

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 Ω @ 10 mA)
- Very low signal distortion
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101¹⁾

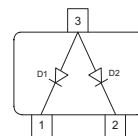
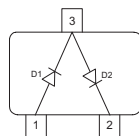
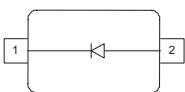


BAR64-02EL
BAR64-02V
BAR64-03W

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 |

¹⁾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 BAR64-02EL, $T_S \leq 135^\circ\text{C}$ BAR64-02V, $T_S \leq 125^\circ\text{C}$ BAR64-03W, $T_S \leq 25^\circ\text{C}$ BAR64-04, -05, -06, $T_S \leq 65^\circ\text{C}$ BAR64-04W, -05W, -06W, $T_S \leq 115^\circ\text{C}$ | P_{tot} | 250 250 250 250 250 | mW |
| Junction temperature | T_j | 150 | °C |
| Operating temperature range | T_{op} | -55 ... 125 | |
| Storage temperature | T_{stg} | -55 ... 150 | |

Thermal Resistance

| Parameter | Symbol | Value | Unit |
|--|-------------------|---|------|
| Junction - soldering point ¹⁾ BAR64-02EL BAR64-02V, -04W, -05W, -06W BAR64-03W BAR64-04, -05, -06 | R_{thJS} | ≤ 60 ≤ 140 ≤ 370 ≤ 340 | K/W |

¹⁾For calculation of R_{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 $I_{(\text{BR})} = 5 \mu\text{A}$ | $V_{(\text{BR})}$ | 150 | - | - | V |
| Forward voltage $I_F = 50 \text{ mA}$ | V_F | - | - | 1.1 | |

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

| Parameter | Symbol | Values | | | Unit |
|---|-------------|------------------|-----------------------------|---------------------|---------------|
| | | min. | typ. | max. | |
| AC Characteristics | | | | | |
| Diode capacitance $V_R = 20\text{ V}, f = 1\text{ MHz}$ $V_R = 0\text{ V}, f = 100\text{ MHz}$ $V_R = 0\text{ V}, f = 1\dots 1.8\text{ GHz}, \text{BAR64-02EL}$ $V_R = 0\text{ V}, f = 1\dots 1.8\text{ GHz}, \text{all other}$ | C_T | - - - - | 0.23 0.3 0.13 0.17 | 0.35 - - - | pF |
| Reverse parallel resistance $V_R = 0\text{ V}, f = 100\text{ MHz}$ $V_R = 0\text{ V}, f = 1\text{ GHz}$ $V_R = 0\text{ V}, f = 1.8\text{ GHz}$ | R_P | - - - | 10 4 3 | - - - | k Ω |
| Forward resistance $I_F = 1\text{ mA}, f = 100\text{ MHz}$ $I_F = 10\text{ mA}, f = 100\text{ MHz}$ $I_F = 100\text{ mA}, f = 100\text{ MHz}$ | r_f | - - - | 12.5 2.1 0.85 | 20 2.8 1.35 | Ω |
| Charge carrier life time $I_F = 10\text{ mA}, I_R = 6\text{ mA}, \text{measured at } I_R = 3\text{ mA},$ $R_L = 100\ \Omega$ | τ_{rr} | - | 1550 | - | ns |
| I-region width | W_I | - | 50 | - | μm |
| Insertion loss ¹⁾ $I_F = 3\text{ mA}, f = 1.8\text{ GHz}$ $I_F = 5\text{ mA}, f = 1.8\text{ GHz}$ $I_F = 10\text{ mA}, f = 1.8\text{ GHz}$ | I_L | - - - | 0.32 0.23 0.16 | - - - | dB |
| Isolation ¹⁾ $V_R = 0\text{ V}, f = 0.9\text{ GHz}$ $V_R = 0\text{ V}, f = 1.8\text{ GHz}$ $V_R = 0\text{ V}, f = 2.45\text{ GHz}$ $V_R = 0\text{ V}, f = 5.6\text{ GHz}$ | I_{SO} | - - - - | 22 17 14.5 8.5 | - - - - | |

