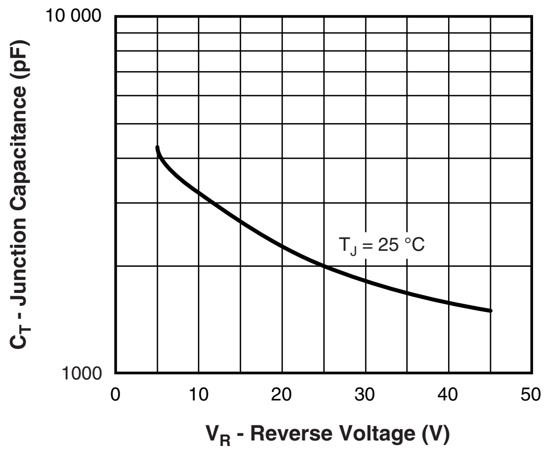

Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

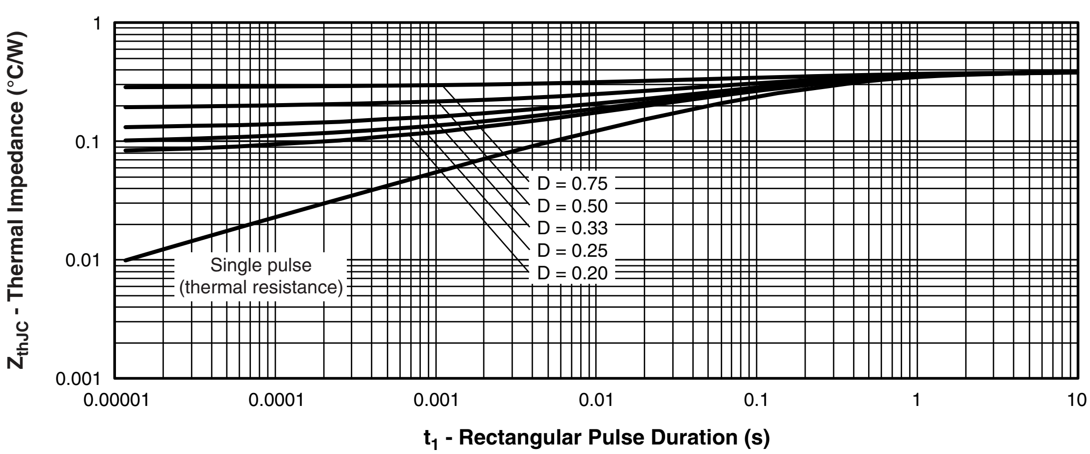

Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

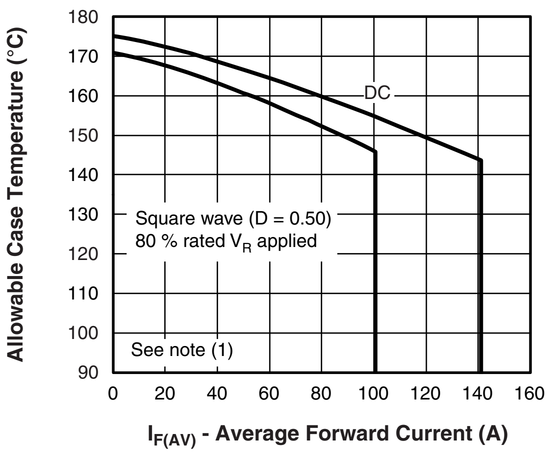

Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

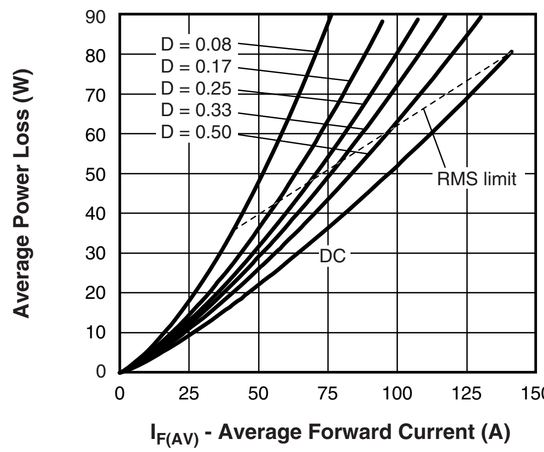

Fig. 6 - Forward Power Loss Characteristics (Per Leg)

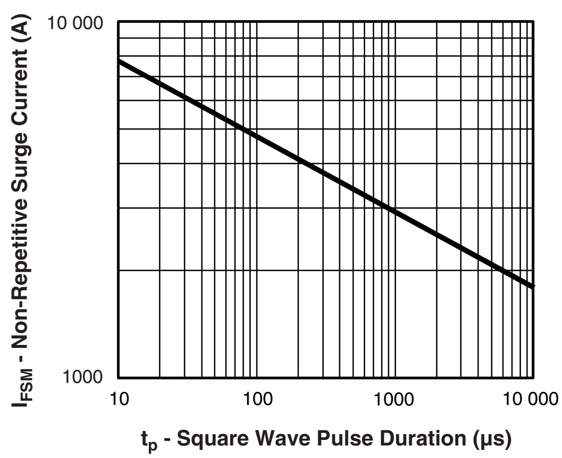

Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

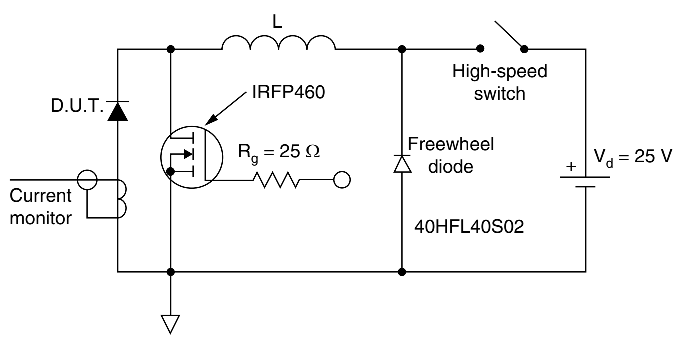

Fig. 8 - Unclamped Inductive Test Circuit

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
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-	20	1	C	N	Q	050	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 (050 = 50 V)
8 - Lead (Pb)-free

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

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