



VS-87CNQ020A, VS-87CNQ020ASM, VS-87CNQ020ASL

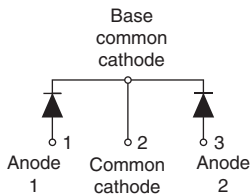
Vishay Semiconductors

Schottky Rectifier New Generation 3 D-61 Package, 2 x 40 A

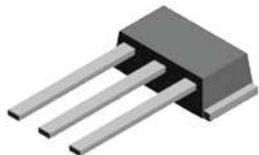
VS-87CNQ020A



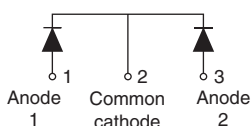
D-61-8



VS-87CNQ020ASM



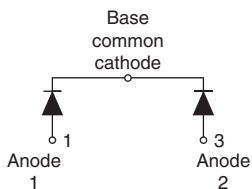
D-61-8-SM



VS-87CNQ020ASL



D-61-8-SL



FEATURES

- 150 °C T_J operation
- Center tap module
- Optimized for 3.3 V application
- Ultralow forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- New fully transfer-mold low profile, small footprint, high current package
- Designed and qualified for industrial level

DESCRIPTION

The center tap Schottky rectifier module has been optimized for ultralow forward voltage drop specifically for 3.3 V output power supplies. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in parallel switching power supplies, converters, reverse battery protection, and redundant power subsystems.

PRODUCT SUMMARY

$I_{F(AV)}$	2 x 40 A
V_R at 125 °C	20 V
V_R at 150 °C	10 V
I_{RM}	550 mA at 125 °C

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	80	A
V_{RRM}		20	V
I_{FSM}	$t_p = 5 \mu s$ sine	6000	A
V_F	40 A _{pk} , $T_J = 125 \text{ °C}$ (per leg)	0.32	V
T_J	Range	- 55 to 150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VS-87CNQ020A	UNITS
Maximum DC reverse voltage	V_R	125 °C	20	V
		150 °C	10	

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ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current <small>per leg</small> <small>per device</small>	I _{F(AV)}	50 % duty cycle at T _C = 135 °C, rectangular waveform		40	A
				80	
Maximum peak one cycle non-repetitive surge current per leg	I _{FSM}	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V _{RRM} applied	6000	
		10 ms sine or 6 ms rect. pulse		1100	
Non-repetitive avalanche energy per leg	E _{AS}	T _J = 25 °C, I _{AS} = 8 A, L = 1.12 mH		36	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		8	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg	V _{FM} ⁽¹⁾	40 A	T _J = 25 °C	0.45	V
		80 A		0.51	
		40 A	T _J = 125 °C	0.32	
		80 A		0.39	
		40 A	T _J = 150 °C	0.29	
		80 A		0.37	
Maximum reverse leakage current per leg	I _{RM} ⁽¹⁾	T _J = 125 °C	V _R = 5 V	90	mA
			V _R = 3.3 V	70	
		T _J = 150 °C	V _R = 10 V	480	
		T _J = 25 °C	V _R = Rated V _R	5.5	
T _J = 125 °C	550				
Threshold voltage	V _{F(TO)}	T _J = T _J maximum		0.191	V
Forward slope resistance	r _f			2.3	mΩ
Maximum junction capacitance per leg	C _T	V _R = 5 V _{DC} (test signal range 100 kHz to 1 MHz), 25 °C		6500	pF
Typical series inductance per leg	L _S	Measured lead to lead 5 mm from package body		5.5	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	TEST CONDITIONS		VALUES	UNITS
Maximum junction and storage temperature range	T _J , T _{Stg}			- 55 to 150	°C
Maximum thermal resistance, junction to case per leg	R _{thJC}	DC operation		0.85	°C/W
Maximum thermal resistance, junction to case per package				0.42	
Typical thermal resistance, case to heatsink (D-61-8 only)	R _{thCS}	Mounting surface, smooth and greased Device flatness < 5 mils		0.30	
Approximate weight			7.8		g
			0.28		oz.
Mounting torque (D-61-8 only)	minimum			40 (35)	kgf · cm (lbf · in)
	maximum			58 (50)	
Marking device	Case style D-61-8		87CNQ020A		
	Case style D-61-8-SM		87CNQ020ASM		
	Case style D-61-8-SL		87CNQ020ASL		



