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Electronic Components Sourcing Information

Product Reference Information

Part Number:	BSS84AKMB,315
Manufacturer:	Nexperia USA Inc.
Package:	Please confirm with sales
Availability:	Please confirm with sales

Product Page:

<https://antrexco.com/product/details/nexperia-usa-inc/bss84akmb-315.html>

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Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.



BSS84AKMB

50 V, single P-channel Trench MOSFET

27 October 2020

Product data sheet

1. General description

P-channel enhancement mode Field-Effect Transistor (FET) in a leadless ultra small DFN1006B-3 (SOT883B) Surface-Mounted Device (SMD) plastic package using Trench MOSFET technology.

2. Features and benefits

- Logic-level compatible
- Very fast switching
- Trench MOSFET technology
- ESD protection up to 1 kV
- Ultra thin package profile with 0.37 mm height

3. Applications

- Relay driver
- High-speed line driver
- High-side load switch
- Switching circuits

4. Quick reference data

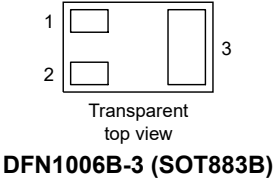
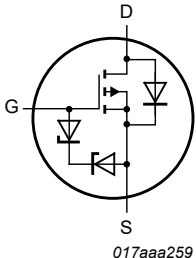
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$T_j = 25\text{ }^{\circ}\text{C}$		-	-	-50	V
V_{GS}	gate-source voltage			-20	-	20	V
I_D	drain current	$V_{GS} = -10\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	-230	mA
Static characteristics							
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = -10\text{ V}; I_D = -100\text{ mA}; T_j = 25\text{ }^{\circ}\text{C}$		-	4.5	7.5	Ω

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for drain 1 cm^2 .

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	G	gate		
2	S	source		
3	D	drain		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BSS84AKMB	DFN1006B-3	plastic, leadless ultra small plastic package; 3 solder lands; 0.35 mm pitch; 1.0 mm x 0.6 mm x 0.37 mm body	SOT883B

