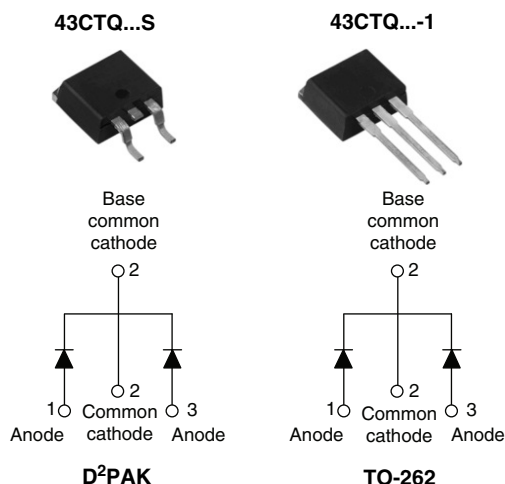


## Schottky Rectifier, 2 x 20 A



### FEATURES

- 175 °C T<sub>J</sub> operation
- Center tap configuration
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Designed and qualified for AEC-Q101 level

### DESCRIPTION

This center tap Schottky rectifier 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 switching power supplies, freewheeling diodes, and reverse battery protection.

### PRODUCT SUMMARY

|                    |          |
|--------------------|----------|
| I <sub>F(AV)</sub> | 2 x 20 A |
| V <sub>R</sub>     | 80/100 V |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL             | CHARACTERISTICS                           | VALUES      | UNITS |
|--------------------|-------------------------------------------|-------------|-------|
| I <sub>F(AV)</sub> | Rectangular waveform                      | 40          | A     |
| V <sub>RRM</sub>   |                                           | 80/100      | V     |
| I <sub>FSM</sub>   | t <sub>p</sub> = 5 μs sine                | 850         | A     |
| V <sub>F</sub>     | 20 Apk, T <sub>J</sub> = 125 °C (per leg) | 0.67        | V     |
| T <sub>J</sub>     | Range                                     | - 55 to 175 | °C    |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL           | 43CTQ080S<br>43CTQ080-1 | 43CTQ100S<br>43CTQ100-1 | UNITS |
|--------------------------------------|------------------|-------------------------|-------------------------|-------|
| Maximum DC reverse voltage           | V <sub>R</sub>   | 80                      | 100                     | V     |
| Maximum working peak reverse voltage | V <sub>RWM</sub> |                         |                         |       |

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER                                                                 | SYMBOL             | TEST CONDITIONS                                                                                                                        | VALUES | UNITS |
|---------------------------------------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------|--------|-------|
| Maximum average forward current<br>per leg<br>See fig. 5                  | I <sub>F(AV)</sub> | 50 % duty cycle at T <sub>C</sub> = 135 °C, rectangular waveform                                                                       | 20     | A     |
| per device                                                                |                    |                                                                                                                                        | 40     |       |
| Maximum peak one cycle non-repetitive surge current per leg<br>See fig. 7 | I <sub>FSM</sub>   | 5 μs sine or 3 μs rect. pulse                                                                                                          | 850    |       |
|                                                                           |                    | 10 ms sine or 6 ms rect. pulse                                                                                                         | 275    |       |
| Non-repetitive avalanche energy per leg                                   | E <sub>AS</sub>    | T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 0.50 A, L = 60 mH                                                                            | 7.50   | mJ    |
| Repetitive avalanche current per leg                                      | I <sub>AR</sub>    | Current decaying linearly to zero in 1 μs<br>Frequency limited by T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> typical | 0.50   | A     |

