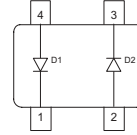
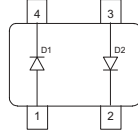
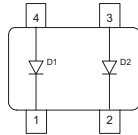
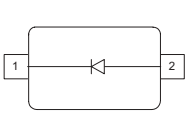


**Silicon Deep Trench PIN Diodes**

- Optimized for low bias current antenna switches in hand held applications
- Very low capacitance at zero volt reverse bias at frequencies above 1GHz (typ. 0.19 pF)
- Low forward resistance (typ. 1.3  $\Omega$  @  $I_F = 3$  mA)
- Improved ON / OFF mode harmonic distortion balance
- Pb-free (RoHS compliant) package<sup>1)</sup>
- Qualified according AEC Q101


**BAR90-02LRH**  
**BAR90-02LS**
**BAR90-07LRH**
**BAR90-098LRH**
**BAR90-099LRH**


| Type         | Package   | Configuration                | $L_S$ (nH) | Marking |
|--------------|-----------|------------------------------|------------|---------|
| BAR90-02LRH  | TSLP-2-7  | single, leadless             | 0.4        | R9      |
| BAR90-02LS   | TSSLP-2-1 | single, leadless             | 0.2        | J       |
| BAR90-07LRH  | TSLP-4-7  | parallel pair, leadless      | 0.4        | T       |
| BAR90-098LRH | TSLP-4-7  | anti-parallel pair, leadless | 0.4        | T9      |
| BAR90-099LRH | TSLP-4-7  | anti-parallel pair, leadless | 0.4        | 99      |

<sup>1</sup>Pb-containing package may be available upon special request

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

| Parameter   | Symbol           | Value       | Unit |
|---|------------------|-------------|------|
| Diode reverse voltage   | $V_R$            | 80          | V    |
| Forward current   | $I_F$            | 100         | mA   |
| Total power dissipation<br>$T_S \leq 137^\circ\text{C}$ , BAR90-02LS<br>$T_S \leq 133^\circ\text{C}$ , all others | $P_{\text{tot}}$ | 150<br>250  | 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><br>BAR90-02LS<br>all others | $R_{\text{thJS}}$ | $\leq 90$<br>$\leq 65$ | K/W  |

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

| Parameter   | Symbol            | Values    |             |           | Unit |
|---|-------------------|-----------|-------------|-----------|------|
|   |                   | min.      | typ.        | max.      |      |
| Breakdown voltage<br>$I_{(\text{BR})} = 5 \mu\text{A}$            | $V_{(\text{BR})}$ | 80        | -           | -         | V    |
| Reverse current<br>$V_R = 60 \text{ V}$                           | $I_R$             | -         | -           | 50        | nA   |
| Forward voltage<br>$I_F = 3 \text{ mA}$<br>$I_F = 100 \text{ mA}$ | $V_F$             | 0.75<br>- | 0.81<br>0.9 | 0.87<br>1 | V    |

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

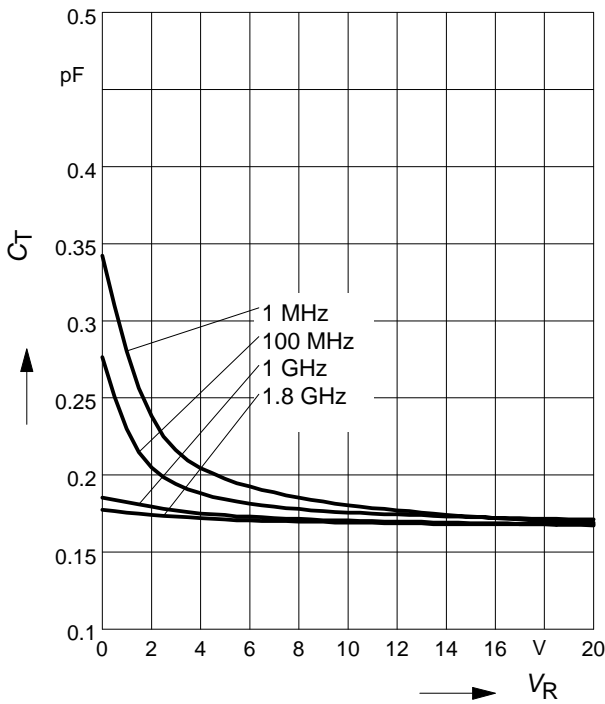
**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

