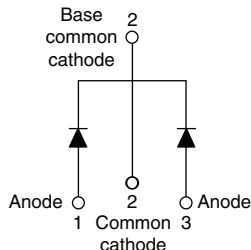


### Schottky Rectifier, 2 x 8 A



TO-220AB



#### FEATURES

- 175 °C  $T_J$  operation
- Center tap configuration
- 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
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for industrial level



**RoHS\***  
COMPLIANT

#### PRODUCT SUMMARY

|             |             |
|-------------|-------------|
| $I_{F(AV)}$ | 2 x 8 A     |
| $V_R$       | 60 to 100 V |

#### 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, converters, freewheeling diodes, and reverse battery protection.

#### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS                      | VALUES      | UNITS |
|-------------|--------------------------------------|-------------|-------|
| $I_{F(AV)}$ | Rectangular waveform                 | 16          | A     |
| $V_{RRM}$   |                                      | 60 to 100   | V     |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine                 | 850         | A     |
| $V_F$       | 8 Apk, $T_J = 125^\circ C$ (per leg) | 0.58        | V     |
| $T_J$       | Range                                | - 55 to 175 | °C    |

#### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | 16CTQ060PbF | 16CTQ080PbF | 16CTQ100PbF | UNITS |
|--------------------------------------|-----------|-------------|-------------|-------------|-------|
| Maximum DC reverse voltage           | $V_R$     | 60          | 80          | 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 $T_C = 148^\circ C$ , rectangular waveform                                                       | 8<br>16    | 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                                           | 850<br>275 | A     |
| Non-repetitive avalanche energy per leg                                   | $E_{AS}$    | $T_J = 25^\circ C$ , $I_{AS} = 0.50$ 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     |

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

| ELECTRICAL SPECIFICATIONS                             |                |                                                                                           |                                     |        |       |  |
|-------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------|-------------------------------------|--------|-------|--|
| PARAMETER                                             | SYMBOL         | TEST CONDITIONS                                                                           |                                     | VALUES | UNITS |  |
| Maximum forward voltage drop per leg<br>See fig. 1    | $V_{FM}^{(1)}$ | 8 A                                                                                       | $T_J = 25\text{ }^{\circ}\text{C}$  | 0.72   | V     |  |
|                                                       |                | 16 A                                                                                      |                                     | 0.88   |       |  |
|                                                       |                | 8 A                                                                                       | $T_J = 125\text{ }^{\circ}\text{C}$ | 0.58   |       |  |
|                                                       |                | 16 A                                                                                      |                                     | 0.69   |       |  |
| Maximum reverse leakage current per leg<br>See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^{\circ}\text{C}$                                                        | $V_R = \text{rated } V_R$           | 0.55   | mA    |  |
|                                                       |                | $T_J = 125\text{ }^{\circ}\text{C}$                                                       |                                     | 7.0    |       |  |
| Threshold voltage                                     | $V_{F(TO)}$    | $T_J = T_J \text{ maximum}$                                                               |                                     | 0.415  | V     |  |
| Forward slope resistance                              | $r_t$          |                                                                                           |                                     | 11.07  | mΩ    |  |
| 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                                              |                                     | 8.0    | nH    |  |
| Maximum voltage rate of change                        | dV/dt          | Rated $V_R$                                                                               |                                     | 10 000 | V/μs  |  |

**Note**(1) 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                         | 3.25        | °C/W                   |
| Maximum thermal resistance junction to case per package | R <sub>thJC</sub>                 |                                      | 1.63        |                        |
| Typical thermal resistance, case to heatsink            | R <sub>thCS</sub>                 | Mounting surface, smooth and greased | 0.50        |                        |
| Approximate weight                                      |                                   |                                      | 2           | g                      |
|                                                         |                                   |                                      | 0.07        | oz.                    |
| Mounting torque                                         | minimum                           |                                      | 6 (5)       | kgf · cm<br>(lbf · in) |
|                                                         | maximum                           |                                      | 12 (10)     |                        |
| Marking device                                          |                                   | Case style TO-220AB                  | 16CTQ100    |                        |