7. Marking

Table 4. Marking codes

Type number	Marking code
BSS84AKMB	0000 0010

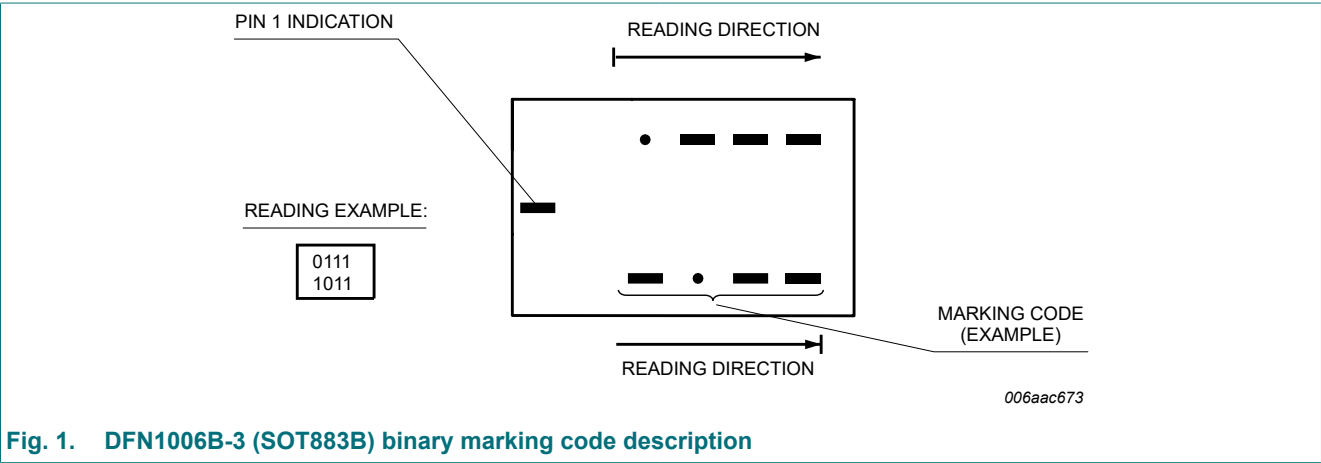


Fig. 1. DFN1006B-3 (SOT883B) binary marking code description

8. Limiting values

Table 5. Limiting values

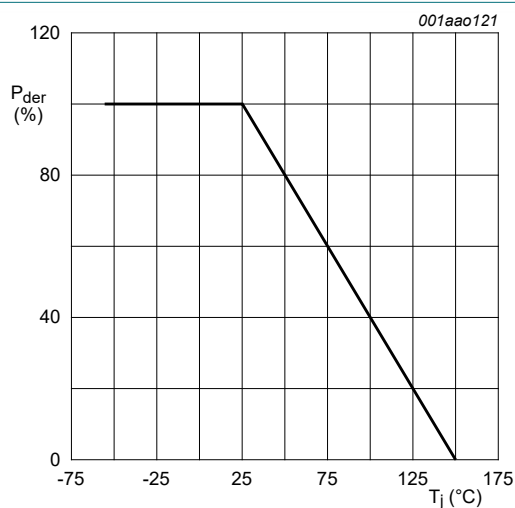
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V _{DS}	drain-source voltage	T _j = 25 °C		-	-50	V
V _{GS}	gate-source voltage			-20	20	V
I _D	drain current	V _{GS} = -10 V; T _{amb} = 25 °C	[1]	-	-230	mA
		V _{GS} = -10 V; T _{amb} = 100 °C	[1]	-	-150	mA
I _{DM}	peak drain current	T _{amb} = 25 °C; single pulse; t _p ≤ 10 μs		-	-0.9	A
P _{tot}	total power dissipation	T _{amb} = 25 °C	[2]	-	360	mW
			[1]	-	715	mW
		T _{sp} = 25 °C		-	2700	mW
T _j	junction temperature			-55	150	°C
T _{amb}	ambient temperature			-55	150	°C
T _{stg}	storage temperature			-65	150	°C
Source-drain diode						
I _S	source current	T _{amb} = 25 °C	[1]	-	-230	mA
ESD maximum rating						
V _{ESD}	electrostatic discharge voltage	HBM	[3]	-	1000	V

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for drain 1 cm².

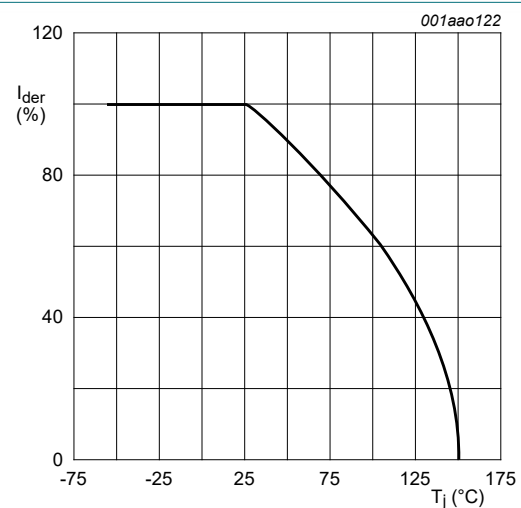
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[3] Measured between all pins.



