

**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 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, $T_S \leq 115^\circ\text{C}$	$P_{\text{tot}}$	250 250 250 250 250	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> BAR64-02EL BAR64-02V, -04W, -05W, -06W BAR64-03W BAR64-04, -05, -06	$R_{\text{thJS}}$	$\leq 60$ $\leq 140$ $\leq 370$ $\leq 340$	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 $I_{(\text{BR})} = 5 \mu\text{A}$	$V_{(\text{BR})}$	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.	
<b>AC Characteristics</b>					
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 $\Omega$
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	$\Omega$
Charge carrier life time $I_F = 10\text{ mA}, I_R = 6\text{ mA}, \text{measured at } I_R = 3\text{ mA},$ $R_L = 100\ \Omega$	$\tau_{rr}$	-	1550	-	ns
I-region width	$W_I$	-	50	-	$\mu\text{m}$
Insertion loss <sup>1)</sup> $I_F = 3\text{ mA}, f = 1.8\text{ GHz}$ $I_F = 5\text{ mA}, f = 1.8\text{ GHz}$ $I_F = 10\text{ mA}, f = 1.8\text{ GHz}$	$I_L$	- - -	0.32 0.23 0.16	- - -	dB
Isolation <sup>1)</sup> $V_R = 0\text{ V}, f = 0.9\text{ GHz}$ $V_R = 0\text{ V}, f = 1.8\text{ GHz}$ $V_R = 0\text{ V}, f = 2.45\text{ GHz}$ $V_R = 0\text{ V}, f = 5.6\text{ GHz}$	$I_{SO}$	- - - -	22 17 14.5 8.5	- - - -	

