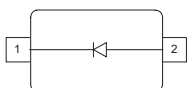


## Silicon PIN Diodes

- 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               | $^\circ\text{C}$ |
| 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. |      |
| DC Characteristics                      |        |        |      |      |      |
| 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

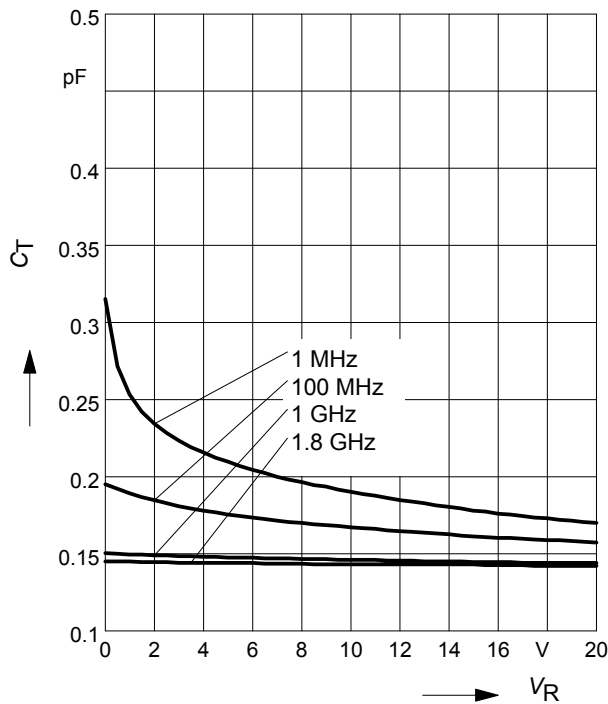
**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

| Parameter                                                                                                                                                                                                                                                                              | Symbol      | Values                |                                   |                           | Unit |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------|-----------------------------------|---------------------------|------|
|                                                                                                                                                                                                                                                                                        |             | min.                  | typ.                              | max.                      |      |
| AC Characteristics                                                                                                                                                                                                                                                                     |             |                       |                                   |                           |      |
| Diode capacitance<br>$V_R = 1\text{ V}$ , $f = 1\text{ MHz}$<br>$V_R = 5\text{ V}$ , $f = 1\text{ MHz}$<br>$V_R = 0\text{ V}$ , $f = 100\text{ MHz}$<br>$V_R = 0\text{ V}$ , $f = 1\ldots 1.8\text{ GHz}$ , BAR50-02L<br>$V_R = 0\text{ V}$ , $f = 1\ldots 1.8\text{ GHz}$ , all other | $C_T$       | -<br>-<br>-<br>-<br>- | 0.24<br>0.2<br>0.2<br>0.1<br>0.15 | 0.5<br>0.4<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>-           | 25<br>6<br>5                      | -<br>-<br>-               | kΩ   |
| Forward resistance<br>$I_F = 0.5\text{ mA}$ , $f = 100\text{ MHz}$<br>$I_F = 1\text{ mA}$ , $f = 100\text{ MHz}$<br>$I_F = 10\text{ mA}$ , $f = 100\text{ MHz}$                                                                                                                        | $r_f$       | -<br>-<br>-           | 25<br>16.5<br>3                   | 40<br>25<br>4.5           | Ω    |
| Charge carrier life time<br>$I_F = 10\text{ mA}$ , $I_R = 6\text{ mA}$ , measured at $I_R = 3\text{ mA}$ ,<br>$R_L = 100\text{ }\Omega$                                                                                                                                                | $\tau_{rr}$ | -                     | 1100                              | -                         | ns   |
| I-region width                                                                                                                                                                                                                                                                         | $W_I$       | -                     | 56                                | -                         | μm   |
| 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>-           | 0.56<br>0.4<br>0.27               | -<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>-      | 24.5<br>20<br>18<br>12            | -<br>-<br>-<br>-          |      |

