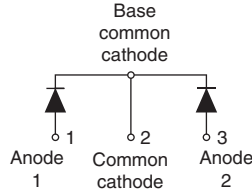
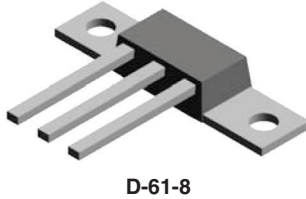
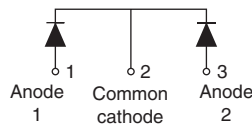
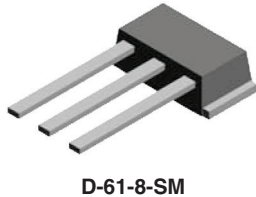


## Schottky Rectifier New Generation 3 D-61 Package, 2 x 55 A

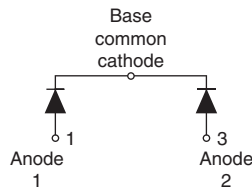
VS-111CNQ045APbF



VS-111CNQ045ASMPbF



VS-111CNQ045ASLPbF



### FEATURES

- 175 °C  $T_J$  operation
- Center tap module
- Very low forward voltage drop
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- New fully transfer-mold low profile, small footprint, high current package
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level



Available  
**RoHS\***  
COMPLIANT

### DESCRIPTION

The center tap Schottky rectifier module has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 175 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

### PRODUCT SUMMARY

|             |          |
|-------------|----------|
| $I_{F(AV)}$ | 2 x 55 A |
| $V_R$       | 45 V     |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS                                      | VALUES      | UNITS            |
|-------------|--|-------------|------------------|
| $I_{F(AV)}$ | Rectangular waveform                                 | 110         | A                |
| $V_{RRM}$   |  | 45          | V                |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine                                 | 4000        | A                |
| $V_F$       | 55 Apk, $T_J = 125 \text{ }^\circ\text{C}$ (per leg) | 0.55        | V                |
| $T_J$       | Range  | - 55 to 175 | $^\circ\text{C}$ |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | VS-111CNQ045APbF | UNITS |
|--------------------------------------|-----------|------------------|-------|
| Maximum DC reverse voltage           | $V_R$     | 45               | V     |
| Maximum working peak reverse voltage | $V_{RWM}$ |                  |       |

\* Pb containing terminations are not RoHS compliant, exemptions may apply

| ABSOLUTE MAXIMUM RATINGS  |             |   |   |        |       |
|---|-------------|---|---|--------|-------|
| PARAMETER   | SYMBOL      | TEST CONDITIONS   |   | VALUES | UNITS |
| Maximum average forward current<br>See fig. 5                             | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 152\text{ }^\circ\text{C}$ , rectangular waveform   |   | 55     | A     |
|   |             |   |   | 110    |       |
| Maximum peak one cycle non-repetitive surge current per leg<br>See fig. 7 | $I_{FSM}$   | 5 $\mu\text{s}$ sine or 3 $\mu\text{s}$ rect. pulse   | Following any rated load condition and with rated $V_{RRM}$ | 4000   | A     |
|   |             | 10 ms sine or 6 ms rect. pulse  |   | 600    |       |
| Non-repetitive avalanche energy per leg                                   | $E_{AS}$    | $T_J = 25\text{ }^\circ\text{C}$ , $I_{AS} = 8\text{ A}$ , $L = 1.7\text{ mH}$  |   | 54     | mJ    |
| Repetitive avalanche current per leg                                      | $I_{AR}$    | Current decaying linearly to zero in 1 $\mu\text{s}$<br>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<br>See fig. 1 | $V_{FM}^{(1)}$ | 55 A   | $T_J = 25\text{ }^\circ\text{C}$  | 0.61   | V                |
|  |                | 110 A  |                                   | 0.75   |                  |
|  |                | 55 A   | $T_J = 125\text{ }^\circ\text{C}$ | 0.55   |                  |
|  |                | 110 A  |                                   | 0.69   |                  |
| Maximum reverse leakage current per leg            | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$   | $V_R = \text{Rated } V_R$         | 1.5    | mA               |
|  |                | $T_J = 125\text{ }^\circ\text{C}$  |                                   | 65     |                  |
| Maximum junction capacitance per leg               | $C_T$          | $V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$ |                                   | 3900   | 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/ $\mu\text{s}$ |

