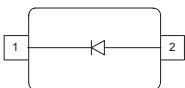


**Silicon PIN Diodes**

- Current-controlled RF resistor for switching and attenuating applications
- Frequency range above 10 MHz up to 6 GHz
- Especially useful as antenna switch in mobile communication
- Very low capacitance at zero volt reverse bias at frequencies above 1 GHz (typ. 0.15 pF)
- Low forward resistance
- Very low harmonic distortion
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101<sup>1)</sup>



**BAR50-02L**  
**BAR50-02V**  
**BAR50-03W**



| Type       | Package  | Configuration    | $L_S$ (nH) | Marking |
|------------|----------|------------------|------------|---------|
| BAR50-02L* | TSLP-2-1 | single, leadless | 0.4        | AB      |
| BAR50-02V  | SC79     | single           | 0.6        | a       |
| BAR50-03W  | SOD323   | single           | 1.8        | blue A  |

<sup>1)</sup>BAR50-02L 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  | $V_R$            | 50                | V    |
| Forward current  | $I_F$            | 100               | mA   |
| Total power dissipation<br>BAR50-02L, $T_S \leq 130^\circ\text{C}$<br>BAR50-02V, $T_S \leq 120^\circ\text{C}$<br>BAR50-03W, $T_S \leq 115^\circ\text{C}$ | $P_{\text{tot}}$ | 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>BAR50-02L<br>BAR50-02V<br>BAR50-03W | $R_{\text{thJS}}$ | $\leq 80$<br>$\leq 120$<br>$\leq 140$ | K/W  |

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

| Parameter                               | Symbol | Values |      |      | Unit |
|---|--------|--------|------|------|------|
|   |        | min.   | typ. | max. |      |
| Reverse current<br>$V_R = 50\text{ V}$  | $I_R$  | -      | -    | 50   | nA   |
| Forward voltage<br>$I_F = 50\text{ mA}$ | $V_F$  | -      | 0.95 | 1.1  | V    |

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

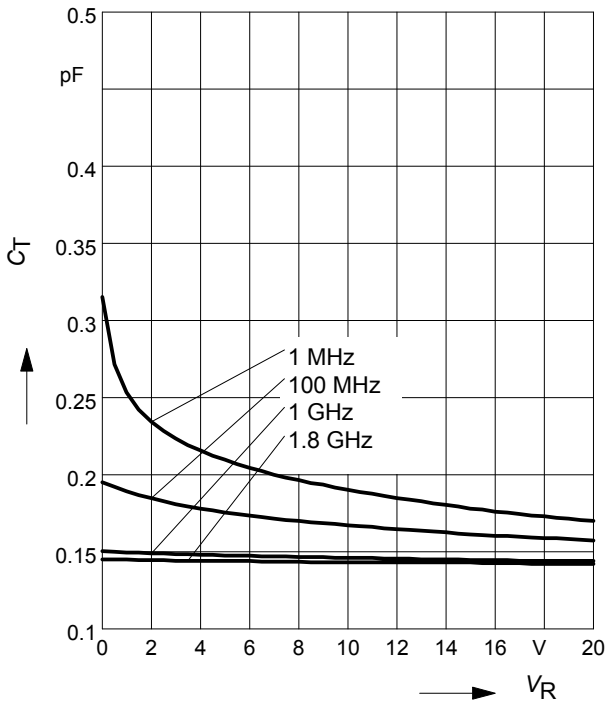
**Electrical Characteristics at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

