

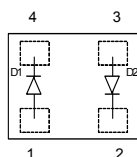
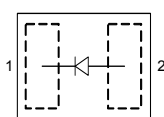
Silicon Deep Trench PIN Diodes

- Optimized for low bias current antenna switches in hand held applications
- Very low capacitance at zero volt reverse bias at frequencies above 1GHz (typ. 0.19 pF)
- Low forward resistance (typ. 1.3Ω @ $I_F = 3 \text{ mA}$)
- Improved ON / OFF mode harmonic distortion balance
- Pb-free (RoHS compliant) package



BAR90-02LRH
BAR90-02LS

BAR90-098LRH



Type	Package	Configuration	$L_S(\text{nH})$	Marking
BAR90-02LRH	TSLP-2-7	single, leadless	0.4	R9
BAR90-02LS	TSSLP-2-1	single, leadless	0.2	J
BAR90-098LRH	TSLP-4-7	anti-parallel pair, leadless	0.4	T9

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

Parameter	Symbol	Value	Unit
Diode reverse voltage	V_R	80	V
Forward current	I_F	100	mA
Total power dissipation $T_S \leq 137^\circ\text{C}$, BAR90-02LS $T_S \leq 133^\circ\text{C}$, all others	P_{tot}	150 250	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Operating temperature range	T_{op}	-55 ... 125	
Storage temperature	T_{stg}	-55 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point ¹⁾	R_{thJS}		K/W
BAR90-02LS		≤ 90	
All others		≤ 65	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

DC Characteristics

Breakdown voltage $I_{(BR)} = 5 \mu\text{A}$	$V_{(BR)}$	80	-	-	V
Reverse current $V_R = 60 \text{ V}$	I_R	-	-	50	nA
Forward voltage $I_F = 3 \text{ mA}$ $I_F = 100 \text{ mA}$	V_F	0.75 -	0.81 0.9	0.87 1	V

¹⁾For calculation of R_{thJA} please refer to Application Note AN077 (Thermal Resistance Calculation)

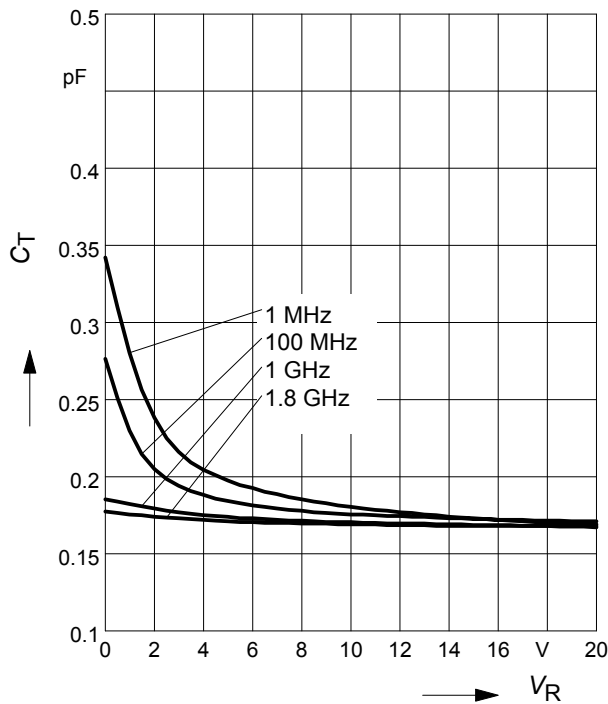
Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Diode capacitance $V_R = 1\text{ V}$, $f = 1\text{ MHz}$ $V_R = 0\text{ V}$, $f = 100\text{ MHz}$ $V_R = 0\text{ V}$, $f = 1\text{ GHz}$ $V_R = 0\text{ V}$, $f = 1.8\text{ GHz}$	C_T	- - - -	0.25 0.3 0.19 0.18	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	- - -	35 5 4	- - -	kΩ
Forward resistance $I_F = 1\text{ mA}$, $f = 100\text{ MHz}$ $I_F = 3\text{ mA}$, $f = 100\text{ MHz}$ $I_F = 10\text{ mA}$, $f = 100\text{ MHz}$	r_f	- - -	2 1.3 0.8	- 2.3 -	Ω
Charge carrier life time $I_F = 10\text{ mA}$, $I_R = 6\text{ mA}$, measured at $I_R = 3\text{ mA}$, $R_L = 100\text{ Ω}$	τ_{rr}	-	750	-	ns
I-region width	W_I	-	20	-	μm
Insertion loss ¹⁾ $I_F = 1\text{ mA}$, $f = 1.8\text{ GHz}$ $I_F = 3\text{ mA}$, $f = 1.8\text{ GHz}$ $I_F = 10\text{ mA}$, $f = 1.8\text{ GHz}$	I_L	- - -	0.16 0.11 0.08	- - -	dB
Isolation ¹⁾ $V_R = 0\text{ V}$, $f = 0.9\text{ GHz}$ $V_R = 0\text{ V}$, $f = 1.8\text{ GHz}$ $V_R = 0\text{ V}$, $f = 2.45\text{ GHz}$	I_{SO}	- - -	18.5 13.5 11.5	- - -	

