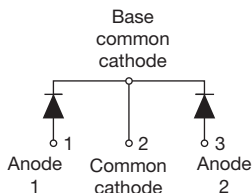
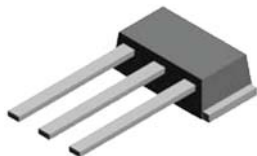
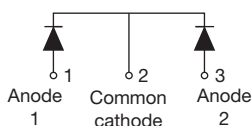
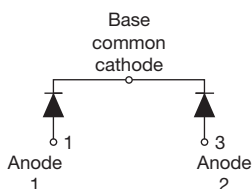


## High Performance Schottky Rectifier

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

**VS-111CNQ045APbF**

**D-61-8**

**VS-111CNQ045ASMPbF**

**D-61-8-SM**

**VS-111CNQ045ASLPbF**

**D-61-8-SL**


#### FEATURES

- 175 °C  $T_J$  operation
- Center tap module
- Very low forward voltage drop
- High frequency operation
- High power discrete
- 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
- 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)

#### Note

\* This datasheet provides information about parts that are RoHS-compliant and/or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information/tables in this datasheet for details.



#### 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

|                 |                 |
|-----------------|-----------------|
| Package         | D-61            |
| $I_{F(AV)}$     | 2 x 55 A        |
| $V_R$           | 45 V            |
| $V_F$ at $I_F$  | 0.61            |
| $I_{RM}$ max.   | 65 mA at 125 °C |
| $T_J$ max.      | 175 °C          |
| Diode variation | Common cathode  |
| $E_{AS}$        | 54 mJ           |

#### 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 A <sub>pk</sub> , $T_J = 125$ °C (per leg) | 0.55       | V     |
| $T_J$       | Range                                         | -55 to 175 | °C    |

#### VOLTAGE RATINGS

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

**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     |
| per leg<br>per device                                                     |             |                                                                                                                           | 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                                                                       | 4000   | A     |
|                                                                           |             | 10 ms sine or 6 ms rect. pulse                                                                                            | 600    |       |
|                                                                           |             | Following any rated load condition and with rated $V_{RRM}$ applied                                                       |        |       |
| 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                                                                                       | 0.61   | V                |
|                                                    |                | 110 A                                                                                      | 0.75   |                  |
|                                                    |                | 55 A                                                                                       | 0.55   |                  |
|                                                    |                | 110 A                                                                                      | 0.69   |                  |
| Maximum reverse leakage current per leg            | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^{\circ}\text{C}$                                                         | 1.5    | mA               |
|                                                    |                | $T_J = 125\text{ }^{\circ}\text{C}$                                                        | 65     |                  |
|                                                    |                | $V_R = \text{Rated } V_R$                                                                  |        |                  |
| 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 |                        |  |

