

**Silicon PIN Diode**

- High voltage current controlled RF resistor for RF attenuator and switches
- Frequency range above 1 MHz up to 6 GHz
- Very low capacitance at zero volt reverse bias at frequencies above 1 GHz (typ. 0.17 pF)
- Low forward resistance (typ. 2.1  $\Omega$  @ 10 mA)
- Very low signal distortion
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101<sup>1)</sup>



**BAR64-02EL**  
**BAR64-02V**  
**BAR64-03W**

**BAR64-04**  
**BAR64-04W**

**BAR64-05**  
**BAR64-05W**

**BAR64-06**  
**BAR64-06W**



| Type        | Package   | Configuration    | $L_S$ (nH) | Marking |
|-------------|-----------|------------------|------------|---------|
| BAR64-02EL* | TSLP-2-19 | single, leadless | 0.4        | OE      |
| BAR64-02V   | SC79      | single           | 0.6        | O       |
| BAR64-03W   | SOD323    | single           | 1.8        | blue 2  |
| BAR64-04    | SOT23     | series           | 1.8        | PPs     |
| BAR64-04W   | SOT323    | series           | 1.4        | PPs     |
| BAR64-05    | SOT23     | common cathode   | 1.8        | PRs     |
| BAR64-05W   | SOT323    | common cathode   | 1.4        | PRs     |
| BAR64-06    | SOT23     | common anode     | 1.8        | PSs     |
| BAR64-06W   | SOT323    | common anode     | 1.4        | PSs     |

<sup>1)</sup>BAR64-02EL is not qualified according AEC Q101

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

| Parameter  | Symbol           | Value                           | Unit |
|--|------------------|---------------------------------|------|
| Diode reverse voltage  | $V_R$            | 150                             | V    |
| Forward current  | $I_F$            | 100                             | mA   |
| Total power dissipation<br>BAR64-02EL, $T_S \leq 135^\circ\text{C}$<br>BAR64-02V, $T_S \leq 125^\circ\text{C}$<br>BAR64-03W, $T_S \leq 25^\circ\text{C}$<br>BAR64-04, -05, -06, $T_S \leq 65^\circ\text{C}$<br>BAR64-04W, -05W, -06W, $T_S \leq 115^\circ\text{C}$ | $P_{\text{tot}}$ | 250<br>250<br>250<br>250<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>BAR64-02EL<br>BAR64-02V, -04W, -05W, -06W<br>BAR64-03W<br>BAR64-04, -05, -06 | $R_{\text{thJS}}$ | $\leq 60$<br>$\leq 140$<br>$\leq 370$<br>$\leq 340$ | K/W  |

<sup>1)</sup>For calculation of  $R_{\text{thJA}}$  please refer to Application Note AN077 (Thermal Resistance Calculation)

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

| Parameter | Symbol | Values |      |      | Unit |
|-----------|--------|--------|------|------|------|
|           |        | min.   | typ. | max. |      |

**DC Characteristics**

|  |                   |     |   |     |   |
|--|-------------------|-----|---|-----|---|
| Breakdown voltage<br>$I_{(\text{BR})} = 5 \mu\text{A}$ | $V_{(\text{BR})}$ | 150 | - | -   | V |
| Forward voltage<br>$I_F = 50 \text{ mA}$               | $V_F$             | -   | - | 1.1 |   |

**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>$V_R = 20\text{ V}, f = 1\text{ MHz}$<br>$V_R = 0\text{ V}, f = 100\text{ MHz}$<br>$V_R = 0\text{ V}, f = 1\dots 1.8\text{ GHz}, \text{BAR64-02EL}$<br>$V_R = 0\text{ V}, f = 1\dots 1.8\text{ GHz}, \text{all other}$ | $C_T$       | -<br>-<br>-<br>- | 0.23<br>0.3<br>0.13<br>0.17 | 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>-      | 10<br>4<br>3                | -<br>-<br>-         | k $\Omega$    |
| Forward resistance<br>$I_F = 1\text{ mA}, f = 100\text{ MHz}$<br>$I_F = 10\text{ mA}, f = 100\text{ MHz}$<br>$I_F = 100\text{ mA}, f = 100\text{ MHz}$  | $r_f$       | -<br>-<br>-      | 12.5<br>2.1<br>0.85         | 20<br>2.8<br>1.35   | $\Omega$      |
| Charge carrier life time<br>$I_F = 10\text{ mA}, I_R = 6\text{ mA}, \text{measured at } I_R = 3\text{ mA},$<br>$R_L = 100\ \Omega$  | $\tau_{rr}$ | -                | 1550                        | -                   | ns            |
| I-region width  | $W_I$       | -                | 50                          | -                   | $\mu\text{m}$ |
| Insertion loss <sup>1)</sup><br>$I_F = 3\text{ mA}, f = 1.8\text{ GHz}$<br>$I_F = 5\text{ mA}, f = 1.8\text{ GHz}$<br>$I_F = 10\text{ mA}, f = 1.8\text{ GHz}$  | $I_L$       | -<br>-<br>-      | 0.32<br>0.23<br>0.16        | -<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>$V_R = 0\text{ V}, f = 2.45\text{ GHz}$<br>$V_R = 0\text{ V}, f = 5.6\text{ GHz}$  | $I_{SO}$    | -<br>-<br>-<br>- | 22<br>17<br>14.5<br>8.5     | -<br>-<br>-<br>-    |               |