¹⁾BAR90-02LRH in series configuration, $Z = 50\text{ }\Omega$

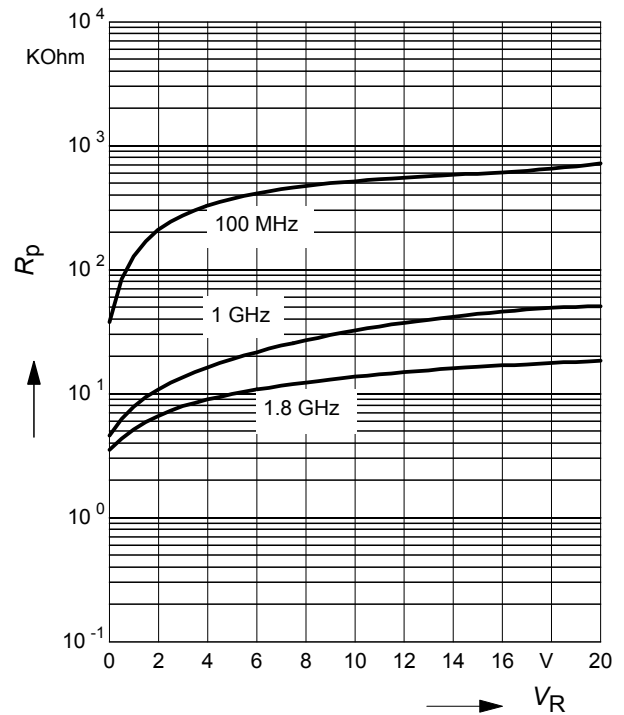
Diode capacitance $C_T = f(V_R)$

f = Parameter



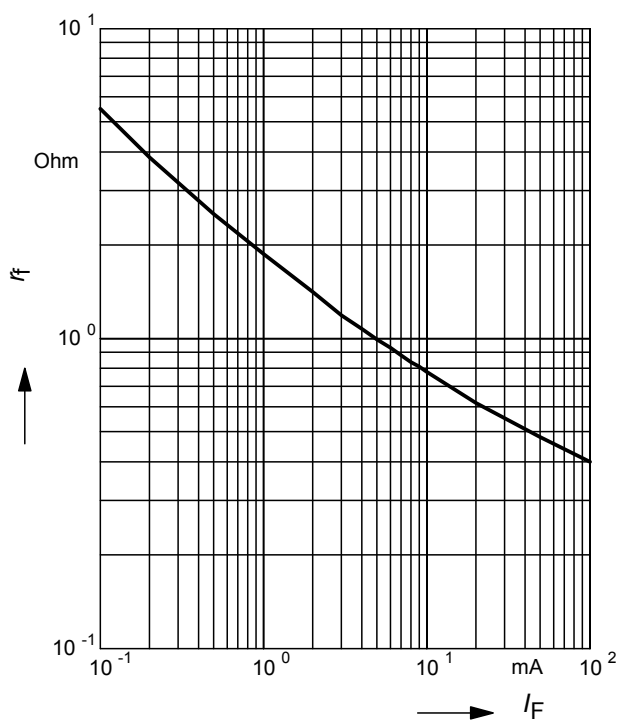
Reverse parallel resistance $R_P = f(V_R)$