¹BAR64-02EL in series configuration, $Z = 50\ \Omega$

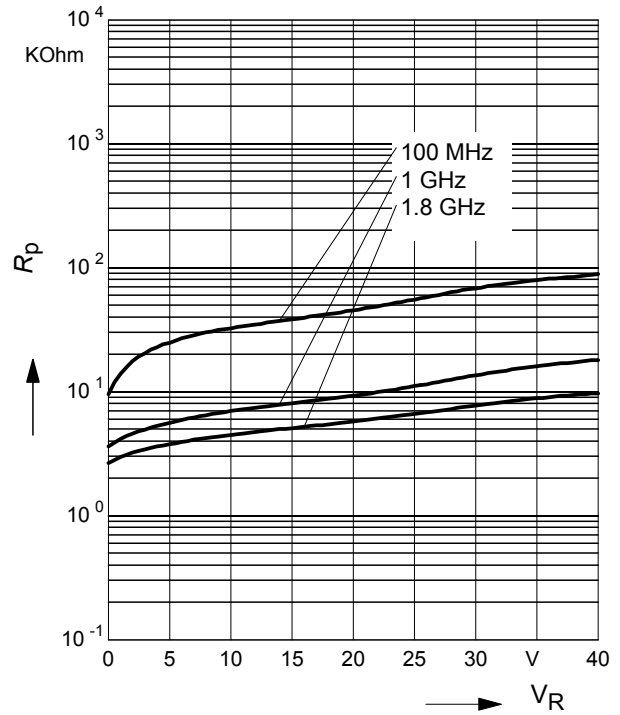
Diode capacitance $C_T = f(V_R)$

$f =$ Parameter



Reverse parallel resistance $R_p = f(V_R)$

$f =$ Parameter



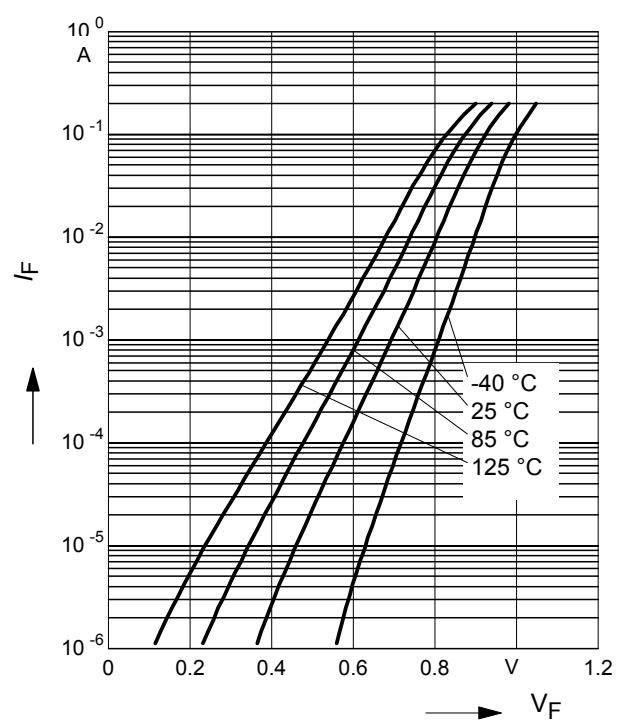
Forward resistance $r_f = f(I_F)$

$f = 100\text{MHz}$



