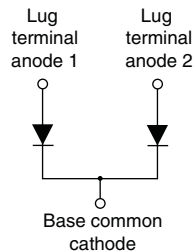


## Schottky Rectifier, 300 A



TO-244



### FEATURES

- 175 °C  $T_J$  operation
- Center tap module
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead (Pb)-free
- Designed and qualified for industrial level



**RoHS**  
COMPLIANT

### DESCRIPTION

The 303CNQ... center tap Schottky rectifier module series 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 high current switching power supplies, plating power supplies, UPS systems, converters, freewheeling diodes, welding, and reverse battery protection.

### PRODUCT SUMMARY

|             |       |
|-------------|-------|
| $I_{F(AV)}$ | 300 A |
| $V_R$       | 100 V |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS                        | VALUES      | UNITS |
|-------------|----------------------------------------|-------------|-------|
| $I_{F(AV)}$ | Rectangular waveform                   | 300         | A     |
| $V_{RRM}$   |                                        | 100         | V     |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine                   | 22 000      | A     |
| $V_F$       | 150 Apk, $T_J = 125^\circ C$ (per leg) | 0.72        | V     |
| $T_J$       | Range                                  | - 55 to 175 | °C    |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | 303CNQ100PbF | UNITS |
|--------------------------------------|-----------|--------------|-------|
| Maximum DC reverse voltage           | $V_R$     | 100          | V     |
| Maximum working peak reverse voltage | $V_{RWM}$ |              |       |

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER                                                                 | SYMBOL      | TEST CONDITIONS                                                                                                     | VALUES | UNITS |
|---------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------|--------|-------|
| Maximum average forward current<br>per leg<br>See fig. 5<br>per device    | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 138^\circ C$ , rectangular waveform                                                       | 150    | A     |
|                                                                           |             |                                                                                                                     | 300    |       |
| 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                                                                             | 22 000 |       |
|                                                                           |             | 10 ms sine or 6 ms rect. pulse                                                                                      | 2500   |       |
| Non-repetitive avalanche energy per leg                                   | $E_{AS}$    | $T_J = 25^\circ C$ , $I_{AS} = 13 A$ , $L = 0.2 mH$                                                                 | 15     | 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 | 1      | A     |

| ELECTRICAL SPECIFICATIONS                             |                                |                                                                               |                                       |        |       |  |
|-------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------|---------------------------------------|--------|-------|--|
| PARAMETER                                             | SYMBOL                         | TEST CONDITIONS                                                               |                                       | VALUES | UNITS |  |
| Maximum forward voltage drop per leg<br>See fig. 1    | V <sub>FM</sub> <sup>(1)</sup> | 150 A                                                                         | T <sub>J</sub> = 25 °C                | 0.91   | V     |  |
|                                                       |                                | 300 A                                                                         |                                       | 1.09   |       |  |
|                                                       |                                | 150 A                                                                         | T <sub>J</sub> = 125 °C               | 0.72   |       |  |
|                                                       |                                | 300 A                                                                         |                                       | 0.85   |       |  |
| Maximum reverse leakage current per leg<br>See fig. 2 | I <sub>RM</sub> <sup>(1)</sup> | T <sub>J</sub> = 25 °C                                                        | V <sub>R</sub> = Rated V <sub>R</sub> | 4.5    | mA    |  |
|                                                       |                                | T <sub>J</sub> = 125 °C                                                       |                                       | 80     |       |  |
| Maximum junction capacitance per leg                  | C <sub>T</sub>                 | V <sub>R</sub> = 5 V <sub>DC</sub> (test signal range 100 kHz to 1 MHz) 25 °C |                                       | 4150   | pF    |  |
| Typical series inductance per leg                     | L <sub>S</sub>                 | From top of terminal hole to mounting plane                                   |                                       | 6.0    | nH    |  |
| Maximum voltage rate of change                        | dV/dt                          | Rated V <sub>R</sub>                                                          |                                       | 10 000 | V/μs  |  |