f = Parameter



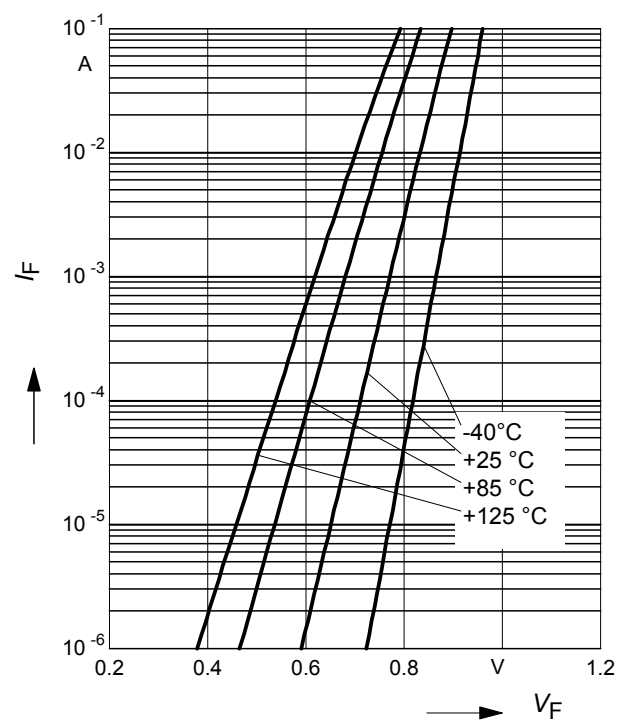
Forward resistance $r_f = f(I_F)$

f = 100 MHz



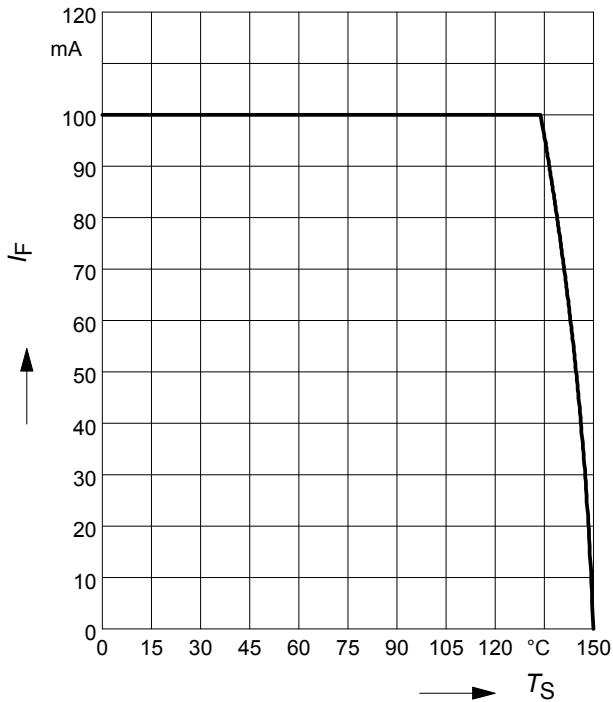
Forward current $I_F = f(V_F)$

