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BAT15-099

Anti-parallel silicon RF Schottky diode pair

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Product description

These Infineon RF Schottky diodes are silicon low barrier N-type devices with an integrated guard ring on-chip for over-voltage protection. Their low barrier height, low forward voltage and low junction capacitance make BAT15-099 a suitable choice for mixer and detector functions in applications which frequencies are as high as 12 GHz.



Feature list

- Low inductance L_S = 2 nH (typical)
- Low capacitance C = 0.29 pF (typical) at 1 MHz
- Industry standard SOT143 package (2.9 mm x 2.4 mm x 1 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

For mixers and detectors in:

- Wearables
- Smart metering
- Telematic systems
- Set top boxes

Device information

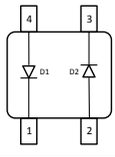


Table 1 Part information

Product name / Ordering code	Package	Pin configuration	Marking	Pieces / Reel
BAT15-099 / BAT15099E6327HTSA1	SOT143	Anti-parallel pair	S5s	3 k
BAT15-099 / BAT15099E6433HTMA1				10 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	–	4	V	
Forward current	I_F	–	110	mA	
Total power dissipation	P_{TOT}	–	100	mW	$T_S \leq 48$ °C [1)]
Junction temperature	T_J	–	150	°C	
Operating temperature	T_{OP}	-55	150		
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.

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2 Electrical performance in test fixture

2.1 Electrical characteristics

Table 3 Electrical characteristics at T_A = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit	Note or test condition
		Min.	Typ.	Max.		
Breakdown voltage	V_{BR}	4	–	–	V	I_R = 100 µA
Reverse current	I_R	–	–	5	µA	V_R = 1 V
Forward voltage	V_F	0.16	0.25	0.32	V	I_F = 1 mA
		0.25	0.35	0.41		I_F = 10 mA
Forward voltage matching	ΔV_F	–	–	20	mV	I_F = 10 mA [1)]
Differential forward resistance	R_F	–	5.8	–	Ω	I_F = 10 mA / 50 mA [2)]
Capacitance	C	–	0.29	0.35	pF	V_R = 0 V, f = 1 MHz
Inductance	L_S	–	2	–	nH	

1 ΔV_F is the difference between lowest and highest V_F in a multiple diode component.

2 $R_F = \frac{V_F(50\text{ mA}) - V_F(10\text{ mA})}{50\text{ mA} - 10\text{ mA}}$

