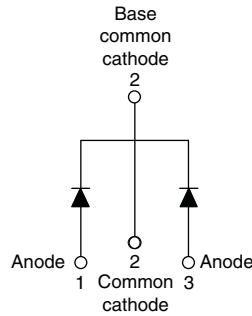


## High Performance Schottky Rectifier, 2 x 30 A


**3L TO-220AB**


### 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
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
 COMPLIANT  
 HALOGEN  
**FREE**

| PRIMARY CHARACTERISTICS |                 |
|-------------------------|-----------------|
| $I_{F(AV)}$             | 2 x 30 A        |
| $V_R$                   | 100 V           |
| $V_F$ at $I_F$          | 0.69 V          |
| $I_{RM}$ max.           | 20 mA at 125 °C |
| $T_J$ max.              | 175 °C          |
| $E_{AS}$                | 11.25 mJ        |
| Package                 | 3L TO-220AB     |
| Circuit configuration   | Common cathode  |

### DESCRIPTION

This 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 (per device) | 60          | A     |  |
| $V_{RRM}$                         |                                   | 100         | V     |  |
| $I_{FRM}$                         | $T_C = 139$ °C (per leg)          | 60          | A     |  |
| $I_{FSM}$                         | $t_p = 5$ $\mu$ s sine            | 1500        | A     |  |
| $V_F$                             | 30 $A_{pk}$ , $T_J = 125$ °C      | 0.69        | V     |  |
| $T_J$                             | Range                             | -65 to +175 | °C    |  |

| VOLTAGE RATINGS                      |           |                |       |
|--------------------------------------|-----------|----------------|-------|
| PARAMETER                            | SYMBOL    | VS-63CTQ100-M3 | UNITS |
| Maximum DC reverse voltage           | $V_R$     | 100            | V     |
| Maximum working peak reverse voltage | $V_{RWM}$ |                | V     |

| ABSOLUTE MAXIMUM RATINGS                                    |             |   |        |       |
|---|-------------|---|--------|-------|
| PARAMETER   | SYMBOL      | TEST CONDITIONS   | VALUES | UNITS |
| Maximum average forward current<br>per leg<br>per device    | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 139$ °C, rectangular waveform   | 30     | A     |
|   |             |   | 60     |       |
| Peak repetitive forward current per leg                     | $I_{FRM}$   | Rated $V_R$ , square wave, 20 kHz, $T_C = 140$ °C   | 60     | A     |
| Maximum peak one cycle non-repetitive surge current per leg | $I_{FSM}$   | 5 $\mu$ s sine or 3 $\mu$ s rect. pulse   | 1500   | A     |
|   |             | 10 ms sine or 6 ms rect. pulse  | 300    |       |
| Non-repetitive avalanche energy per leg                     | $E_{AS}$    | $T_J = 25$ °C, $I_{AS} = 0.75$ A, $L = 40$ mH   | 11.25  | 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 | 0.75   | A     |



| ELECTRICAL SPECIFICATIONS             |                |   |                                   |        |      |                  |
|---------------------------------------|----------------|---|-----------------------------------|--------|------|------------------|
| PARAMETER                             | SYMBOL         | TEST CONDITIONS   |                                   | TYP.   | MAX. | UNITS            |
| Maximum forward voltage drop          | $V_{FM}^{(1)}$ | 30 A  | $T_J = 25\text{ }^\circ\text{C}$  | 0.78   | 0.82 | V                |
|                                       |                | 60 A  |                                   | 0.94   | 1.0  |                  |
|                                       |                | 30 A  | $T_J = 125\text{ }^\circ\text{C}$ | 0.64   | 0.69 |                  |
|                                       |                | 60 A  |                                   | 0.78   | 0.83 |                  |
| Maximum instantaneous reverse current | $I_{RM}$       | $T_J = 25\text{ }^\circ\text{C}$  | Rated DC voltage                  | 0.02   | 0.3  | mA               |
|                                       |                | $T_J = 125\text{ }^\circ\text{C}$   |                                   | 11     | 20   |                  |
| Maximum junction capacitance          | $C_T$          | $V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$ |                                   | 1100   |      | pF               |
| Typical series inductance             | $L_S$          | Measured from top of terminal to mounting plane   |                                   | 8.0    |      | 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       | $T_J, T_{Stg}$ |                                       | -65 to +175 | $^\circ\text{C}$   |
| Maximum thermal resistance, junction to case per leg | $R_{thJC}$     | DC operation                          | 1.2         | $^\circ\text{C/W}$ |
| Typical thermal resistance, case to heatsink         | $R_{thCS}$     | Mounting surface, smooth, and greased | 0.50        |                    |
| Approximate weight                                   |                |                                       | 2           | g                  |
|  |                |                                       | 0.07        | oz.                |
| Mounting torque                                      | minimum        | Non-lubricated threads                | 6 (5)       | kgf · cm           |
|  | maximum        |                                       | 12 (10)     | (lbf · in)         |
| Marking device                                       |                | Case style 3L TO-220AB                | 63CTQ100    |                    |