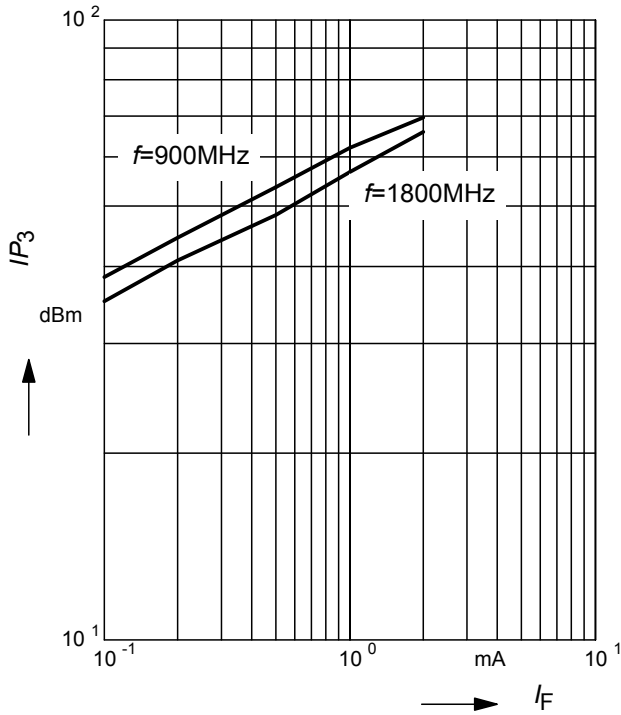
Forward current $I_F = f(V_F)$

$T_A =$ 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

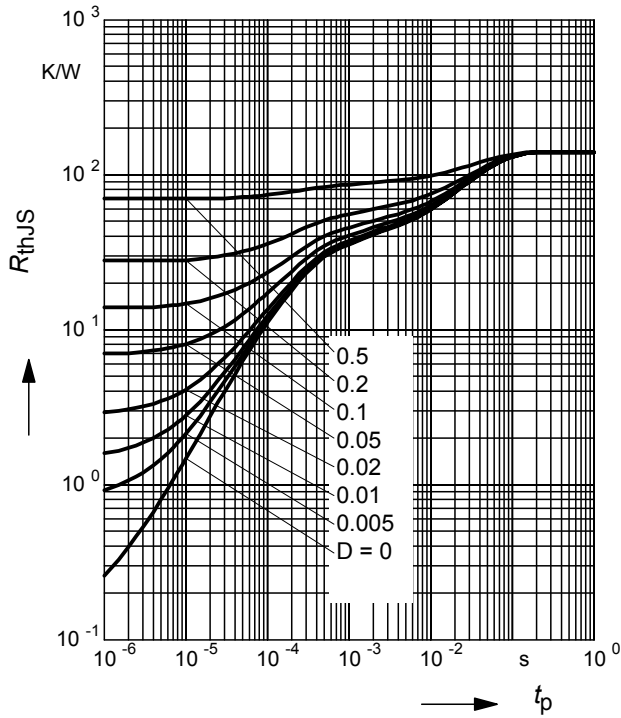
$I_{Fmax} / I_{FDC} = f(t_p)$

BAR64-02EL



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

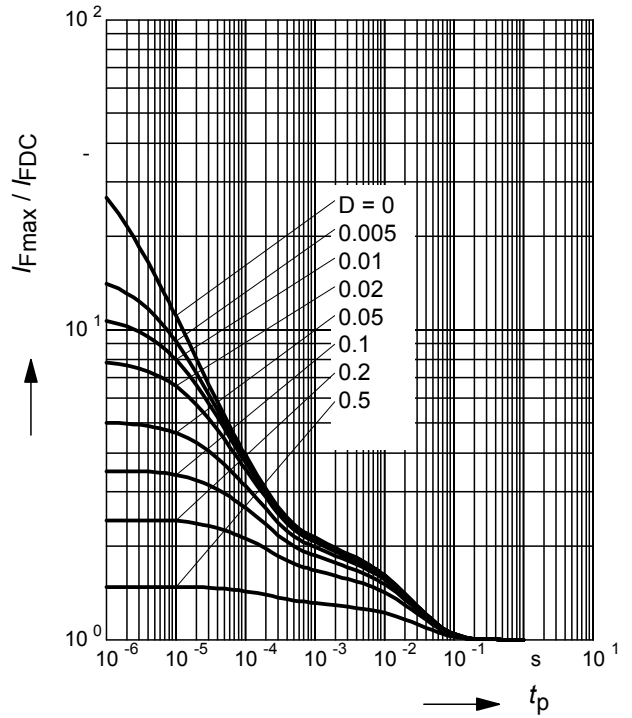
BAR64-02V



Permissible Pulse Load