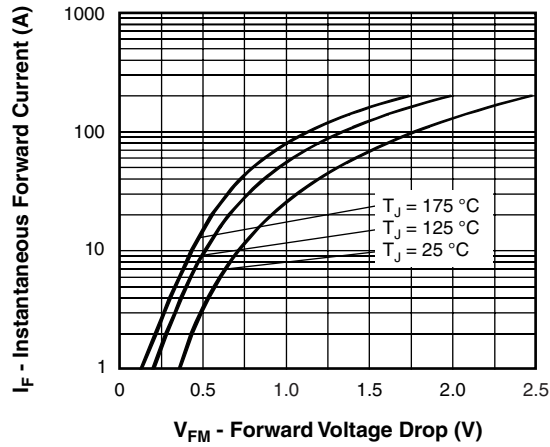


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

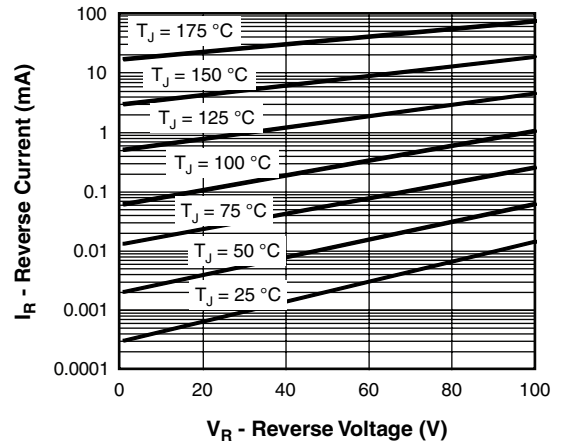


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

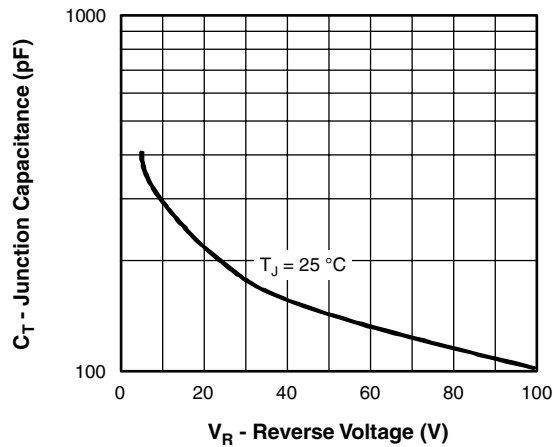


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

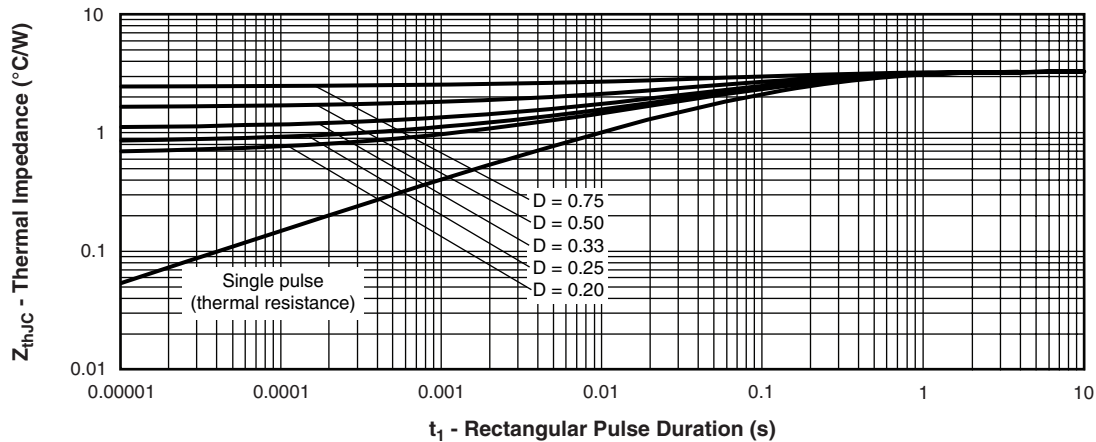


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

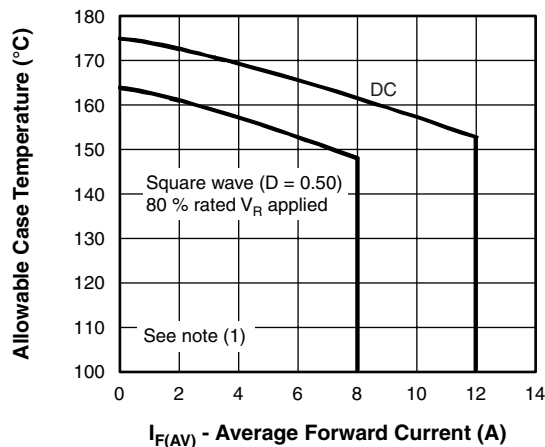


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

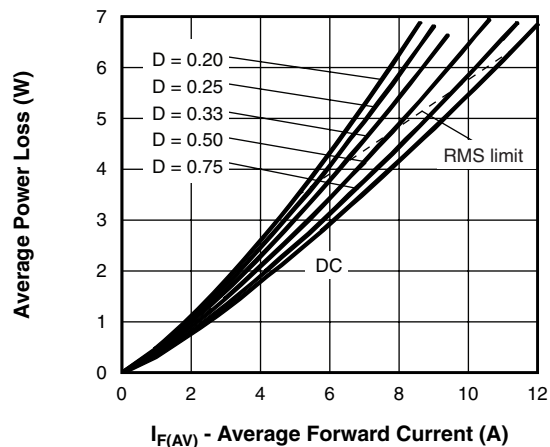


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

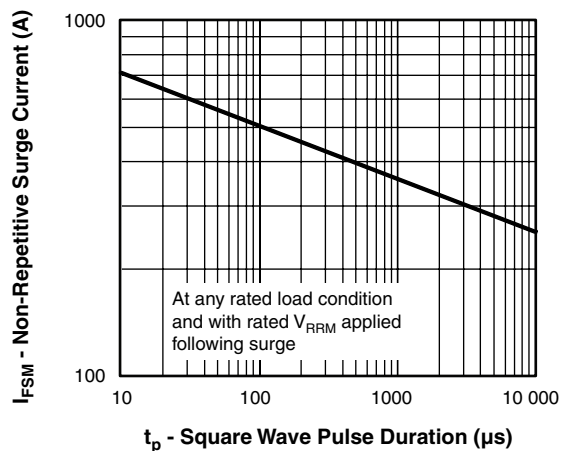


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