<sup>1</sup>BAR64-02EL 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  $r_f = f(I_F)$**

$f = 100\text{MHz}$



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

$T_A =$  Parameter



**Intermodulation intercept point**

$IP_3 = f(I_F); f = \text{Parameter}$



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

BAR64-02EL



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

BAR64-02V



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

BAR64-04, BAR64-05, BAR64-06



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

BAR64-04W, BAR64-05W, BAR64-06W



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

BAR64-02EL



**Permissible Pulse Load**

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

BAR64-02EL



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

BAR64-02V



**Permissible Pulse Load**

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

BAR64-02V



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

BAR64-04, BAR64-05, BAR64-06



**Permissible Pulse Load**

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

BAR64-04, BAR64-05, BAR64-06



**Permissible Puls Load  $R_{thJS} = f(t_p)$**   
 BAR64-04W, BAR64-05W, BAR64-06W



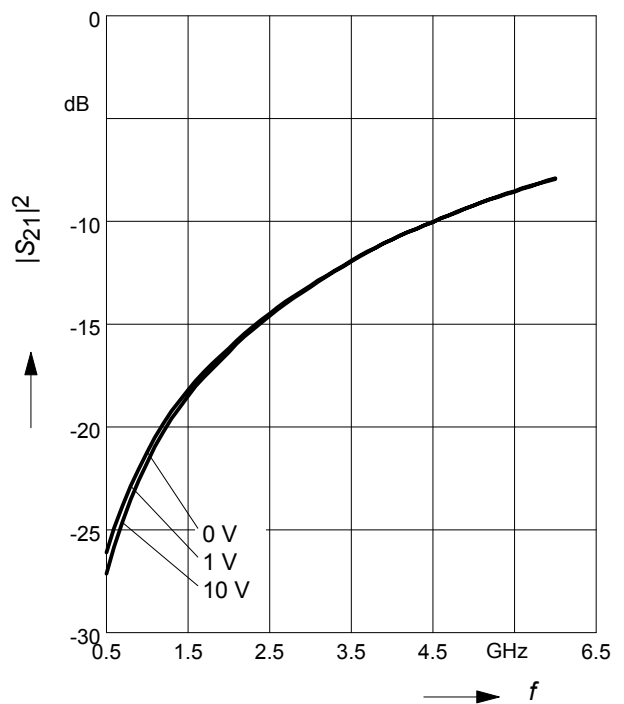
**Permissible Pulse Load**  
 $I_{Fmax}/I_{FDC} = f(t_p)$   
 BAR64-04W, BAR64-05W, BAR64-06W



**Insertion loss  $I_L = -|S_{21}|^2 = f(f)$**   
 $I_F$  = Parameter  
 BAR64-02EL in series configuration,  $Z = 50\Omega$

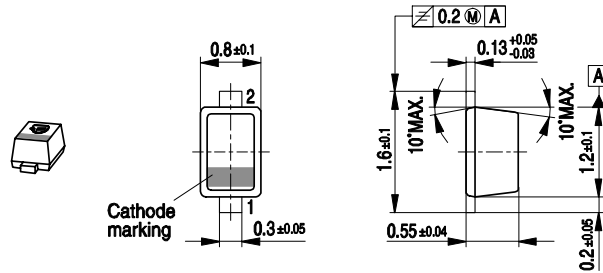


**Isolation  $I_{SO} = -|S_{21}|^2 = f(f)$**   
 $V_R$  = Parameter  
 BAR64-02EL in series configuration,  $Z = 50\Omega$