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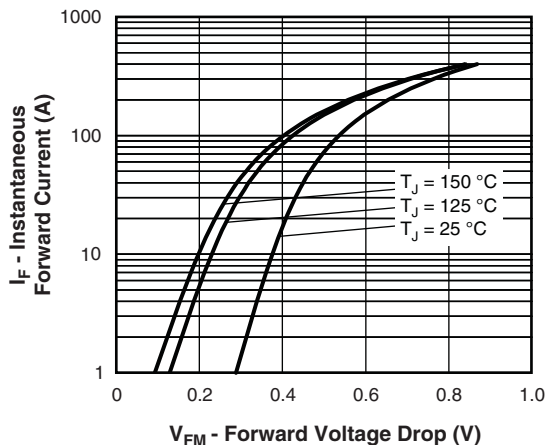


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

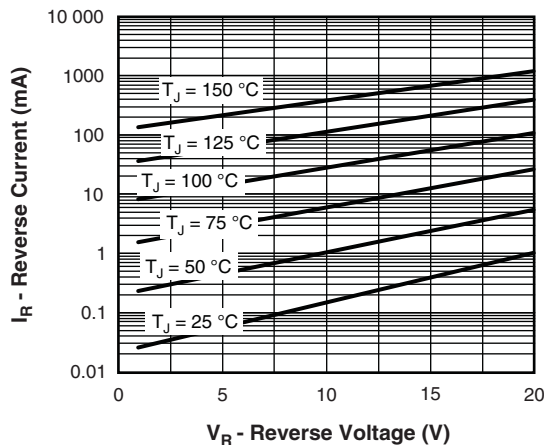


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

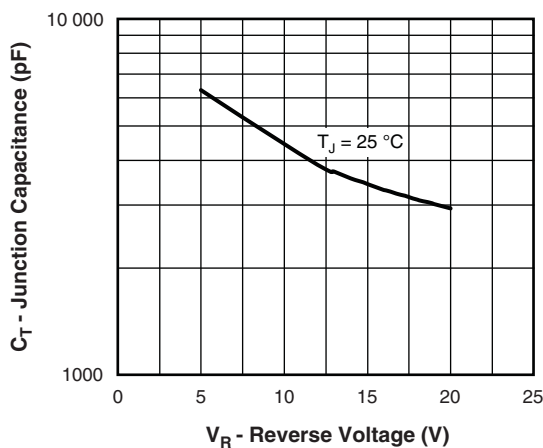


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

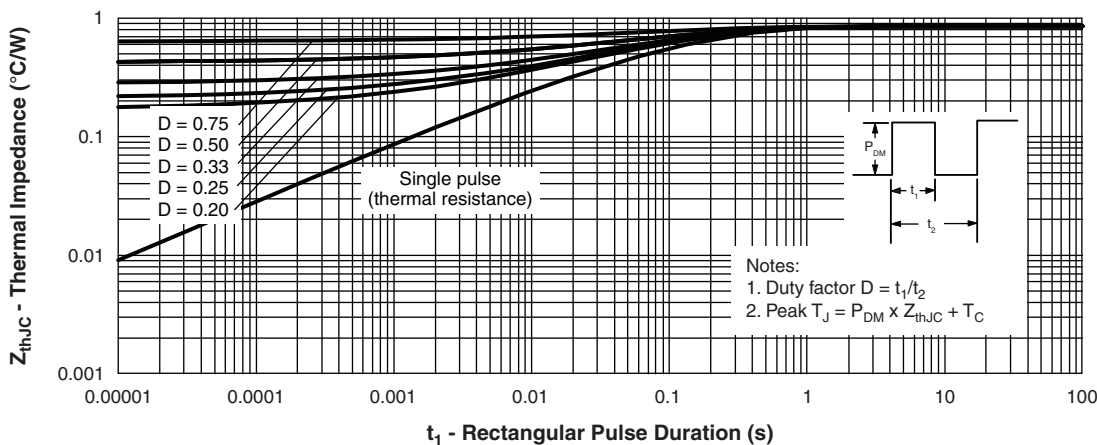


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

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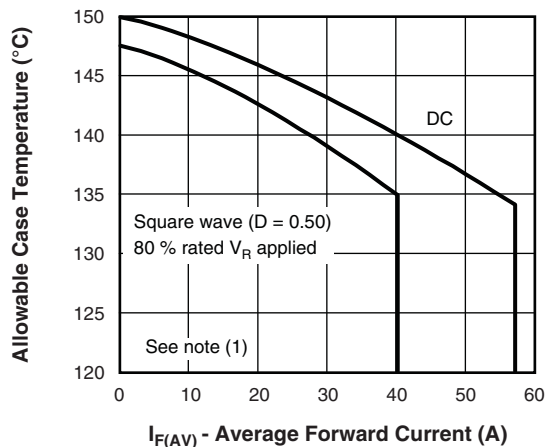


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

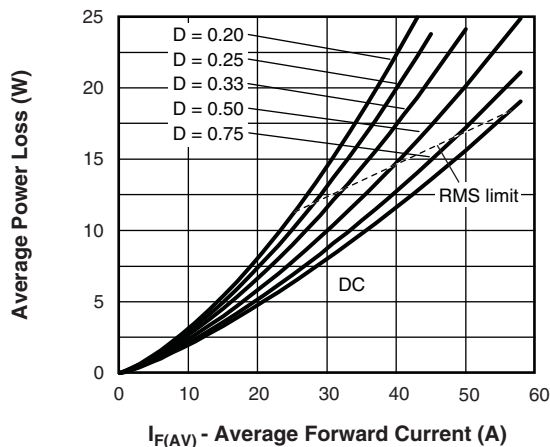


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

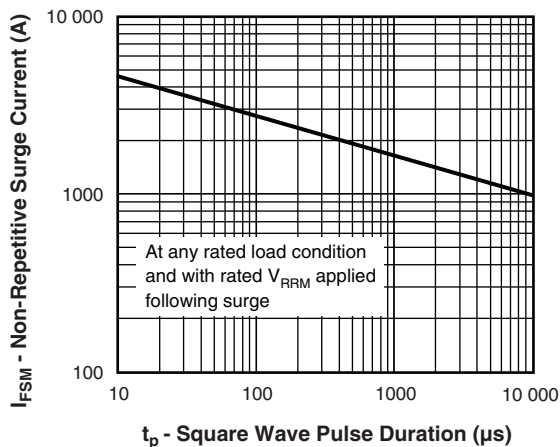


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