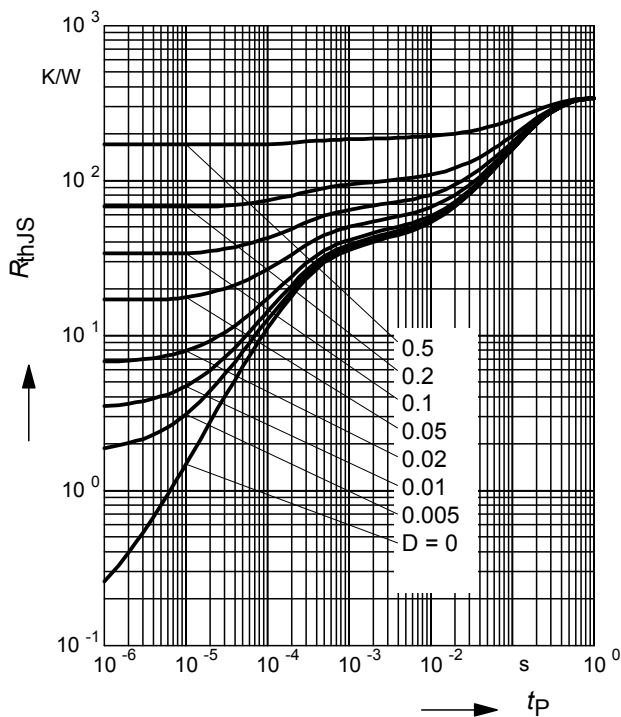
$I_{Fmax} / I_{FDC} = f(t_p)$

BAR64-02V



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

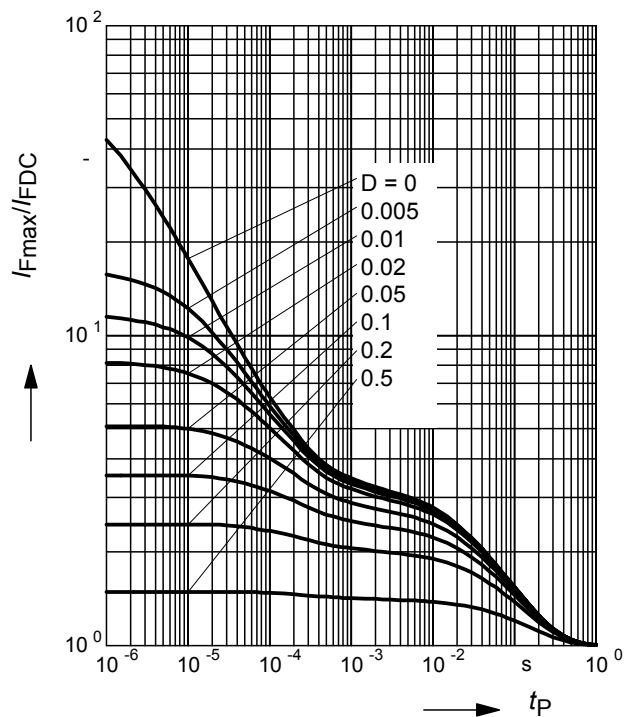
BAR64-04, BAR64-05, BAR64-06



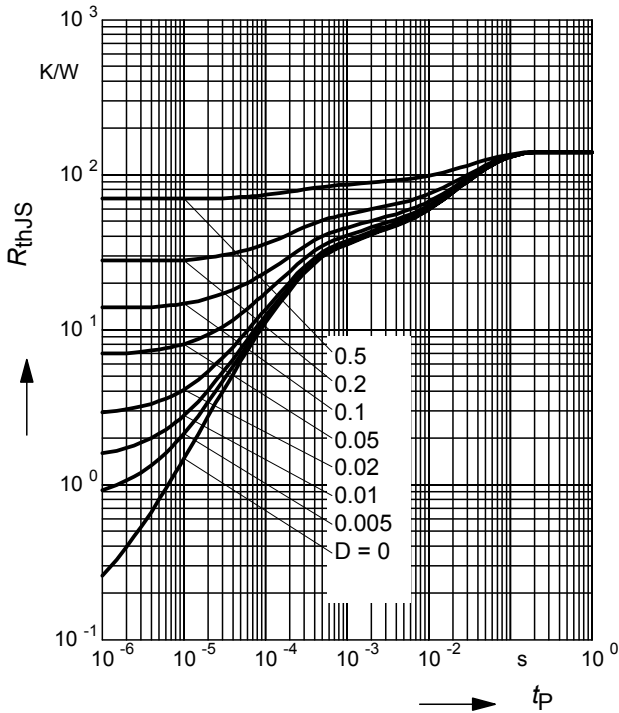
Permissible Pulse Load

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