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

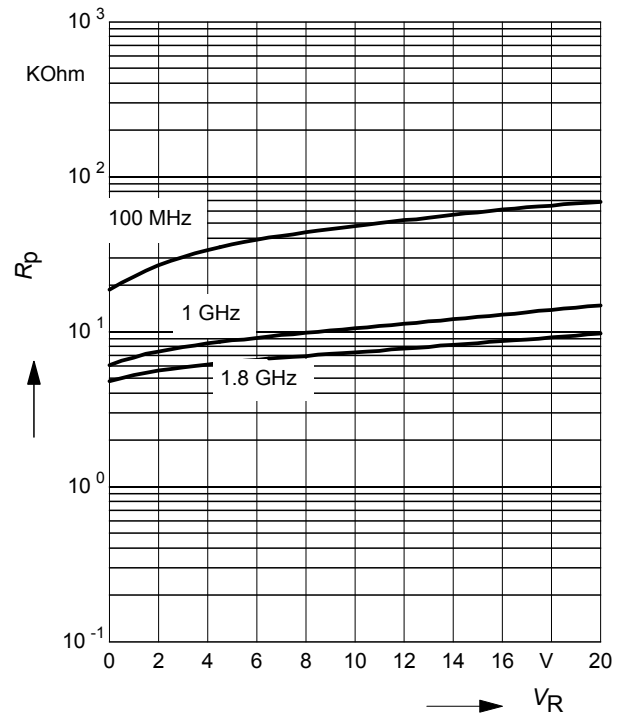
**Diode capacitance  $C_T = f(V_R)$**

$f$  = Parameter



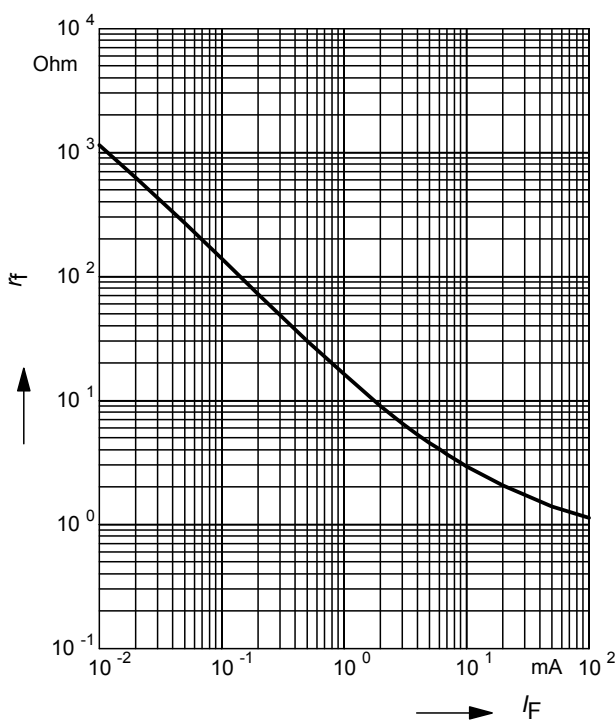
**Reverse parallel resistance  $R_P = f(V_R)$**