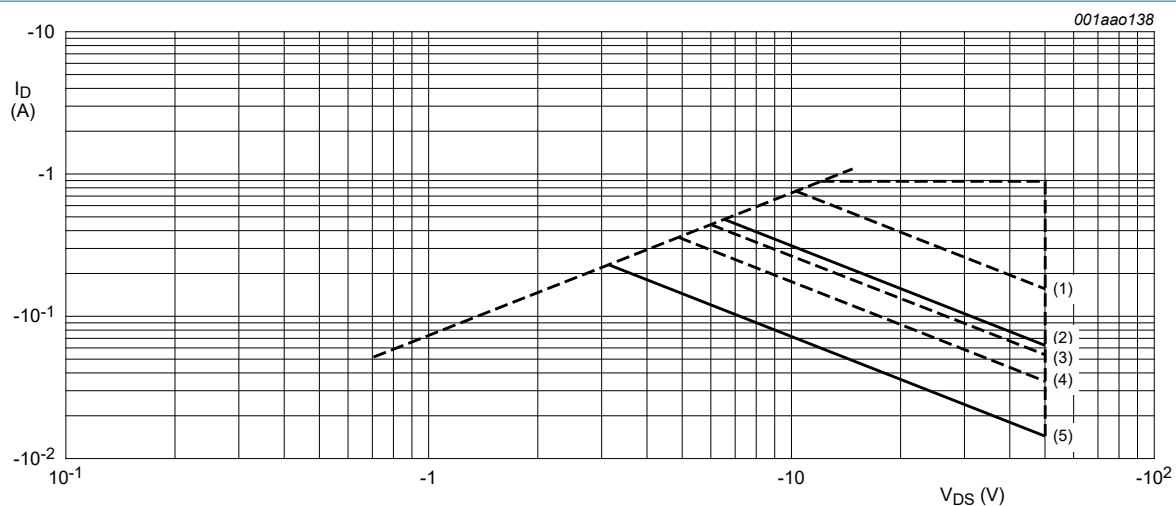
$$P_{der} = \frac{P_{tot}}{P_{tot(25^\circ\text{C})}}$$

Fig. 2. Normalized total power dissipation as a function of junction temperature



$$I_{der} = \frac{I_D}{I_{D(25^\circ\text{C})}} \times 100\%$$

Fig. 3. Normalized continuous drain current as a function of junction temperature



I_{DM} is single pulse

(1) $t_p = 1$ ms

(2) DC; $T_{sp} = 25$ °C

(3) $t_p = 10$ ms

(4) $t_p = 100$ ms

(5) DC; $T_{amb} = 25$ °C; drain mounting pad 1 cm^2

Fig. 4. Safe operating area; junction to ambient; continuous and peak drain currents as a function of drain-source voltage

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	305	350	K/W
			[2]	-	150	175	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	40	K/W

- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for drain 1 cm².

