

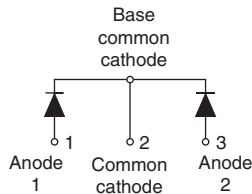
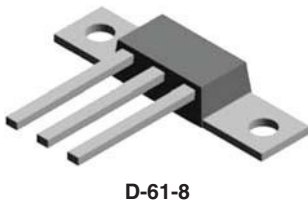


# VS-87CNQ020A, VS-87CNQ020ASM, VS-87CNQ020ASL

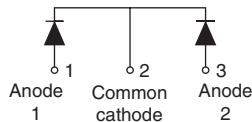
Vishay Semiconductors

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

VS-87CNQ020A

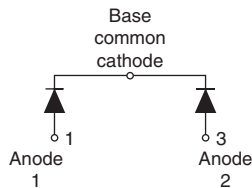


VS-87CNQ020ASM



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 <sub>pk</sub> , $T_J = 125 \text{ °C}$ (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	$I_{F(AV)}$	50 % duty cycle at $T_C = 135\text{ }^\circ\text{C}$ , rectangular waveform		40	A
				80	
Maximum peak one cycle non-repetitive surge current per leg	$I_{FSM}$	5 $\mu\text{s}$ sine or 3 $\mu\text{s}$ 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	$E_{AS}$	$T_J = 25\text{ }^\circ\text{C}$ , $I_{AS} = 8\text{ A}$ , $L = 1.12\text{ mH}$		36	mJ
Repetitive avalanche current per leg	$I_{AR}$	Current decaying linearly to zero in 1 $\mu\text{s}$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical		8	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg	$V_{FM}^{(1)}$	40 A	$T_J = 25\text{ }^\circ\text{C}$	0.45	V
		80 A		0.51	
		40 A	$T_J = 125\text{ }^\circ\text{C}$	0.32	
		80 A		0.39	
		40 A	$T_J = 150\text{ }^\circ\text{C}$	0.29	
		80 A		0.37	
Maximum reverse leakage current per leg	$I_{RM}^{(1)}$	$T_J = 125\text{ }^\circ\text{C}$	$V_R = 5\text{ V}$	90	mA
			$V_R = 3.3\text{ V}$	70	
		$T_J = 150\text{ }^\circ\text{C}$	$V_R = 10\text{ V}$	480	
		$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	5.5	
		$T_J = 125\text{ }^\circ\text{C}$		550	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J$ maximum		0.191	V
Forward slope resistance	$r_t$			2.3	$\text{m}\Omega$
Maximum junction capacitance per leg	$C_T$	$V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$		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	$\text{V}/\mu\text{s}$

**Note**

(1) Pulse width < 300  $\mu\text{s}$ , 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	$^\circ\text{C}$
Maximum thermal resistance, junction to case per leg	$R_{thJC}$	DC operation		0.85	$^\circ\text{C}/\text{W}$
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)	$\text{kgf} \cdot \text{cm}$
	maximum			58 (50)	( $\text{lbf} \cdot \text{in}$ )
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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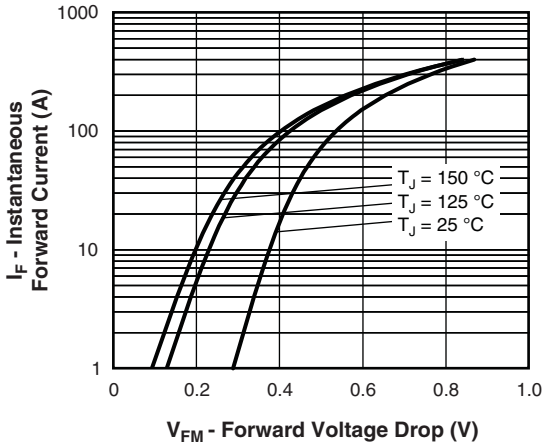