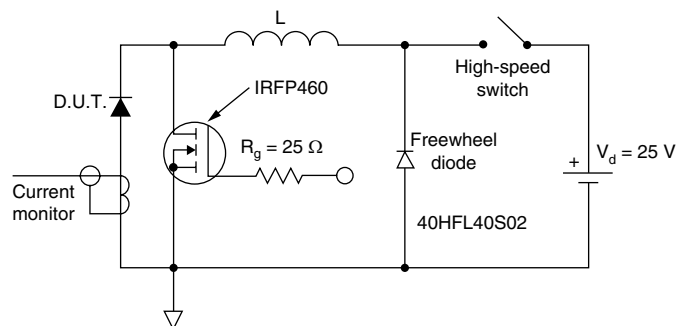


Fig. 8 - Unclamped Inductive Test Circuit

### 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  $V_R$  applied



## ORDERING INFORMATION TABLE

|             |    |   |   |   |     |     |
|-------------|----|---|---|---|-----|-----|
| Device code | 16 | C | T | Q | 100 | PbF |
|             | ①  | ② | ③ | ④ | ⑤   | ⑥   |
|             | 1  | - | - | - | -   | -   |
|             | 2  | - | - | - | -   | -   |
|             | 3  | - | - | - | -   | -   |
|             | 4  | - | - | - | -   | -   |
|             | 5  | - | - | - | -   | -   |
|             | 6  | - | - | - | -   | -   |

