BAR64-04W

Low signal distortion, surface mount RF PIN diode, series pair

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Product description

This Infineon cost optimized RF PIN diode is designed for low distortion switches that require to hold off large RF voltages, and is best suited for frequencies as high as 3 GHz. Its nominal 50 µm I-region width, combined with the typical 1.55 µs carrier lifetime, result in a diode with low forward resistance and low distortion characteristics.

Feature list

- Low signal distortion, charge carrier lifetime t_{rr} = 1.55 µs (typical)
- Very low capacitance C = 0.25 pF (typical) at voltage V_R = 0 and frequencies $f \geq 1$ Ghz
- Low forward resistance R_F = 2.2 Ω (typical) at forward current I_F = 10 mA and frequency f = 100 MHz
- Industry standard SOT323-3 package (2.1 mm x 2 mm x 0.9 mm)
- Pb-free, RoHS compliant and halogen-free

Product validation

Qualified for industrial applications according to the relevant tests of JEDEC47/20/22.

Potential applications

Optimized for low bias current RF and high-speed interface switches and attenuators

- Wireless communication
- High speed data networks

Device information

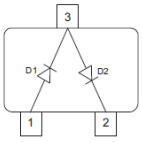

Table 1 Part information

Product name / Ordering code	Package	Pin configuration	Marking	Pieces / Reel
BAR64-04W / BAR6404WH6327XTSA1	SOT323-3	Series pair	PPs	3 k

Attention: ESD (Electrostatic discharge) sensitive device, observe handling precautions!

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1 Absolute maximum ratings

Table 2 Absolute maximum ratings at T_A = 25 °C, unless otherwise specified

Parameter	Symbol	Values		Unit	Note or test condition
		Min.	Max.		
Diode reverse voltage	V_R	–	150	V	
Forward current	I_F	–	100	mA	
Total power dissipation	P_{TOT}	–	250	mW	$T_S \leq 123$ °C [1)]
Junction temperature	T_J	–	150	°C	
Operating temperature	T_{OP}	-55	125		
Storage temperature	T_{STG}	-55	150		

Attention: ***Stresses above the maximum values listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Exceeding only one of these values may cause irreversible damage to the component.***

1 T_S is the soldering point temperature.

2 Electrical performance in test fixture

2.1 DC characteristics

At T_A = 25 °C, unless otherwise specified

Table 3 DC characteristics

Parameter	Symbol	Values			Unit	Note or test condition
		Min.	Typ.	Max.		
Breakdown voltage	V_{BR}	150	–	–	V	I_R = 5 µA
Reverse current	I_R	–	–	20	nA	V_R = 20 V
Forward voltage	V_F	–	0.82	–	V	I_F = 10 mA
		–	0.9	–		I_F = 50 mA
		–	0.95	1.1		I_F = 100 mA
I-region width	W_I	–	50	–	µm	

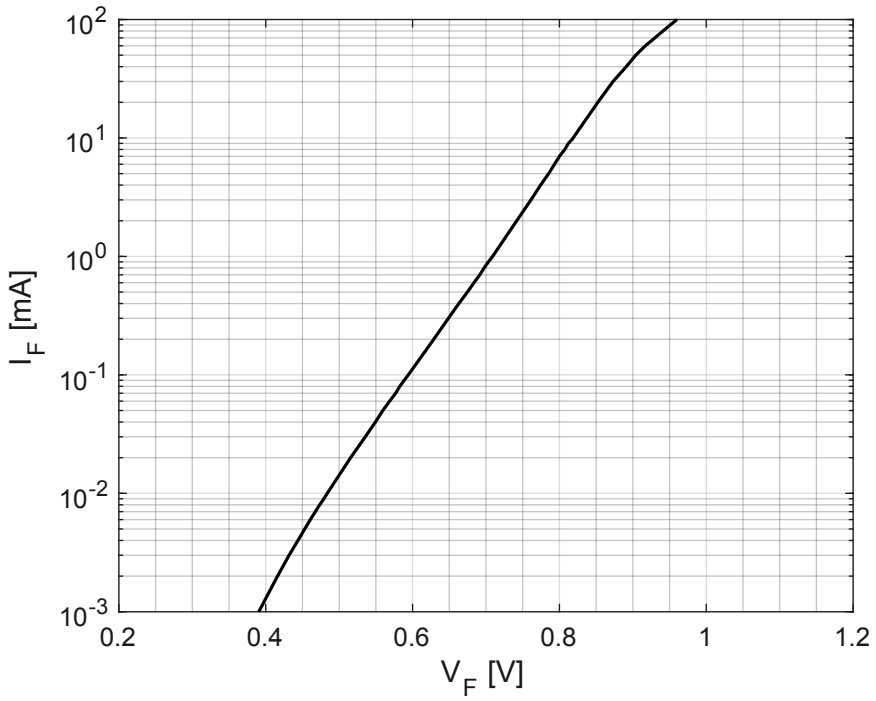

Figure 1 Forward current I_F vs. forward voltage V_F

2.2 AC characteristics

At T_A = 25 °C, unless otherwise specified

Table 4 Key parameter

Parameter	Symbol	Values			Unit	Note or test condition
		Min.	Typ.	Max.		
Capacitance	C	–	0.65	–	pF	V_R = 0 V, f = 1 MHz
		–	0.26	0.35		V_R = 20 V, f = 1 MHz
Forward resistance	R_F	–	10.2	20		I_F = 1 mA, f = 100 MHz
		–	4.4	–		I_F = 3 mA, f = 100 MHz
		–	3.2	–		I_F = 5 mA, f = 100 MHz
		–	2.2	2.8		I_F = 10 mA, f = 100 MHz
		–	–	1.35		I_F = 100 mA, f = 100 MHz
Inductance	L_S	–	1.4	–	nH	
Charge carrier lifetime	τ_{rr}	–	1550	–	ns	I_F = 10 mA, I_R = 6 mA, measured at I_R = 3 mA, R_L = 100 Ω

