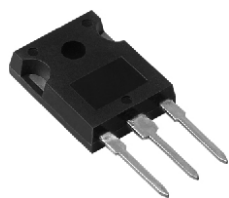
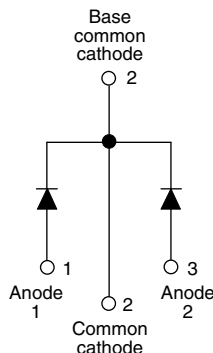


## Schottky Rectifier, 2 x 15 A



TO-247AC



### FEATURES

- 175 °C  $T_J$  operation
- 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
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified according to JEDEC-JESD47
- Halogen-free according to IEC 61249-2-21 definition (-N3 only)



### PRODUCT SUMMARY

|                 |                   |
|-----------------|-------------------|
| Package         | TO-247AC          |
| $I_{F(AV)}$     | 2 x 15 A          |
| $V_R$           | 80 V, 90 V, 100 V |
| $V_F$ at $I_F$  | 0.67 V            |
| $I_{RM}$ max.   | 7 mA at 125 °C    |
| $T_J$ max.      | 175 °C            |
| Diode variation | Common cathode    |
| $E_{AS}$        | 7.5 mJ            |

### DESCRIPTION

The VS-30CPQ...G... center tap Schottky rectifier has been optimized for low reverse leakage at high temperature. 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.

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS                  | VALUES      | UNITS |
|-------------|----------------------------------|-------------|-------|
| $I_{F(AV)}$ | Rectangular waveform             | 30          | A     |
| $V_{RRM}$   |                                  | 80 to 100   | V     |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine             | 920         | A     |
| $V_F$       | 15 Apk, $T_J = 125$ °C (per leg) | 0.67        | V     |
| $T_J$       |                                  | - 55 to 175 | °C    |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | VS-30CPQ080GPbF | VS-30CPQ080G-N3 | VS-30CPQ090GPbF | VS-30CPQ090G-N3 | VS-30CPQ100GPbF | VS-30CPQ100G-N3 | UNITS |
|--------------------------------------|-----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------|
| Maximum DC reverse voltage           | $V_R$     | 80              | 80              | 90              | 90              | 100             | 100             | 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 $T_C = 140$ °C, rectangular waveform                                                             | 30         | A     |
| Maximum peak one cycle non-repetitive surge current per leg<br>See fig. 7 | $I_{FSM}$   | 5 $\mu s$ sine or 3 $\mu s$ rect. pulse<br>10 ms sine or 6 ms rect. pulse                                           | 920<br>240 | A     |
| Non-repetitive avalanche energy per leg                                   | $E_{AS}$    | $T_J = 25$ °C, $I_{AS} = 0.50$ A, $L = 60$ mH                                                                       | 7.50       | mJ    |
| Repetitive avalanche current per leg                                      | $I_{AR}$    | Current decaying linearly to zero in 1 $\mu s$<br>Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical | 0.50       | A     |

**ELECTRICAL SPECIFICATIONS**

| PARAMETER                                             | SYMBOL         | TEST CONDITIONS                                                                           |                                     | VALUES | UNITS      |
|-------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------|-------------------------------------|--------|------------|
| Maximum forward voltage drop per leg<br>See fig. 1    | $V_{FM}^{(1)}$ | 15 A                                                                                      | $T_J = 25\text{ }^{\circ}\text{C}$  | 0.86   | V          |
|                                                       |                | 30 A                                                                                      |                                     | 1.05   |            |
|                                                       |                | 15 A                                                                                      | $T_J = 125\text{ }^{\circ}\text{C}$ | 0.67   |            |
|                                                       |                | 30 A                                                                                      |                                     | 0.81   |            |
| Maximum reverse leakage current per leg<br>See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^{\circ}\text{C}$                                                        | $V_R = \text{Rated } V_R$           | 0.28   | mA         |
|                                                       |                | $T_J = 125\text{ }^{\circ}\text{C}$                                                       |                                     | 7      |            |
| Maximum junction capacitance per leg                  | $C_T$          | $V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^{\circ}\text{C}$ |                                     | 500    | pF         |
| Typical series inductance per leg                     | $L_S$          | Measured lead to lead 5 mm from package body                                              |                                     | 7.5    | nH         |
| Maximum voltage rate of change                        | dV/dt          | Rated $V_R$                                                                               |                                     | 10 000 | V/ $\mu$ s |