| Parameter   | Symbol      | Values |      |      | Unit          |
|---|-------------|--------|------|------|---------------|
|   |             | min.   | typ. | max. |               |
| <b>AC Characteristics</b>   |             |        |      |      |               |
| Diode capacitance   | $C_T$       |        |      |      | pF            |
| $V_R = 1\text{ V}, f = 1\text{ MHz}$  |             | -      | 0.24 | 0.5  |               |
| $V_R = 5\text{ V}, f = 1\text{ MHz}$  |             | -      | 0.2  | 0.4  |               |
| $V_R = 0\text{ V}, f = 100\text{ MHz}$  |             | -      | 0.2  | -    |               |
| $V_R = 0\text{ V}, f = 1\dots 1.8\text{ GHz}, \text{BAR50-02L}$                                   |             | -      | 0.1  | -    |               |
| $V_R = 0\text{ V}, f = 1\dots 1.8\text{ GHz}, \text{all other}$                                   |             | -      | 0.15 | -    |               |
| Reverse parallel resistance   | $R_P$       |        |      |      | k $\Omega$    |
| $V_R = 0\text{ V}, f = 100\text{ MHz}$  |             | -      | 25   | -    |               |
| $V_R = 0\text{ V}, f = 1\text{ GHz}$  |             | -      | 6    | -    |               |
| $V_R = 0\text{ V}, f = 1.8\text{ GHz}$  |             | -      | 5    | -    |               |
| Forward resistance  | $r_f$       |        |      |      | $\Omega$      |
| $I_F = 0.5\text{ mA}, f = 100\text{ MHz}$   |             | -      | 25   | 40   |               |
| $I_F = 1\text{ mA}, f = 100\text{ MHz}$   |             | -      | 16.5 | 25   |               |
| $I_F = 10\text{ mA}, f = 100\text{ MHz}$  |             | -      | 3    | 4.5  |               |
| Charge carrier life time  | $\tau_{rr}$ | -      | 1100 | -    | ns            |
| $I_F = 10\text{ mA}, I_R = 6\text{ mA}, \text{measured at } I_R = 3\text{ mA}, R_L = 100\ \Omega$ |             |        |      |      |               |
| I-region width  | $W_I$       | -      | 56   | -    | $\mu\text{m}$ |
| Insertion loss <sup>1)</sup>  | $I_L$       |        |      |      | dB            |
| $I_F = 3\text{ mA}, f = 1.8\text{ GHz}$   |             | -      | 0.56 | -    |               |
| $I_F = 5\text{ mA}, f = 1.8\text{ GHz}$   |             | -      | 0.4  | -    |               |
| $I_F = 10\text{ mA}, f = 1.8\text{ GHz}$  |             | -      | 0.27 | -    |               |
| Isolation <sup>1)</sup>   | $I_{SO}$    |        |      |      |               |
| $V_R = 0\text{ V}, f = 0.9\text{ GHz}$  |             | -      | 24.5 | -    |               |
| $V_R = 0\text{ V}, f = 1.8\text{ GHz}$  |             | -      | 20   | -    |               |
| $V_R = 0\text{ V}, f = 2.45\text{ GHz}$   |             | -      | 18   | -    |               |
| $V_R = 0\text{ V}, f = 5.6\text{ GHz}$  |             | -      | 12   | -    |               |