Table 5 AC parameter at f = 1 GHz

Parameter	Symbol	Values			Unit	Note or test condition
		Min.	Typ.	Max.		
Capacitance	C	–	0.23	–	pF	V_R = 0 V
Reverse parallel resistance	R_P	–	3.5	–	kΩ	V_R = 0 V
Forward resistance	R_F	–	10.2	–	Ω	I_F = 1 mA
		–	4.4	–		I_F = 3 mA
		–	3.3	–		I_F = 5 mA
		–	2.4	–		I_F = 10 mA
Insertion loss	I_L	–	0.84	–	dB	I_F = 1 mA
		–	0.41	–		I_F = 3 mA
		–	0.31	–		I_F = 5 mA
		–	0.24	–		I_F = 10 mA
Isolation	I_{SO}	–	18.6	–		V_R = 0 V

Table 6 AC parameter at f = 1.8 GHz

Parameter	Symbol	Values			Unit	Note or test condition
		Min.	Typ.	Max.		
Capacitance	C	–	0.23	–	pF	V_R = 0 V
Reverse parallel resistance	R_P	–	2.8	–	kΩ	V_R = 0 V

Electrical performance in test fixture

Table 6 AC parameter at f = 1.8 GHz (continued)

Parameter	Symbol	Values			Unit	Note or test condition
		Min.	Typ.	Max.		
Forward resistance	R_F	–	10.2	–	Ω	I_F = 1 mA
		–	4.5	–		I_F = 3 mA
		–	3.4	–		I_F = 5 mA
		–	2.5	–		I_F = 10 mA
Insertion loss	I_L	–	0.89	–	dB	I_F = 1 mA
		–	0.46	–		I_F = 3 mA
		–	0.37	–		I_F = 5 mA
		–	0.29	–		I_F = 10 mA
Isolation	I_{SO}	–	13.7	–		V_R = 0 V

Table 7 AC parameter at f = 2.5 GHz

Parameter	Symbol	Values			Unit	Note or test condition
		Min.	Typ.	Max.		
Capacitance	C	–	0.23	–	pF	V_R = 0 V
Reverse parallel resistance	R_P	–	2.5	–	kΩ	V_R = 0 V
Forward resistance	R_F	–	10.2	–	Ω	I_F = 1 mA
		–	4.7	–		I_F = 3 mA
		–	3.5	–		I_F = 5 mA
		–	2.6	–		I_F = 10 mA
Insertion loss	I_L	–	0.94	–	dB	I_F = 1 mA
		–	0.53	–		I_F = 3 mA
		–	0.43	–		I_F = 5 mA
		–	0.36	–		I_F = 10 mA
Isolation	I_{SO}	–	11	–		V_R = 0 V