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

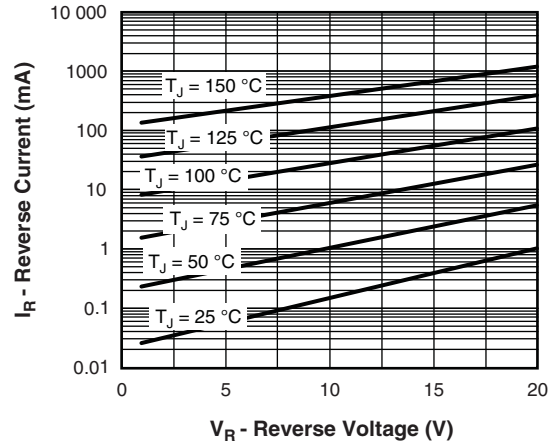


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

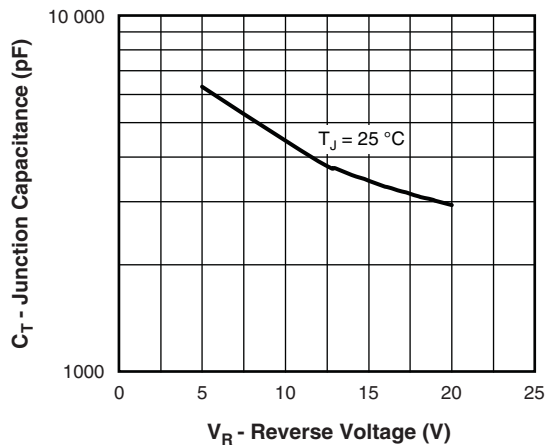


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

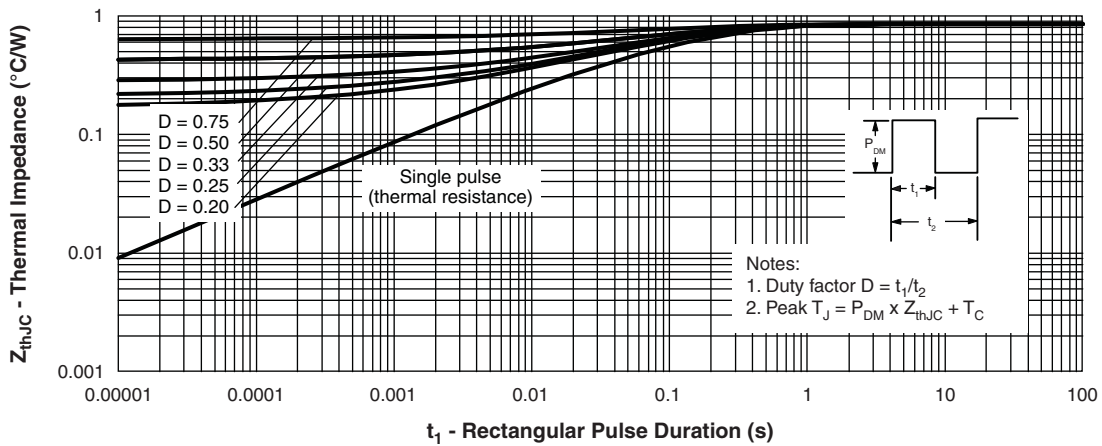


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

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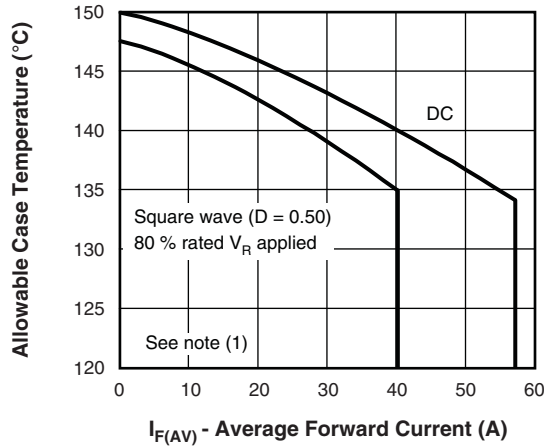