<sup>1</sup>BAR50-02L in series configuration,  $Z = 50\ \Omega$

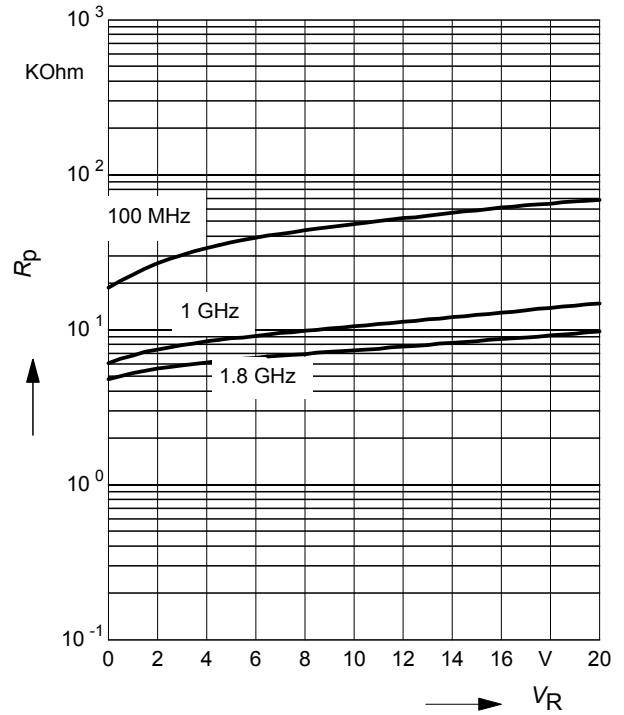
**Diode capacitance  $C_T = f(V_R)$**

$f =$  Parameter



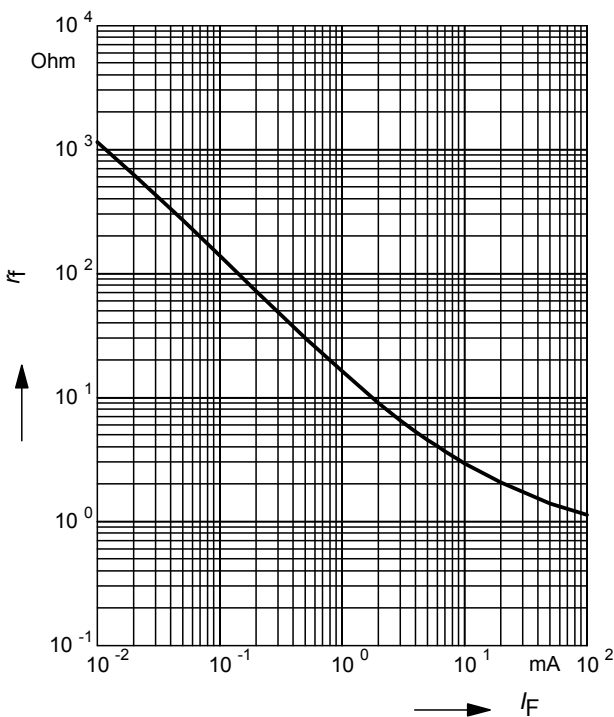
**Reverse parallel resistance  $R_P = f(V_R)$**