Electrical performance in test fixture

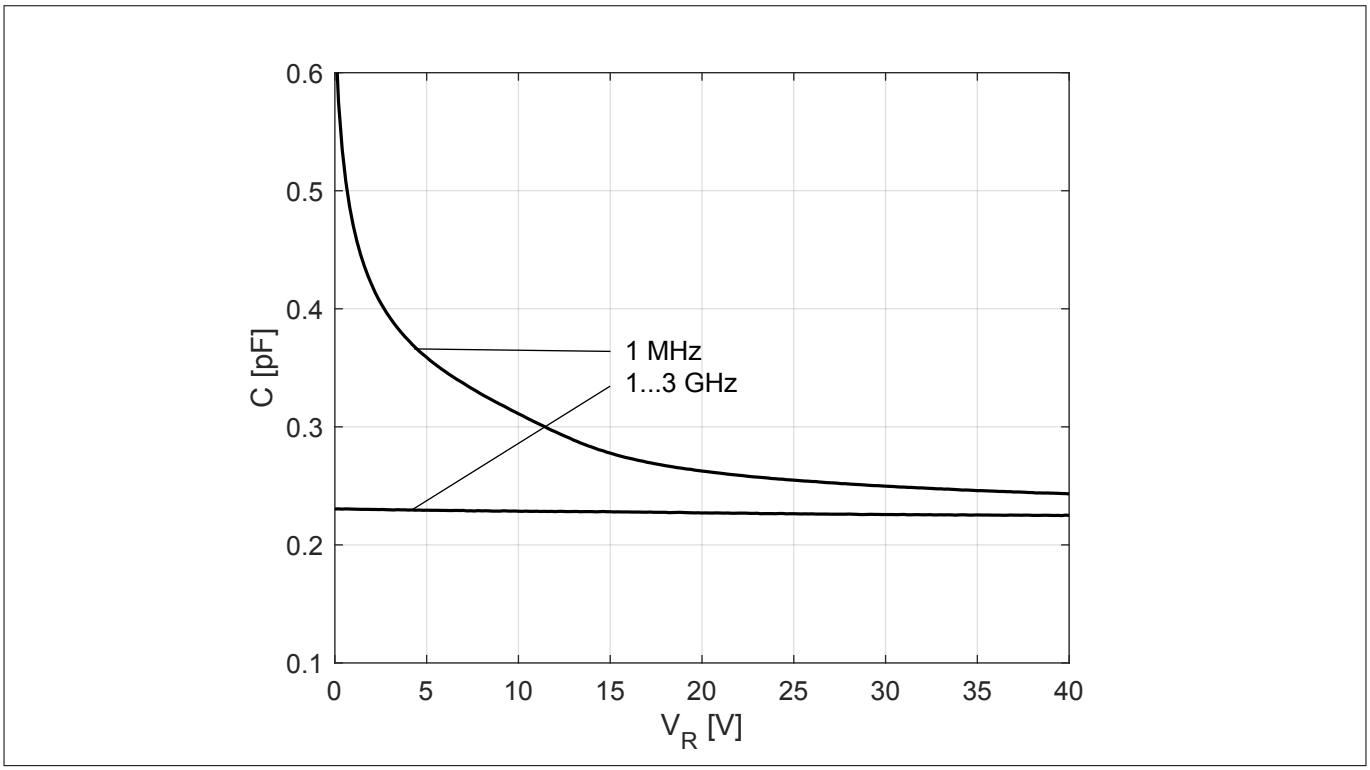

Figure 2 **Capacitance *C* vs. reverse voltage V_R at different frequencies**

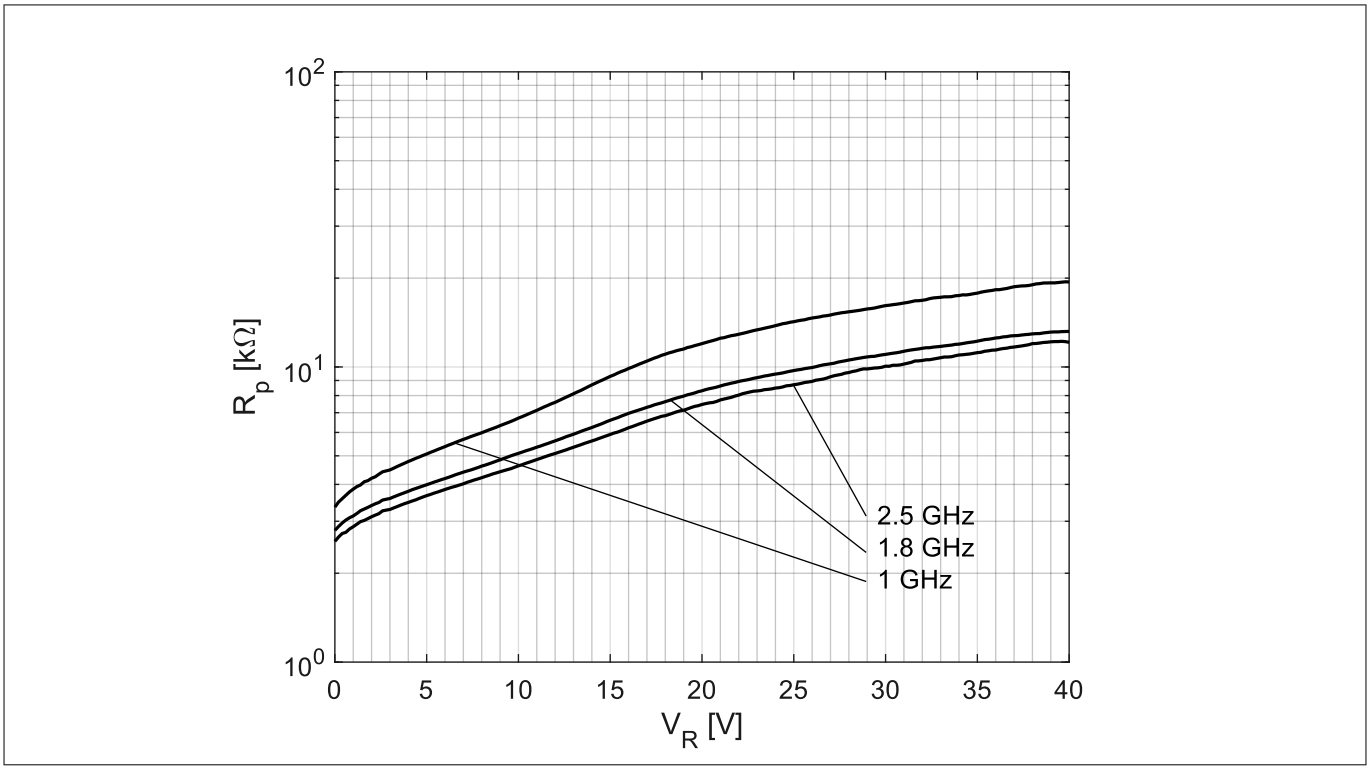

Figure 3 **Reverse parallel resistance R_P vs. reverse voltage V_R at different frequencies**

