

International  
**IR** Rectifier

90SQ... SERIES

SCHOTTKY RECTIFIER

9 Amp

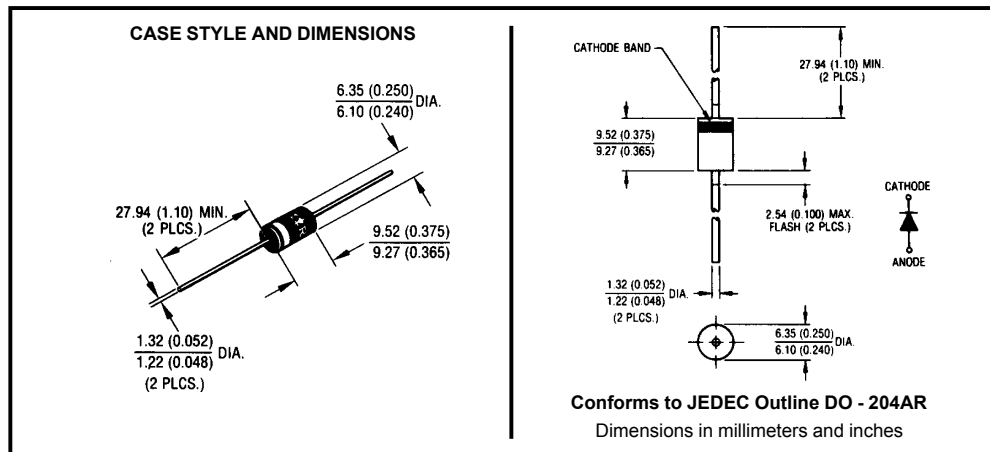
### Major Ratings and Characteristics

| Characteristics                   | 90SQ...    | Units      |
|-----------------------------------|------------|------------|
| $I_{F(AV)}$ Rectangular waveform  | 9          | A          |
| $V_{RRM}$ range                   | 35 to 45   | V          |
| $I_{FSM}$ @ $t_p = 5 \mu s$ sine  | 2150       | A          |
| $V_F$ @ 9Apk, $T_J = 125^\circ C$ | 0.42       | V          |
| $T_J$ range                       | -55 to 150 | $^\circ C$ |

### Description/Features

The 90SQ axial leaded Schottky rectifier series has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to  $150^\circ C$  junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- $150^\circ C$   $T_J$  operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability



## Voltage Ratings

| Part number                                     | 90SQ035 | 90SQ040 | 90SQ045 |
|---|---------|---------|---------|
| $V_R$ Max. DC Reverse Voltage (V)               | 35      | 40      | 45      |
| $V_{RWM}$ Max. Working Peak Reverse Voltage (V) |         |         |         |

## Absolute Maximum Ratings

| Parameters  | 90SQ | Units | Conditions   |
|---|------|-------|--|
| $I_{F(AV)}$ Max. Average Forward Current<br>* See Fig. 5                | 9    | A     | 50% duty cycle @ $T_C = 69^\circ\text{C}$ , rectangular wave form  |
| $I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7 | 2150 | A     | 5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse<br>10ms Sine or 6ms Rect. pulse                                      |
|   | 340  |       |  |
| $E_{AS}$ Non-Repetitive Avalanche Energy                                | 12   | mJ    | $T_J = 25^\circ\text{C}$ , $I_{AS} = 1.8$ Amps, $L = 7.4$ mH   |
| $I_{AR}$ Repetitive Avalanche Current                                   | 1.8  | A     | Current decaying linearly to zero in 1 $\mu\text{sec}$<br>Frequency limited by $T_J$ max. $V_A = 1.5 \times V_R$ typical |

## Electrical Specifications

| Parameters  | 90SQ  | Units            | Conditions  |
|---|-------|------------------|---|
| $V_{FM}$ Max. Forward Voltage Drop (1)<br>* See Fig. 1    | 0.48  | V                | @ 9A<br>$T_J = 25^\circ\text{C}$  |
|   | 0.57  | V                | @ 18A   |
|   | 0.42  | V                | @ 9A<br>$T_J = 125^\circ\text{C}$                                       |
|   | 0.52  | V                | @ 18A   |
| $I_{RM}$ Max. Reverse Leakage Current (1)<br>* See Fig. 2 | 1.75  | mA               | $T_J = 25^\circ\text{C}$  |
|   | 70    | mA               | $T_J = 125^\circ\text{C}$<br>$V_R = \text{rated } V_R$                  |
| $C_T$ Max. Junction Capacitance                           | 900   | pF               | $V_R = 5V_{DC}$ , (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$ |
| $L_S$ Typical Series Inductance                           | 10.0  | nH               | Measured lead to lead 5mm from body                                     |
| $dv/dt$ Max. Voltage Rate of Change (Rated $V_R$ )        | 10000 | V/ $\mu\text{s}$ |   |