**Note**(1) Pulse width < 300  $\mu$ s, duty cycle < 2 %

| THERMAL - MECHANICAL SPECIFICATIONS                           |                |          |      |          |                      |
|---------------------------------------------------------------|----------------|----------|------|----------|----------------------|
| PARAMETER                                                     | SYMBOL         | MIN.     | TYP. | MAX.     | UNITS                |
| Maximum junction and storage temperature range                | $T_J, T_{Stg}$ | - 55     | -    | 175      | $^{\circ}\text{C}$   |
| Thermal resistance, junction to case<br>per leg<br>per module | $R_{thJC}$     | -        | -    | 0.28     | $^{\circ}\text{C/W}$ |
|                                                               |                | -        | -    | 0.14     |                      |
| Thermal resistance, case to heatsink                          | $R_{thCS}$     | -        | 0.10 | -        |                      |
| Weight                                                        |                | -        | 68   | -        | g                    |
|                                                               |                | -        | 2.4  | -        | oz.                  |
| Mounting torque                                               |                | 35.4 (4) | -    | 53.1 (6) | lbf · in<br>(N · m)  |
| Mounting torque center hole                                   |                | 30 (3.4) | -    | 40 (4.6) |                      |
| Terminal torque                                               |                | 30 (3.4) | -    | 44.2 (5) |                      |
| Vertical pull                                                 |                | -        | -    | 80       | lbf · in             |
| 2" lever pull                                                 |                | -        | -    | 35       |                      |