$f$  = Parameter



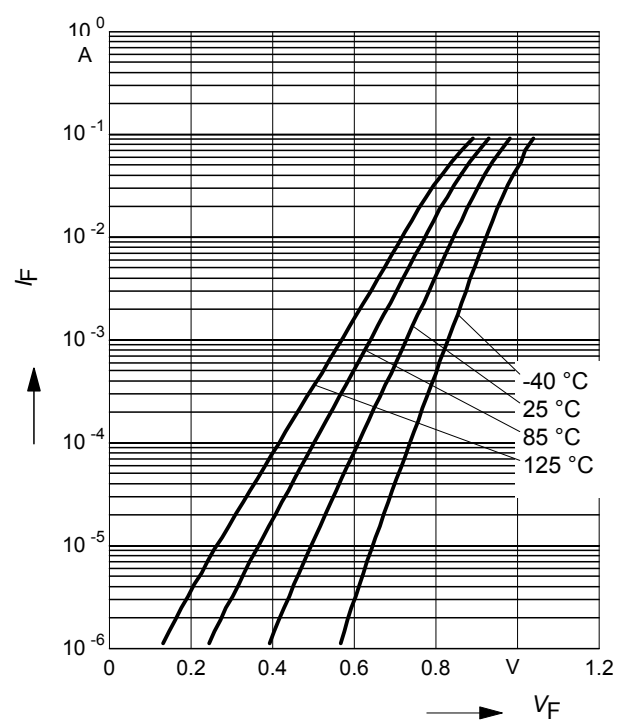
**Forward resistance  $r_f = f(I_F)$**

$f$  = 100 MHz



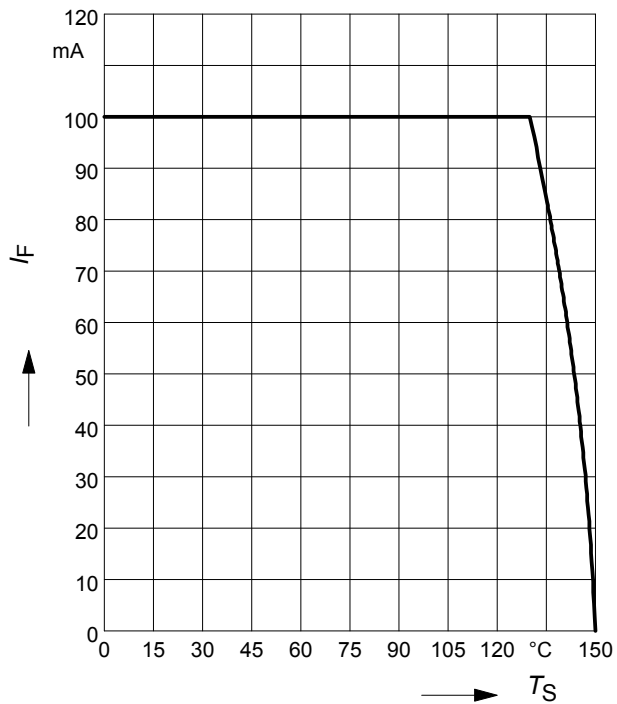
**Forward current  $I_F = f(V_F)$**

$T_A$  = Parameter



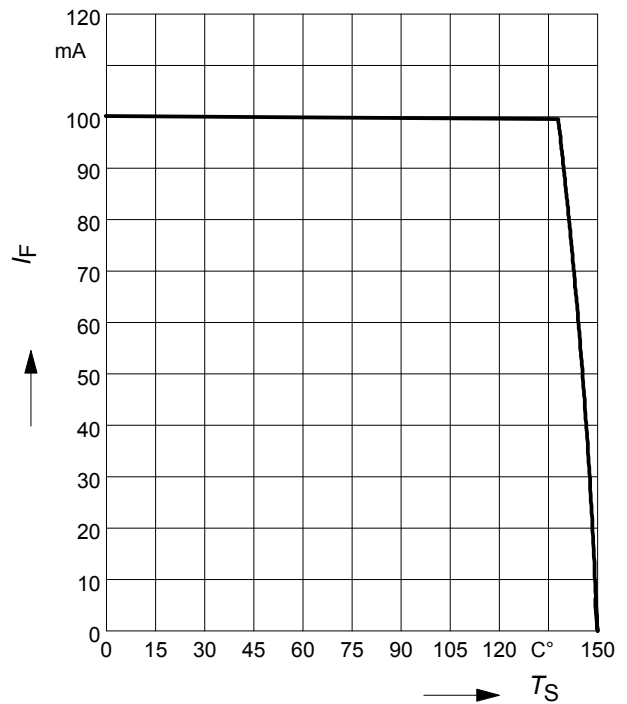
**Forward current  $I_F = f(T_S)$**

BAR50-02L



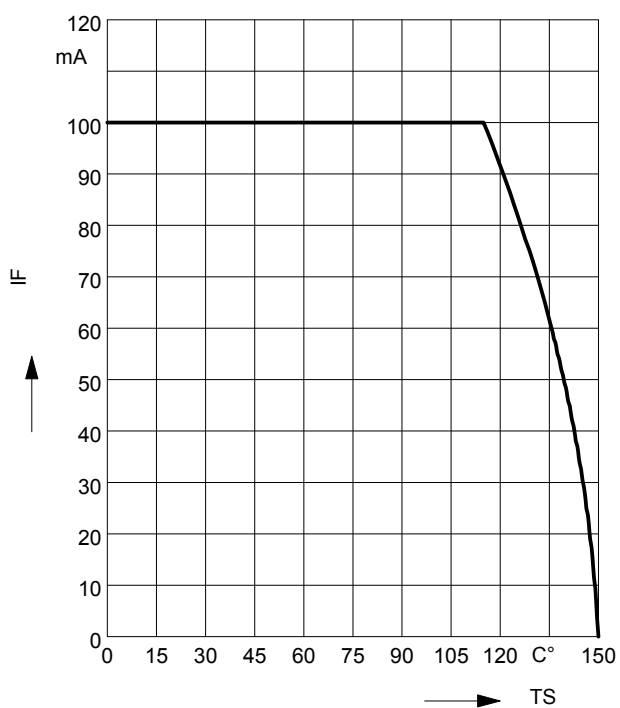
**Forward current  $I_F = f(T_S)$**

BAR50-02V