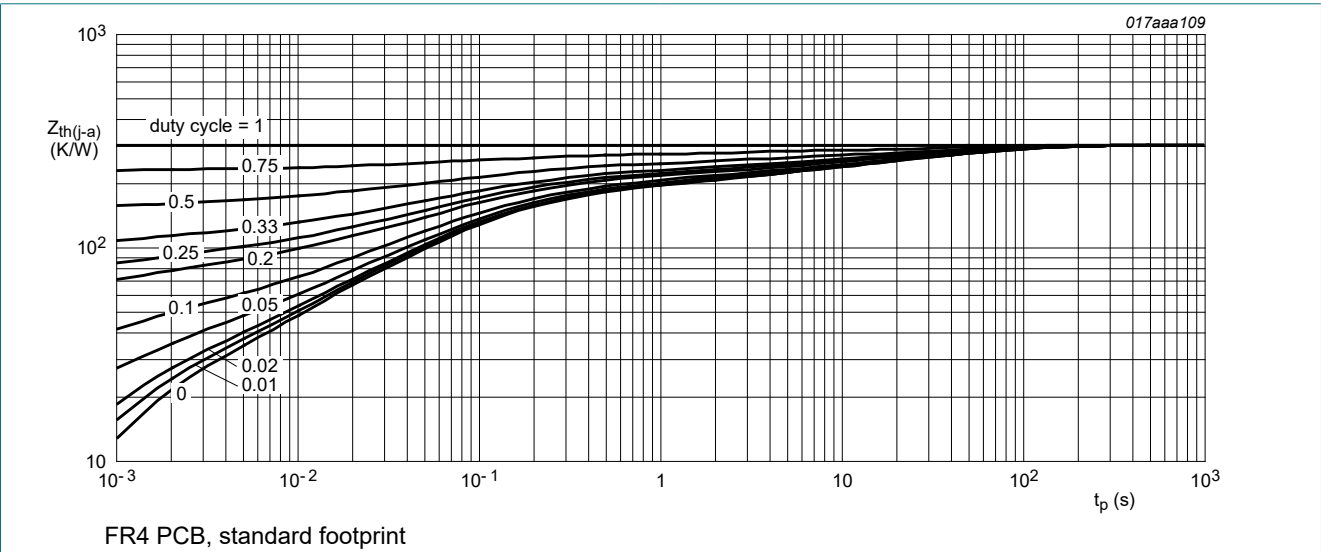


Fig. 5. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

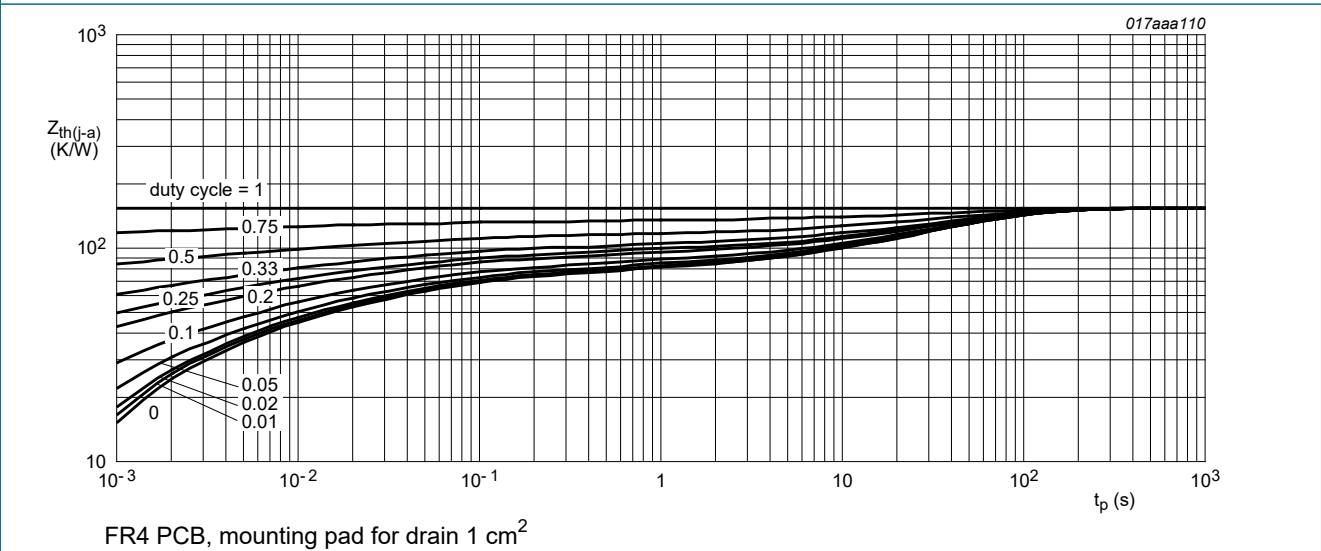


Fig. 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
$V_{(BR)DSS}$	drain-source breakdown voltage	$I_D = -250 \mu A$; $V_{GS} = 0 V$; $T_j = 25 ^\circ C$		-50	-	-	V
V_{GSth}	gate-source threshold voltage	$I_D = -250 \mu A$; $V_{DS}=V_{GS}$; $T_j = 25 ^\circ C$		-1.1	-1.6	-2.1	V
I_{DSS}	drain leakage current	$V_{DS} = -50 V$; $V_{GS} = 0 V$; $T_j = 25 ^\circ C$		-	-	-1	μA
		$V_{DS} = -50 V$; $V_{GS} = 0 V$; $T_j = 150 ^\circ C$		-	-	-2	μA
I_{GSS}	gate leakage current	$V_{GS} = -20 V$; $V_{DS} = 0 V$; $T_j = 25 ^\circ C$		-	-	-10	μA
		$V_{GS} = 20 V$; $V_{DS} = 0 V$; $T_j = 25 ^\circ C$		-	-	-10	μA
R_{DSon}	drain-source on-state resistance	$V_{GS} = -10 V$; $I_D = -100 mA$; $T_j = 25 ^\circ C$		-	4.5	7.5	Ω
		$V_{GS} = -10 V$; $I_D = -100 mA$; $T_j = 150 ^\circ C$		-	8	13.5	Ω
		$V_{GS} = -5 V$; $I_D = -100 mA$; $T_j = 25 ^\circ C$		-	5.7	8.5	Ω
g_{fs}	forward transconductance	$V_{DS} = -10 V$; $I_D = -100 mA$; $T_j = 25 ^\circ C$		-	150	-	mS