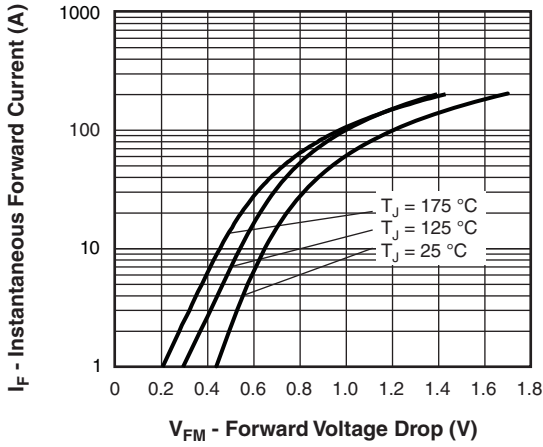


Fig. 1 - Maximum Forward Voltage Drop Characteristics

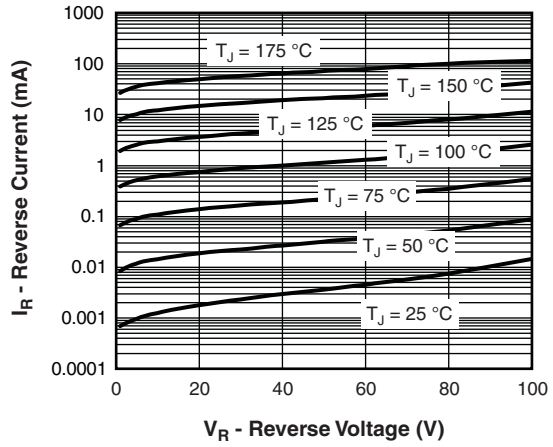


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

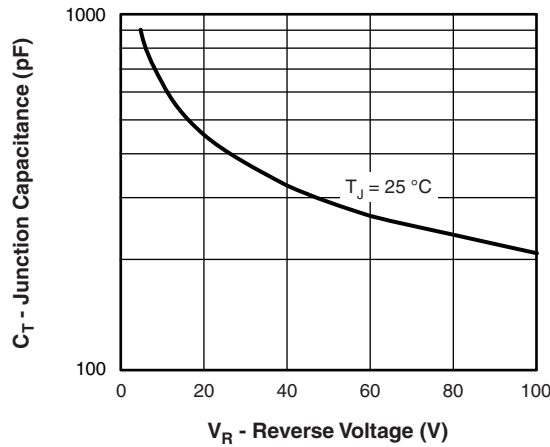


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

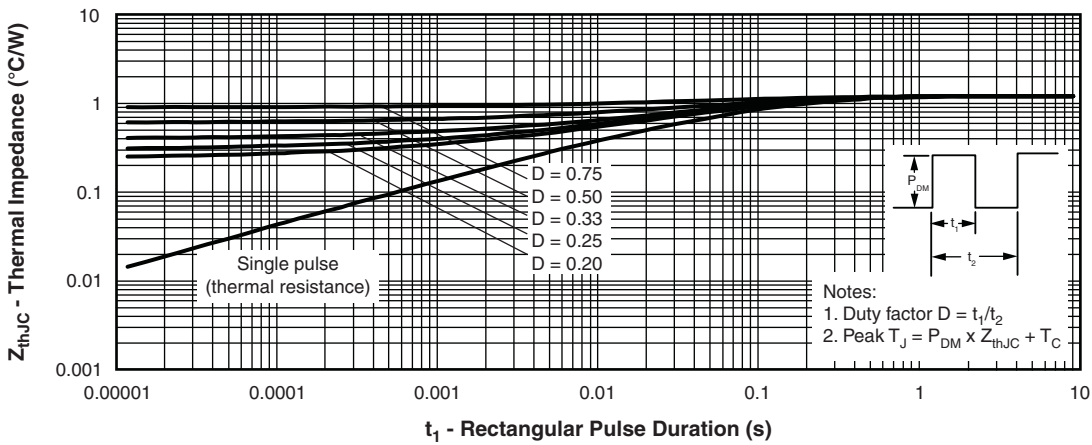


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

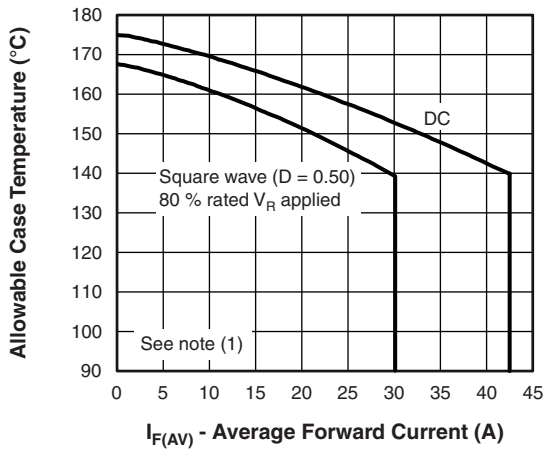


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

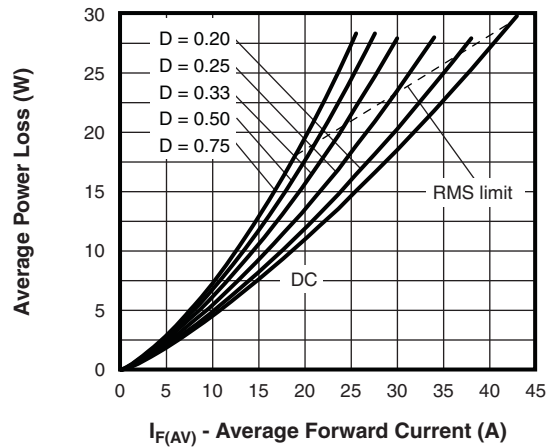


Fig. 6 - Forward Power Loss Characteristics

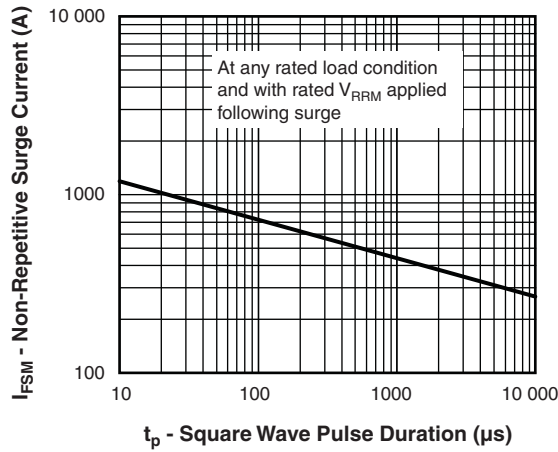


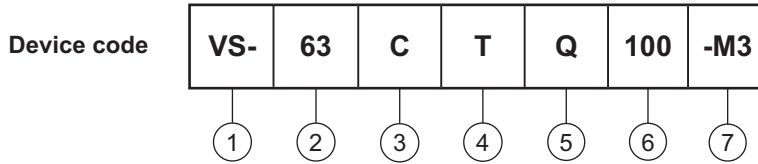
Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

**Note**

- (1) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;  
 $P_d$  = forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{d_{REV}}$  = inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (60 A)
- 3** - Circuit configuration  
C = common cathode
- 4** - Package  
T = TO-220
- 5** - Schottky "Q" series
- 6** - Voltage rating (100 = 100 V)
- 7** - Environmental digit  
-M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

| ORDERING INFORMATION (Example) |                  |                        |                         |
|--------------------------------|------------------|------------------------|-------------------------|
| PREFERRED P/N                  | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION   |
| VS-63CTQ100-M3                 | 50               | 1000                   | Antistatic plastic tube |

| LINKS TO RELATED DOCUMENTS |  |
|----------------------------|--|
| Dimensions                 | <a href="http://www.vishay.com/doc?96154">www.vishay.com/doc?96154</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95028">www.vishay.com/doc?95028</a> |



# 3L TO-220AB

**DIMENSIONS** in millimeters and inches



Conforms to JEDEC® outline TO-220AB