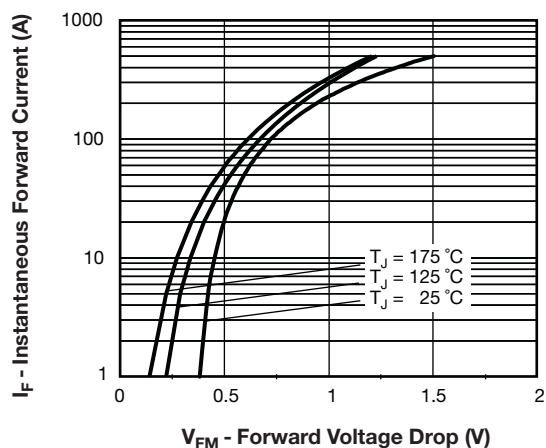


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

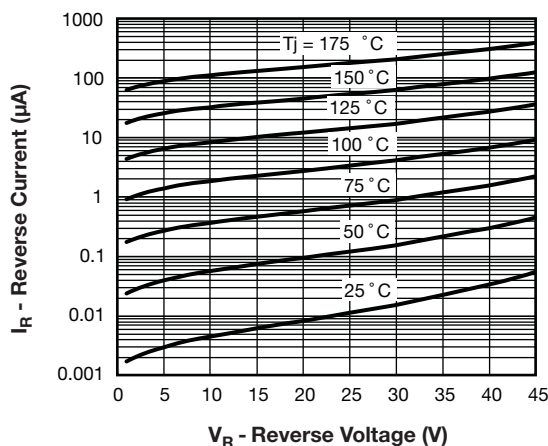


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

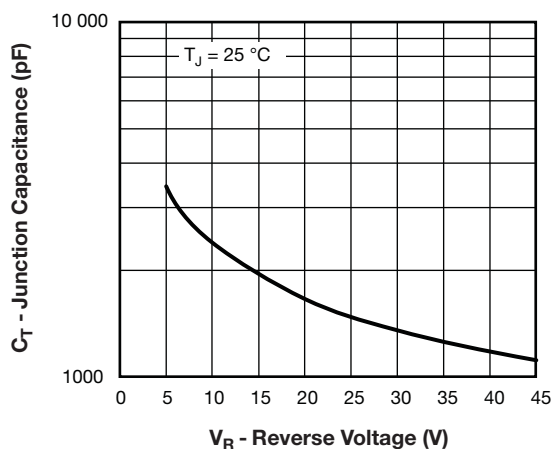


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

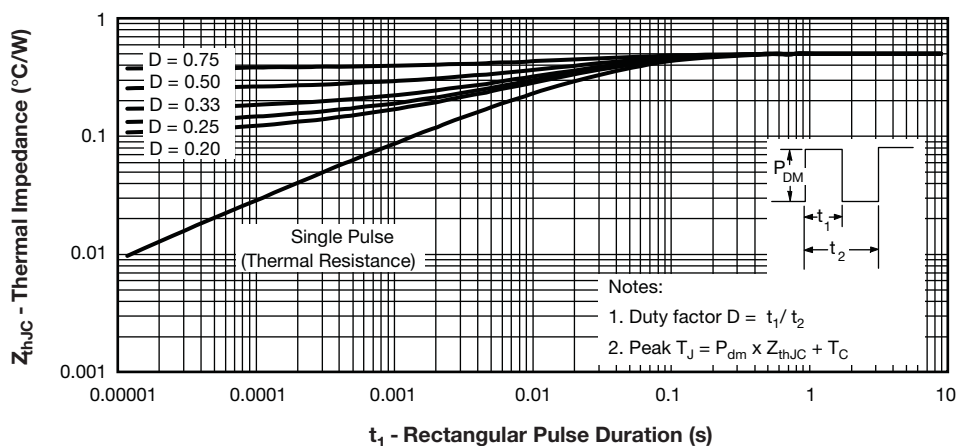


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

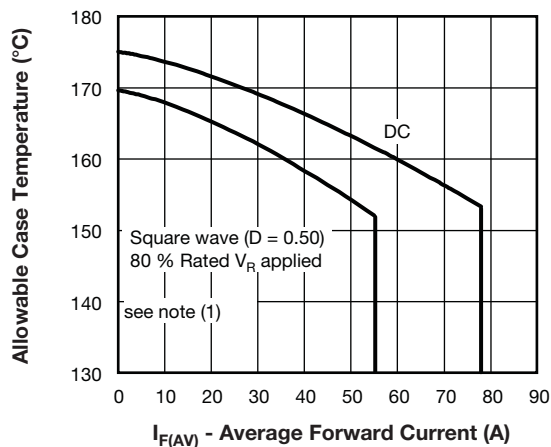


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

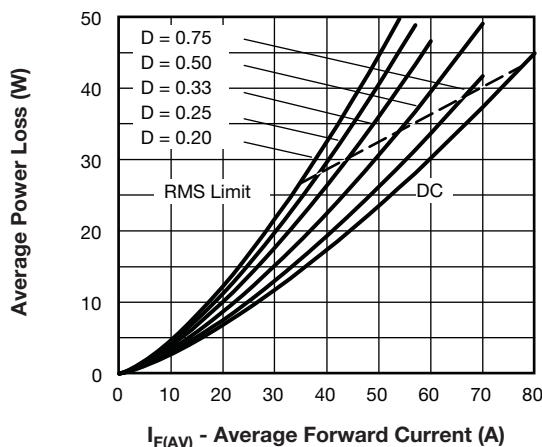


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

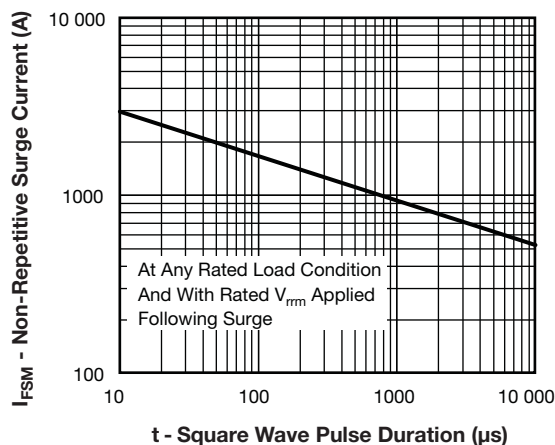


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

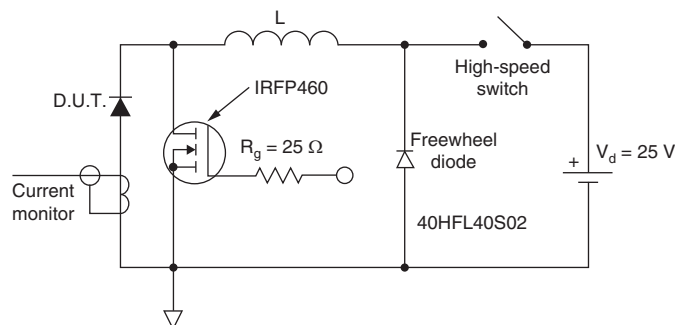


Fig. 8 - Unclamped Inductive Test Circuit

#### 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  $V_R$



## ORDERING INFORMATION TABLE

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

- 1** - Vishay Semiconductors product
- 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)







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