060 = 60 V  
080 = 80 V  
100 = 100 V

1

-

Current rating (16 = 16 A)

2

-

Circuit configuration  
C = Common cathode

3

-

Package  
T = TO-220

4

-

Schottky "Q" series

5

-

Voltage ratings

6

-

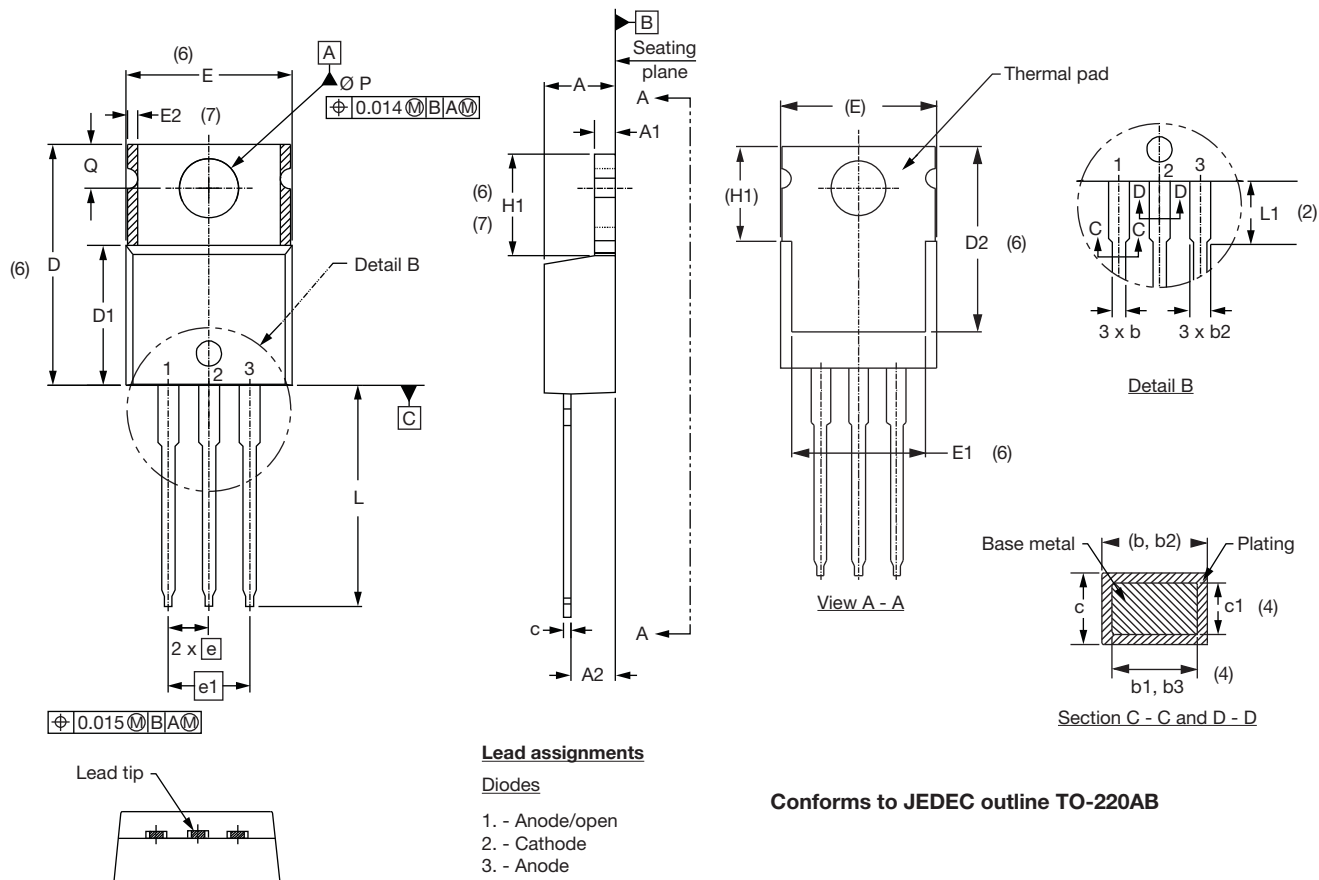
• None = Standard production  
• PbF = Lead (Pb)-free