| SYMBOL | MILLIMETERS |       | INCHES |       | NOTES | SYMBOL          | MILLIMETERS |       | INCHES |       | NOTES |
|--------|-------------|-------|--------|-------|-------|-----------------|-------------|-------|--------|-------|-------|
|        | MIN.        | MAX.  | MIN.   | MAX.  |       |                 | MIN.        | MAX.  | MIN.   | MAX.  |       |
| A      | 4.25        | 4.65  | 0.167  | 0.183 |       | D2              | 11.68       | 13.30 | 0.460  | 0.524 | 6, 7  |
| A1     | 1.14        | 1.40  | 0.045  | 0.055 |       | E               | 10.11       | 10.51 | 0.398  | 0.414 | 3, 6  |
| A2     | 2.50        | 2.92  | 0.098  | 0.115 |       | E1              | 6.86        | 8.89  | 0.270  | 0.350 | 6     |
| b      | 0.69        | 1.01  | 0.027  | 0.040 |       | e               | 2.41        | 2.67  | 0.095  | 0.105 |       |
| b1     | 0.38        | 0.97  | 0.015  | 0.038 | 4     | e1              | 4.88        | 5.28  | 0.192  | 0.208 |       |
| b2     | 1.20        | 1.73  | 0.047  | 0.068 |       | H1              | 6.09        | 6.48  | 0.240  | 0.255 | 6     |
| b3     | 1.14        | 1.73  | 0.045  | 0.068 | 4     | L               | 13.52       | 14.02 | 0.532  | 0.552 |       |
| c      | 0.36        | 0.61  | 0.014  | 0.024 |       | L1              | 3.32        | 3.82  | 0.131  | 0.150 | 2     |
| c1     | 0.36        | 0.56  | 0.014  | 0.022 | 4     | $\varnothing P$ | 3.54        | 3.91  | 0.139  | 0.154 |       |
| D      | 14.85       | 15.35 | 0.585  | 0.604 | 3     | Q               | 2.60        | 3.00  | 0.102  | 0.118 |       |
| D1     | 8.38        | 9.02  | 0.330  | 0.355 |       |                 |             |       |        |       |       |

**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) Outline conforms to JEDEC® TO-220, except D2



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