| Parameter   | Symbol      | Values           |                             |                     | Unit          |
|---|-------------|------------------|-----------------------------|---------------------|---------------|
|   |             | min.             | typ.                        | max.                |               |
| <b>AC Characteristics</b>   |             |                  |                             |                     |               |
| Diode capacitance<br>$V_R = 1\text{ V}, f = 1\text{ MHz}$<br>$V_R = 0\text{ V}, f = 100\text{ MHz}$<br>$V_R = 0\text{ V}, f = 1\text{ GHz}$<br>$V_R = 0\text{ V}, f = 1.8\text{ GHz}$ | $C_T$       | -<br>-<br>-<br>- | 0.25<br>0.3<br>0.19<br>0.18 | 0.35<br>-<br>-<br>- | pF            |
| Reverse parallel resistance<br>$V_R = 0\text{ V}, f = 100\text{ MHz}$<br>$V_R = 0\text{ V}, f = 1\text{ GHz}$<br>$V_R = 0\text{ V}, f = 1.8\text{ GHz}$                               | $R_p$       | -<br>-<br>-      | 35<br>5<br>4                | -<br>-<br>-         | k $\Omega$    |
| Forward resistance<br>$I_F = 1\text{ mA}, f = 100\text{ MHz}$<br>$I_F = 3\text{ mA}, f = 100\text{ MHz}$<br>$I_F = 10\text{ mA}, f = 100\text{ MHz}$                                  | $r_f$       | -<br>-<br>-      | 2<br>1.3<br>0.8             | -<br>2.3<br>-       | $\Omega$      |
| Charge carrier life time<br>$I_F = 10\text{ mA}, I_R = 6\text{ mA}$ , measured at $I_R = 3\text{ mA}$ ,<br>$R_L = 100\ \Omega$  | $\tau_{rr}$ | -                | 750                         | -                   | ns            |
| I-region width  | $W_I$       | -                | 20                          | -                   | $\mu\text{m}$ |
| Insertion loss <sup>1)</sup><br>$I_F = 1\text{ mA}, f = 1.8\text{ GHz}$<br>$I_F = 3\text{ mA}, f = 1.8\text{ GHz}$<br>$I_F = 10\text{ mA}, f = 1.8\text{ GHz}$                        | $l_L$       | -<br>-<br>-      | 0.16<br>0.11<br>0.08        | -<br>-<br>-         | dB            |
| Isolation <sup>1)</sup><br>$V_R = 0\text{ V}, f = 0.9\text{ GHz}$<br>$V_R = 0\text{ V}, f = 1.8\text{ GHz}$<br>$V_R = 0\text{ V}, f = 2.45\text{ GHz}$                                | $l_{SO}$    | -<br>-<br>-      | 18.5<br>13.5<br>11.5        | -<br>-<br>-         |               |