Electrical performance in test fixture

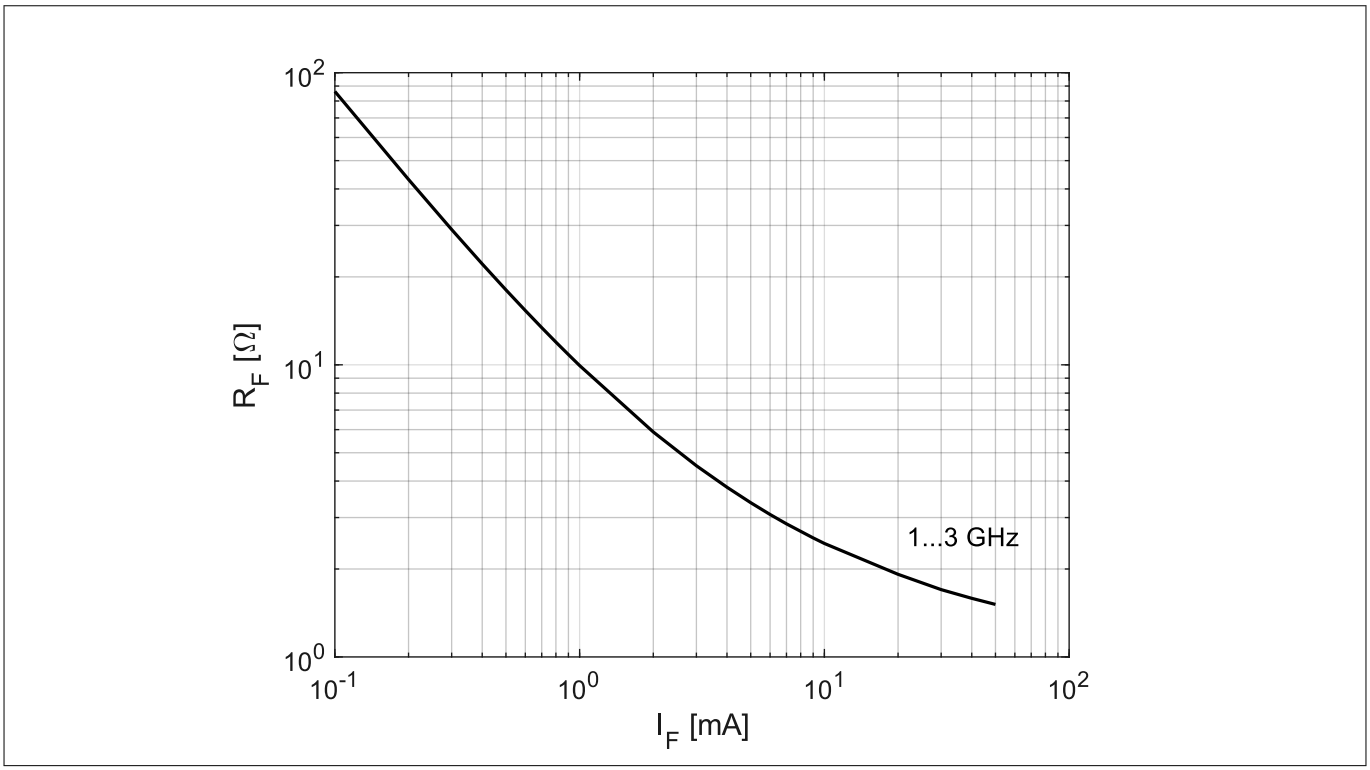

Figure 4 **Forward resistance R_F vs. forward current I_F at different frequencies**