Dynamic characteristics							
$Q_{G(tot)}$	total gate charge	$V_{DS} = -25 V$; $I_D = -200 mA$; $V_{GS} = -5 V$; $T_j = 25 ^\circ C$		-	0.26	0.35	nC
Q_{GS}	gate-source charge			-	0.12	-	nC
Q_{GD}	gate-drain charge	$V_{DS} = -10 V$; $I_D = -200 mA$; $V_{GS} = -5 V$; $T_j = 25 ^\circ C$		-	0.09	-	nC
C_{iss}	input capacitance	$V_{DS} = -25 V$; $f = 1 MHz$; $V_{GS} = 0 V$; $T_j = 25 ^\circ C$		-	24	36	pF
C_{oss}	output capacitance			-	4.5	-	pF
C_{rss}	reverse transfer capacitance			-	1.3	-	pF
$t_{d(on)}$	turn-on delay time	$V_{DS} = -30 V$; $R_L = 250 \Omega$; $V_{GS} = -10 V$; $R_{G(ext)} = 6 \Omega$; $T_j = 25 ^\circ C$		-	13	26	ns
t_r	rise time			-	11	-	ns
$t_{d(off)}$	turn-off delay time			-	48	96	ns
t_f	fall time			-	25	-	ns
Source-drain diode							
V_{SD}	source-drain voltage	$I_S = -115 mA$; $V_{GS} = 0 V$; $T_j = 25 ^\circ C$		-0.48	-0.85	-1.2	V

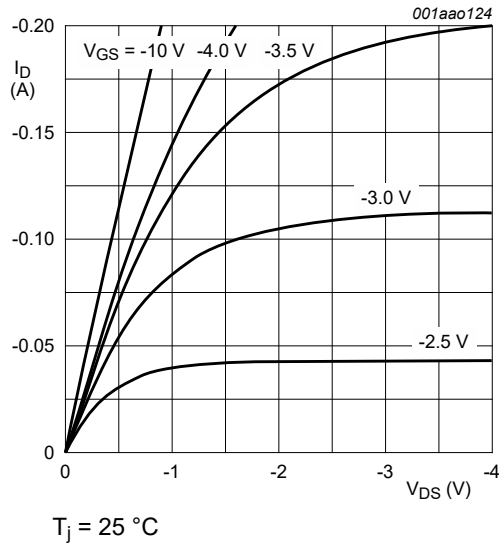


Fig. 7. Output characteristics; drain current as a function of drain-source voltage; typical values