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle < 2%

## Thermal-Mechanical Specifications

| Parameters   | 90SQ       | Units                     | Conditions  |
|--|------------|---------------------------|---|
| $T_J$ Max. Junction Temperature Range                  | -55 to 150 | $^\circ\text{C}$          |   |
| $T_{stg}$ Max. Storage Temperature Range               | -55 to 150 | $^\circ\text{C}$          |   |
| $R_{thJL}$ Max. Thermal Resistance Junction to Lead    | 8.0        | $^\circ\text{C}/\text{W}$ | DC operation * See Fig. 4<br>1/8 inch lead length |
| $R_{thJA}$ Typical Thermal Resistance, Junction to Air |            | 44                        | $^\circ\text{C}/\text{W}$                         |
| wt Approximate Weight                                  | 1.4(0.049) | g(oz.)                    |   |
| Case Style   | DO-204AR   | JEDEC                     |   |

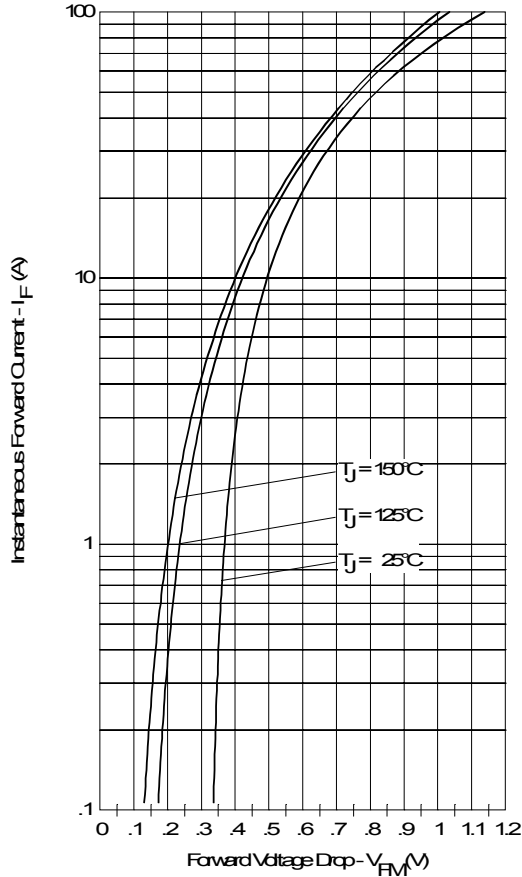


Fig. 1 - Maximum Forward Voltage Drop Characteristics

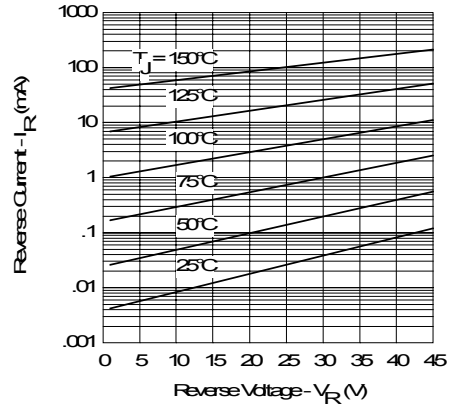


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

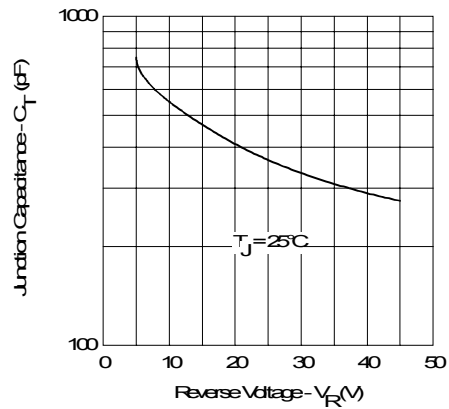


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

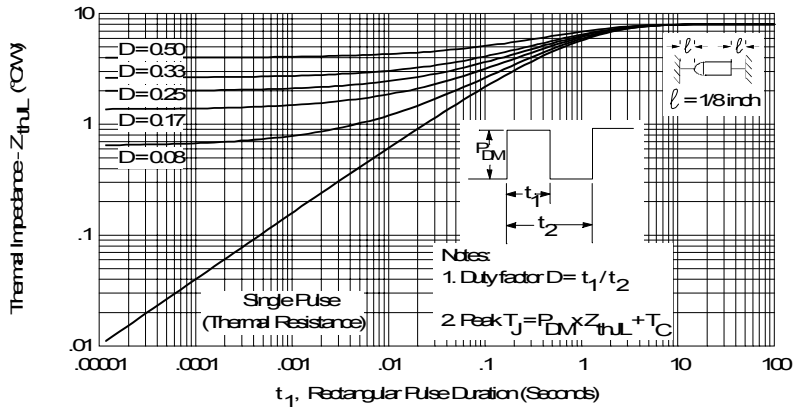


Fig. 4 - Maximum Thermal Impedance  $Z_{thJL}$  Characteristics

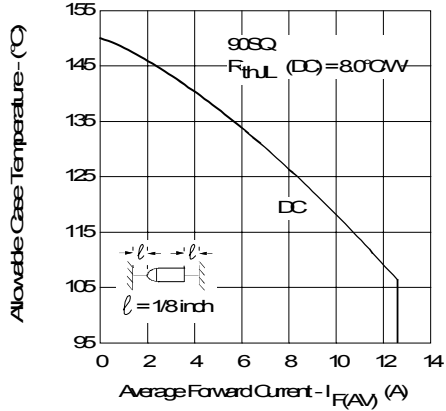