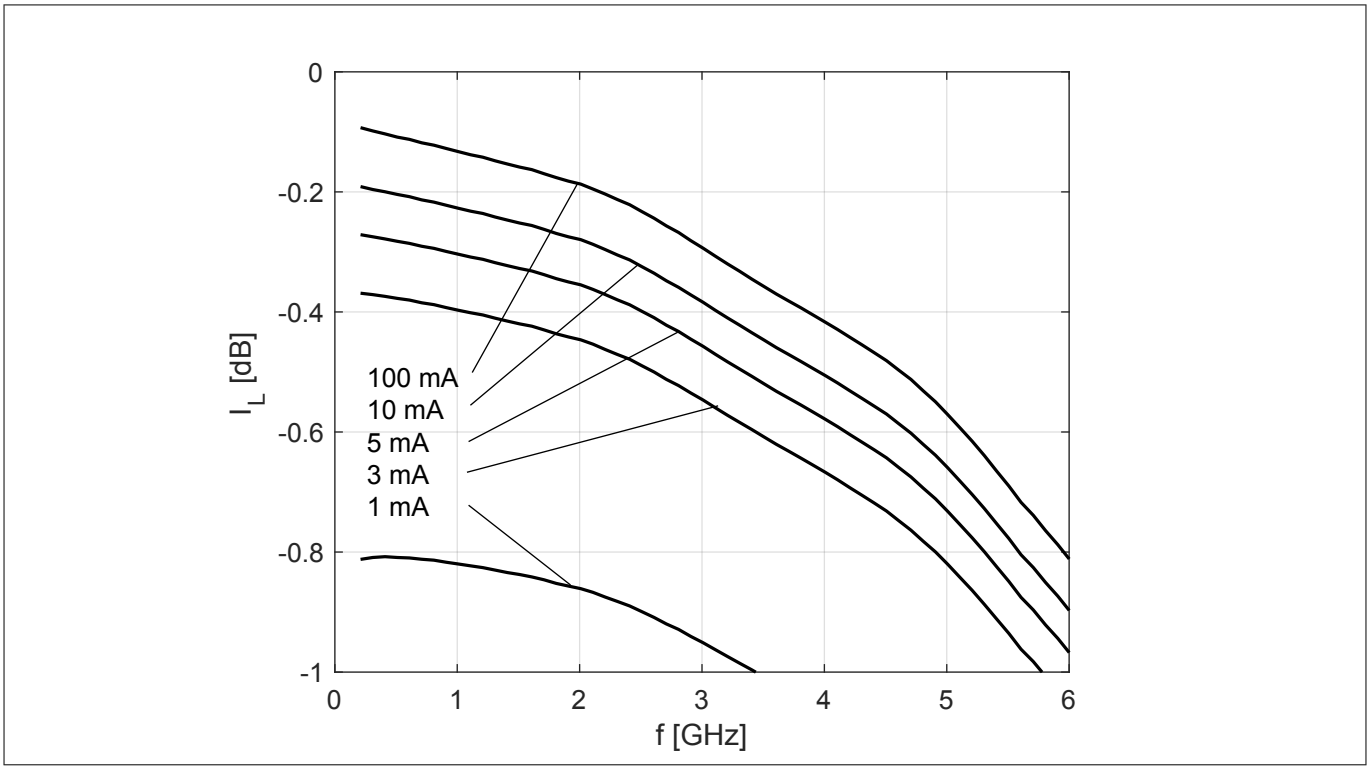

Figure 5 **Insertion loss I_L vs. frequency f at different forward currents**

Electrical performance in test fixture

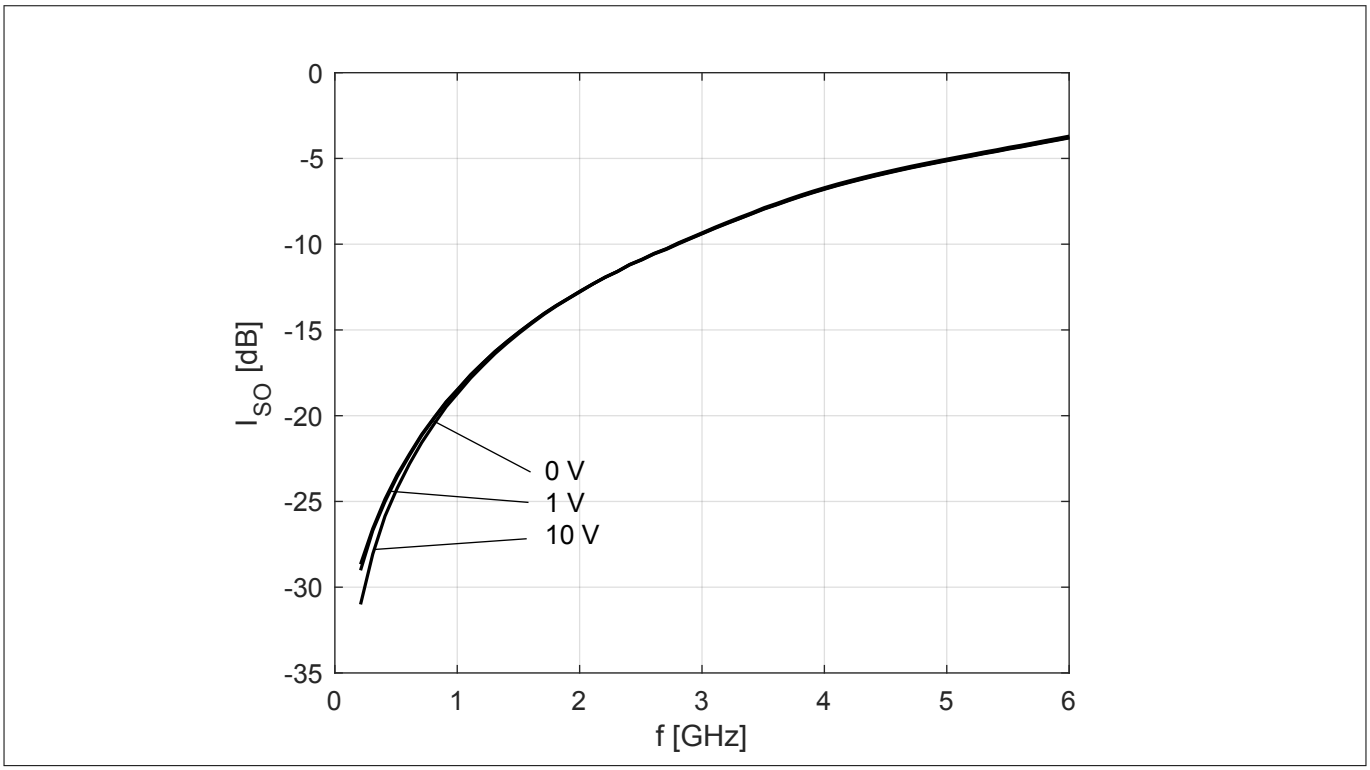

Figure 6 Isolation I_{SO} vs. frequency *f* at different reverse voltages

Note: The curves shown in this chapter have been generated using typical devices but shall not be understood as a guarantee that all devices have identical characteristic curves.

3 Thermal characteristics

Table 8 Thermal resistance

Parameter	Symbol	Values			Unit	Note or test condition
		Min.	Typ.	Max.		
Thermal resistance (junction - soldering point)	R_{thJS}	–	105	–	K/W	T_S = 123 °C [2)]

