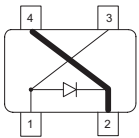


### Silicon RF Switching Diode

- Designed for use in shunt configuration in high performance RF switches
- High shunt signal isolation
- Low shunt insertion loss
- Optimized for short - open transformation using  $\lambda/4$  lines



### BAR81W



| Type   | Package | Configuration      | $L_S$ (nH) | Marking |
|--------|---------|--------------------|------------|---------|
| BAR81W | SOT343  | single shunt-diode | 0.15*      | BBs     |

\* series inductance chip to ground

### Maximum Ratings at $T_A = 25^\circ\text{C}$ , unless otherwise specified

| Parameter   | Symbol           | Value       | Unit |
|---|------------------|-------------|------|
| Diode reverse voltage                                   | $V_R$            | 30          | V    |
| Forward current   | $I_F$            | 100         | mA   |
| Total power dissipation<br>$T_S \leq 138^\circ\text{C}$ | $P_{\text{tot}}$ | 100         | mW   |
| Junction temperature                                    | $T_j$            | 150         | °C   |
| Operating temperature range                             | $T_{\text{op}}$  | -55 ... 125 |      |
| Storage temperature                                     | $T_{\text{stg}}$ | -55 ... 150 |      |

### Thermal Resistance

| Parameter                                | Symbol            | Value      | Unit |
|--|-------------------|------------|------|
| Junction - soldering point <sup>1)</sup> | $R_{\text{thJS}}$ | $\leq 120$ | K/W  |

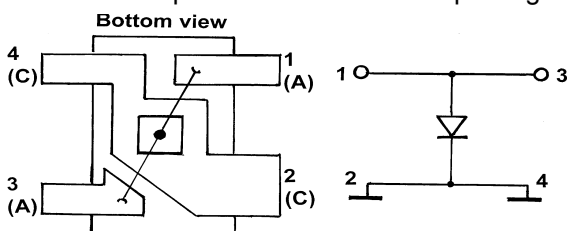
<sup>1)</sup>For calculation of  $R_{\text{thJA}}$  please refer to Application Note Thermal Resistance

**Electrical Characteristics at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

| Parameter  | Symbol       | Values |             |          | Unit          |
|--|--------------|--------|-------------|----------|---------------|
|  |              | min.   | typ.        | max.     |               |
| <b>DC Characteristics</b>  |              |        |             |          |               |
| Reverse current<br>$V_R = 20\text{ V}$   | $I_R$        | -      | -           | 20       | nA            |
| Forward voltage<br>$I_F = 100\text{ mA}$   | $V_F$        | -      | 0.93        | 1        | V             |
| <b>AC Characteristics</b>  |              |        |             |          |               |
| Diode capacitance<br>$V_R = 1\text{ V}, f = 1\text{ MHz}$<br>$V_R = 3\text{ V}, f = 1\text{ MHz}$                              | $C_T$        | -      | 0.6<br>0.57 | 1<br>0.9 | pF            |
| Forward resistance<br>$I_F = 5\text{ mA}, f = 100\text{ MHz}$  | $r_f$        | -      | 0.7         | 1        | $\Omega$      |
| Charge carrier life time<br>$I_F = 10\text{ mA}, I_R = 6\text{ mA}$ , measured at $I_R = 3\text{ mA}$ ,<br>$R_L = 100\ \Omega$ | $\tau_{rr}$  | -      | 80          | -        | ns            |
| I-region width   | $W_I$        | -      | 3.5         | -        | $\mu\text{m}$ |
| Shunt insertion loss <sup>1)</sup><br>$V_R = 3\text{ V}, f = 1.89\text{ GHz}$  | $ S_{21} ^2$ | -      | 0.7         | -        | dB            |
| Shunt isolation <sup>1)</sup><br>$I_F = 10\text{ mA}, f = 1.89\text{ GHz}$   | $ S_{21} ^2$ | -      | 30          | -        |               |