$f =$  Parameter



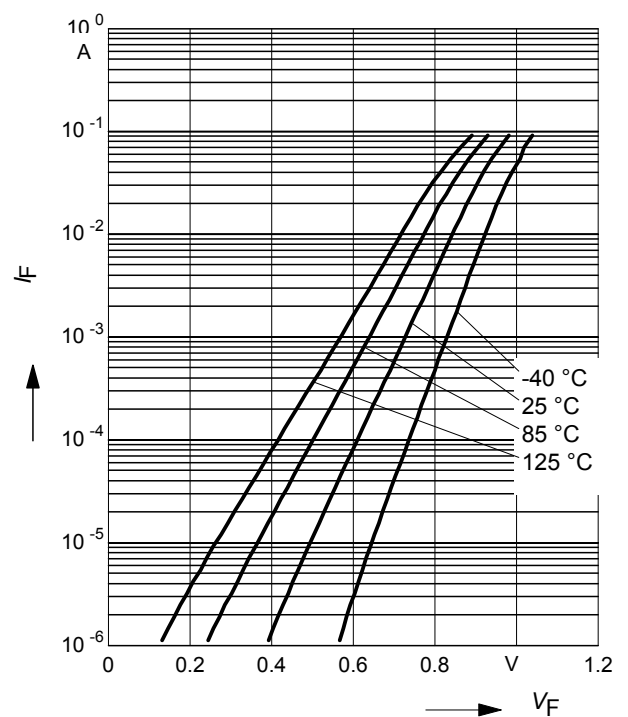
**Forward resistance  $r_f = f(I_F)$**

$f = 100$  MHz



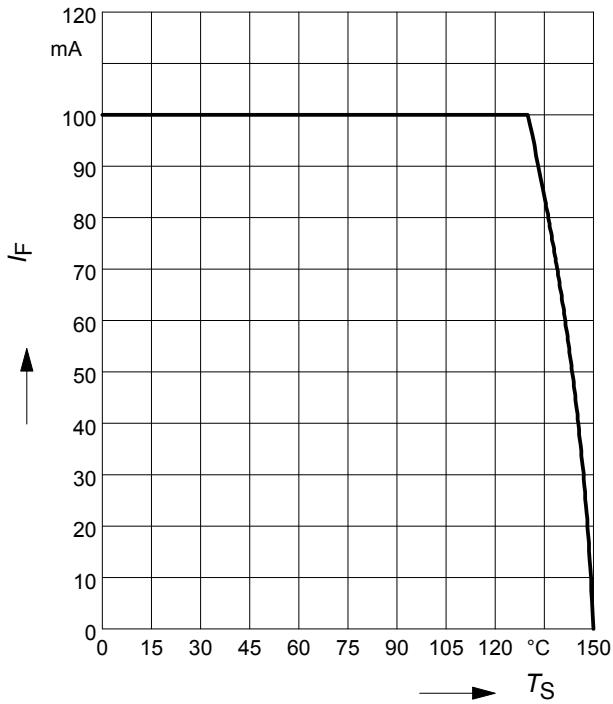
**Forward current  $I_F = f(V_F)$**

$T_A =$  Parameter



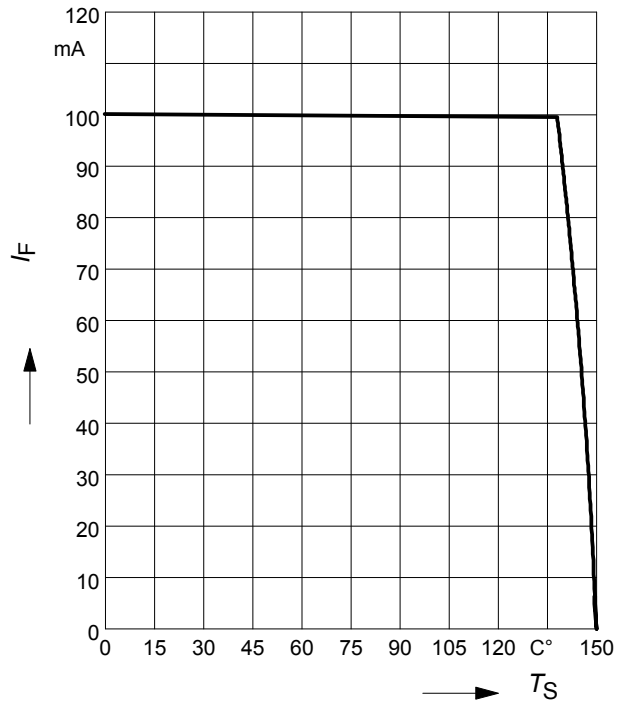
Forward current  $I_F = f(T_S)$

BAR50-02L



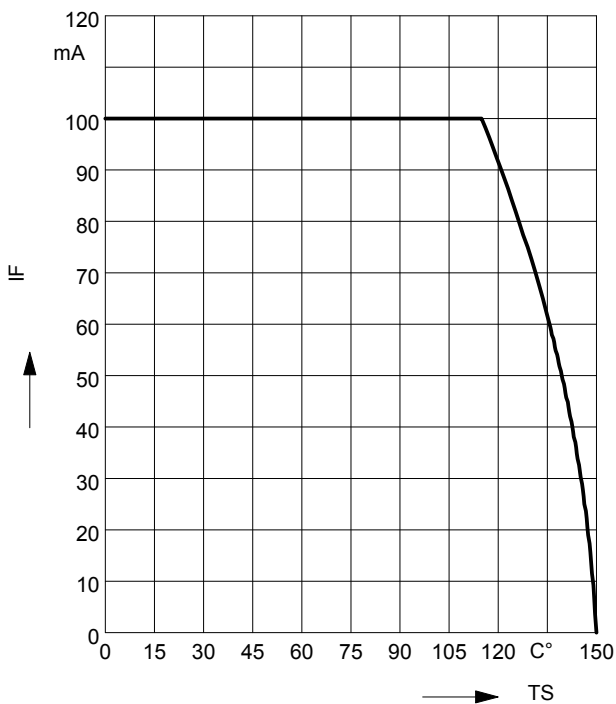