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2.2 Characteristic curves

At T_A = 25 °C, unless otherwise specified

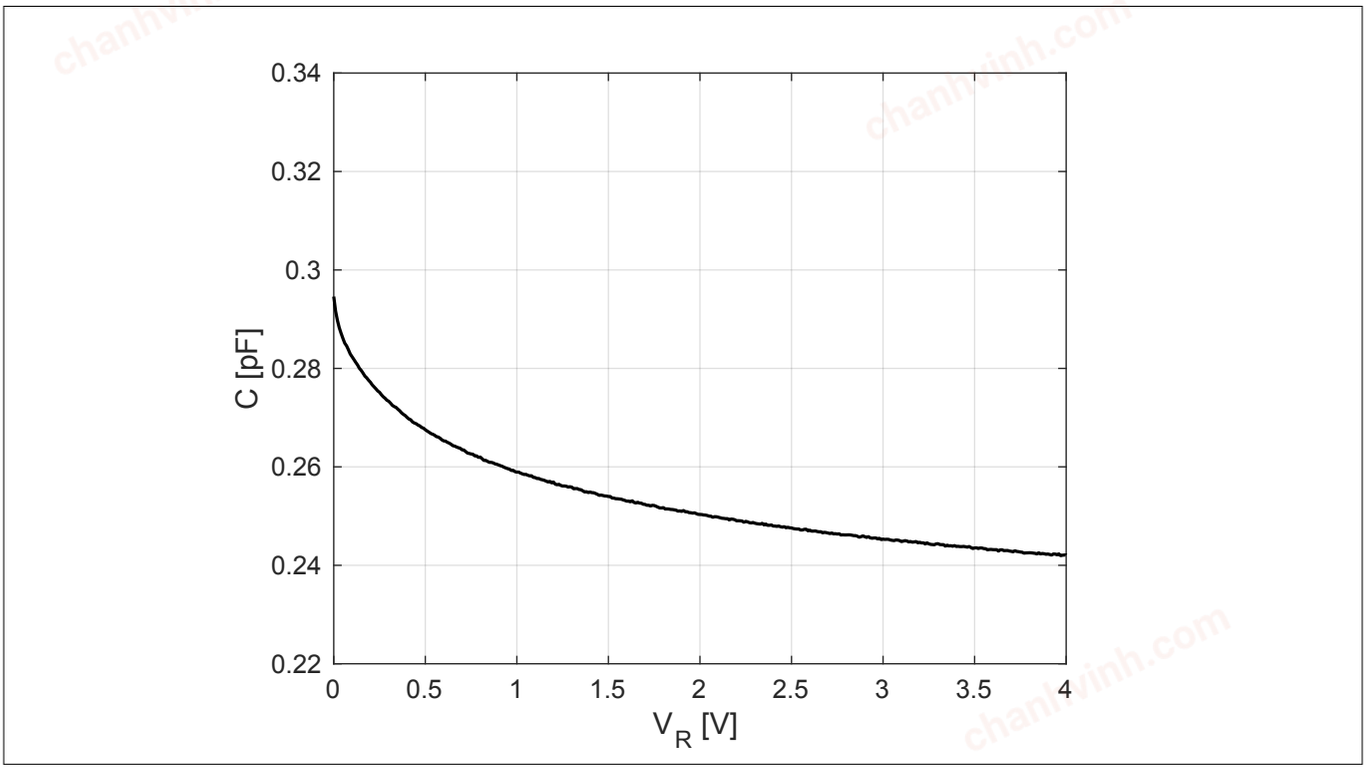


Figure 1 **Diode capacitance *C* vs. reverse voltage V_R at frequency *f* = 1 MHz**