<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  $R_{thJS} = f(t_p)$**

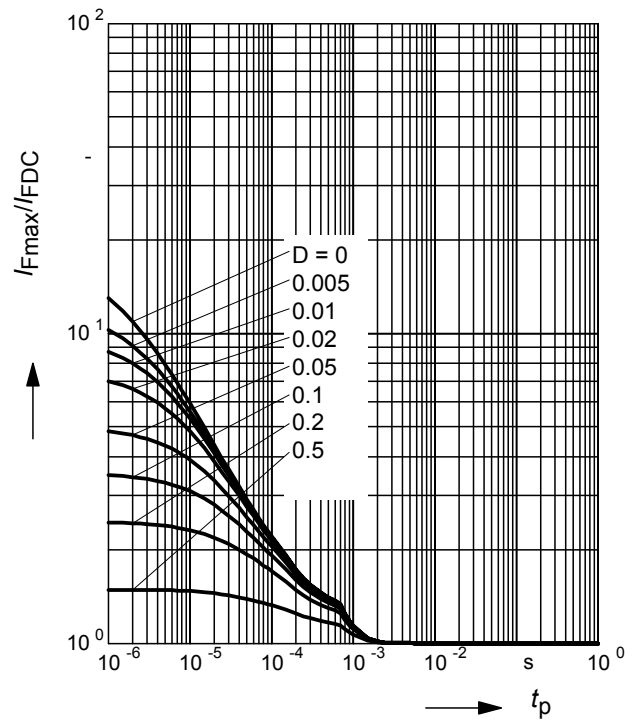
BAR64-02EL



**Permissible Pulse Load**

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

BAR64-02EL



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

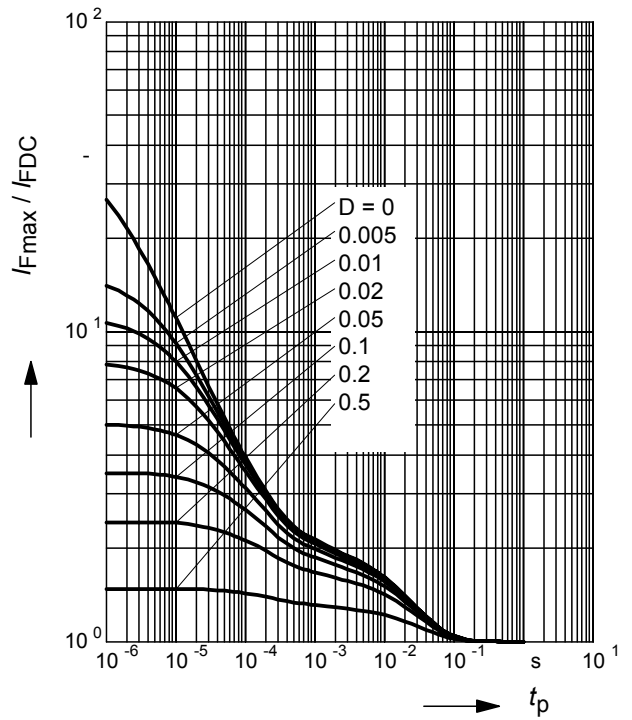
BAR64-02V



**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**

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

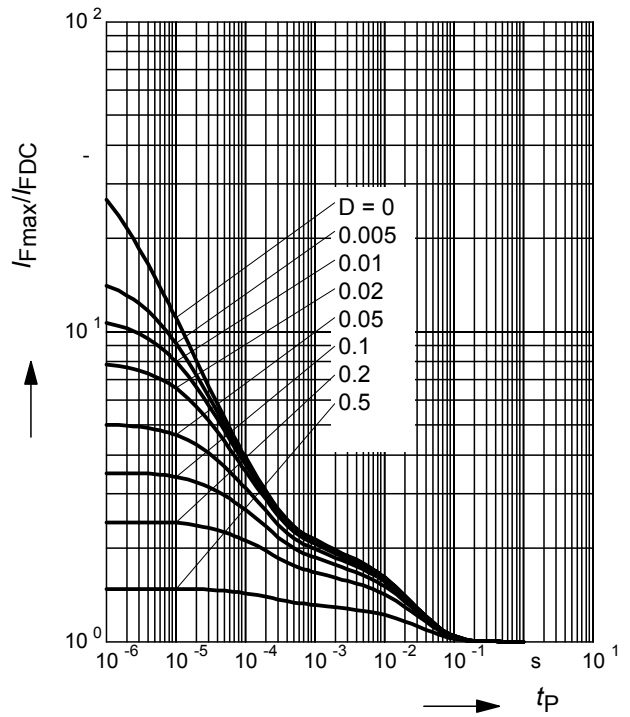
BAR64-04, BAR64-05, BAR64-06



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



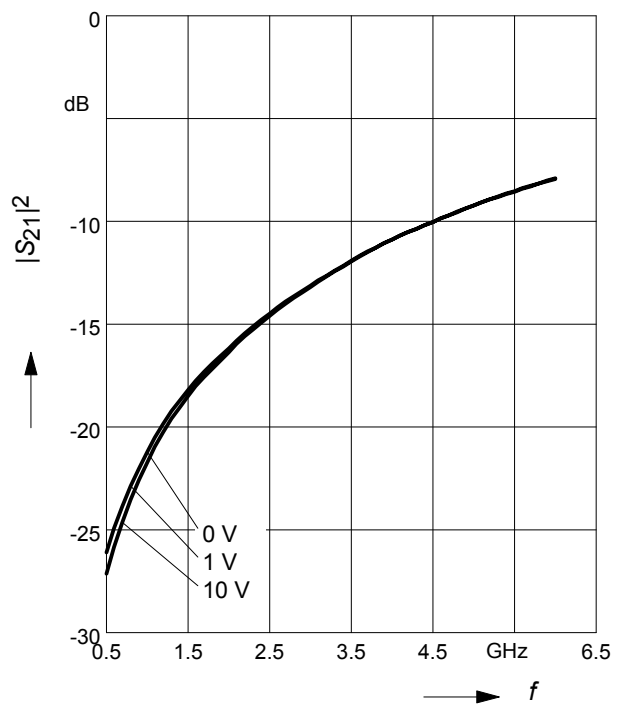
**Permissible Pulse Load**  
 $I_{Fmax}/I_{FDC} = f(t_p)$   
 BAR64-04W, BAR64-05W, BAR64-06W



**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)

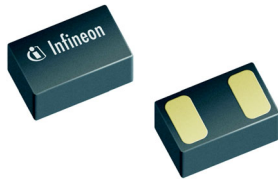


Standard Packing

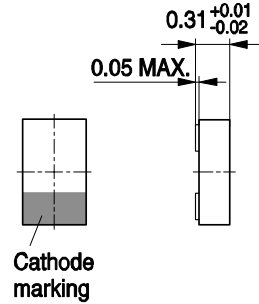
Reel  $\varnothing 180$  mm = 3.000 Pieces/Reel  
 Reel  $\varnothing 330$  mm = 10.000 Pieces/Reel



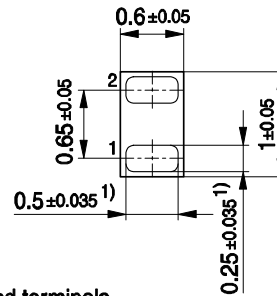
Package Outline



Top view



Bottom view

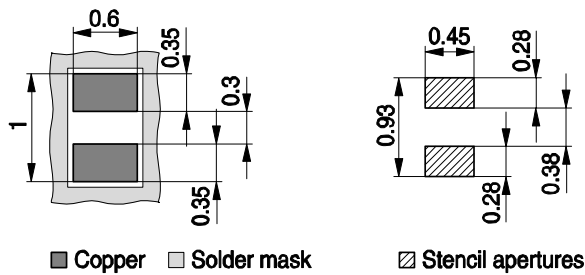


1) Dimension applies to plated terminals

TSLP-2-19, -20-PO V01

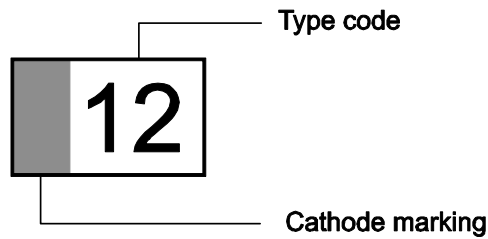
Foot Print

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



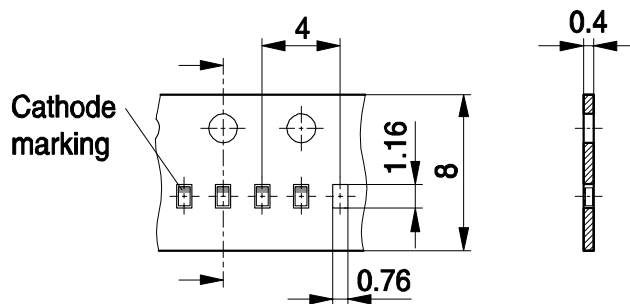
TSLP-2-19, -20-FP V01

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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Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)