**Note**

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

**THERMAL - MECHANICAL SPECIFICATIONS**

| PARAMETER                                                | SYMBOL                            | TEST CONDITIONS                      | VALUES      | UNITS                  |
|----------------------------------------------------------|-----------------------------------|--------------------------------------|-------------|------------------------|
| Maximum junction and storage temperature range           | T <sub>J</sub> , T <sub>Stg</sub> |                                      | - 55 to 175 | °C                     |
| Maximum thermal resistance, junction to case per leg     | R <sub>thJC</sub>                 | DC operation<br>See fig. 4           | 2.20        | °C/W                   |
| Maximum thermal resistance, junction to case per package |                                   | DC operation                         | 1.10        |                        |
| Typical thermal resistance, case to heatsink             | R <sub>thCS</sub>                 | Mounting surface, smooth and greased | 0.24        |                        |
| Approximate weight                                       |                                   |                                      | 6           | g                      |
|                                                          |                                   |                                      | 0.21        | oz.                    |
| Mounting torque                                          | minimum<br>maximum                | Non-lubricated threads               | 6 (5)       | kgf · cm<br>(lbf · in) |
|                                                          |                                   |                                      | 12 (10)     |                        |
| Marking device                                           |                                   | Case style TO-247AC (JEDEC)          | 30CPQ080G   |                        |
|                                                          |                                   |                                      | 30CPQ090G   |                        |
|                                                          |                                   |                                      | 30CPQ100G   |                        |