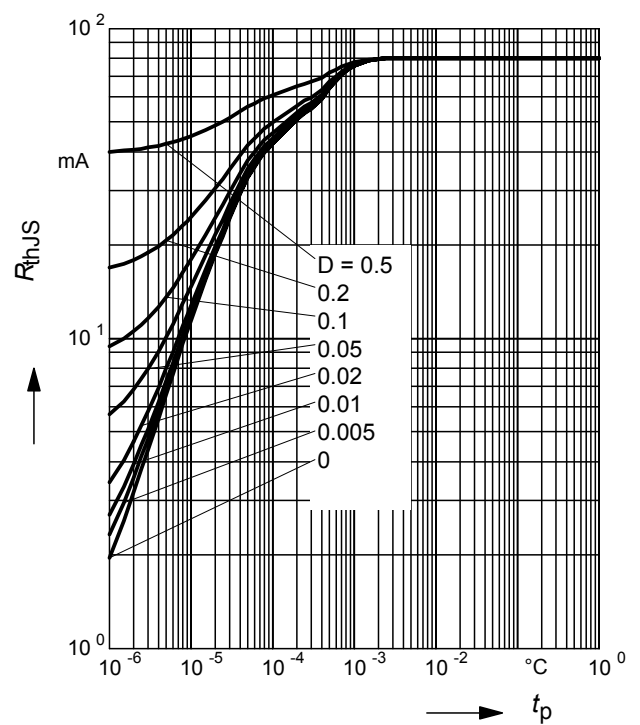
**Forward current  $I_F = f(T_S)$**

BAR50-03W



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

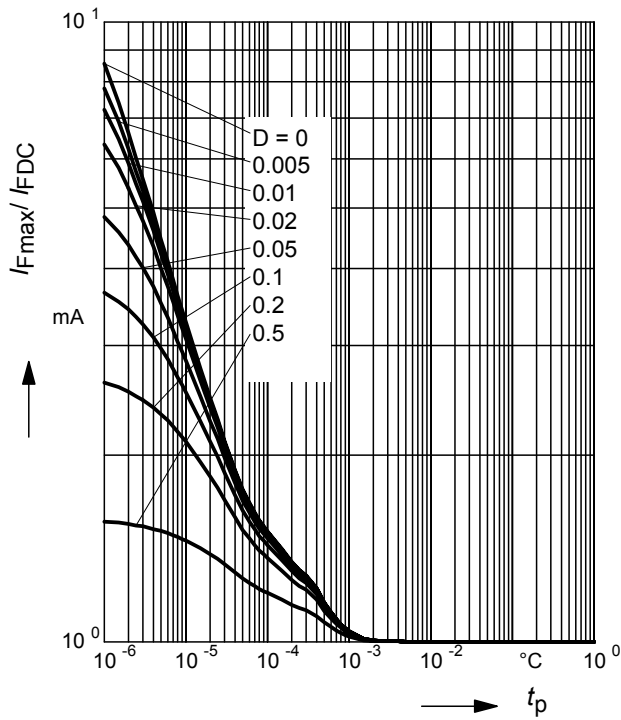
BAR50-02L



### Permissible Pulse Load

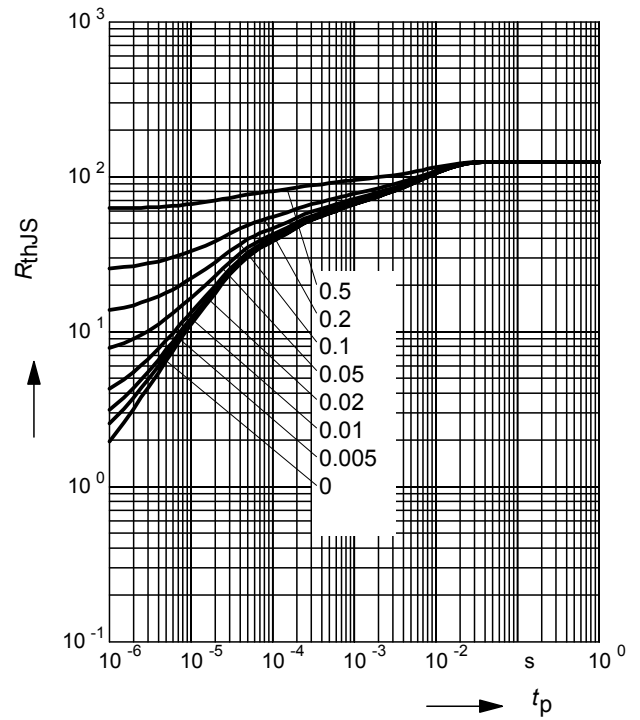
$$I_{Fmax}/I_{FDC} = f(t_p)$$

BAR50-02L



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

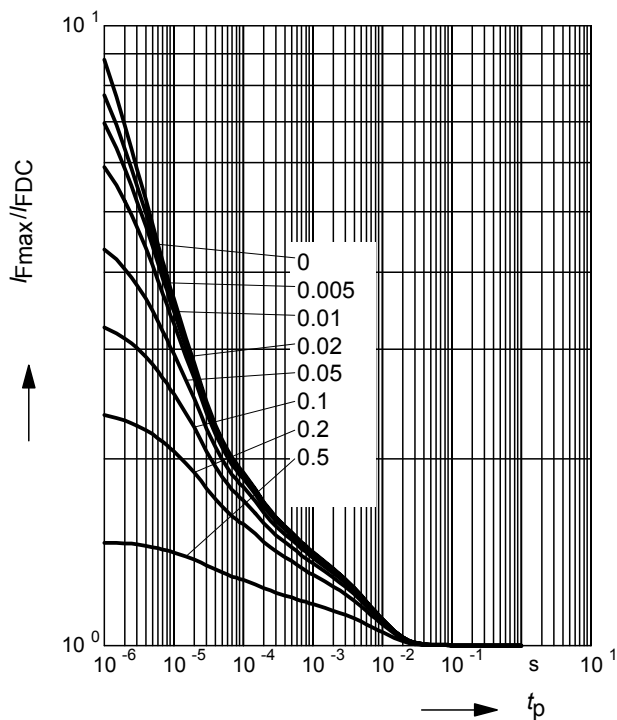
BAR50-02V