**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 175  | $^\circ\text{C}$       |
| Maximum thermal resistance, junction to case per leg       | $R_{thJC}$     | DC operation   |  | 0.5          | $^\circ\text{C/W}$     |
| Maximum thermal resistance, junction to case per package   |                |  |  | 0.25         |                        |
| Typical thermal resistance, case to heatsink (D-61-8 only) | $R_{thCS}$     | Mounting surface, smooth and greased<br>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<br>(lbf · in) |
|  | maximum        |  |  | 58 (50)      |                        |
| Marking device   |                | Case style D-61-8  |  | 111CNQ045A   |                        |
|  |                | Case style D-61-8-SM   |  | 111CNQ045ASM |                        |
|  |                | Case style D-61-8-SL   |  | 111CNQ045ASL |                        |

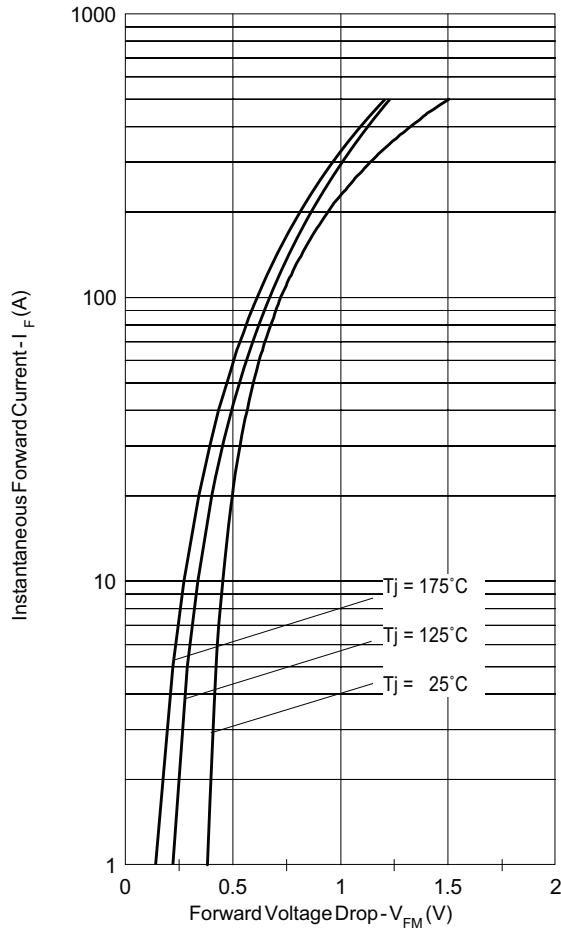


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

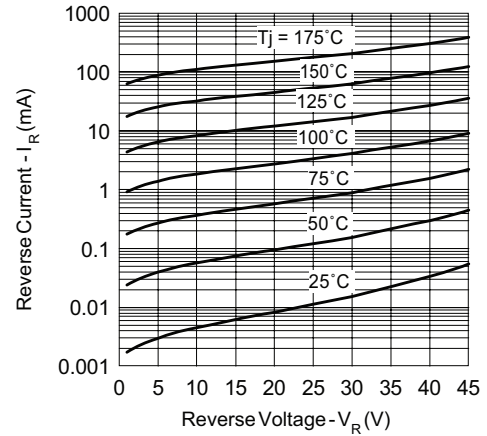


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

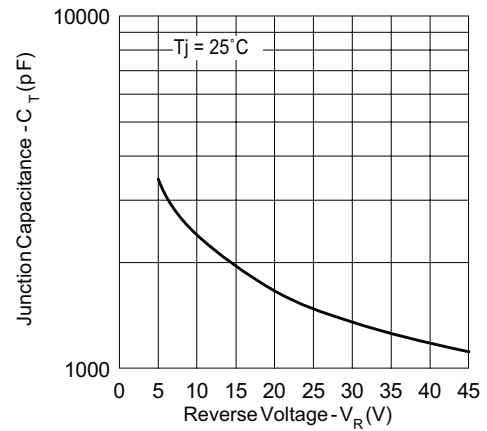


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

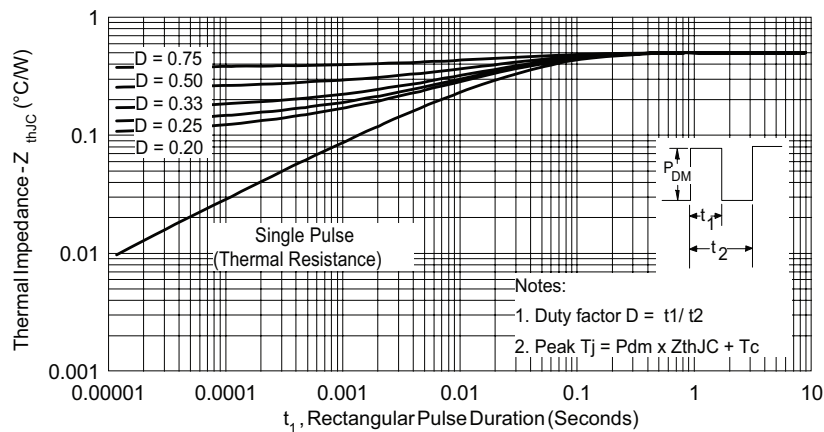


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

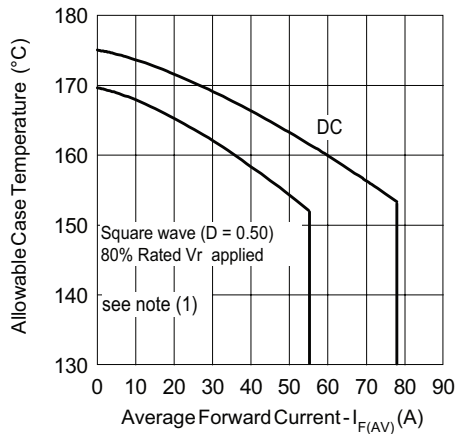


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

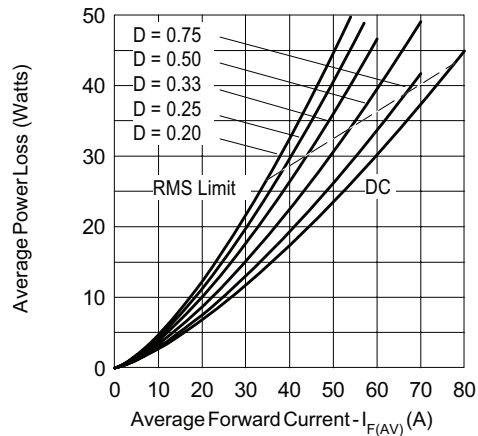


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

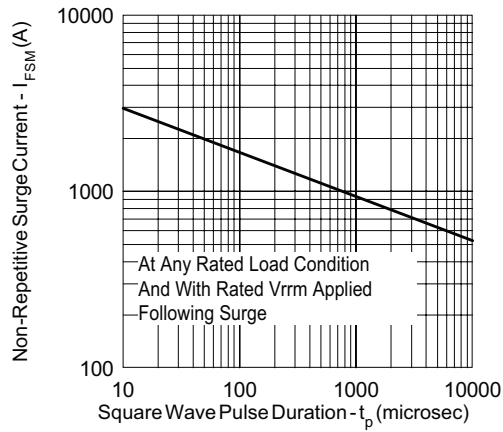


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

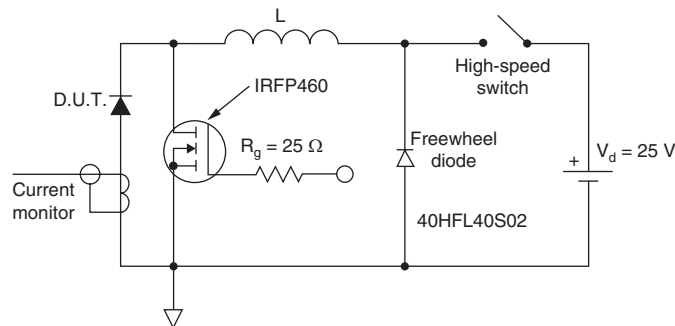


Fig. 8 - Unclamped Inductive Test Circuit

**Note**

- (1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;
- $P_d$  = 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  $V_R$