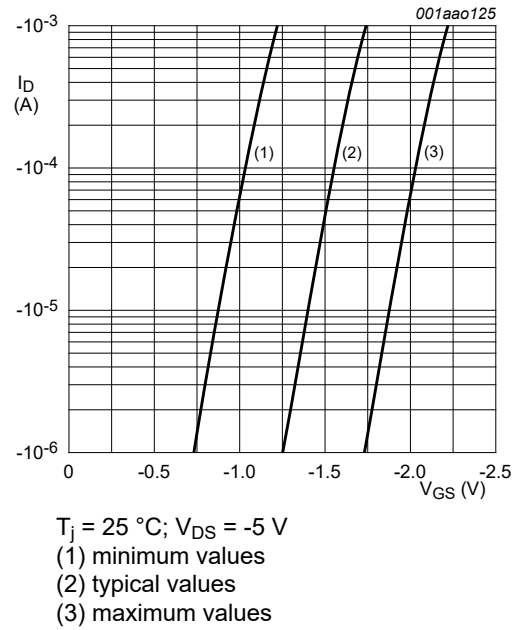


Fig. 8. Sub-threshold drain current as a function of gate-source voltage

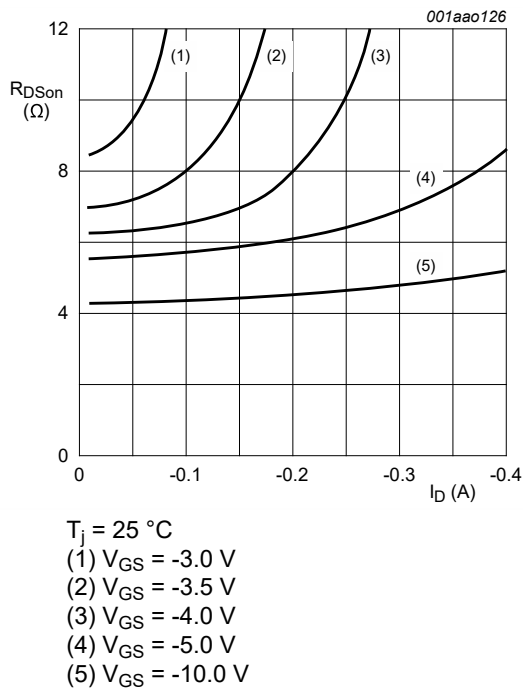


Fig. 9. Drain-source on-state resistance as a function of drain current; typical values

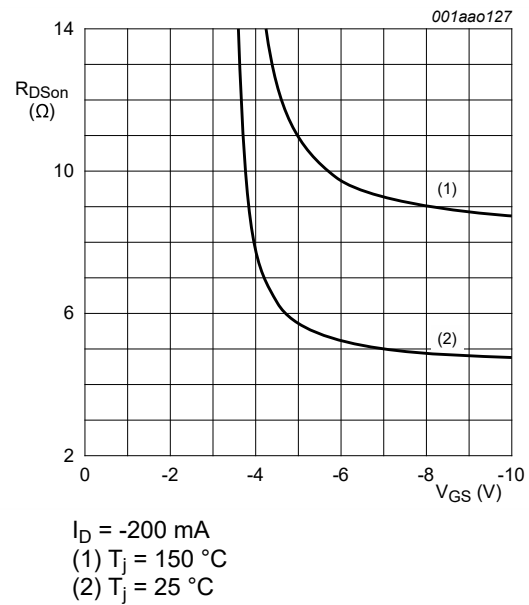


Fig. 10. Drain-source on-state resistance as a function of gate-source voltage; typical values

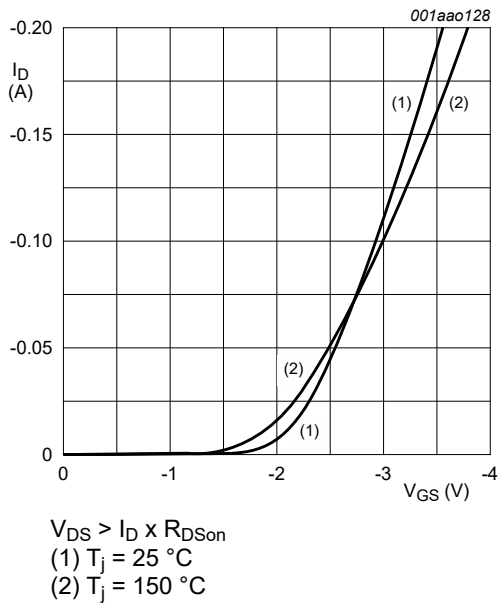


Fig. 11. Transfer characteristics: drain current as a function of gate-source voltage; typical values