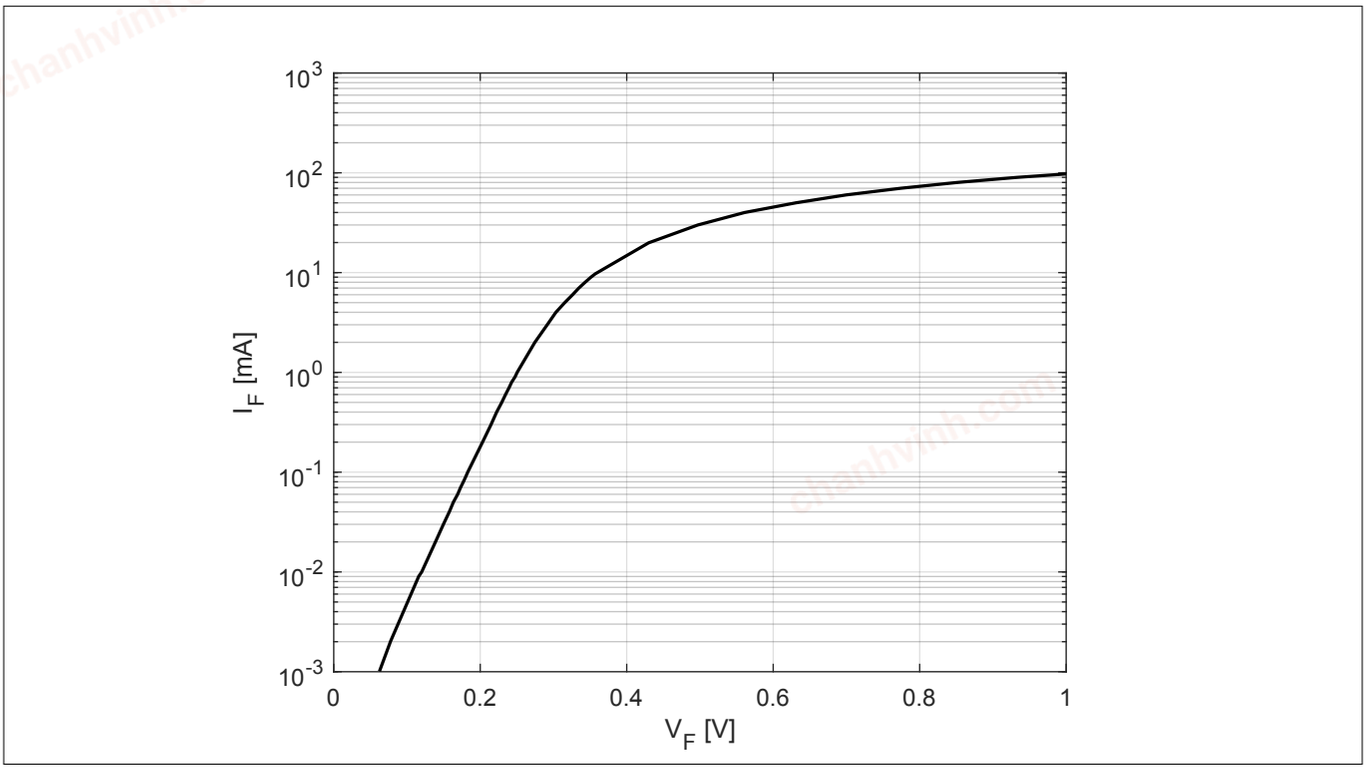


Figure 2 **Forward current I_F vs. forward voltage V_F**

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Electrical performance in test fixture

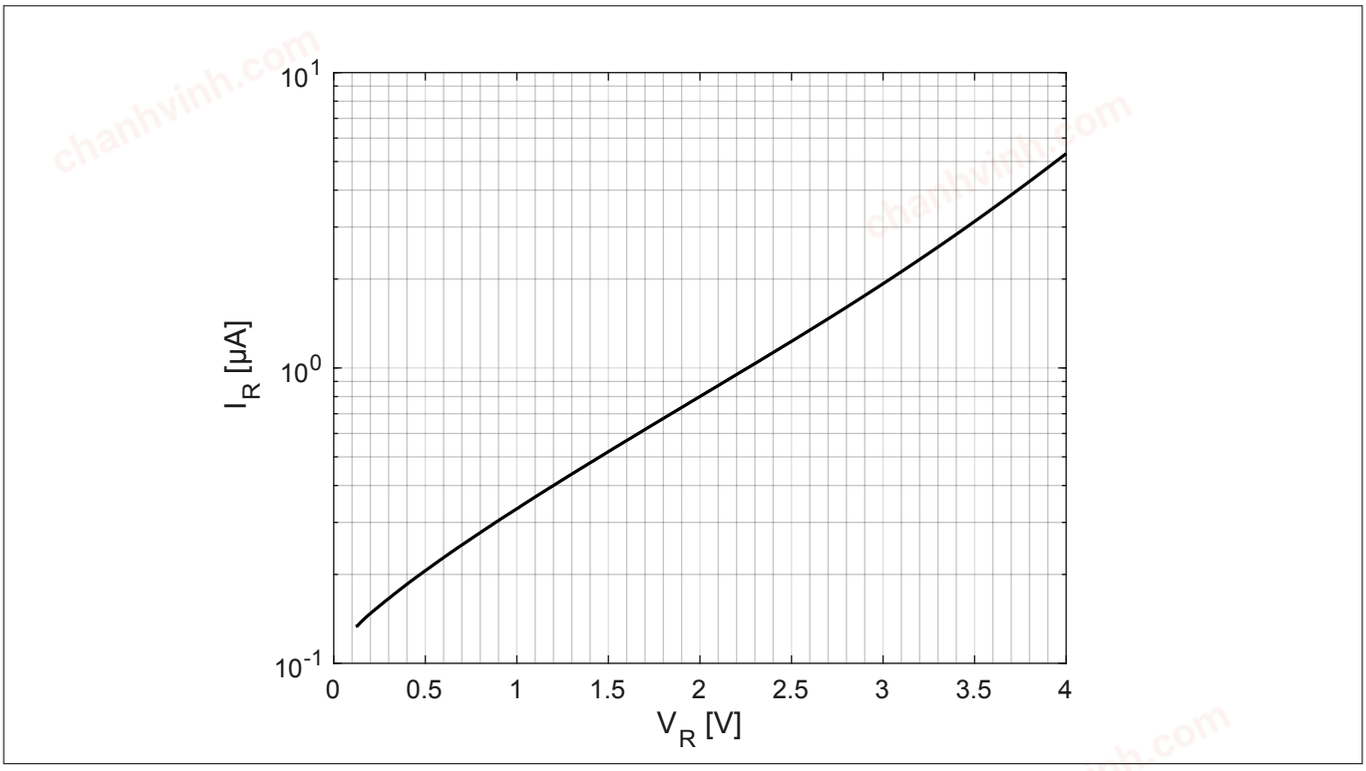


Figure 3 Reverse current I_R vs. reverse voltage V_R

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.