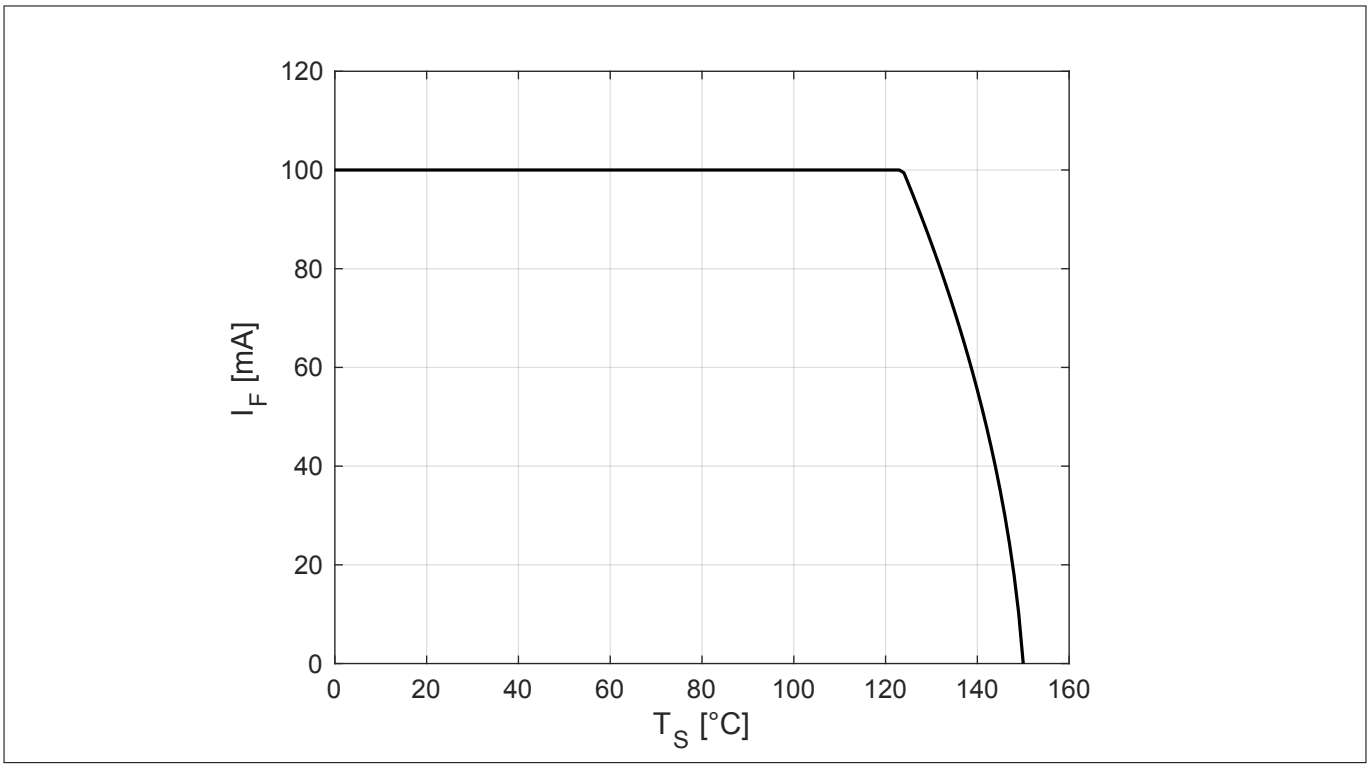

Figure 7 Permissible forward current I_F in DC operation

2 For R_{thJS} in other conditions refer to the curves in this chapter.

Thermal characteristics