T_A = Parameter

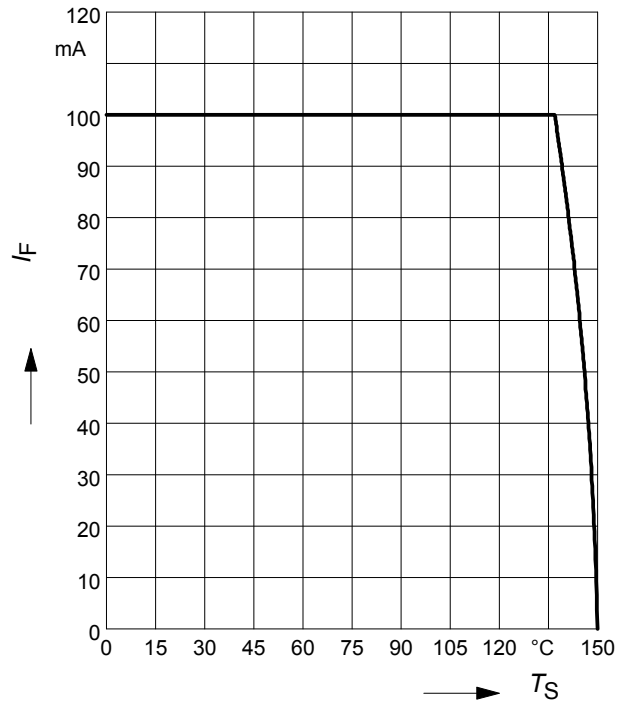


Forward current $I_F = f(T_S)$

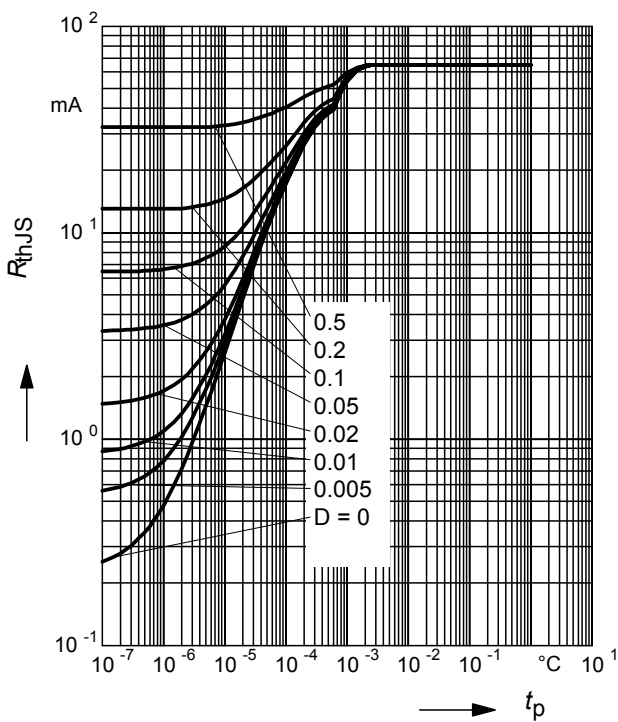
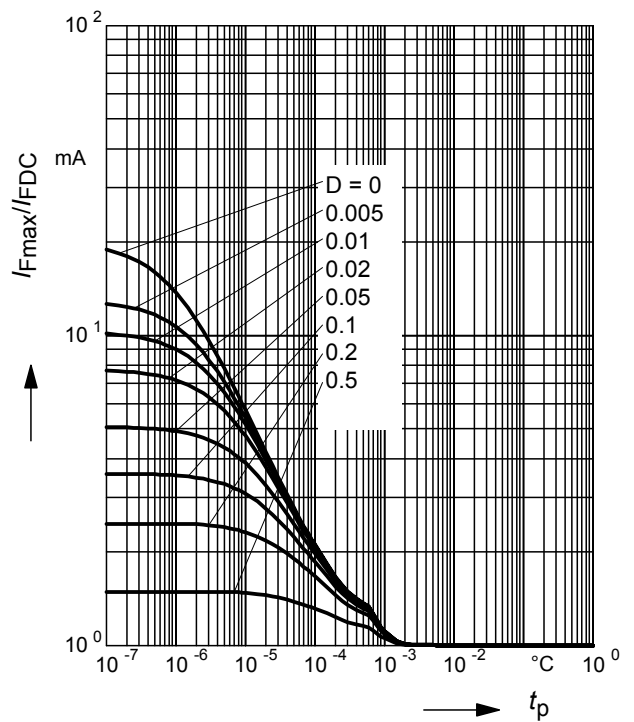
BAR90-02LRH / -098LRH