### Permissible Pulse Load

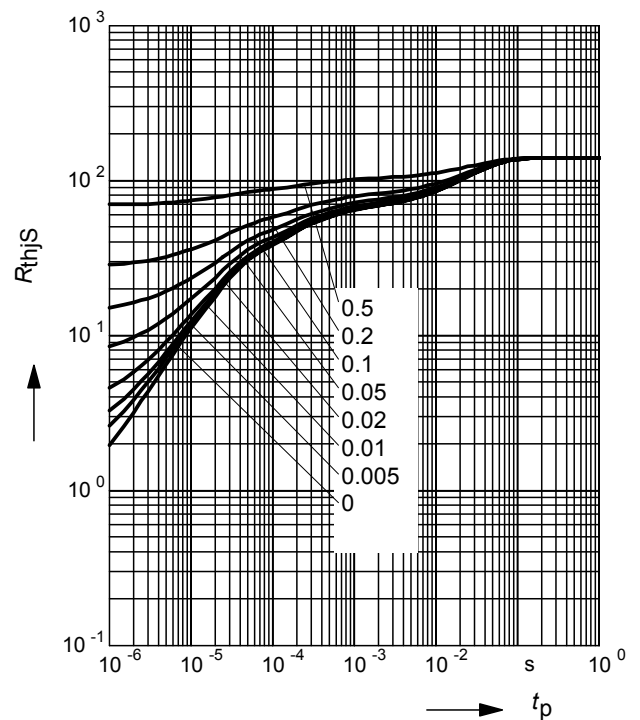
$$I_{Fmax}/I_{FDC} = f(t_p)$$

BAR50-02V



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

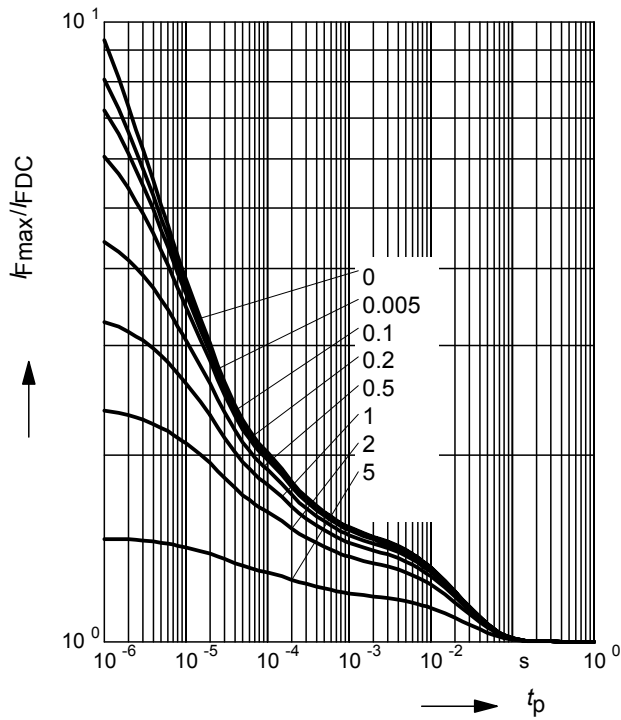
BAR50-03W



### Permissible Pulse Load

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

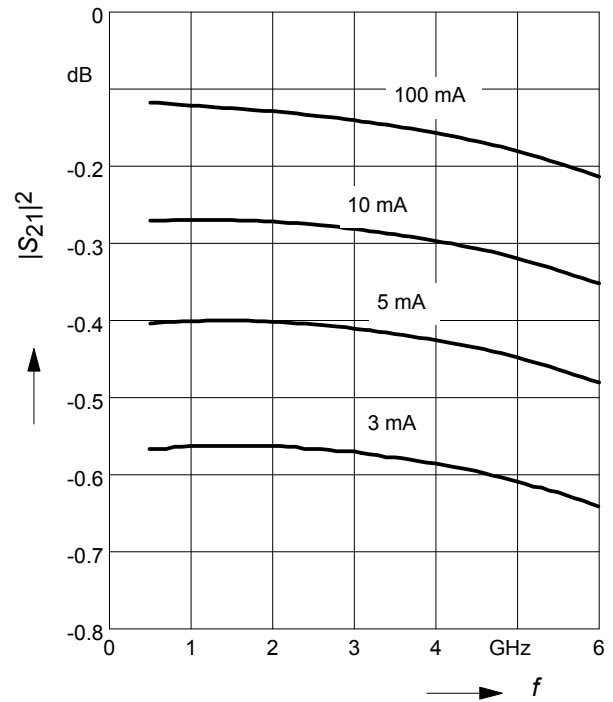
BAR50-03W



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