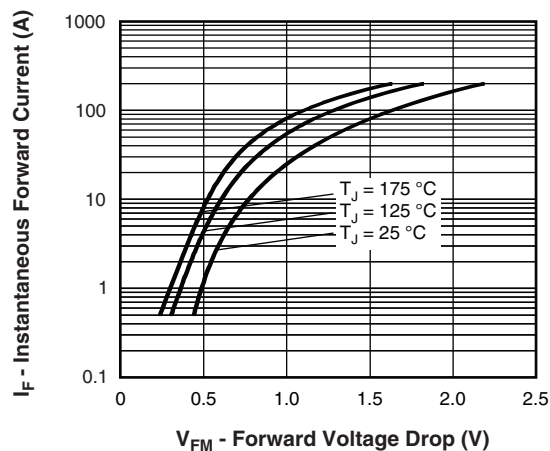


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

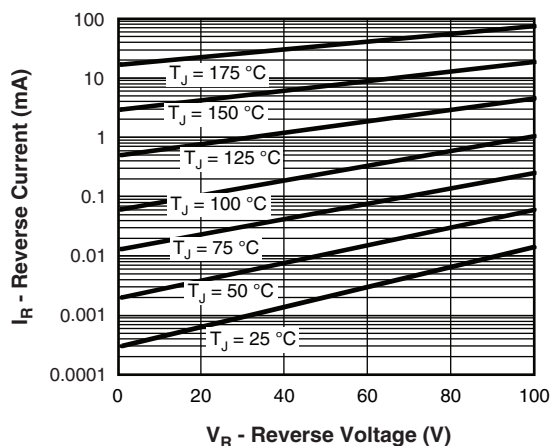


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

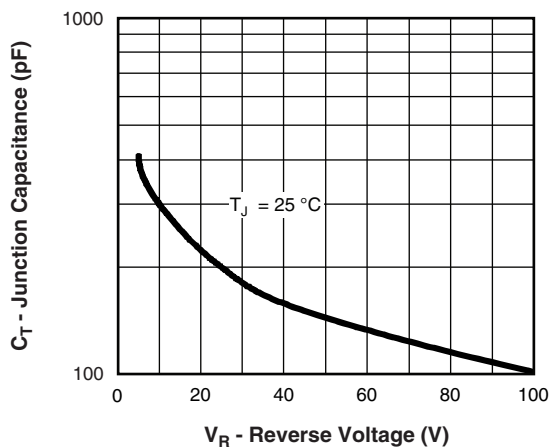


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

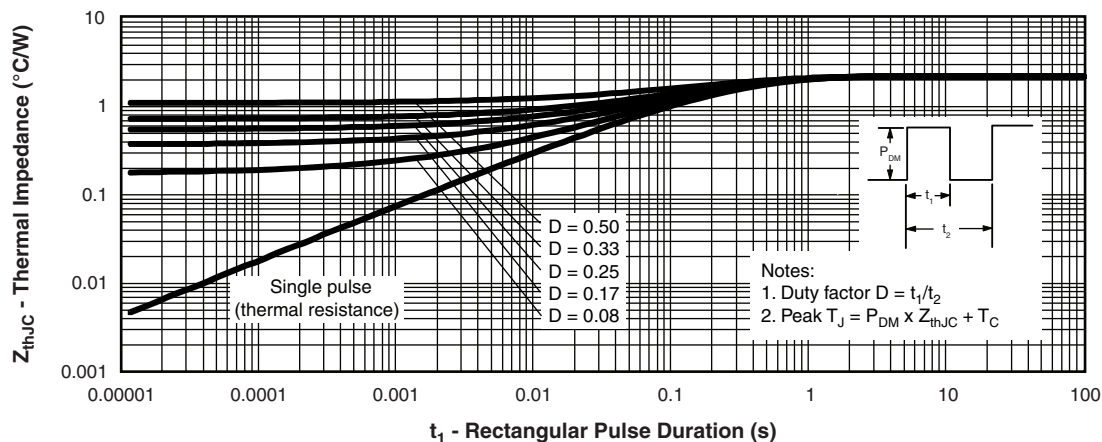


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

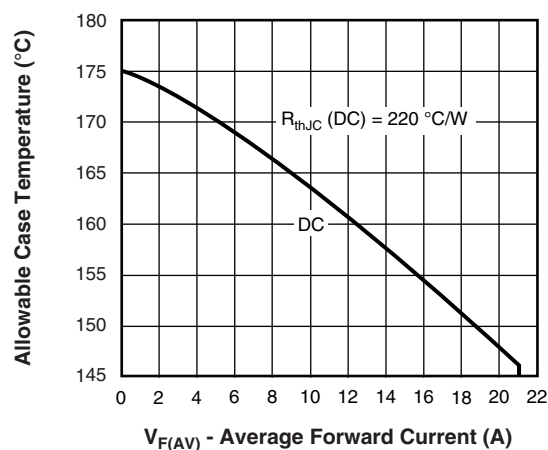


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

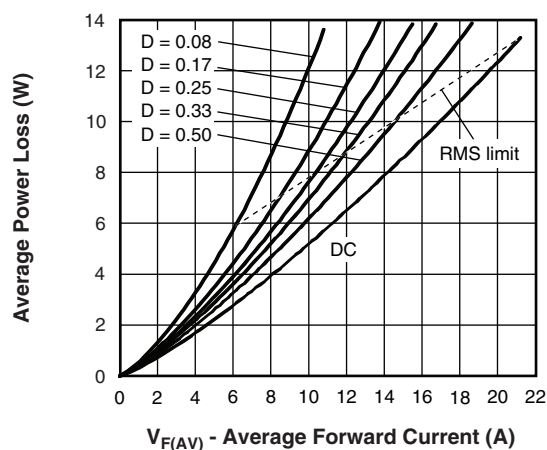


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

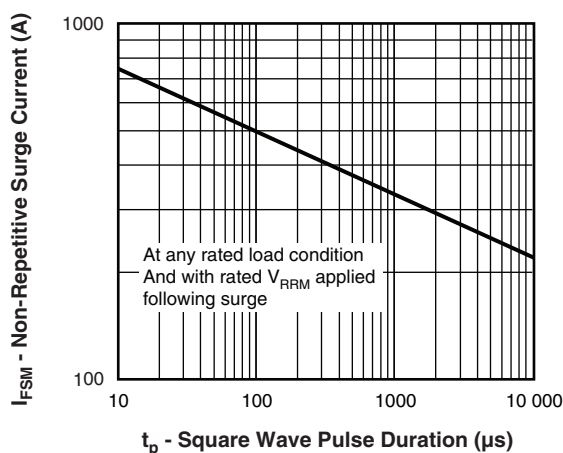


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

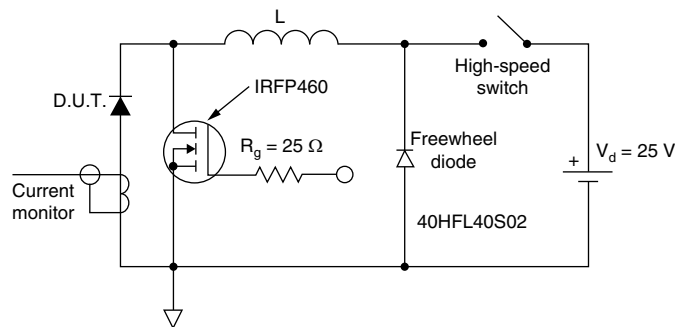


Fig. 8 - Unclamped Inductive Test Circuit