Forward current $I_F = f(T_S)$

BAR90-02LS

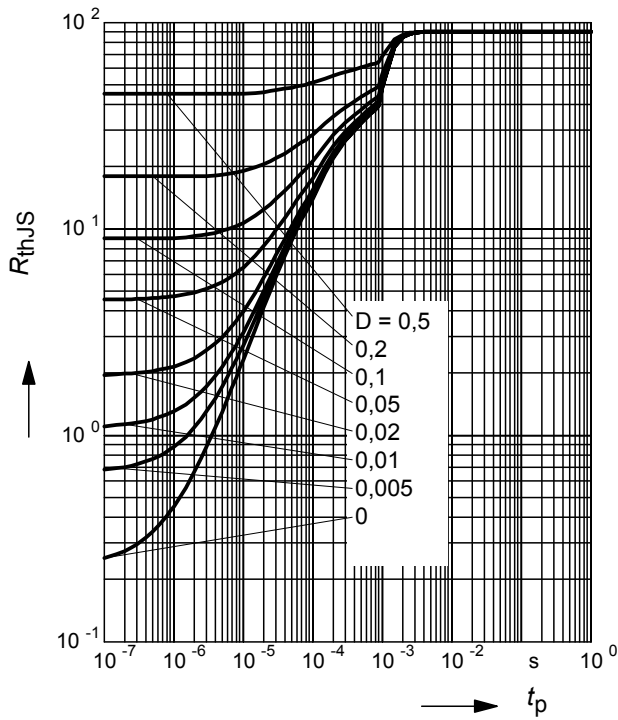

Permissible Puls Load $R_{thJS} = f(t_p)$

BAR90-02LRH / -098LRH


Permissible Pulse Load
 $I_{Fmax}/I_{FDC} = f(t_p)$ BAR90-02LRH / -098LRH


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

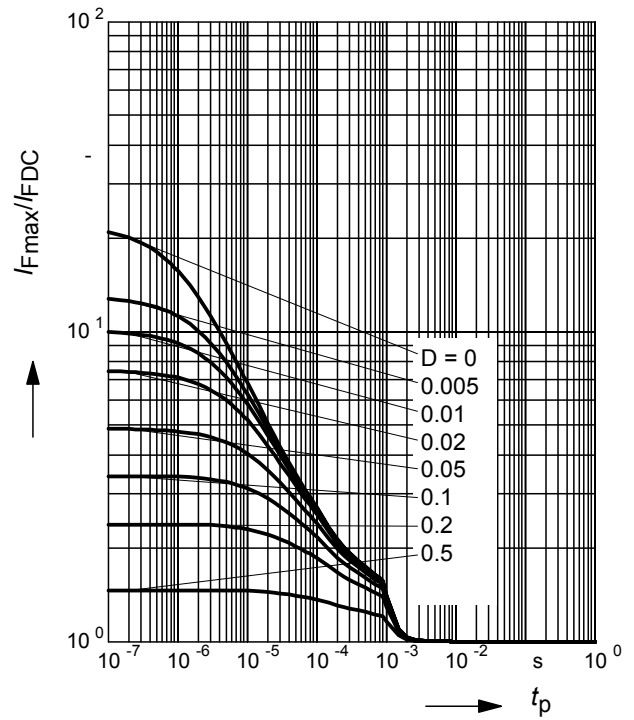