**ELECTRICAL SPECIFICATIONS**

| PARAMETER                                             | SYMBOL         | TEST CONDITIONS                                                    |                                     | VALUES | UNITS |  |
|-------------------------------------------------------|----------------|--------------------------------------------------------------------|-------------------------------------|--------|-------|--|
| Maximum forward voltage drop per leg<br>See fig. 1    | $V_{FM}^{(1)}$ | 20 A                                                               | $T_J = 25\text{ }^{\circ}\text{C}$  | 0.81   | V     |  |
|                                                       |                | 40 A                                                               |                                     | 0.98   |       |  |
|                                                       |                | 20 A                                                               | $T_J = 125\text{ }^{\circ}\text{C}$ | 0.67   |       |  |
|                                                       |                | 40 A                                                               |                                     | 0.81   |       |  |
| Maximum reverse leakage current per leg<br>See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^{\circ}\text{C}$                                 | $V_R = \text{Rated } V_R$           | 1      | mA    |  |
|                                                       |                | $T_J = 125\text{ }^{\circ}\text{C}$                                |                                     | 11     |       |  |
| Threshold voltage                                     | $V_{F(TO)}$    | $T_J = T_J \text{ maximum}$                                        |                                     | 0.71   | V     |  |
| Forward slope resistance                              | $r_t$          |                                                                    |                                     | 0.43   | mΩ    |  |
| Maximum junction capacitance per leg                  | $C_T$          | $V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz) 25 °C |                                     | 1480   | pF    |  |
| Typical series inductance per leg                     | $L_S$          | Measured lead to lead 5 mm from package body                       |                                     | 8.0    | nH    |  |
| Maximum voltage rate of change                        | dV/dt          | Rated $V_R$                                                        |                                     | 10 000 | V/μs  |  |

**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                                              | 2.0         | $^{\circ}\text{C/W}$ |
| Maximum thermal resistance, junction to case per package |                |                                                           | 1.0         |                      |
| Typical thermal resistance, case to heatsink             | $R_{thCS}$     | Mounting surface, smooth and greased<br>(Only for TO-220) | 0.50        |                      |
| Approximate weight                                       |                |                                                           | 2           | g                    |
|                                                          |                |                                                           | 0.07        | oz.                  |
| Mounting torque                                          | minimum        |                                                           | 6 (5)       | kgf · cm             |
|                                                          | maximum        |                                                           | 12 (10)     | (lbf · in)           |
| Marking device                                           |                | Case style D <sup>2</sup> PAK                             | 43CTQ080S   |                      |
|                                                          |                |                                                           | 43CTQ100S   |                      |
|                                                          |                | Case style TO-262                                         | 43CTQ080-1  |                      |
|                                                          |                |                                                           | 43CTQ100-1  |                      |