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3 Thermal characteristics

Table 4 Thermal resistance

Parameter	Symbol	Values			Unit	Note or test condition
		Min.	Typ.	Max.		
Thermal resistance (junction - soldering point)	R_{thJS}	–	1020	–	K/W	T_S = 48 °C [1)]

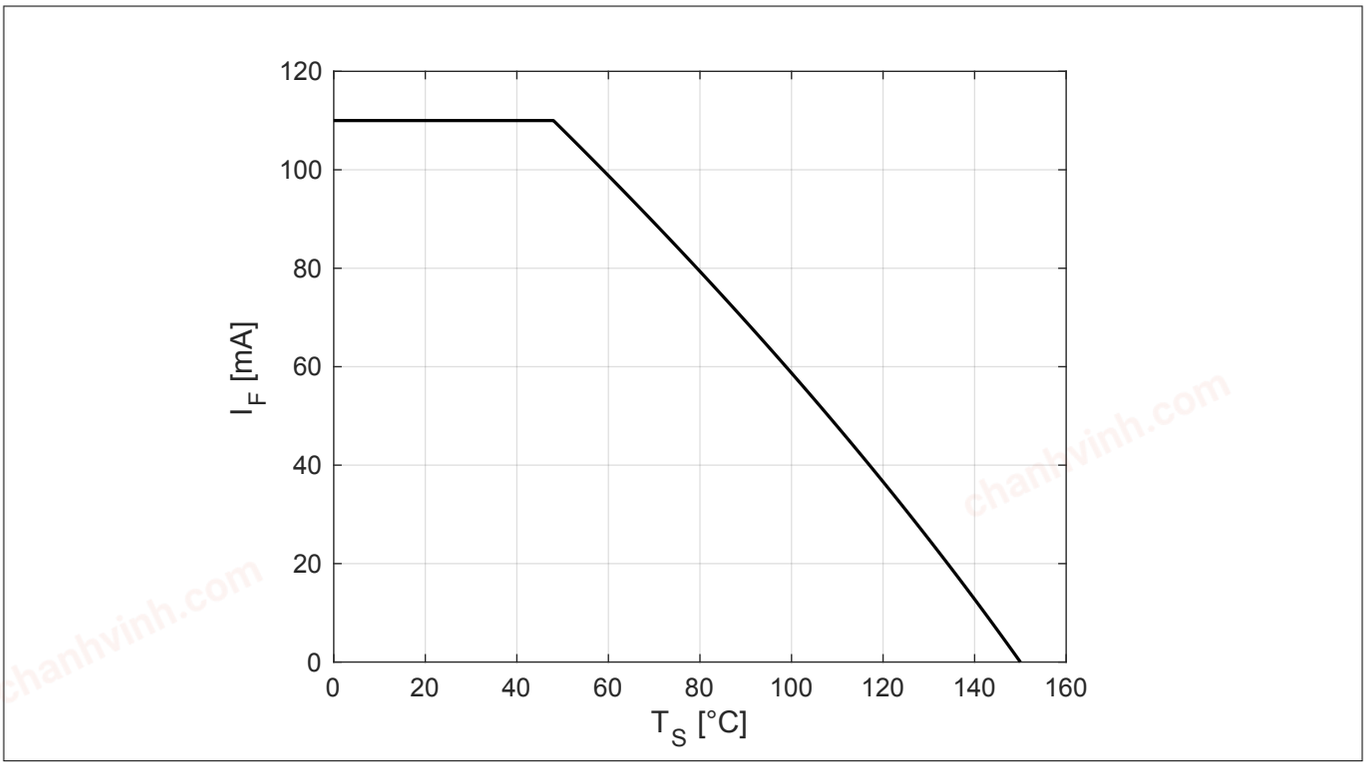


Figure 4 Permissible forward current I_F in DC operation

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