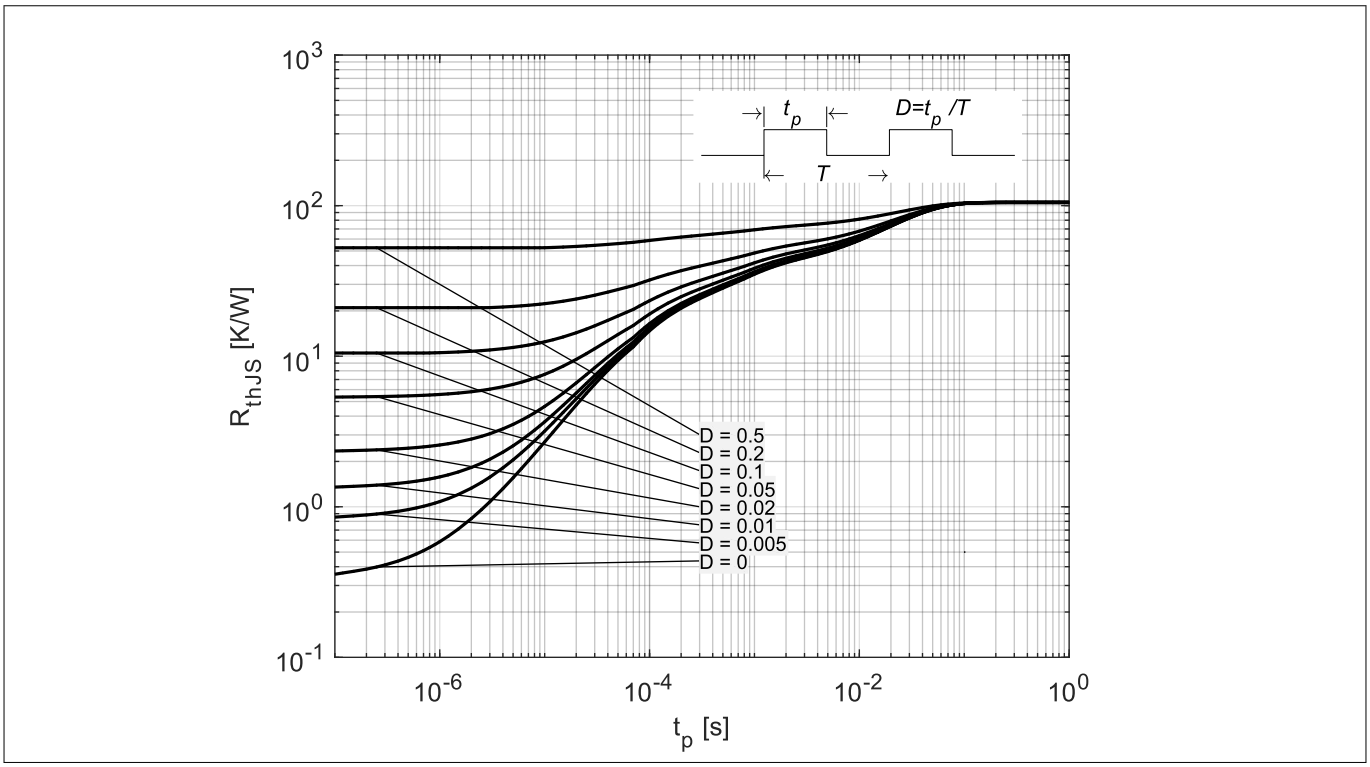

Figure 8 **Thermal resistance R_{thJS} in pulse operation**

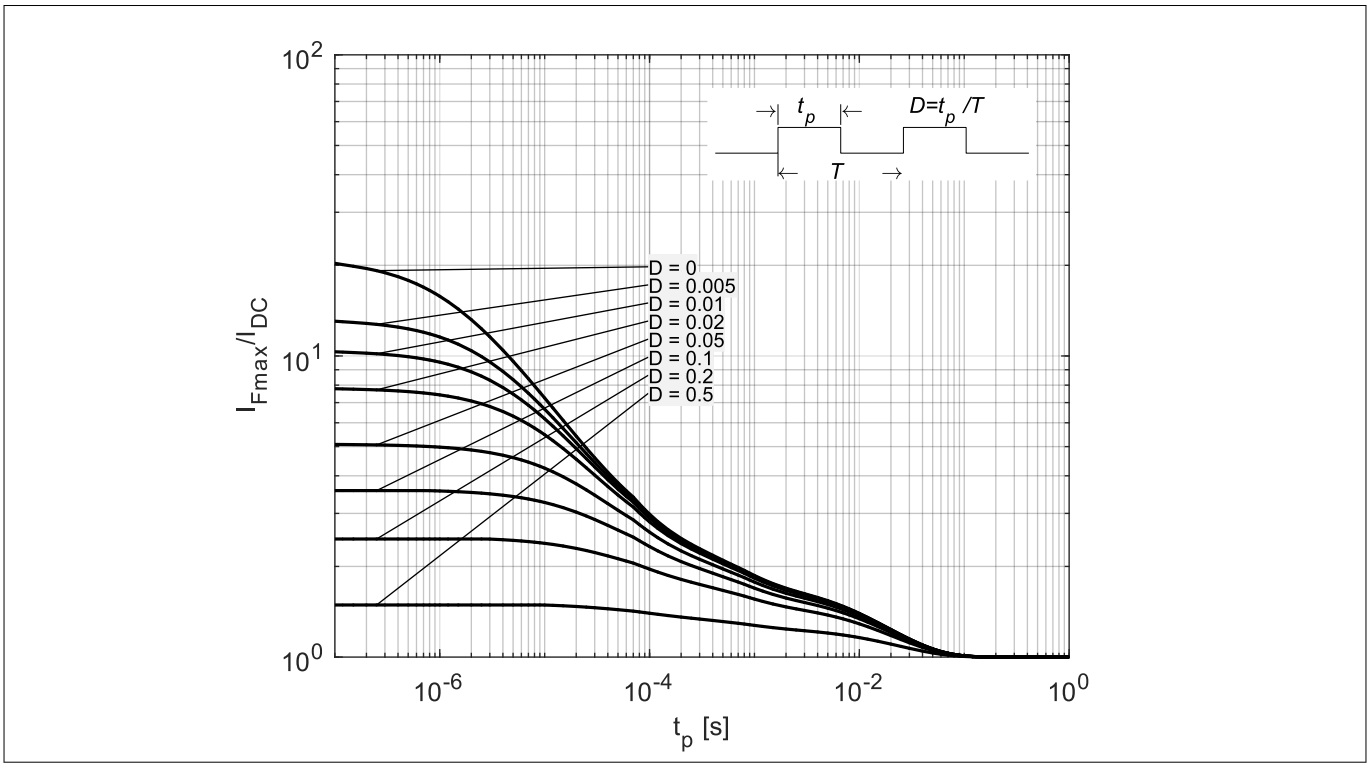

Figure 9 **Permissible forward current ratio I_{Fmax}/I_{DC} in pulse operation**