# VS-111CNQ045A PbF Series

Schottky Rectifier  
New Generation 3 D-61 Package, 2 x 55 A

Vishay High Power Products

## ORDERING INFORMATION TABLE

|             |            |            |          |          |          |            |          |            |
|-------------|------------|------------|----------|----------|----------|------------|----------|------------|
| Device code | <b>VS-</b> | <b>111</b> | <b>C</b> | <b>N</b> | <b>Q</b> | <b>045</b> | <b>A</b> | <b>PbF</b> |
|             | ①          | ②          | ③        | ④        | ⑤        | ⑥          | ⑦        | ⑧          |

- 1** - HPP product suffix
- 2** - Current rating (111 = 110 A)
- 3** - Circuit configuration:  
C = Common cathode
- 4** - Package:  
N = D-61
- 5** - Schottky "Q" series
- 6** - Voltage ratings (045 = 45 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

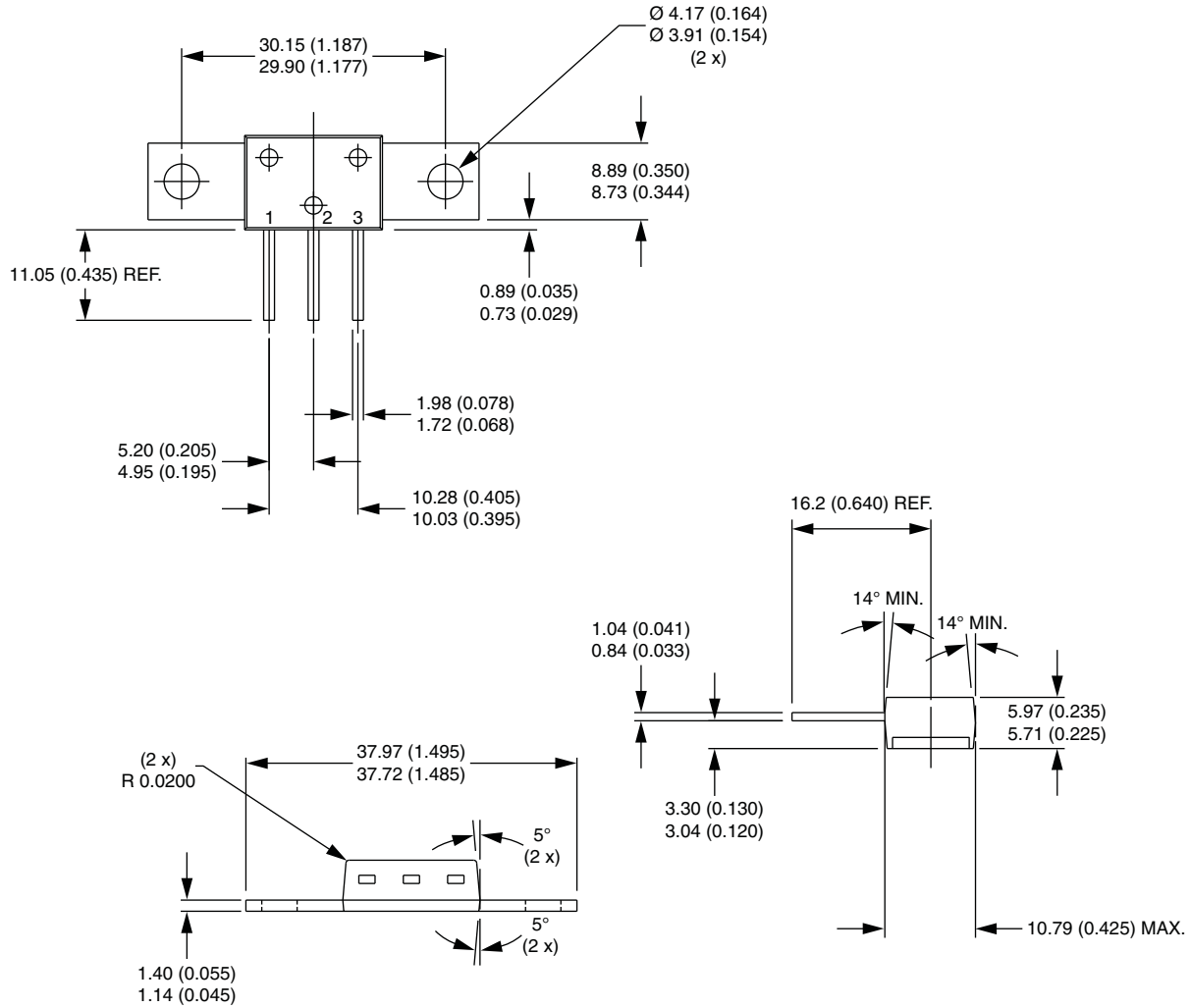
Standard pack quantity: A = 10 pieces; ASM/ASL = 20 pieces