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

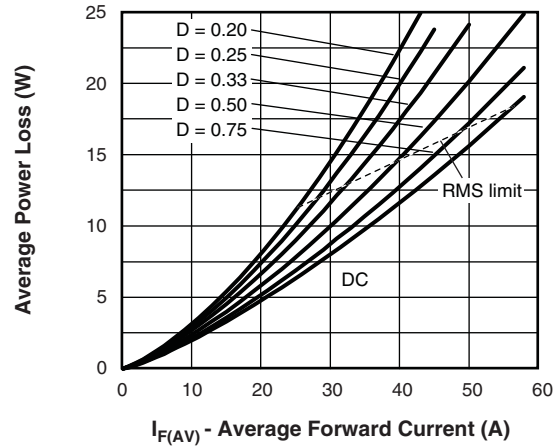


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

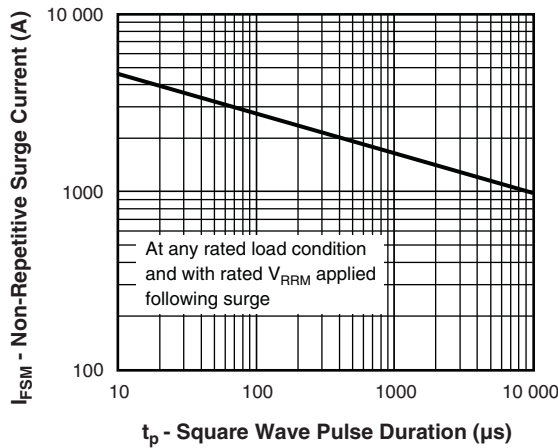


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

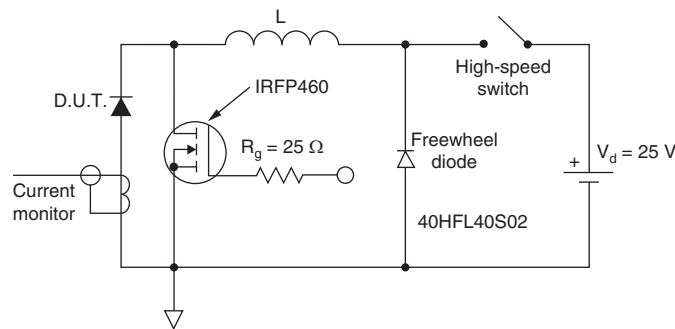


Fig. 8 - Unclamped Inductive Test Circuit

Note

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

Not for New Design - End of Life - Last Available Purchase Date is 31-August-2011



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

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

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## ORDERING INFORMATION TABLE

Device code	<b>VS-</b>	<b>87</b>	<b>C</b>	<b>N</b>	<b>Q</b>	<b>020</b>	<b>A</b>	<b>-</b>
	①	②	③	④	⑤	⑥	⑦	⑧

- 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)

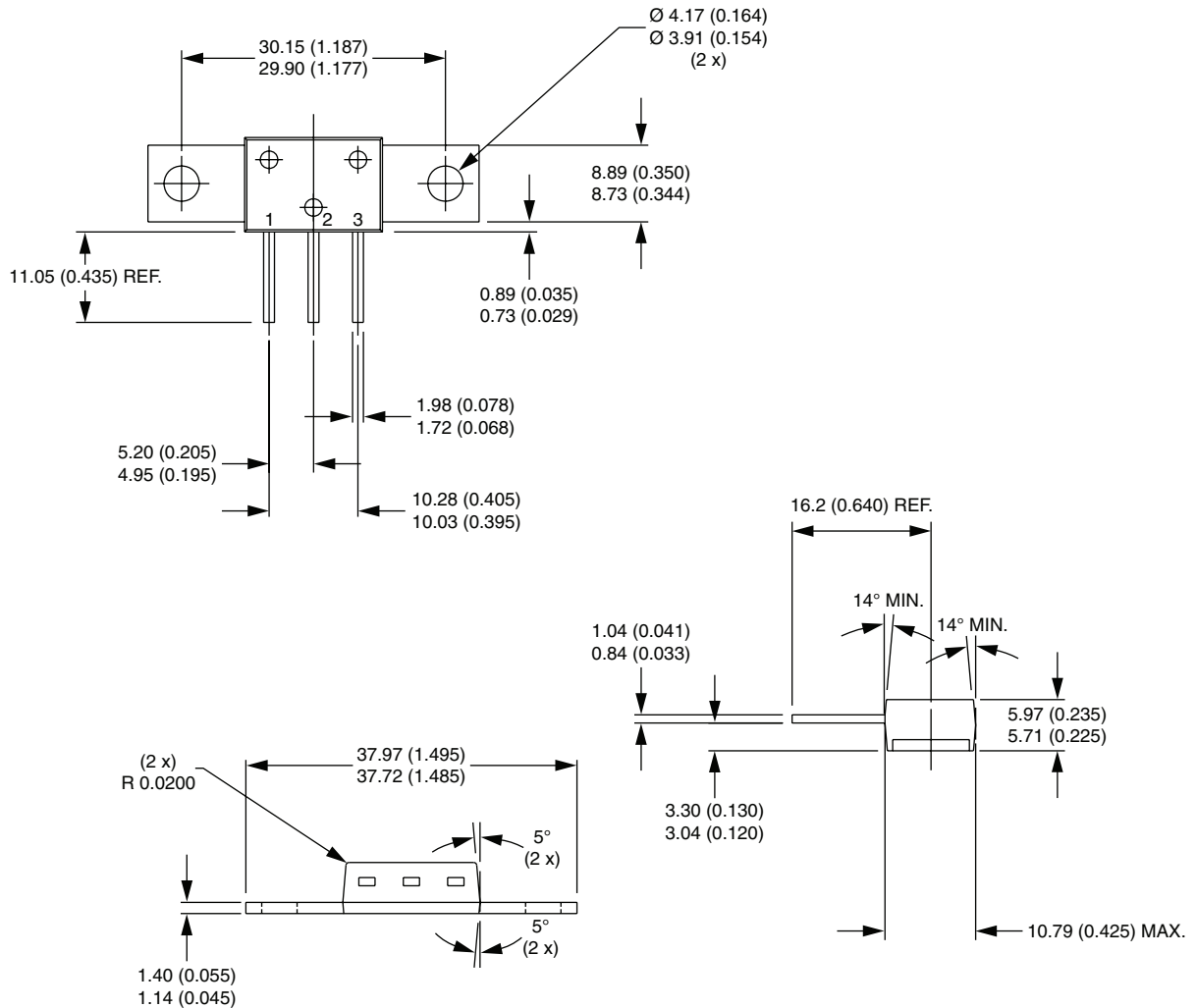
Standard pack quantity: A = 10 pieces; ASM/ASL = 20 pieces