<sup>1)</sup>BAR90-02LRH in series configuration,  $Z = 50\ \Omega$

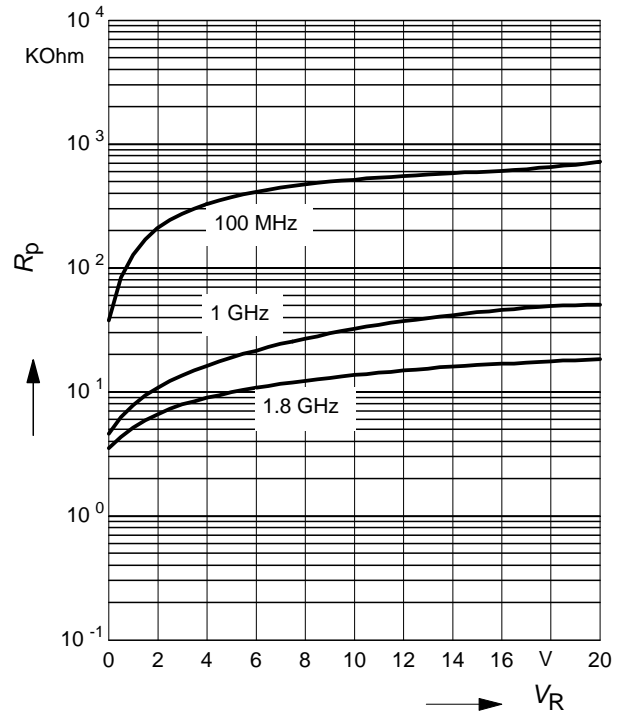
**Diode capacitance  $C_T = f(V_R)$**

$f =$  Parameter



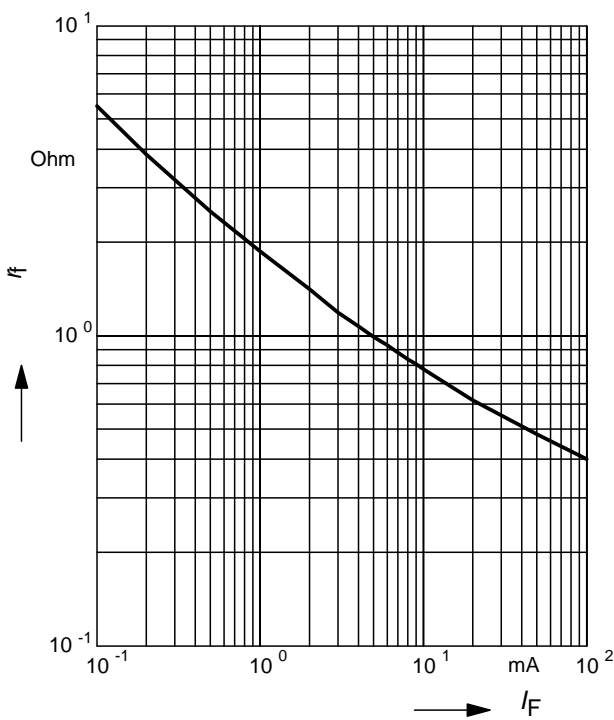
**Reverse parallel resistance  $R_p = f(V_R)$**