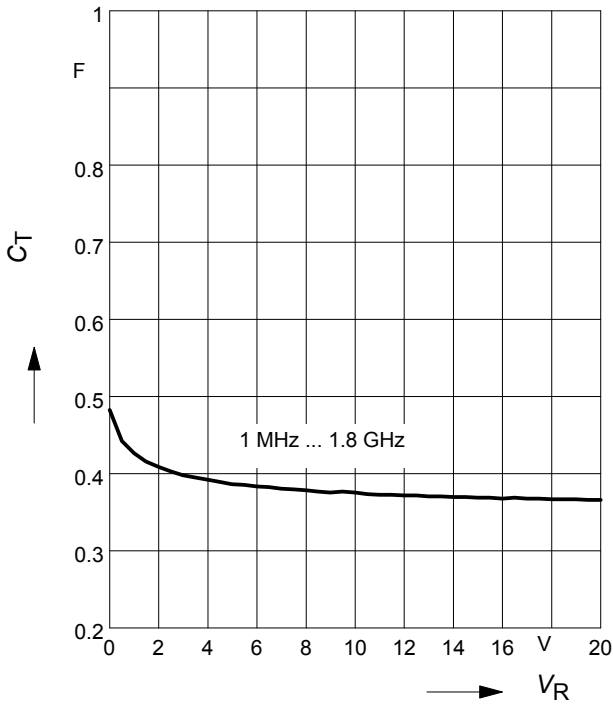
**Configuration of the shunt-diode**

- A perfect ground is essential for optimum isolation
- The anode pins should be used as passage for RF


<sup>1</sup>For more information please refer to Application Note 049.

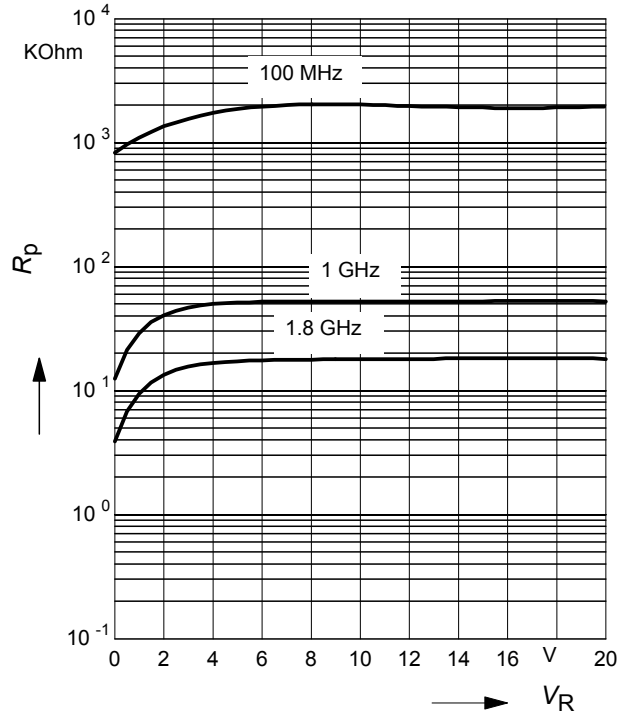
**Diode capacitance  $C_T = f(V_R)$**

$f = \text{Parameter}$



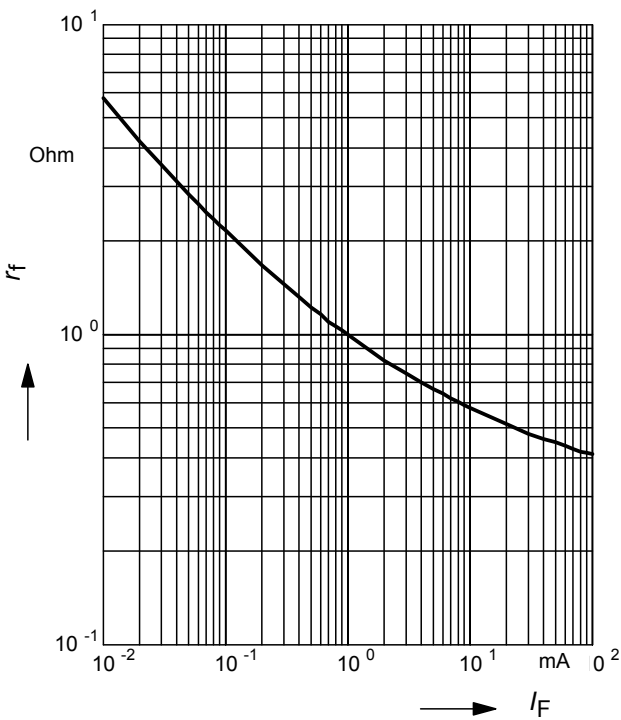
**Reverse parallel resistance  $R_P = f(V_R)$**

