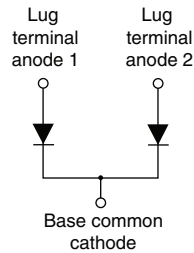


## High Performance Schottky Rectifier, 220 A



TO-244



### FEATURES

- 150 °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](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

PRODUCT SUMMARY	
$I_{F(AV)}$	220 A
$V_R$	30 V
Package	TO-244
Circuit	Two diodes common cathodes

### DESCRIPTION

The VS-220CNQ.. 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 150 °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	220	A
$V_{RRM}$		30	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	18 000	A
$V_F$	110 $A_{pk}$ , $T_J = 125 \text{ }^\circ\text{C}$ (per leg)	0.41	V
$T_J$	Range	-55 to 150	$^\circ\text{C}$

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-220CNQ030PbF	UNITS
Maximum DC reverse voltage	$V_R$	30	V
Maximum working peak reverse voltage	$V_{RWM}$		

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 122 \text{ }^\circ\text{C}$ , rectangular waveform	110	A
			220	
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	18 000	A
		10 ms sine or 6 ms rect. pulse	1950	
Non-repetitive avalanche energy per leg	$E_{AS}$	$T_J = 25 \text{ }^\circ\text{C}$ , $I_{AS} = 15 \text{ A}$ , $L = 1 \text{ mH}$	99	mJ
Repetitive avalanche current per leg	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	22	A



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	110 A	$T_J = 25\text{ }^\circ\text{C}$	0.49	V
		220 A		0.59	
		110 A	$T_J = 125\text{ }^\circ\text{C}$	0.41	
		220 A		0.55	
Maximum reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	10	mA
		$T_J = 125\text{ }^\circ\text{C}$		650	
Maximum junction capacitance per leg	$C_T$	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$		7400	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/ $\mu$ s

**Note**

(1) Pulse width < 300  $\mu$ s, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$	-55	-	150	$^\circ\text{C}$
Thermal resistance, junction to case	per leg	-	-	0.38	$^\circ\text{C/W}$
	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	