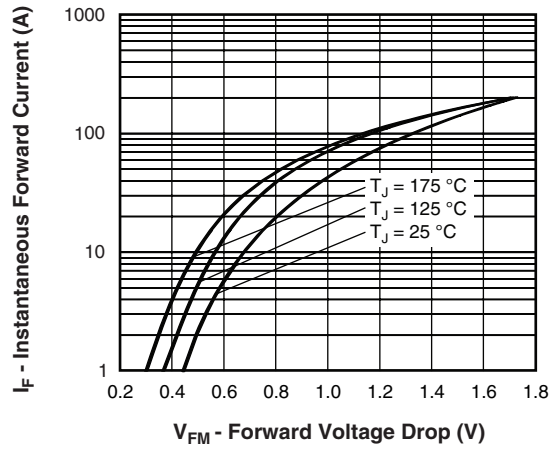


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

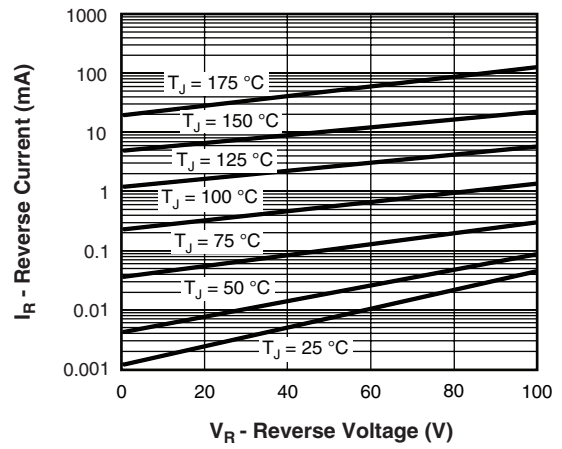


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

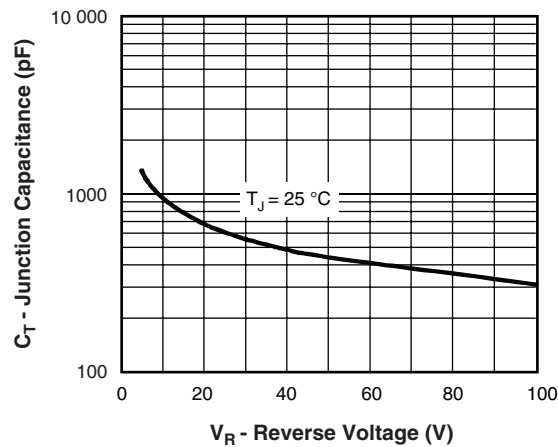


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

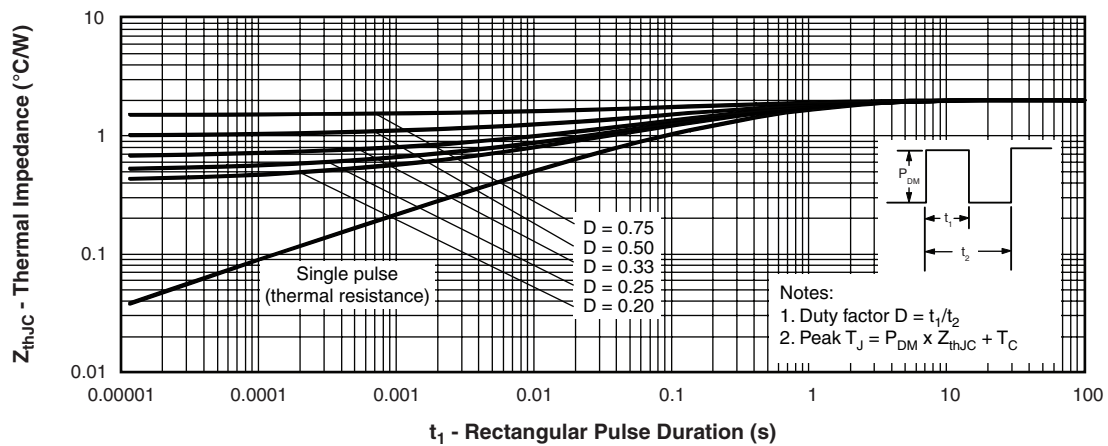


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

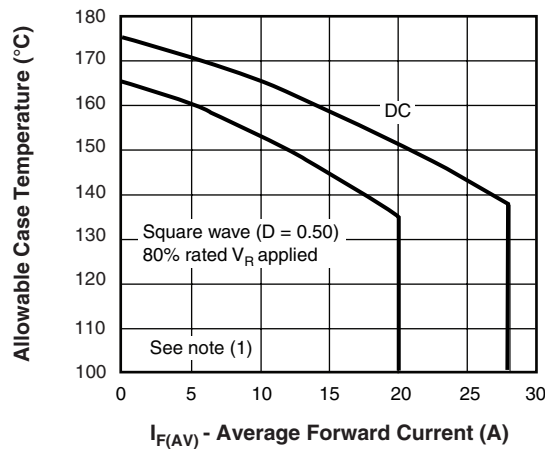


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

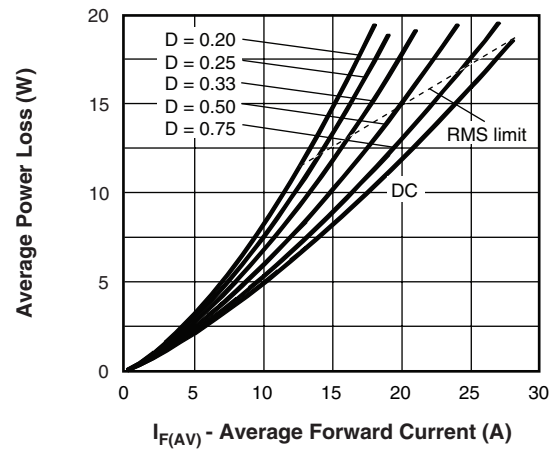


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

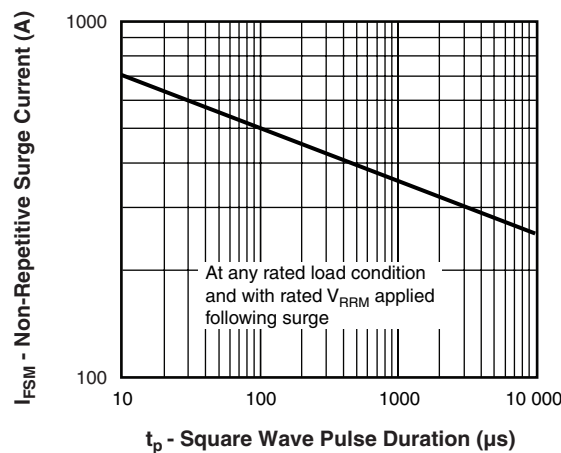


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

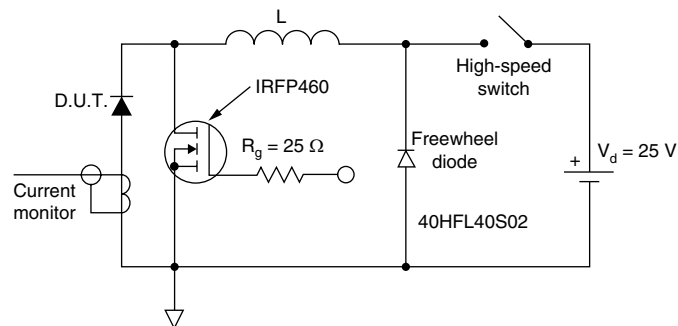


Fig. 8 Unclamped Inductive Test Circuit

## 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  $V_{R1} = 10 V$

**ORDERING INFORMATION TABLE**

| Device code | 43 | C | T | Q | 100 | S | TRL | - |
|-------------|----|---|---|---|-----|---|-----|---|
|             | ①  | ② | ③ | ④ | ⑤   | ⑥ | ⑦   | ⑧ |
|             | 1  | - | - | - | -   | - | -   | - |
|             | 2  | - | - | - | -   | - | -   | - |
|             | 3  | - | - | - | -   | - | -   | - |
|             | 4  | - | - | - | -   | - | -   | - |
|             | 5  | - | - | - | -   | - | -   | - |
|             | 6  | - | - | - | -   | - | -   | - |
|             | 7  | - | - | - | -   | - | -   | - |
|             | 8  | - | - | - | -   | - | -   | - |

1

-

Current rating (40 A)

2

-

Circuit configuration:  
C = Common cathode

3

-

T = TO-220

4

-

Schottky "Q" series

5

-

Voltage ratings

6

-

S = D<sup>2</sup>PAK  
-1 = TO-262

7

-

None = Tube (50 pieces)  
TRL = Tape and reel (left oriented - for D<sup>2</sup>PAK only)  
TRR = Tape and reel (right oriented - for D<sup>2</sup>PAK only)

8

-

None = Standard production  
PbF = Lead (Pb)-free

080 = 80 V  
100 = 100 V

| LINKS TO RELATED DOCUMENTS |                                                                        |
|----------------------------|------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95014">www.vishay.com/doc?95014</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95008">www.vishay.com/doc?95008</a> |
| Packaging information      | <a href="http://www.vishay.com/doc?95032">www.vishay.com/doc?95032</a> |
| SPIICE model               | <a href="http://www.vishay.com/doc?95065">www.vishay.com/doc?95065</a> |



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