Forward current  $I_F = f(T_S)$

BAR50-02V



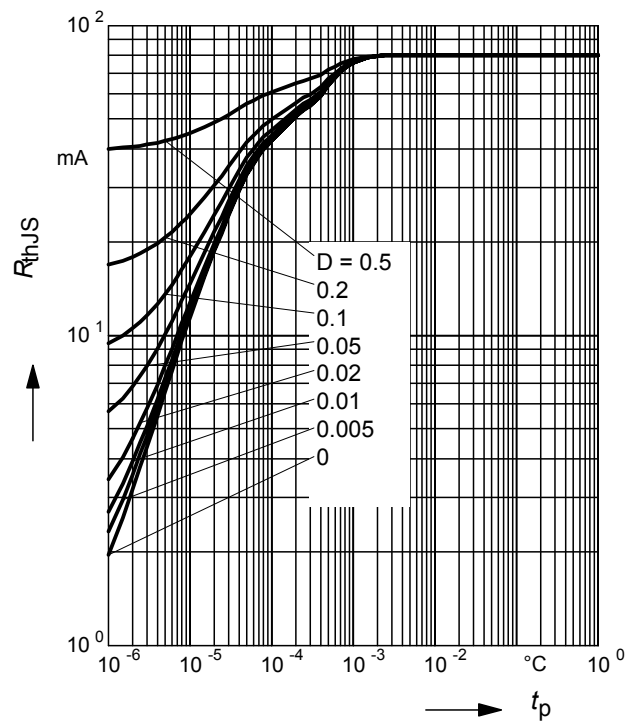
Forward current  $I_F = f(T_S)$

BAR50-03W



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

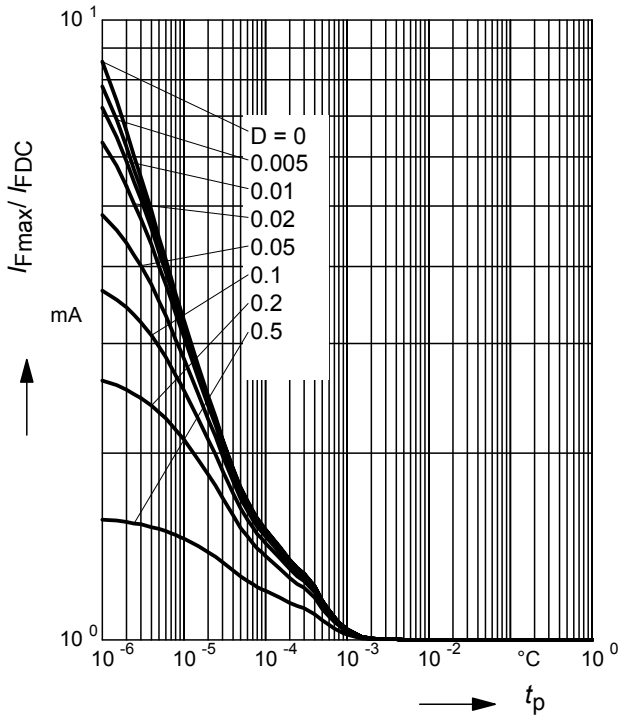
BAR50-02L



**Permissible Pulse Load**

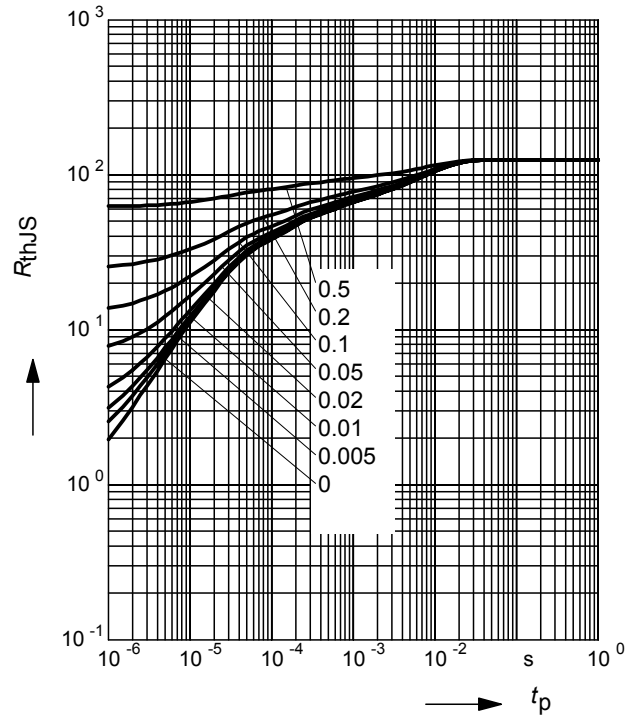