$f =$  Parameter



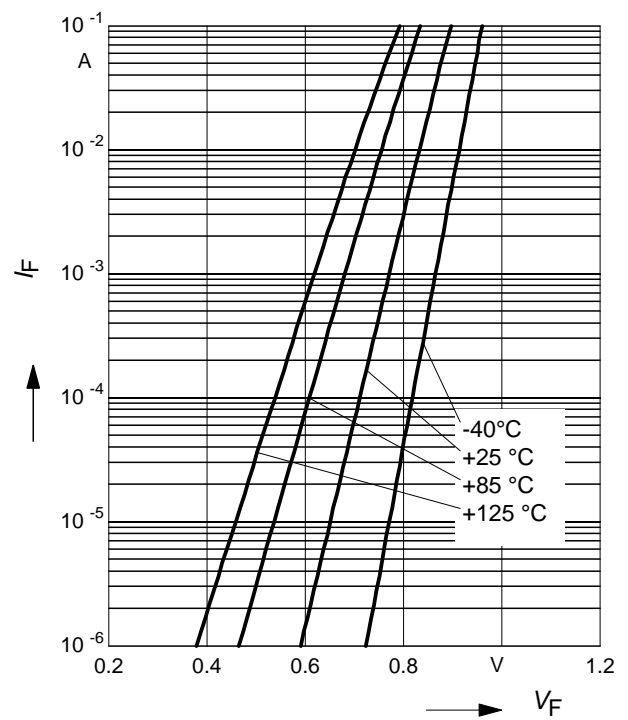
**Forward resistance  $r_f = f(I_F)$**

$f = 100$  MHz



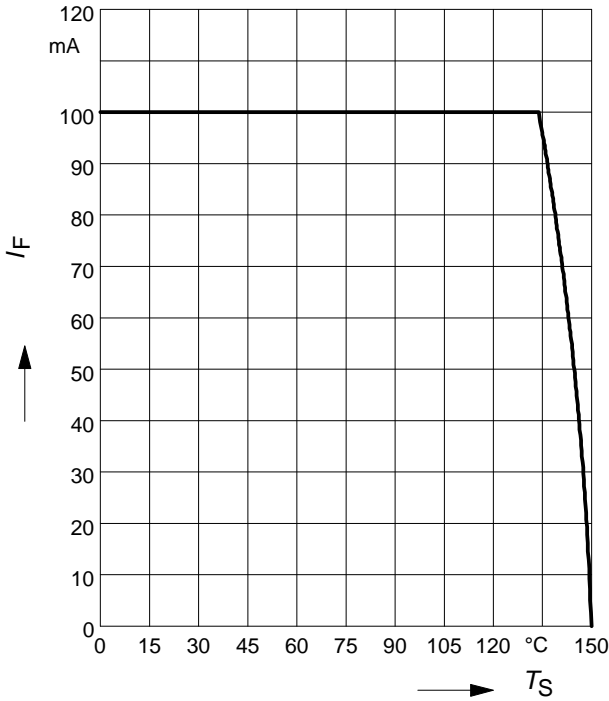
**Forward current  $I_F = f(V_F)$**

$T_A =$  Parameter



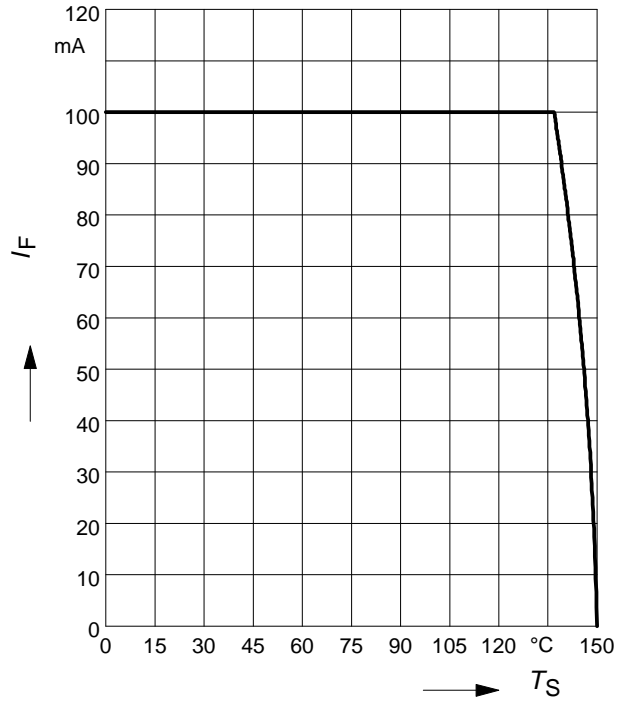