$f = \text{Parameter}$



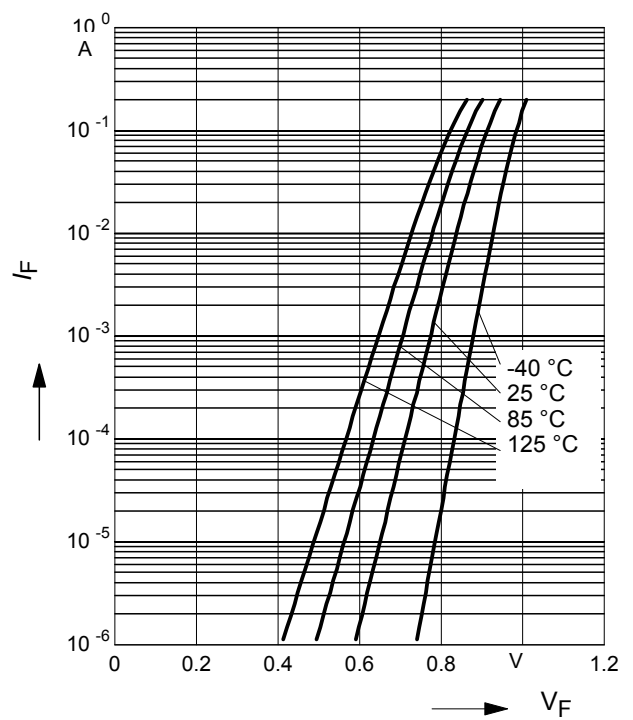
**Forward resistance  $r_f = f(I_F)$**

$f = 100\text{MHz}$



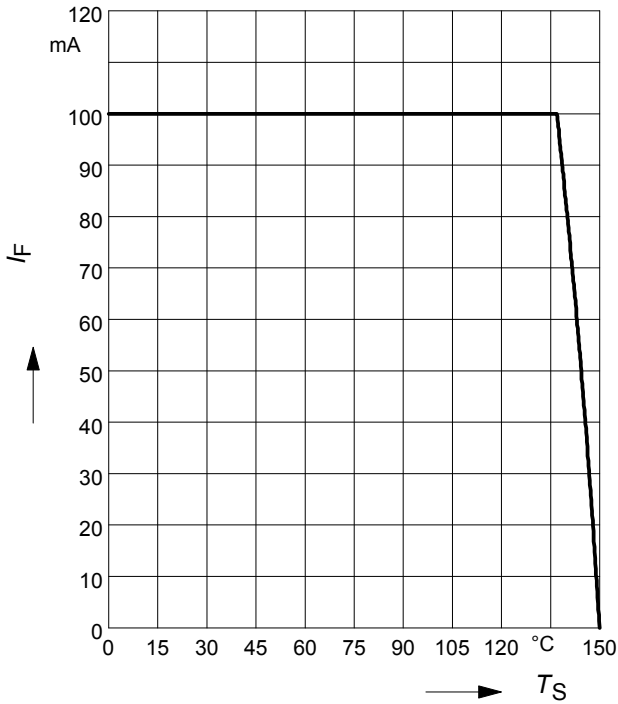
**Forward current  $I_F = f(V_F)$**

$T_A = \text{Parameter}$



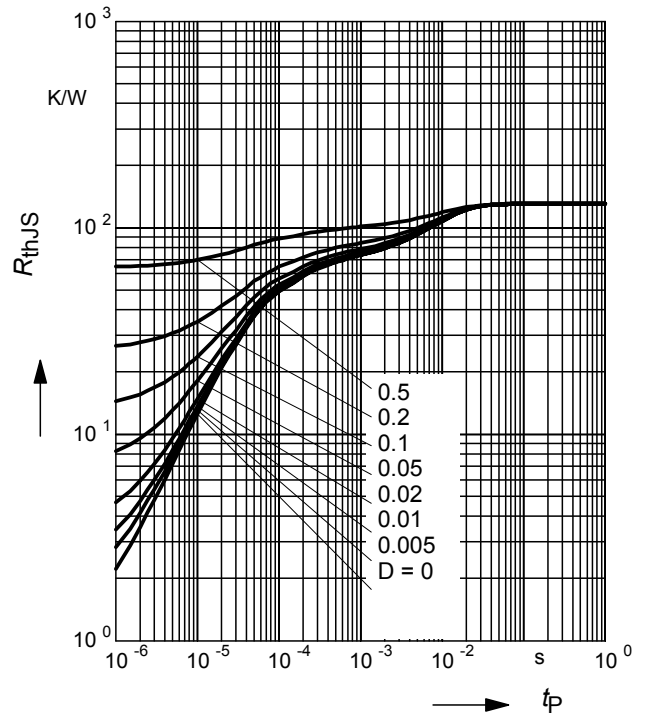
**Forward current  $I_F = f(T_S)$**

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**Permissible Puls Load  $R_{thJS} = f(t_p)$**

BAR81W



**Permissible Pulse Load**

$I_{Fmax} / I_{FDC} = f(t_p)$  BAR81W