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95354">www.vishay.com/doc?95354</a>
Part marking information	<a href="http://www.vishay.com/doc?95356">www.vishay.com/doc?95356</a>



### D-61-8, D-61-8-SM, D-61-8-SL

**DIMENSIONS FOR D-61-8** in millimeters (inches)



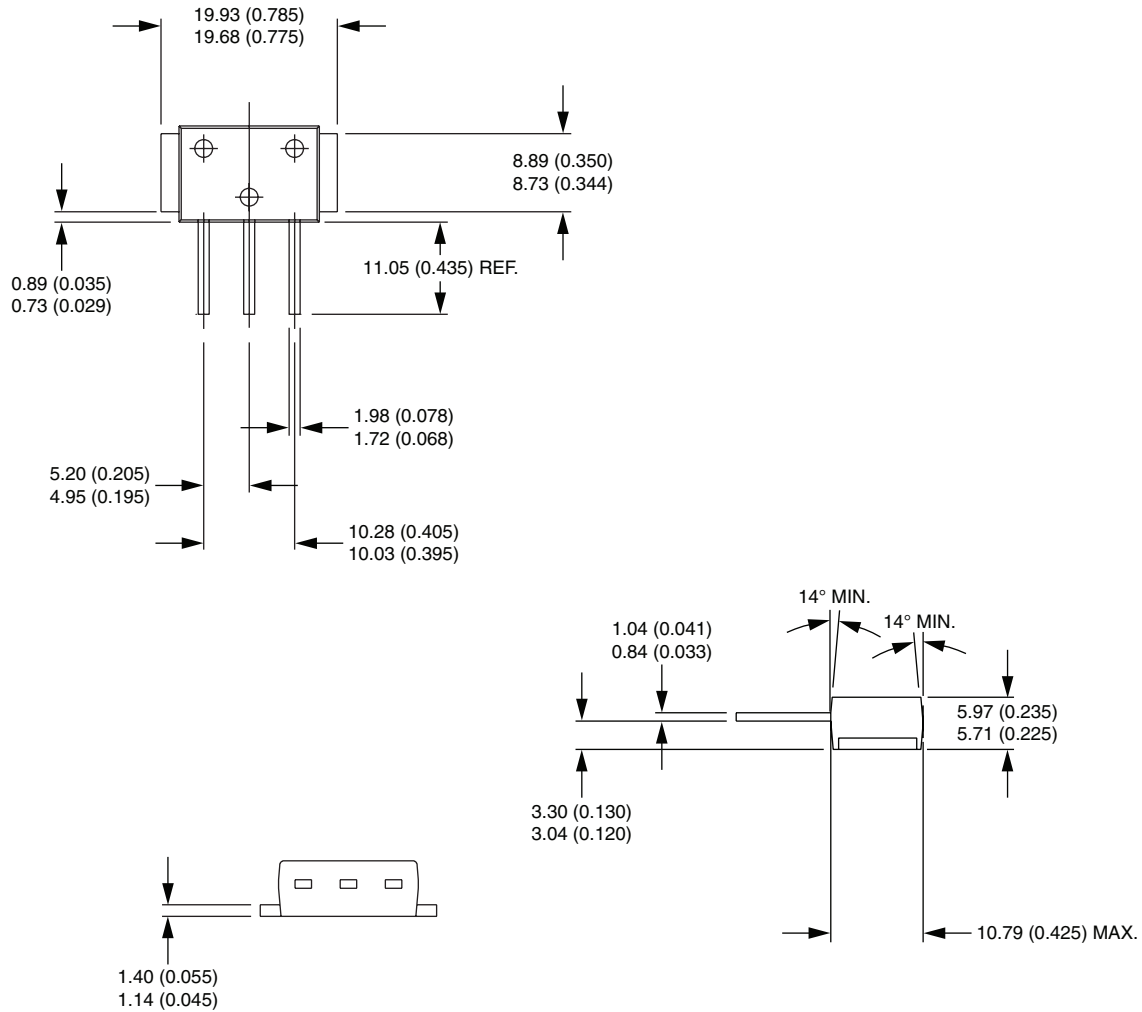
# Outline Dimensions



Vishay High Power Products

D-61-8, D-61-8-SM,  
D-61-8-SL

## DIMENSIONS FOR D-61-8-SM in millimeters (inches)









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