**Forward current  $I_F = f(T_S)$**

BAR90-02LRH /-07LRH /  
-098LRH /-099LRH



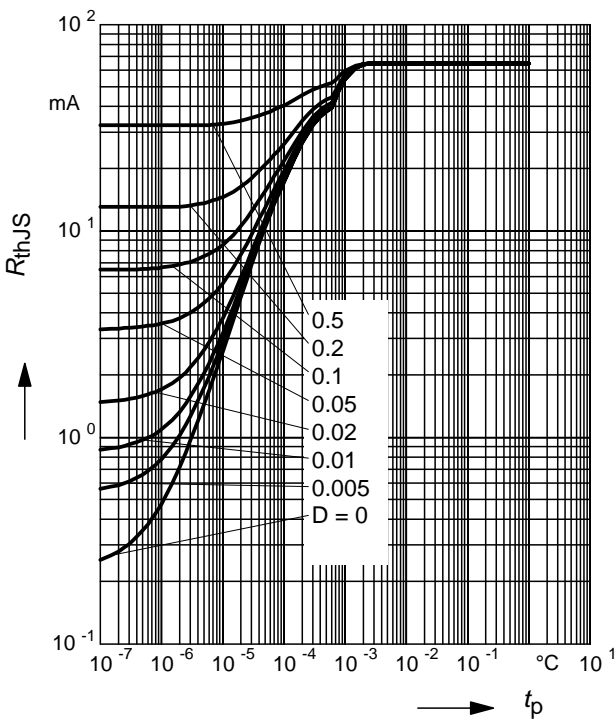
**Forward current  $I_F = f(T_S)$**

BAR90-02LS



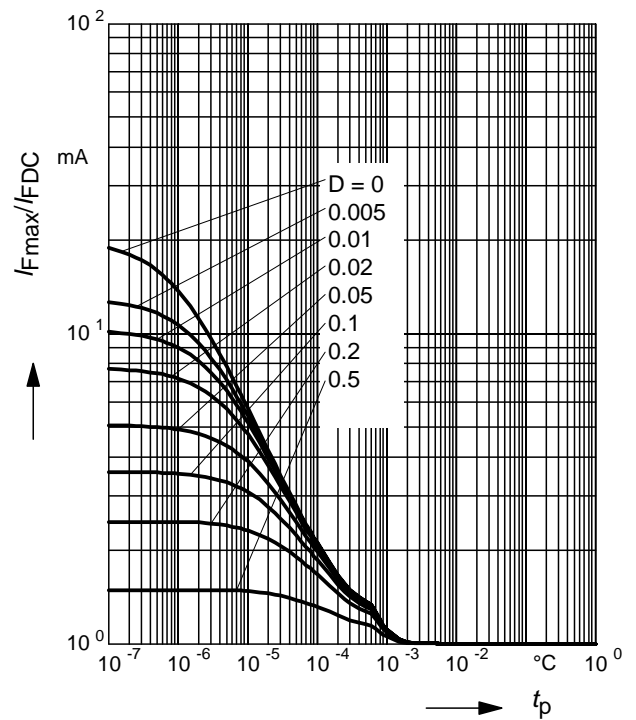
**Permissible Puls Load  $R_{thJS} = f(t_p)$**