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

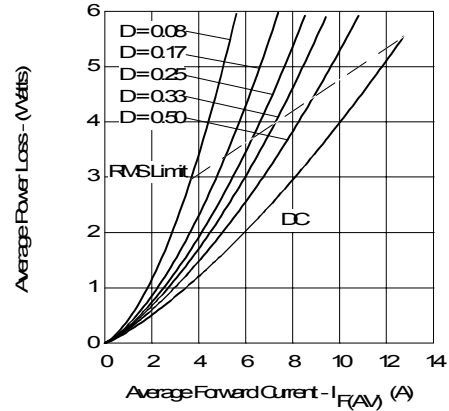


Fig. 6 - Forward Power Loss Characteristics

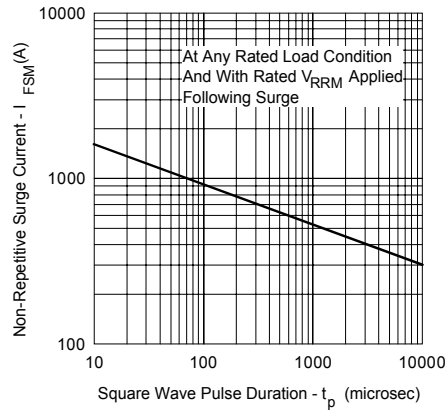


Fig. 7 - Maximum Non-Repetitive Surge Current

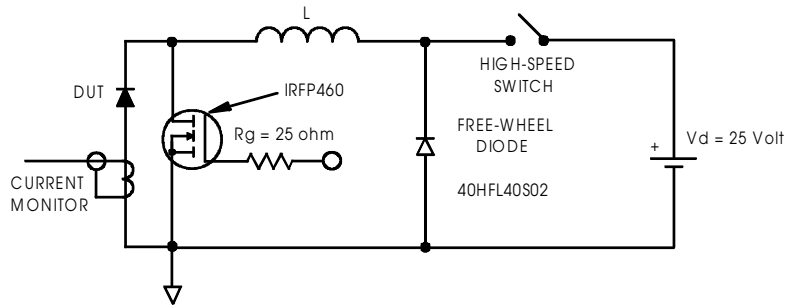


Fig. 8 - Unclamped Inductive Test Circuit

Ordering Information Table

| Device Code |                                       |   |                                     |
|-------------|---------------------------------------|---|-------------------------------------|
| 90          | S                                     | Q | 045                                 |
| ①           | ②                                     | ③ | ④                                   |
| <b>1</b>    | - Essential Part Number (current x10) |   |                                     |
| <b>2</b>    | - S = DO-204AR                        |   |                                     |
| <b>3</b>    | - Q = Schottky Q Series               |   |                                     |
| <b>4</b>    | - Voltage Rating                      |   | 035 = 35V<br>040 = 40V<br>045 = 45V |

Data and specifications subject to change without notice.  
 This product has been designed and qualified for Industrial Level.  
 Qualification Standards can be found on IR's Web site.