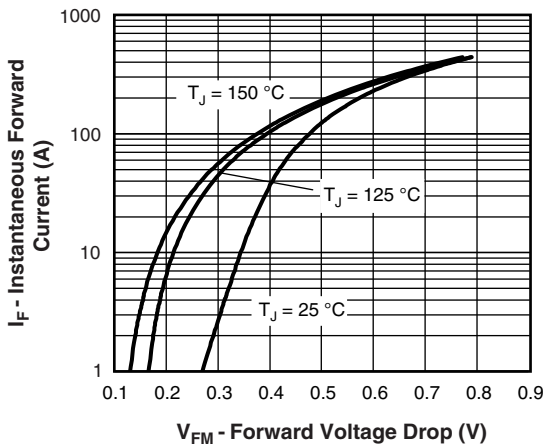


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

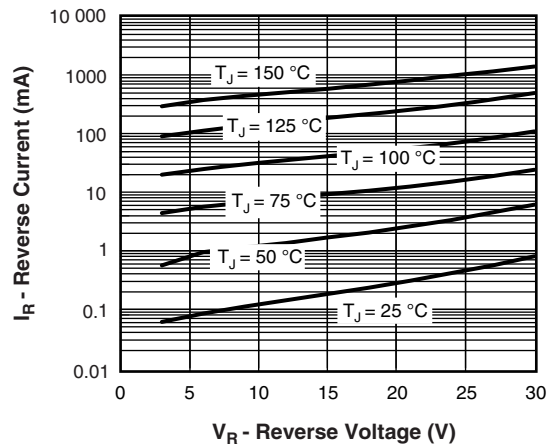


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

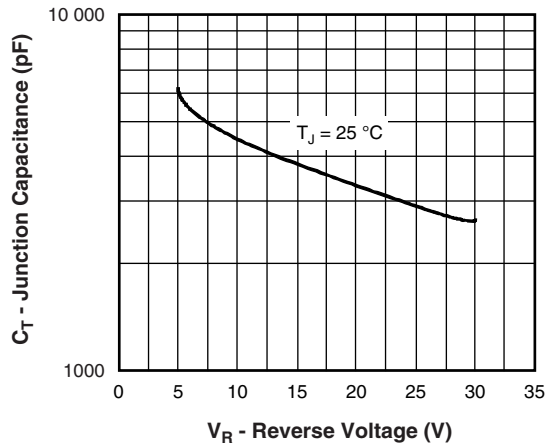


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

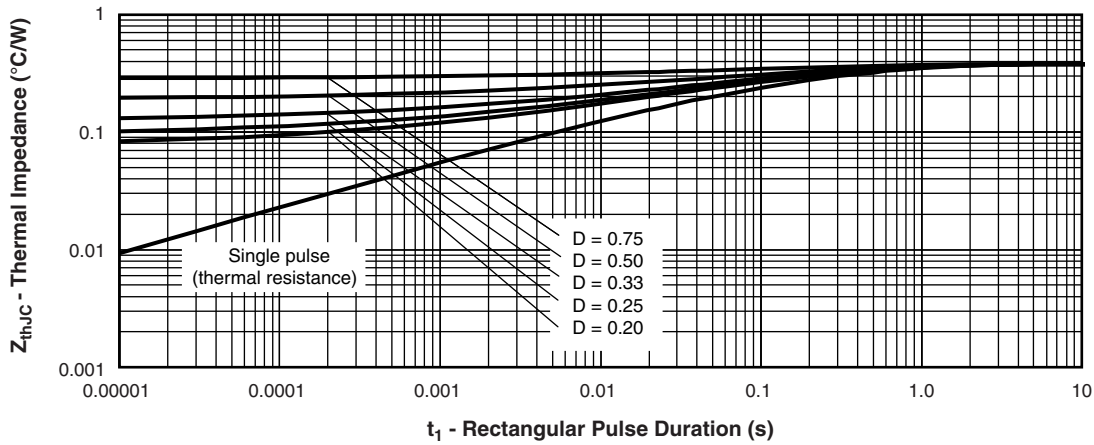


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

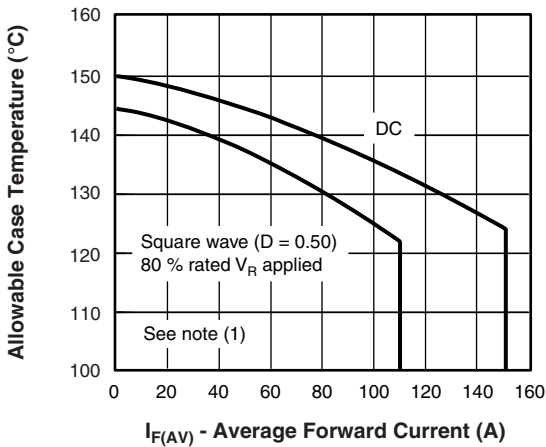


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

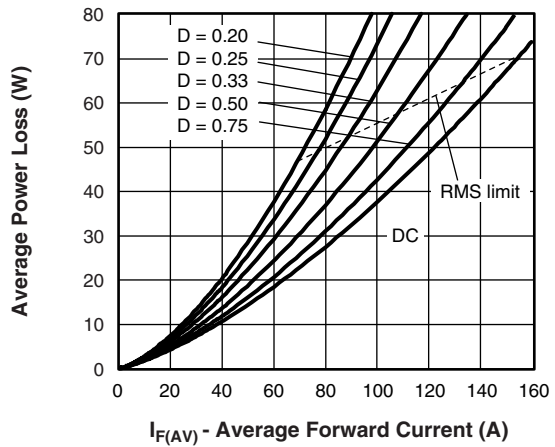


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

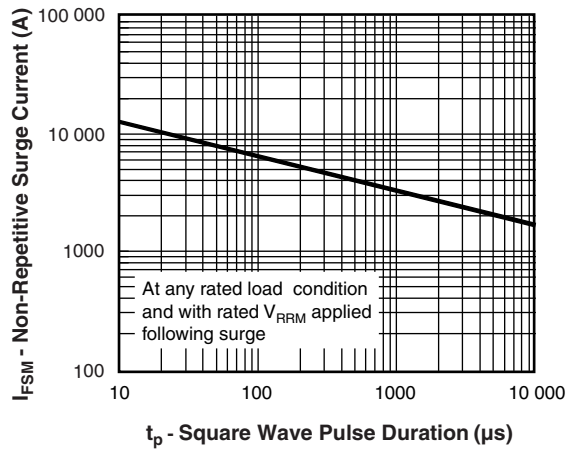


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

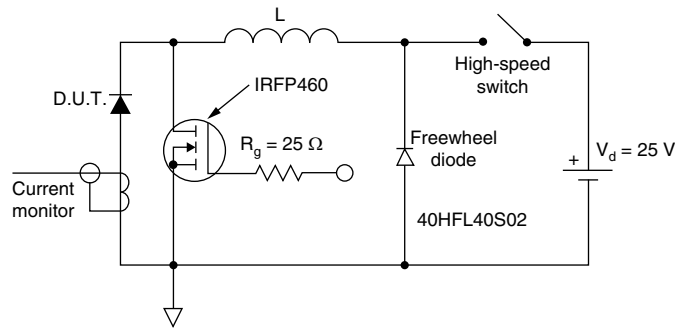


Fig. 8 - Unclamped Inductive Test Circuit

**Note**

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

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>22</b>	<b>0</b>	<b>C</b>	<b>N</b>	<b>Q</b>	<b>030</b>	<b>PbF</b>
	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 (30 V)
- 8** - Lead (Pb)-free

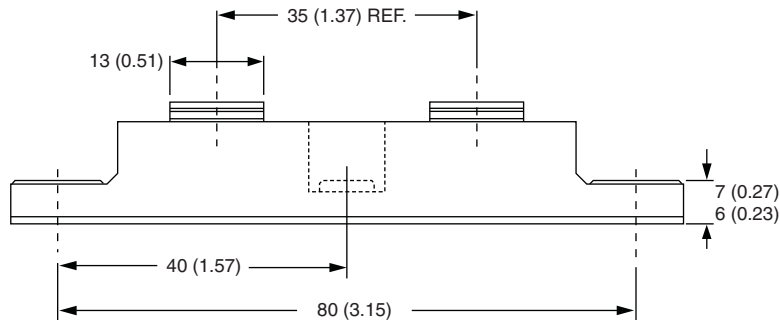
**LINKS TO RELATED DOCUMENTS**

Dimensions	<a href="http://www.vishay.com/doc?95021">www.vishay.com/doc?95021</a>
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## TO-244

**DIMENSIONS** in millimeters (inches)





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