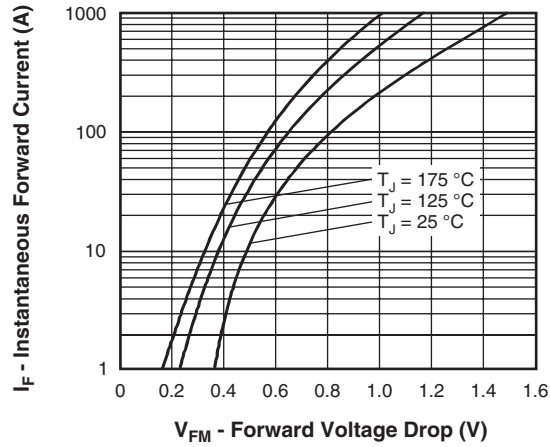


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

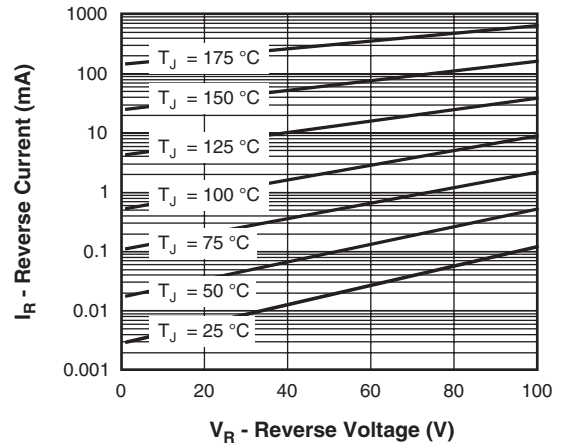


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

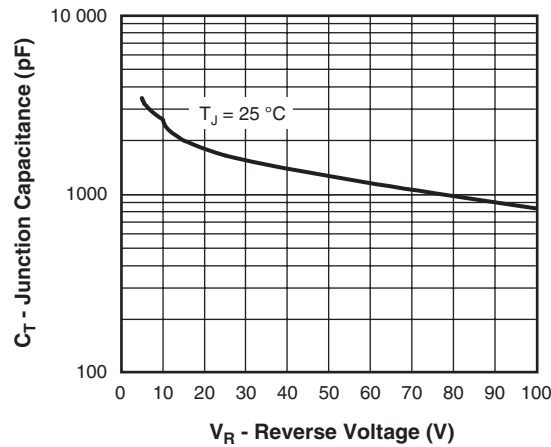


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

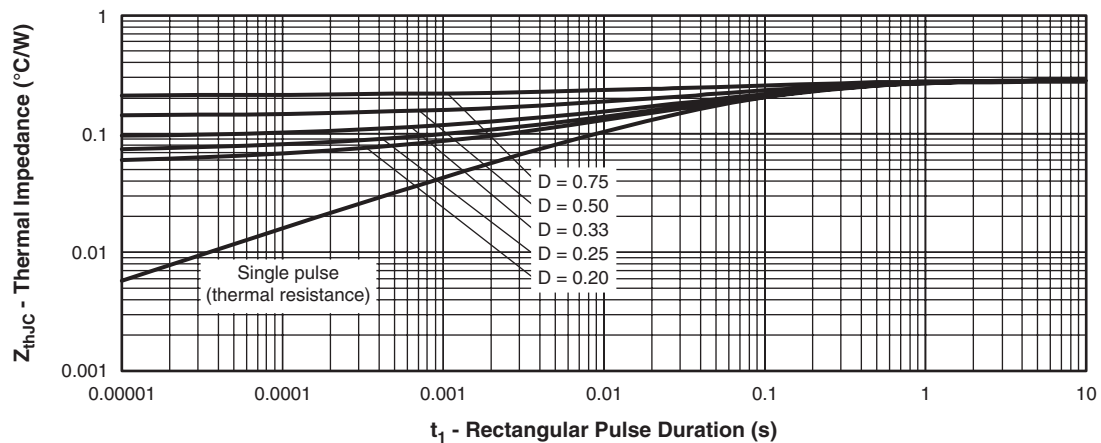


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

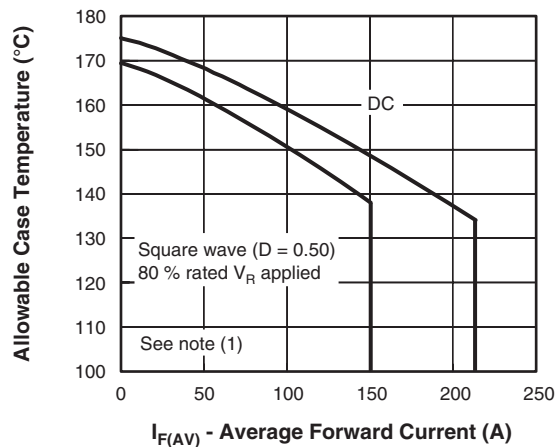


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

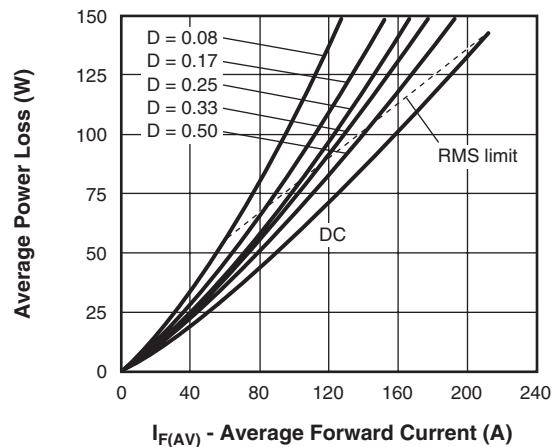


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

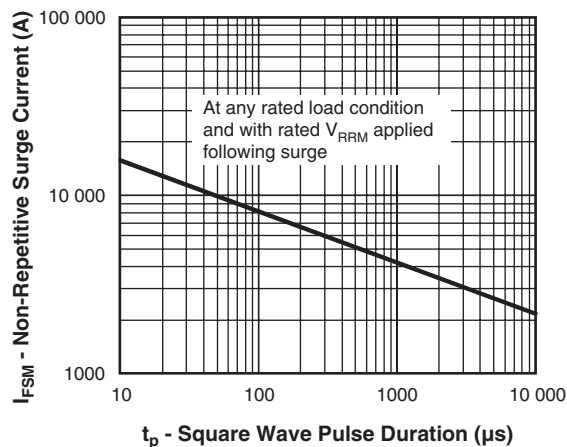


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

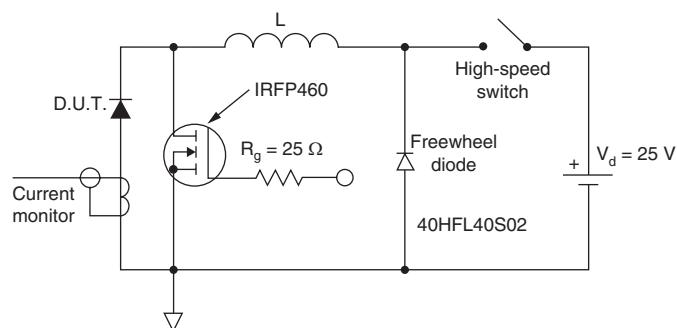


Fig. 8 - Unclamped Inductive Test Circuit

#### 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 | <b>30</b> | <b>3</b> | <b>C</b> | <b>N</b> | <b>Q</b> | <b>100</b> | <b>PbF</b> |
|             | ①         | ②        | ③        | ④        | ⑤        | ⑥          | ⑦          |

- |   |   |                                |
|---|---|--------------------------------|
| 1 | - | Average current rating (x 10)  |
| 2 | - | Product silicon identification |
| 3 | - | C = Circuit configuration      |
| 4 | - | N = Not isolated               |
| 5 | - | Q = Schottky rectifier diode   |
| 6 | - | Voltage rating (100 = 100 V)   |
| 7 | - | Lead (Pb)-free                 |

| LINKS TO RELATED DOCUMENTS |                                                                               |
|----------------------------|-------------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95021">http://www.vishay.com/doc?95021</a> |

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