BAR90-02LRH /-07LRH /  
-098LRH /-099LRH



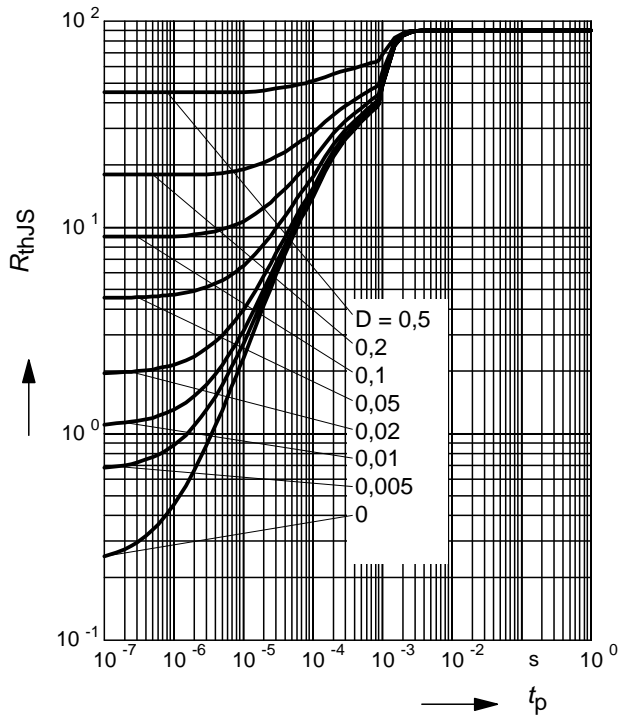
**Permissible Pulse Load**

$I_{Fmax} / I_{FDC} = f(t_p)$  BAR90-02LRH /  
-07LRH / -098LRH /-099LRH



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

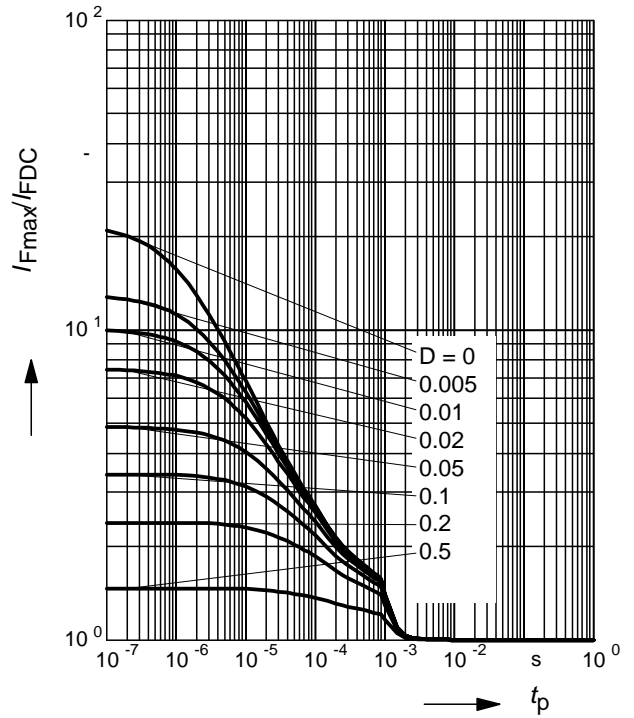
BAR90-02LS



**Permissible Pulse Load**

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

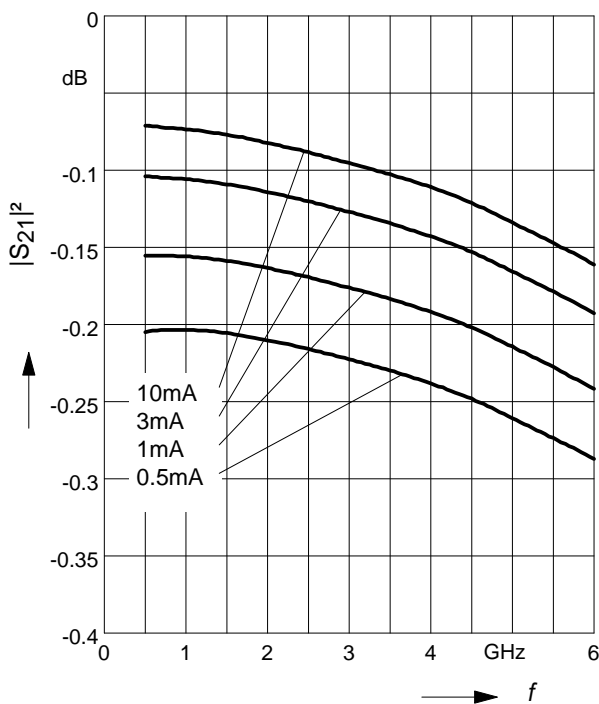
BAR90-02LS



**Insertion loss  $I_L = -|S_{21}|^2 = f(f)$**

$I_F$  = Parameter

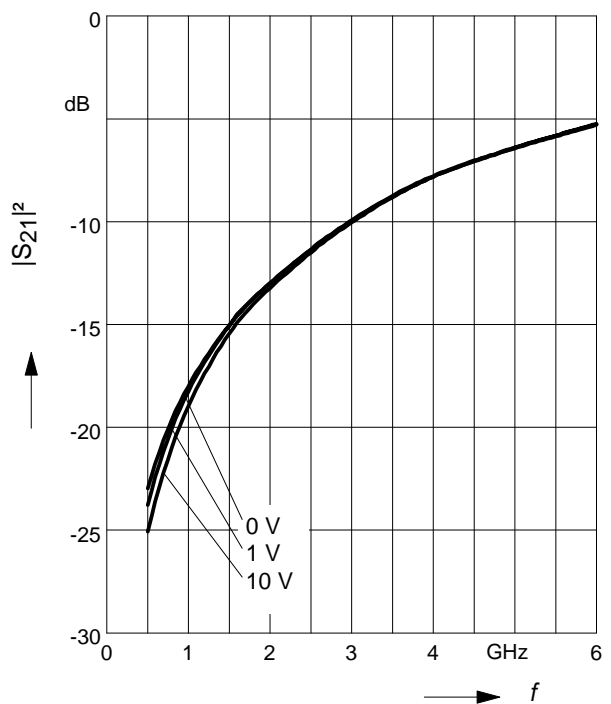
BAR90-02LRH in series configuration,  $Z = 50\Omega$