## ORDERING INFORMATION TABLE

|             |     |    |   |   |   |     |   |     |
|-------------|-----|----|---|---|---|-----|---|-----|
| Device code | VS- | 30 | C | P | Q | 100 | G | PbF |
|             | 1   | 2  | 3 | 4 | 5 | 6   | 7 | 8   |

- 1** - Vishay Semiconductors product
- 2** - Current rating
- 3** - Circuit configuration:  
C = Common cathode
- 4** - Package:  
P = TO-247
- 5** - Schottky "Q" series
- 6** - Voltage code
- 7** - G = Schottky generation
- 8** - Environmental digit
  - PbF = Lead (Pb)-free and RoHS compliant
  - -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free

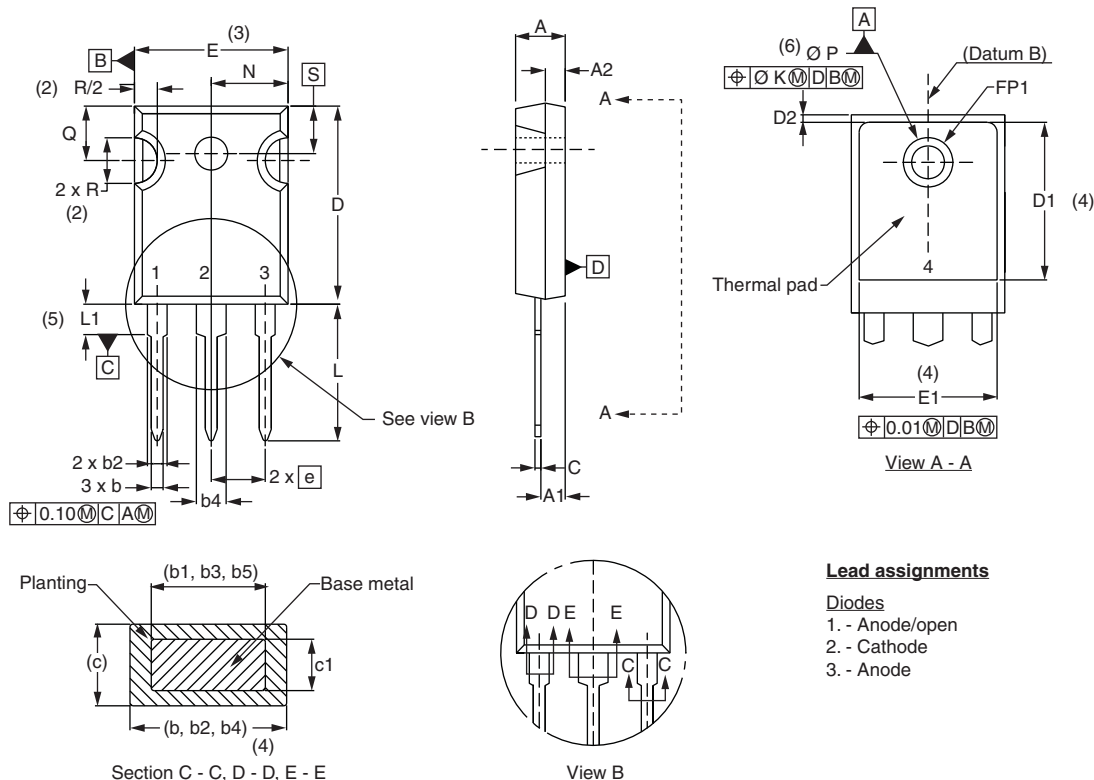
|             |
|-------------|
| 080 = 80 V  |
| 090 = 90 V  |
| 100 = 100 V |