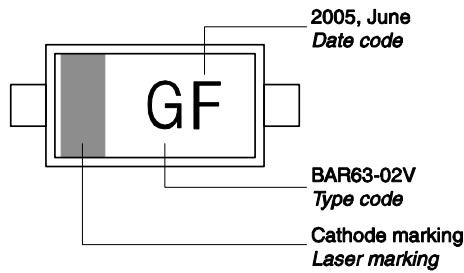
Package Outline



Foot Print

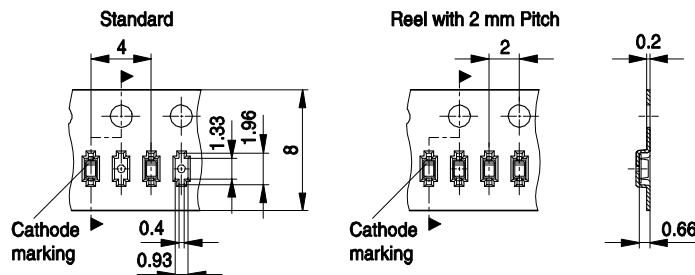


Marking Layout (Example)



Standard Packing

- Reel ø180 mm = 3.000 Pieces/Reel
- Reel ø180 mm = 8.000 Pieces/Reel (2 mm Pitch)
- Reel ø330 mm = 10.000 Pieces/Reel



Date Code marking for discrete packages with one digit (SCD80, SC79, SC75<sup>1)</sup>) CES-Code

| Month | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| 01    | a    | p    | A    | P    | a    | p    | A    | P    | a    | p    | A    | P    |
| 02    | b    | q    | B    | Q    | b    | q    | B    | Q    | b    | q    | B    | Q    |
| 03    | c    | r    | C    | R    | c    | r    | C    | R    | c    | r    | C    | R    |
| 04    | d    | s    | D    | S    | d    | s    | D    | S    | d    | s    | D    | S    |
| 05    | e    | t    | E    | T    | e    | t    | E    | T    | e    | t    | E    | T    |
| 06    | f    | u    | F    | U    | f    | u    | F    | U    | f    | u    | F    | U    |
| 07    | g    | v    | G    | V    | g    | v    | G    | V    | g    | v    | G    | V    |
| 08    | h    | x    | H    | X    | h    | x    | H    | X    | h    | x    | H    | X    |
| 09    | j    | y    | J    | Y    | j    | y    | J    | Y    | j    | y    | J    | Y    |
| 10    | k    | z    | K    | Z    | k    | z    | K    | Z    | k    | z    | K    | Z    |
| 11    | l    | 2    | L    | 4    | l    | 2    | L    | 4    | l    | 2    | L    | 4    |
| 12    | n    | 3    | N    | 5    | n    | 3    | N    | 5    | n    | 3    | N    | 5    |

1) New Marking Layout for SC75, implemented at October 2005.

Package Outline



Foot Print



Marking Layout (Example)



Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel  
 Reel ø330 mm = 10.000 Pieces/Reel



Package Outline



1) Lead width can be 0.6 max. in dambar area

Foot Print



Marking Layout (Example)



Standard Packing

Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel



Package Outline



Foot Print



Marking Layout (Example)

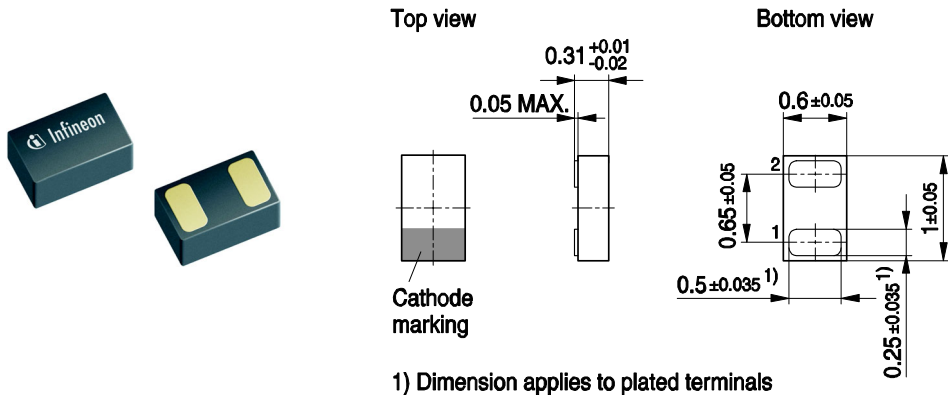


Standard Packing

Reel  $\varnothing 180$  mm = 3.000 Pieces/Reel  
 Reel  $\varnothing 330$  mm = 10.000 Pieces/Reel



Package Outline



TSLP-2-19, -20-PO V01

Foot Print

For board assembly information please refer to Infineon website „Packages“



TSLP-2-19, -20-FP V01

Marking layout (Example)



Standard Packing

Reel Ø 180 mm: 15.000 Pieces / Reel  
 Reel Ø 330 mm: 6.000 Pieces / Reel  
 Reel Ø 330 mm: 50.000 Pieces / Reel



TSLP-2-19, -20-TP V02

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- Подбор аналогов;
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- Техническая поддержка проекта;
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