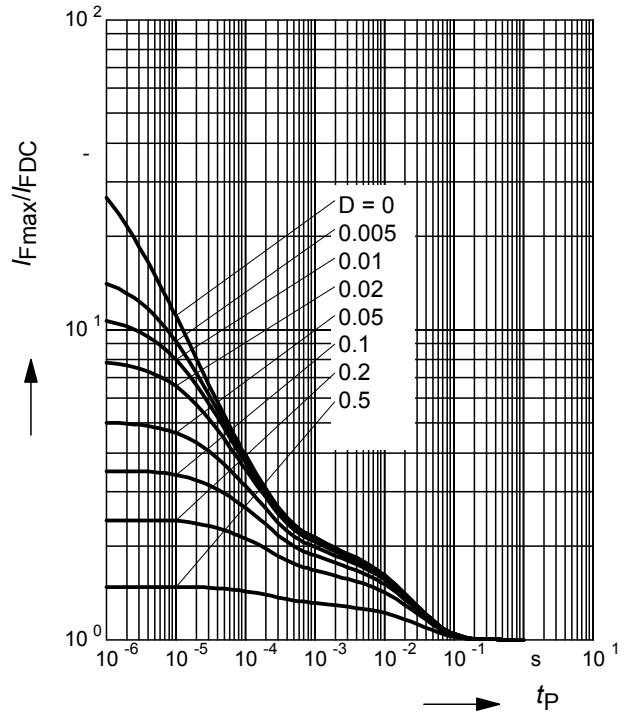
BAR64-04, BAR64-05, BAR64-06



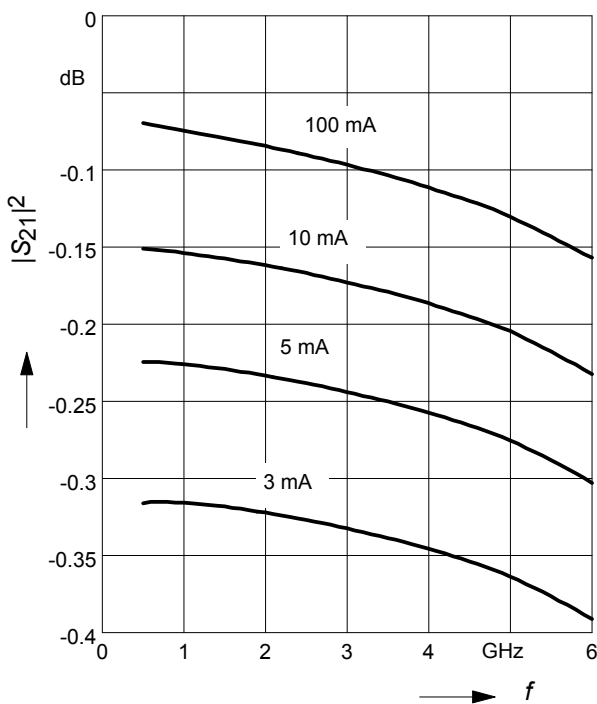
Permissible Puls Load $R_{thJS} = f(t_p)$
 BAR64-04W, BAR64-05W, BAR64-06W



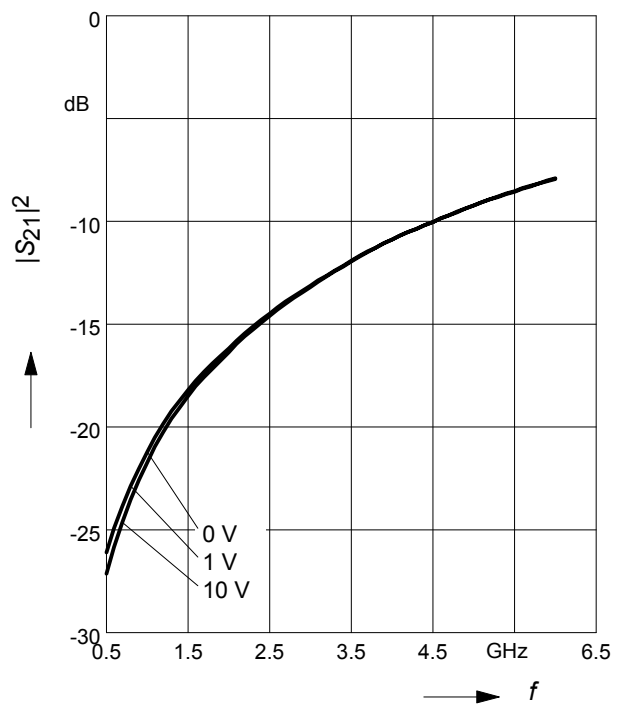
Permissible Pulse Load $I_{Fmax}/I_{FDC} = f(t_p)$
 BAR64-04W, BAR64-05W, BAR64-06W