| ORDERING INFORMATION (Example) |                  |                        |                         |
|--------------------------------|------------------|------------------------|-------------------------|
| PREFERRED P/N                  | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION   |
| VS-30CPQ080GPbF                | 25               | 500                    | Antistatic plastic tube |
| VS-30CPQ080G-N3                | 25               | 500                    | Antistatic plastic tube |
| VS-30CPQ090GPbF                | 25               | 500                    | Antistatic plastic tube |
| VS-30CPQ090G-N3                | 25               | 500                    | Antistatic plastic tube |
| VS-30CPQ100GPbF                | 25               | 500                    | Antistatic plastic tube |
| VS-30CPQ100G-N3                | 25               | 500                    | Antistatic plastic tube |

| LINKS TO RELATED DOCUMENTS |                                                                                     |
|----------------------------|-------------------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95223">www.vishay.com/doc?95223</a>              |
| Part marking information   | TO-247AC PbF <a href="http://www.vishay.com/doc?95226">www.vishay.com/doc?95226</a> |
|                            | TO-247AC -N3 <a href="http://www.vishay.com/doc?95007">www.vishay.com/doc?95007</a> |
| SPIICE model               | <a href="http://www.vishay.com/doc?95469">www.vishay.com/doc?95469</a>              |



**DIMENSIONS** in millimeters and inches



### Lead assignments

#### Diodes

1. - Anode/open
2. - Cathode
3. - Anode

| SYMBOL | MILLIMETERS |       | INCHES |       | NOTES |
|--------|-------------|-------|--------|-------|-------|
|        | MIN.        | MAX.  | MIN.   | MAX.  |       |
| A      | 4.65        | 5.31  | 0.183  | 0.209 |       |
| A1     | 2.21        | 2.59  | 0.087  | 0.102 |       |
| A2     | 1.50        | 2.49  | 0.059  | 0.098 |       |
| b      | 0.99        | 1.40  | 0.039  | 0.055 |       |
| b1     | 0.99        | 1.35  | 0.039  | 0.053 |       |
| b2     | 1.65        | 2.39  | 0.065  | 0.094 |       |
| b3     | 1.65        | 2.37  | 0.065  | 0.094 |       |
| b4     | 2.59        | 3.43  | 0.102  | 0.135 |       |
| b5     | 2.59        | 3.38  | 0.102  | 0.133 |       |
| c      | 0.38        | 0.86  | 0.015  | 0.034 |       |
| c1     | 0.38        | 0.76  | 0.015  | 0.030 |       |
| D      | 19.71       | 20.70 | 0.776  | 0.815 | 3     |
| D1     | 13.08       | -     | 0.515  | -     | 4     |

| SYMBOL    | MILLIMETERS |       | INCHES    |       | NOTES |
|-----------|-------------|-------|-----------|-------|-------|
|           | MIN.        | MAX.  | MIN.      | MAX.  |       |
| D2        | 0.51        | 1.30  | 0.020     | 0.051 |       |
| E         | 15.29       | 15.87 | 0.602     | 0.625 | 3     |
| E1        | 13.72       | -     | 0.540     | -     |       |
| e         | 5.46 BSC    |       | 0.215 BSC |       |       |
| FK        | 2.54        |       | 0.010     |       |       |
| L         | 14.20       | 16.10 | 0.559     | 0.634 |       |
| L1        | 3.71        | 4.29  | 0.146     | 0.169 |       |
| N         | 7.62 BSC    |       | 0.3       |       |       |
| $\Phi P$  | 3.56        | 3.66  | 0.14      | 0.144 |       |
| $\Phi P1$ | -           | 6.98  | -         | 0.275 |       |
| Q         | 5.31        | 5.69  | 0.209     | 0.224 |       |
| R         | 4.52        | 5.49  | 1.78      | 0.216 |       |
| S         | 5.51 BSC    |       | 0.217 BSC |       |       |

### Notes

- (1) Dimensioning and tolerancing per ASME Y14.5M-1994
- (2) Contour of slot optional
- (3) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (4) Thermal pad contour optional with dimensions D1 and E1
- (5) Lead finish uncontrolled in L1
- (6)  $\Phi P$  to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- (7) Outline conforms to JEDEC outline TO-247 with exception of dimension c



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