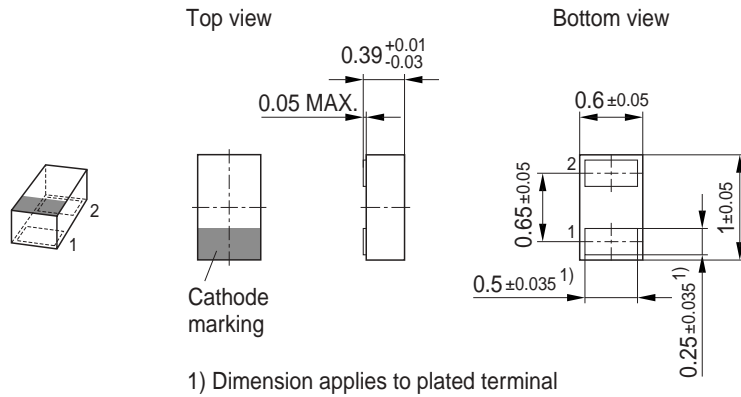
**Isolation  $I_{SO} = -|S_{21}|^2 = f(f)$**

$V_R$  = Parameter

BAR90-02LRH in series configuration,  $Z = 50\Omega$

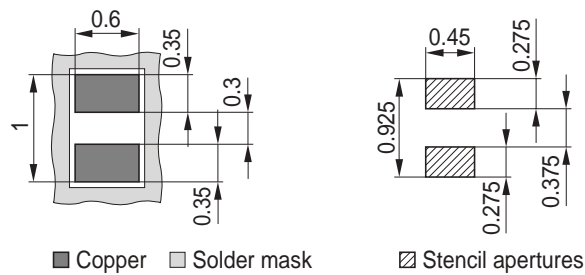


### Package Outline

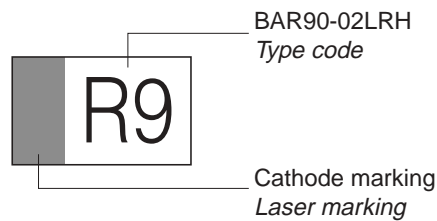


### Foot Print

For board assembly information please refer to Infineon website "Packages"

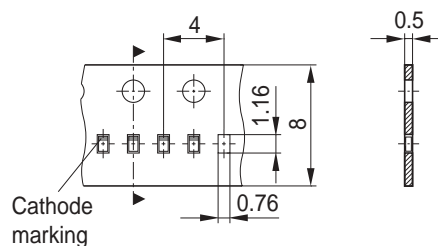


### Marking Layout (Example)

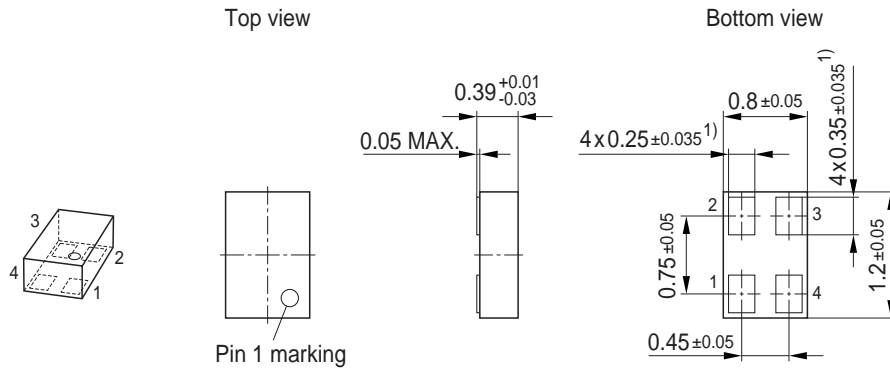


### Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel  
Reel ø330 mm = 50.000 Pieces/Reel (optional)