Tube standard pack quantity: 50 pieces

| LINKS TO RELATED DOCUMENTS |                                                                               |
|----------------------------|-------------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95222">http://www.vishay.com/doc?95222</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95225">http://www.vishay.com/doc?95225</a> |
| SPICE model                | <a href="http://www.vishay.com/doc?95279">http://www.vishay.com/doc?95279</a> |

## TO-220AB

**DIMENSIONS** in millimeters and inches



| SYMBOL | MILLIMETERS |       | INCHES |       | NOTES |
|--------|-------------|-------|--------|-------|-------|
|        | MIN.        | MAX.  | MIN.   | MAX.  |       |
| A      | 4.25        | 4.65  | 0.167  | 0.183 |       |
| A1     | 1.14        | 1.40  | 0.045  | 0.055 |       |
| A2     | 2.56        | 2.92  | 0.101  | 0.115 |       |
| b      | 0.69        | 1.01  | 0.027  | 0.040 |       |
| b1     | 0.38        | 0.97  | 0.015  | 0.038 | 4     |
| b2     | 1.20        | 1.73  | 0.047  | 0.068 |       |
| b3     | 1.14        | 1.73  | 0.045  | 0.068 | 4     |
| c      | 0.36        | 0.61  | 0.014  | 0.024 |       |
| c1     | 0.36        | 0.56  | 0.014  | 0.022 | 4     |
| D      | 14.85       | 15.25 | 0.585  | 0.600 | 3     |
| D1     | 8.38        | 9.02  | 0.330  | 0.355 |       |
| D2     | 11.68       | 12.88 | 0.460  | 0.507 | 6     |

| SYMBOL | MILLIMETERS |       | INCHES     |       | NOTES |
|--------|-------------|-------|------------|-------|-------|
|        | MIN.        | MAX.  | MIN.       | MAX.  |       |
| E      | 10.11       | 10.51 | 0.398      | 0.414 | 3, 6  |
| E1     | 6.86        | 8.89  | 0.270      | 0.350 | 6     |
| E2     | -           | 0.76  | -          | 0.030 | 7     |
| e      | 2.41        | 2.67  | 0.095      | 0.105 |       |
| e1     | 4.88        | 5.28  | 0.192      | 0.208 |       |
| H1     | 6.09        | 6.48  | 0.240      | 0.255 | 6, 7  |
| L      | 13.52       | 14.02 | 0.532      | 0.552 |       |
| L1     | 3.32        | 3.82  | 0.131      | 0.150 | 2     |
| Ø P    | 3.54        | 3.73  | 0.139      | 0.147 |       |
| Q      | 2.60        | 3.00  | 0.102      | 0.118 |       |
| θ      | 90° to 93°  |       | 90° to 93° |       |       |

### Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) Dimension D, D1 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) Dimension b1, b3 and c1 apply to base metal only
- (5) Controlling dimensions: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2 and E1
- (7) Dimensions E2 x H1 define a zone where stamping and singulation irregularities are allowed
- (8) Outline conforms to JEDEC TO-220, except A2 (maximum) and D2 (minimum) where dimensions are derived from the actual package outline



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