BAR90-02LS



Permissible Pulse Load

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

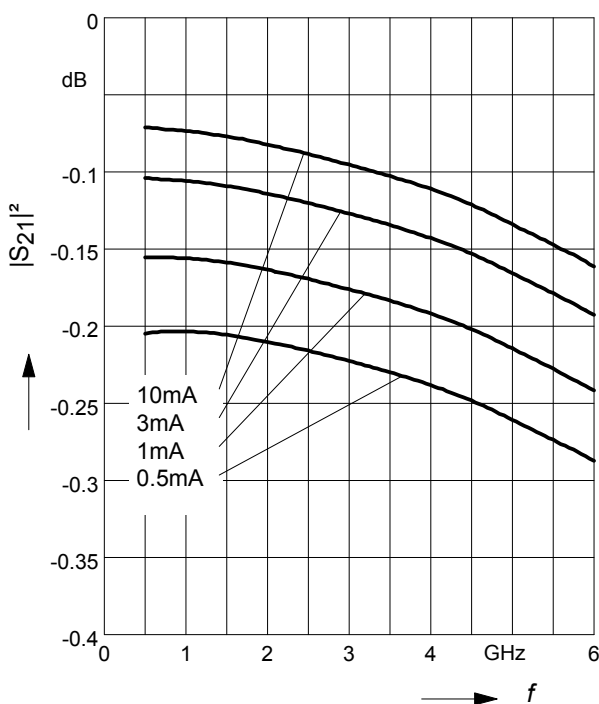
BAR90-02LS



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

I_F = Parameter

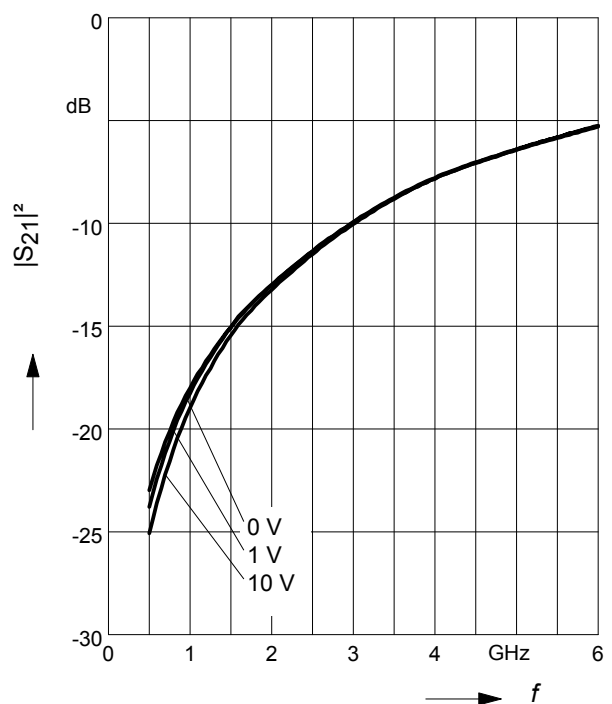
BAR90-02LRH in series configuration, $Z = 50\Omega$