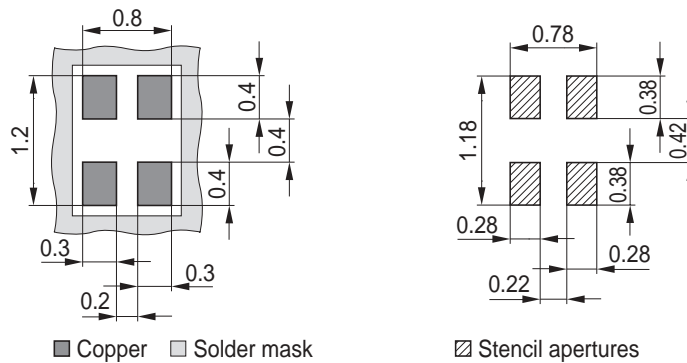
### Package Outline



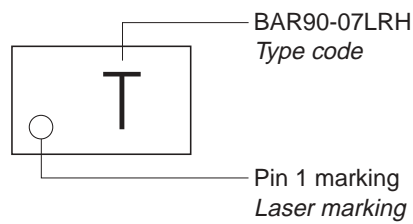
1) Dimension applies to plated terminal

### Foot Print

For board assembly information please refer to Infineon website "Packages"

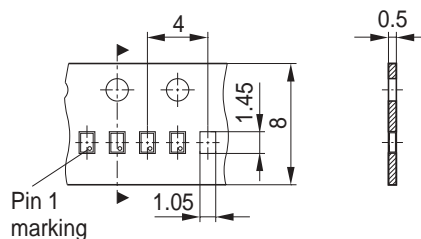


### Marking Layout (Example)



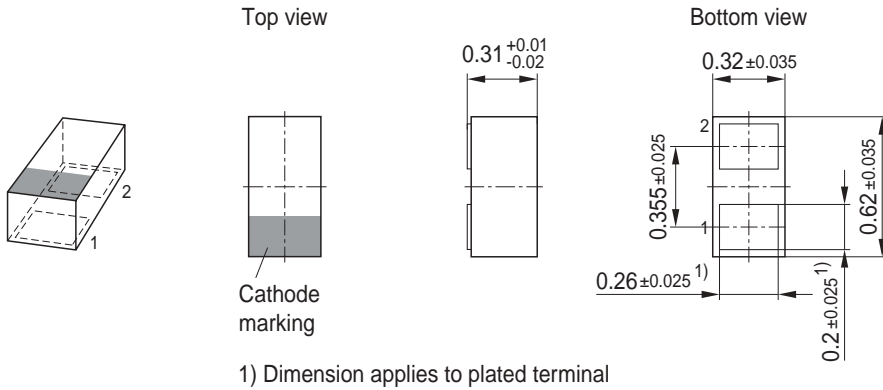
### Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel



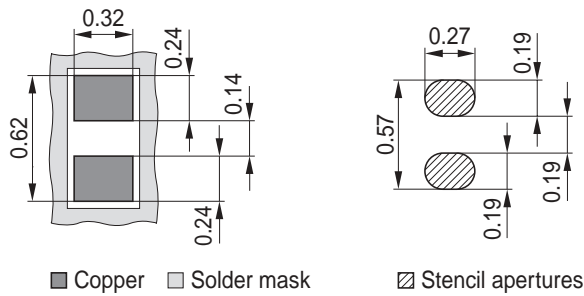


### Package Outline

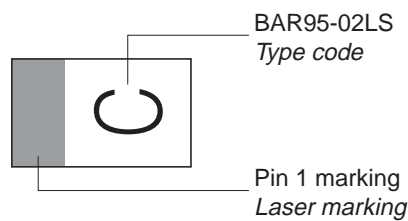


### Foot Print

For board assembly information please refer to Infineon website "Packages"

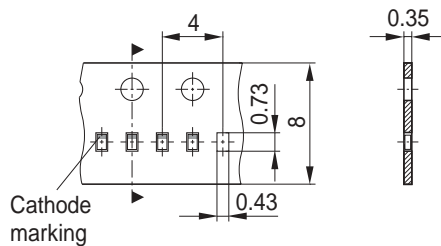


### Marking Layout



### Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel



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