| 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 - D-61-8** in millimeters (inches)



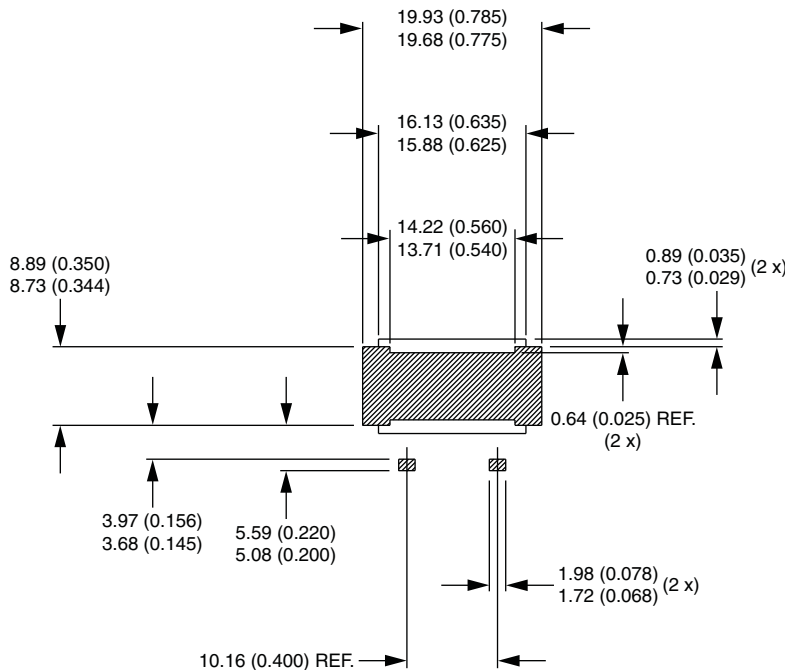
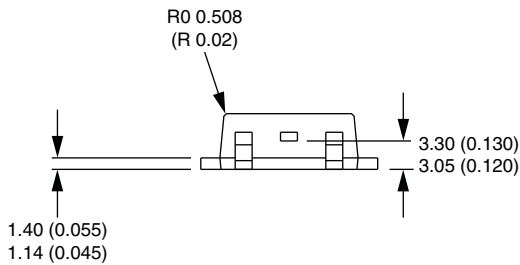
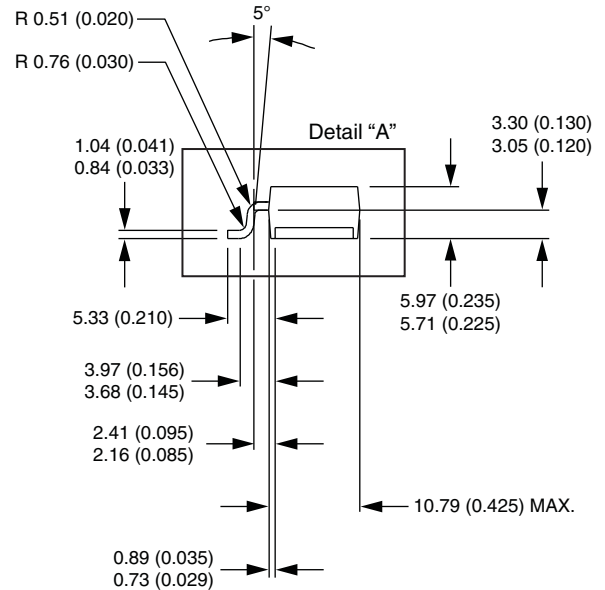


## DIMENSIONS - D-61-8-SM in millimeters (inches)





### DIMENSIONS - D-61-8-SL in millimeters (inches)







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