$$I_{Fmax} / I_{FDC} = f(t_p)$$

BAR50-02L



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

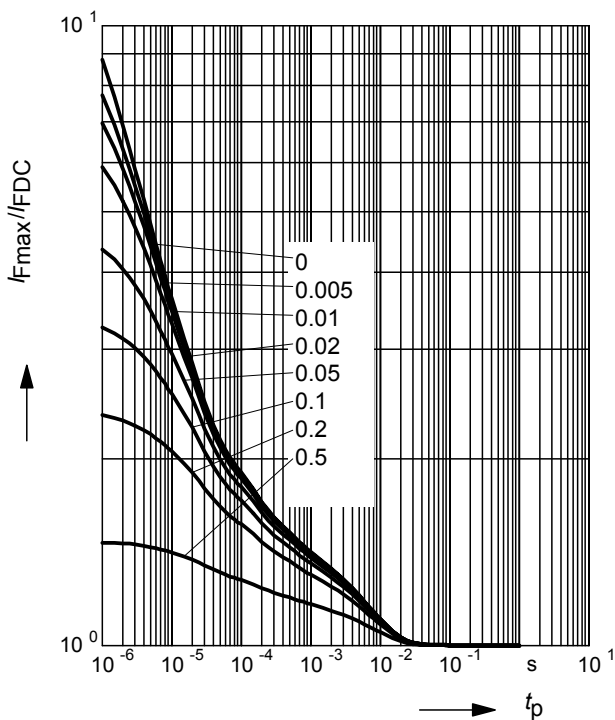
BAR50-02V



**Permissible Pulse Load**

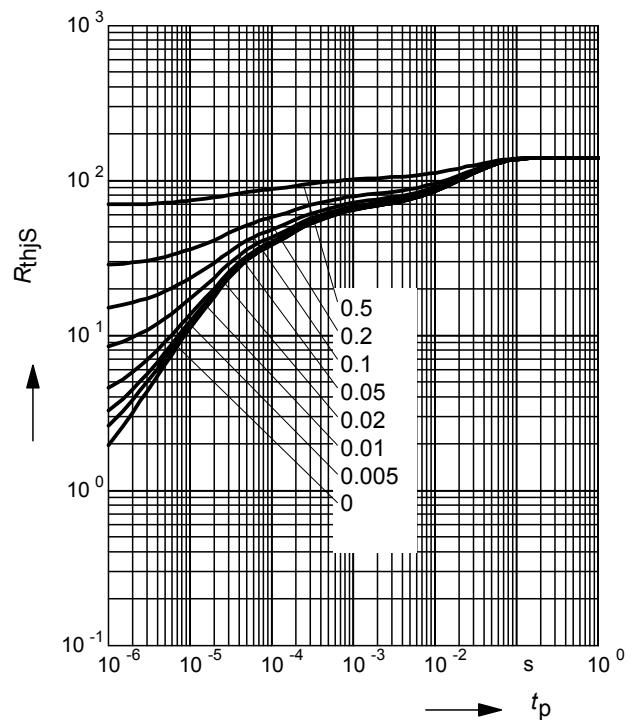
$$I_{Fmax} / I_{FDC} = f(t_p)$$

BAR50-02V



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

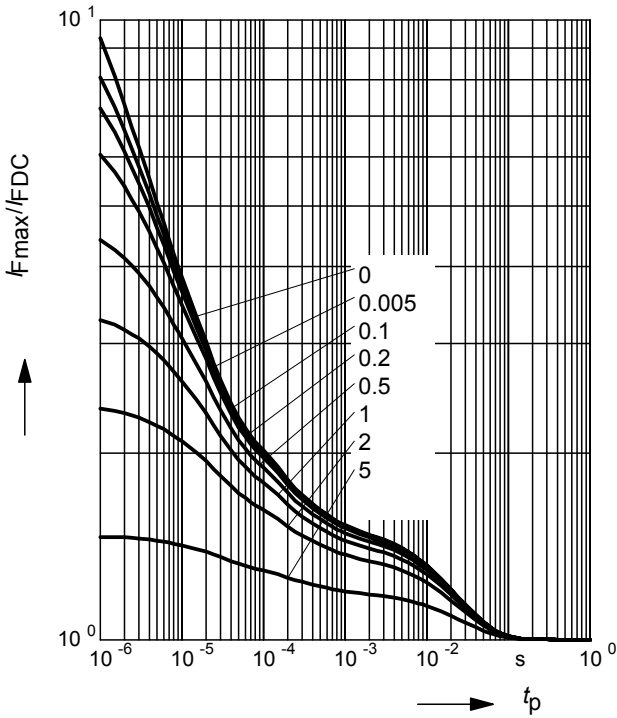