4 Package information SOT323-3

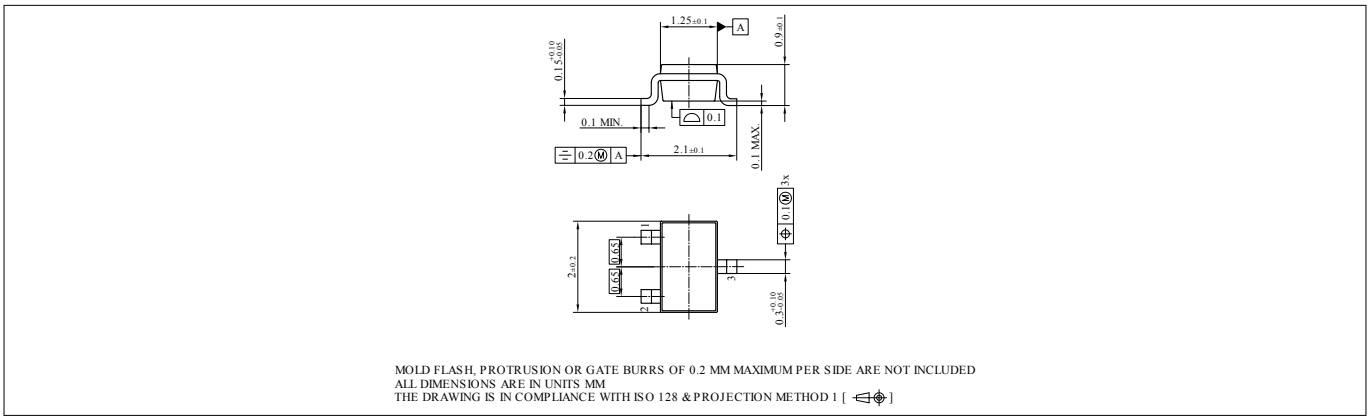

Figure 10 Package outline

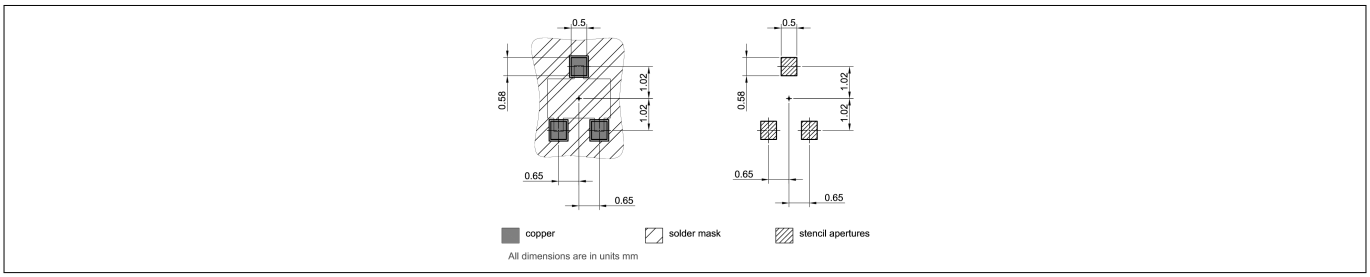

Figure 11 Foot print

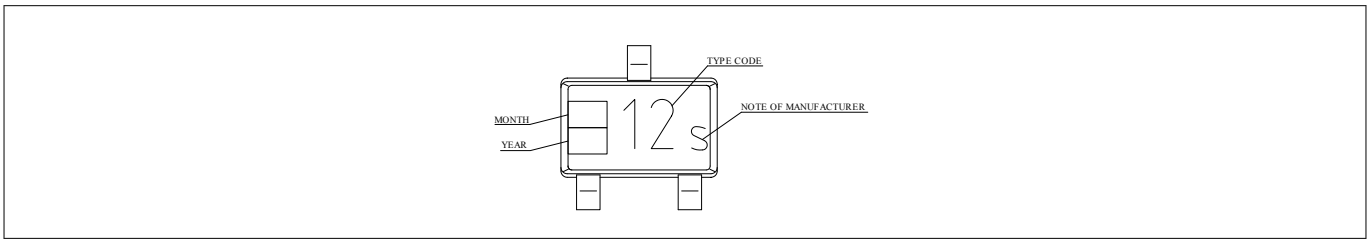

Figure 12 Marking layout example

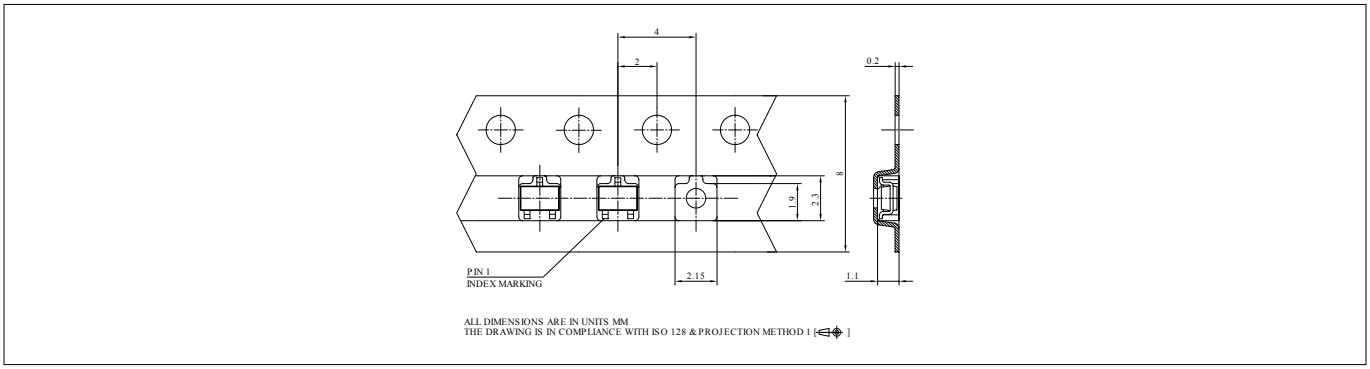

Figure 13 Tape information

Revision history

Document version	Date of release	Description of changes
1.0	2018-09-07	• Change from series datasheet to individual one • Initial release of datasheet • Typical values and curves updated to the values of the production (No product or process change behind) • Maximum/typical values added • Typical curves/values removed
1.1	2019-01-21	Product description, feature list and potential application section reworked

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