$I_F$  = Parameter

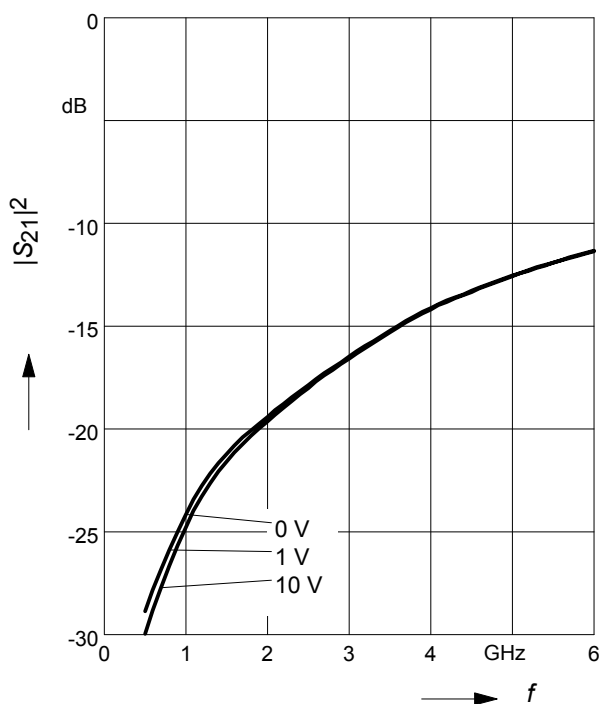
BAR50-02L in series configuration,  $Z = 50\Omega$



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

$V_R$  = Parameter

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



[illegible]

1.35  
0.35

2005, June  
Date code

GF

BAR63-02V  
Type code

Cathode marking  
Laser marking

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.