BAR50-03W



**Permissible Pulse Load**

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

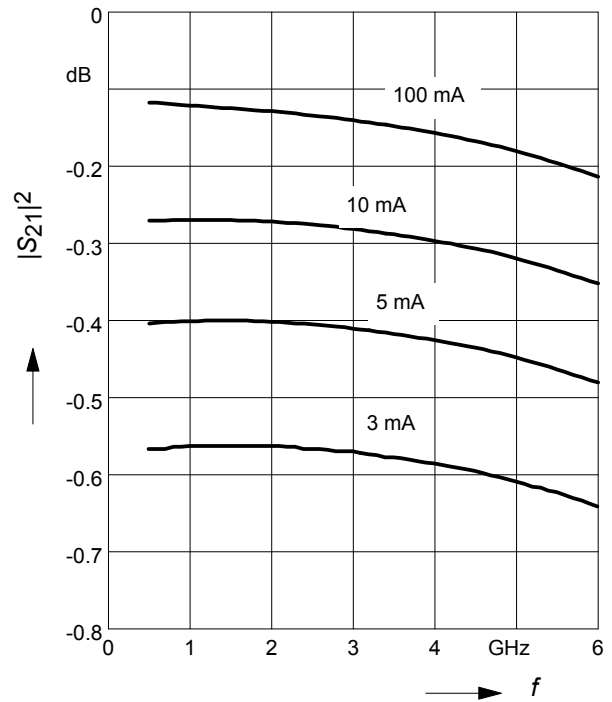
BAR50-03W



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

$I_F$  = Parameter

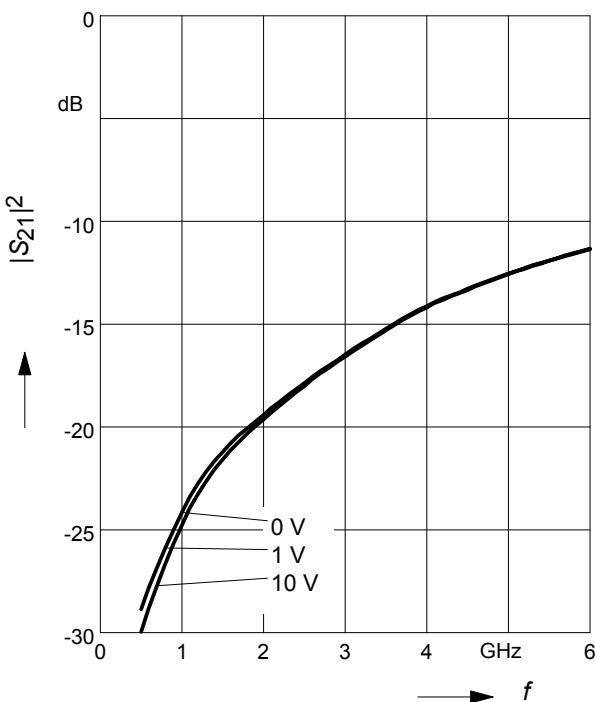
BAR50-02L in series configuration,  $Z = 50\Omega$