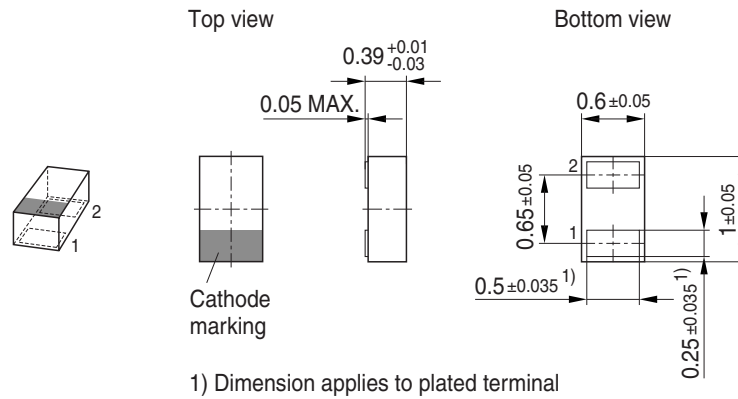
Isolation $I_{SO} = -|S_{21}|^2 = f(f)$

V_R = Parameter

BAR90-02LRH in series configuration, $Z = 50\Omega$

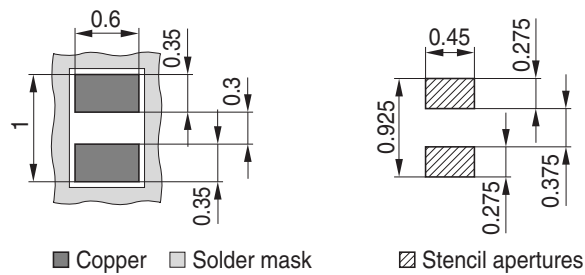


Package Outline

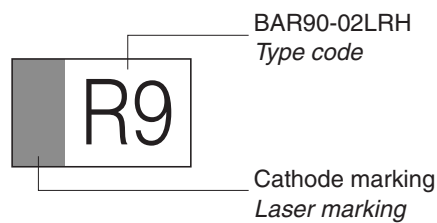


Foot Print

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

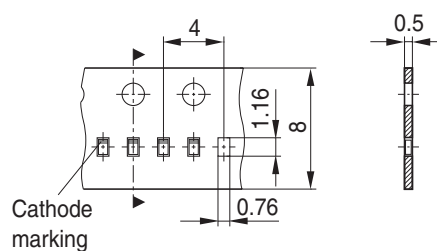


Marking Layout (Example)



Standard Packing

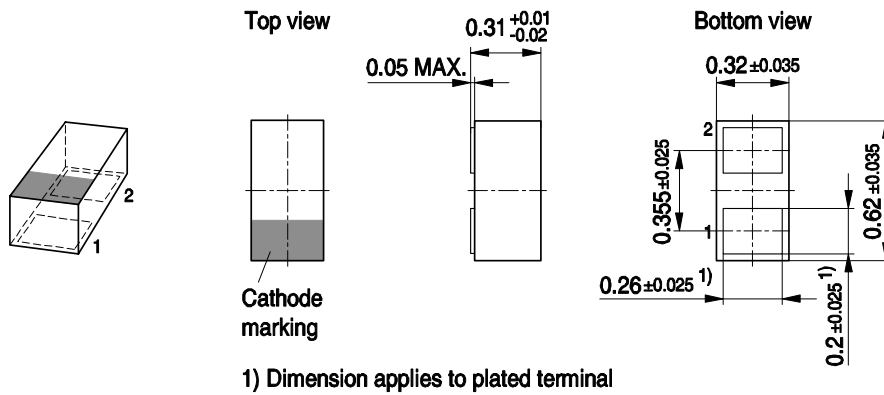
Reel ø180 mm = 15.000 Pieces/Reel
Reel ø330 mm = 50.000 Pieces/Reel (optional)



Technical drawing of a 2x2 grid of rectangular features. The overall width is $4 \times 0.25 \pm 0.035$ (labeled 1). The overall height is $4 \times 0.35 \pm 0.035$ (labeled 1). The distance between the centers of the features in the horizontal direction is 0.8 ± 0.05 . The distance between the centers of the features in the vertical direction is 0.75 ± 0.05 . The width of each individual feature is 0.45 ± 0.05 . The height of each individual feature is 1.2 ± 0.05 . The features are numbered 1, 2, 3, and 4 in a 2x2 grid.

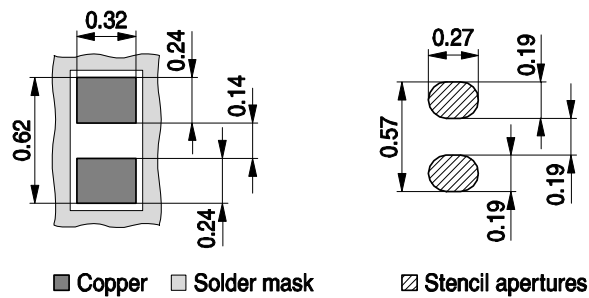
 Stencil apertures

Package Outline

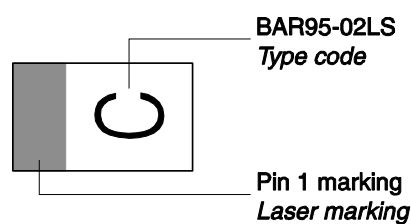


Foot Print

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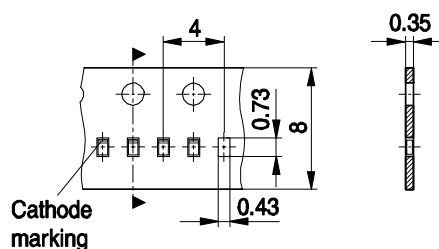


Marking Layout (Example)



Standard Packing

Reel $\varnothing 180$ mm = 15.000 Pieces/Reel



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