Technical drawing of the 025M-A photoresistor, showing isometric, top, and side views with dimensions.

**Isometric View:** Shows the physical component with a 'G' marking on the top surface.

**Top View:** Dimensions include a width of  $1.25^{+0.2}_{-0.1}$ , a height of  $2.5 \pm 0.2$ , a central square area of  $2$  on one side and  $1$  on the other, a cathode marking, and a bottom width of  $0.3^{+0.1}_{-0.05}$ . A label  $0.25 \text{ M A}$  is shown at the bottom.

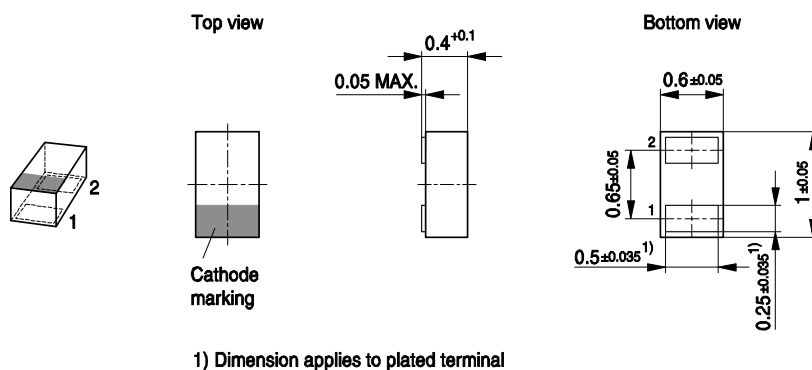
**Side View:** Dimensions include a top width of  $0.9^{+0.2}_{-0.1}$ , a top thickness of  $0 \pm 0.05$ , a side thickness of  $0.45 \pm 0.15$ , a central height of  $1.7^{+0.2}_{-0.1}$  (labeled 'A'), a bottom width of  $0.3^{+0.05}_{-0.2}$ , and a bottom thickness of  $0.15^{+0.1}_{-0.06}$ .

**BAR63-03W**  
*Type code*

**Cathode marking**  
*Color ink or laser marking*

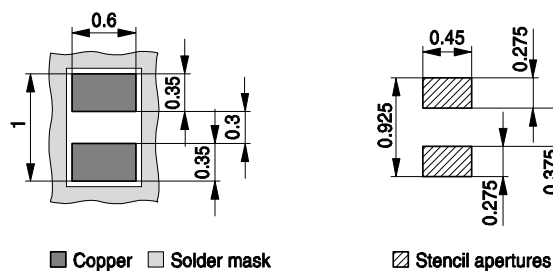
Technical drawing of a cathode marking. The drawing shows a side view and a cross-section. The side view has a total width of 4, a total height of 8, and a central hole with a diameter of 2.9. The cross-section shows a total width of 0.2 and a central hole with a diameter of 1.35. The text "Cathode marking" is written below the side view.

## Package Outline

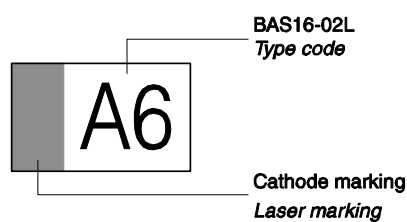


## Foot Print

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

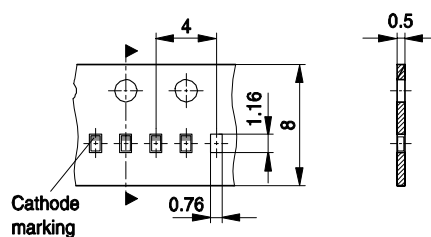


## Marking Layout (Example)



## Standard Packing

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



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