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

$V_R$  = Parameter

BAR50-02L in series configuration,  $Z = 50\Omega$



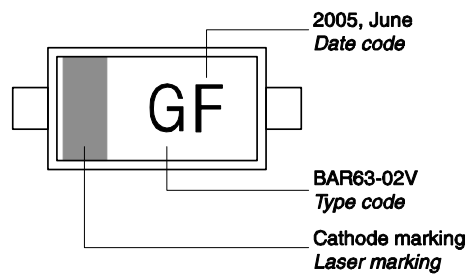
### Package Outline



### Foot Print

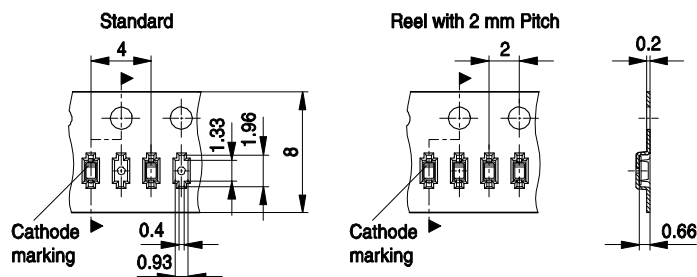


### Marking Layout (Example)



### 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

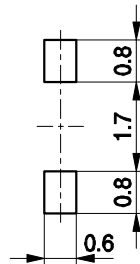
| Month | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| 01    | a    | p    | A    | P    | a    | p    | A    | P    | a    | p    | A    | P    |
| 02    | b    | q    | 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)

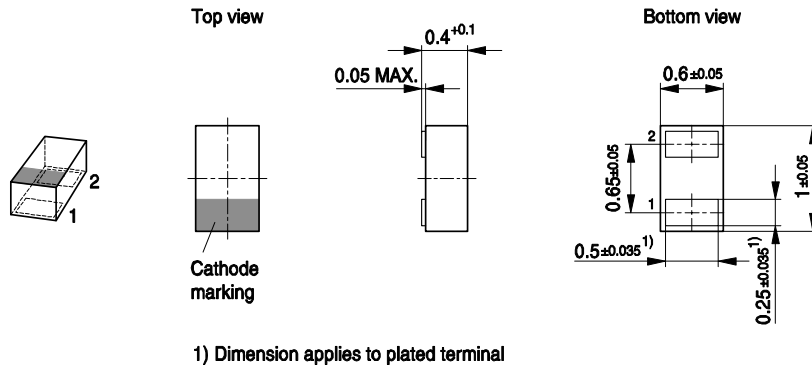


Standard Packing

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

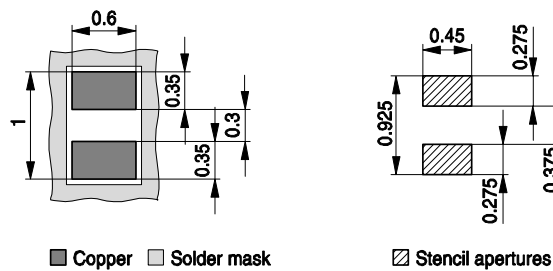


### Package Outline

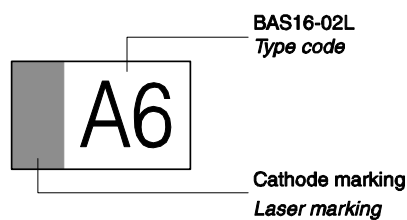


### Foot Print

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

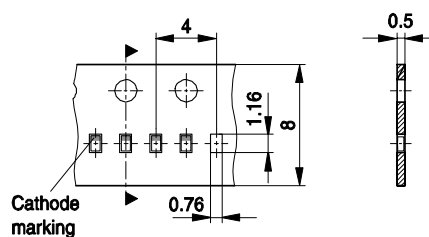


### Marking Layout (Example)



### Standard Packing

Reel  $\varnothing$ 180 mm = 15.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 50.000 Pieces/Reel (optional)



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