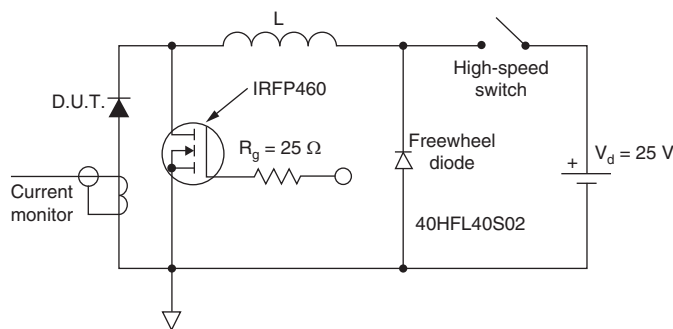


Fig. 8 - Unclamped Inductive Test Circuit

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

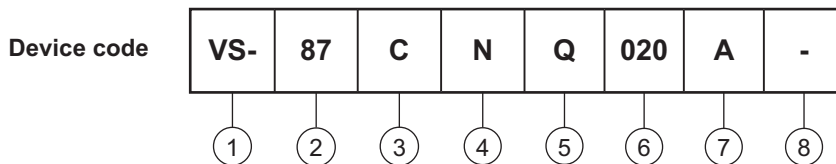


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ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (87 = 80 A)
- 3** - Circuit configuration:
C = Common cathode
- 4** - Package:
N = D-61
- 5** - Schottky "Q" series
- 6** - Voltage rating (020 = 20 V)
- 7** - Package style:
 - A = D-61-8
 - ASM = D-61-8-SM
 - ASL = D-61-8-SL
- 8** -
 - None = Standard production
 - PbF = Lead (Pb)-free (D-61-8 only)

Standard pack quantity: A = 10 pieces; ASM/ASL = 20 pieces

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95354
Part marking information	www.vishay.com/doc?95356



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