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Thermal characteristics

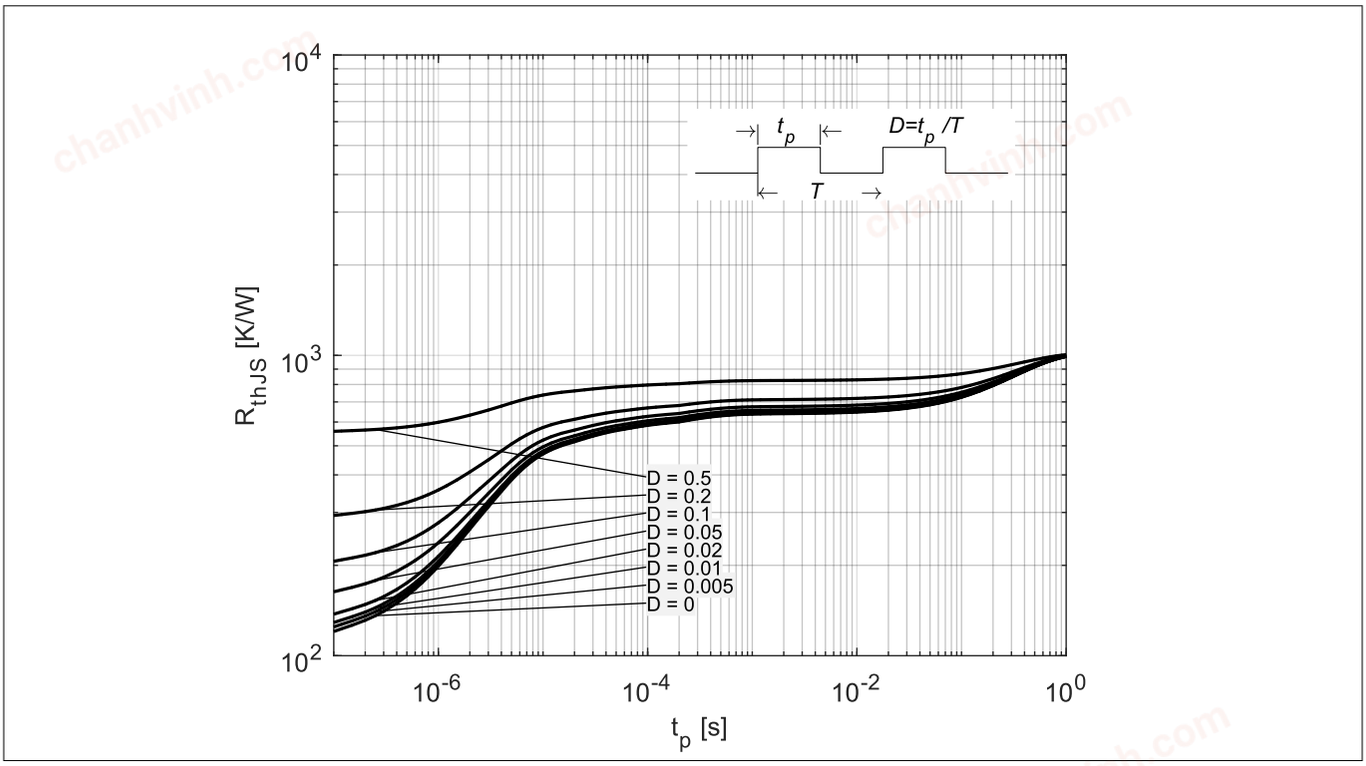


Figure 5 **Thermal resistance R_{thJS} in pulse operation**

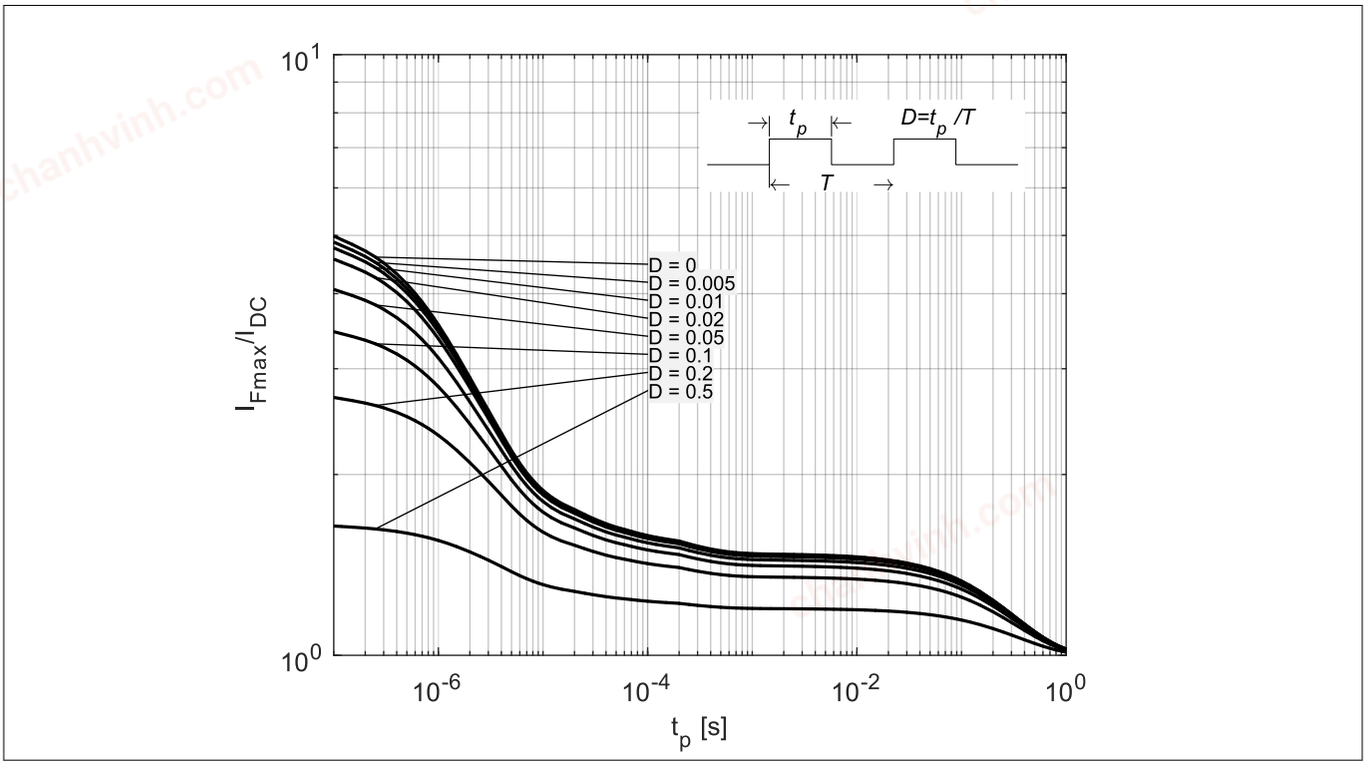


Figure 6 **Permissible forward current ratio I_{Fmax}/I_{DC} in pulse operation**

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4 Package information SOT143

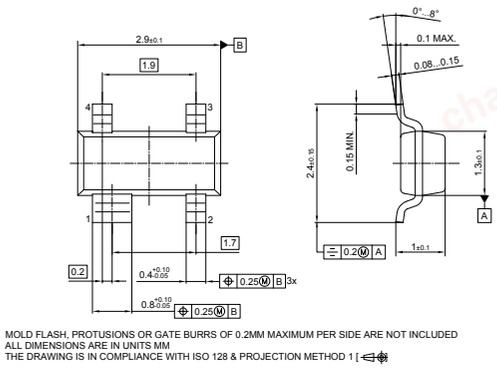


Figure 7 Package outline

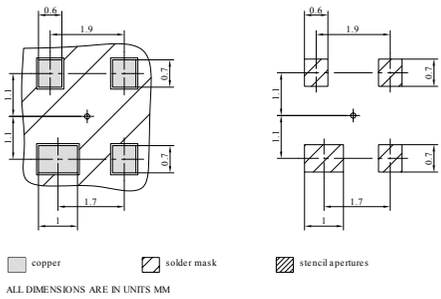


Figure 8 Foot print

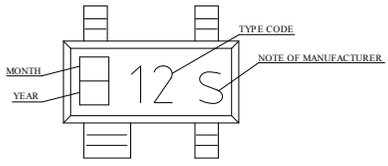


Figure 9 Marking layout example

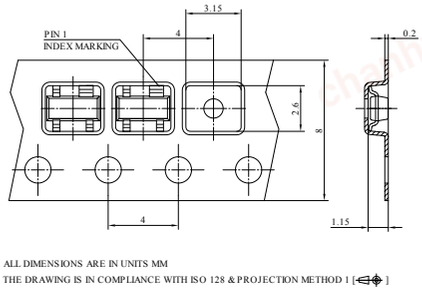


Figure 10 Tape dimensions

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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) • Typical values added • Typical curves removed

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