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



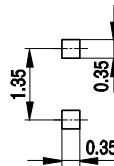
Isolation $I_{SO} = -|S_{21}|^2 = f(f)$
 V_R = Parameter
 BAR64-02EL in series configuration, $Z = 50\Omega$



Package Outline



Foot Print

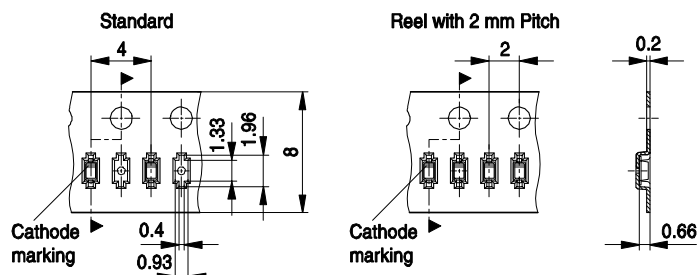


Marking Layout (Example)



Standard Packing

- Reel \varnothing 180 mm = 3.000 Pieces/Reel
- Reel \varnothing 180 mm = 8.000 Pieces/Reel (2 mm Pitch)
- Reel \varnothing 330 mm = 10.000 Pieces/Reel



Date Code marking for discrete packages with one digit (SCD80, SC79, SC75¹⁾) 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)

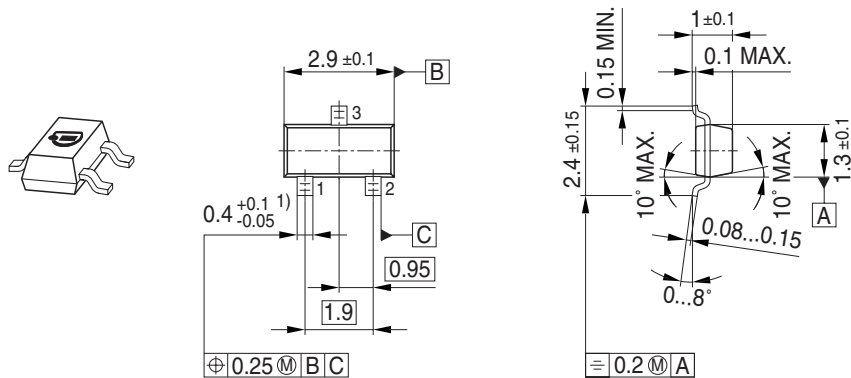


Standard Packing

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

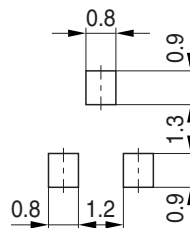


Package Outline



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



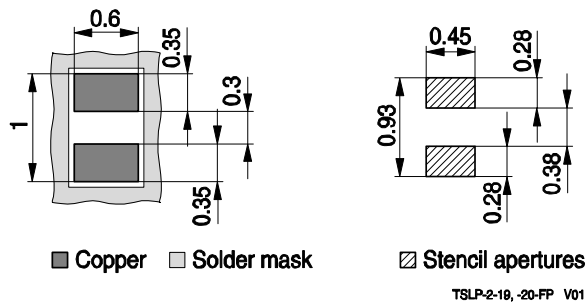
Package Outline



TSLP-2-19, -20-PO V01

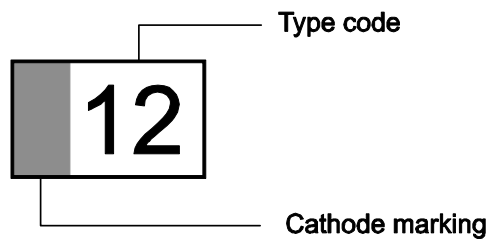
Foot Print

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



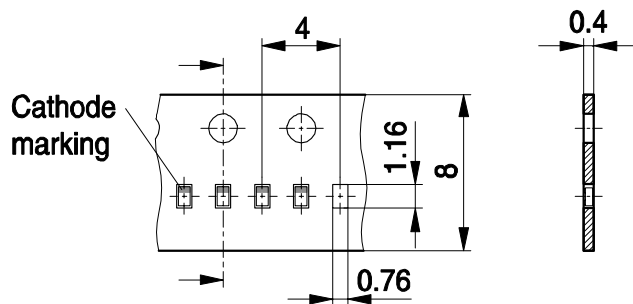
TSLP-2-19, -20-FP V01

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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