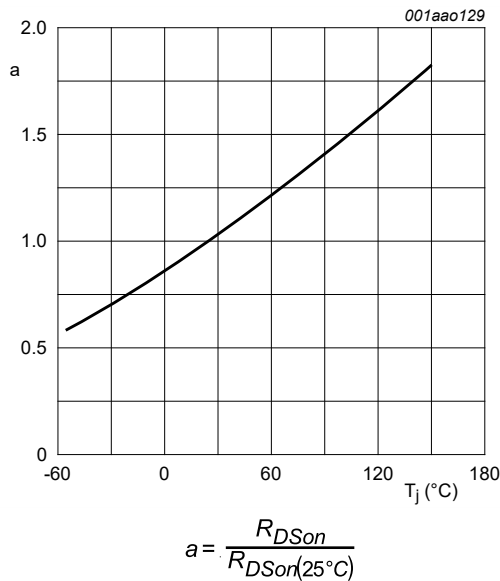


Fig. 12. Normalized drain-source on-state resistance as a function of junction temperature; typical values

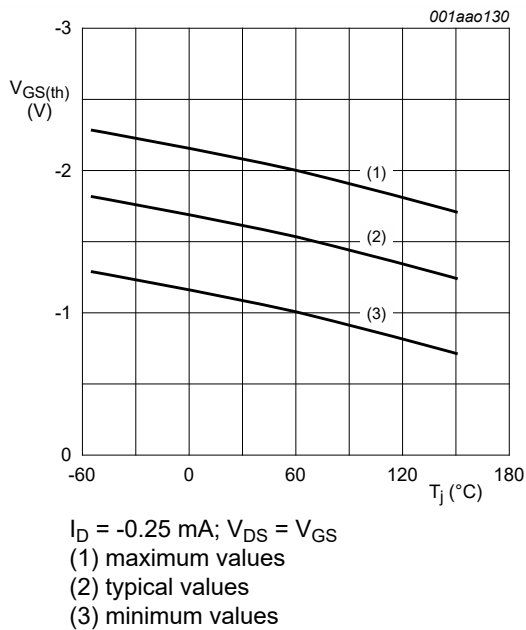


Fig. 13. Gate-source threshold voltage as a function of junction temperature

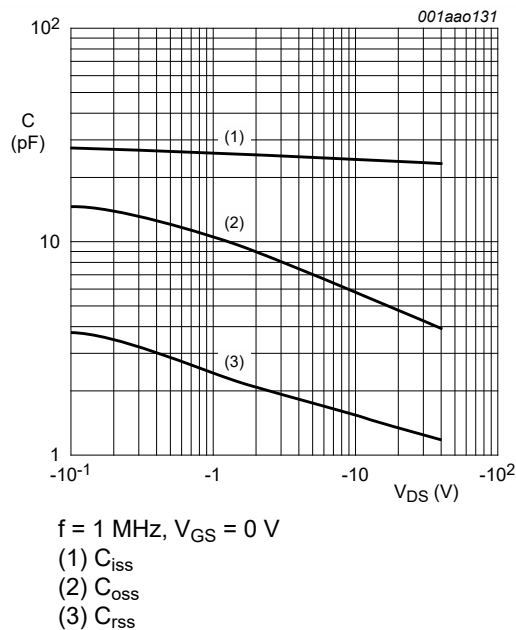


Fig. 14. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

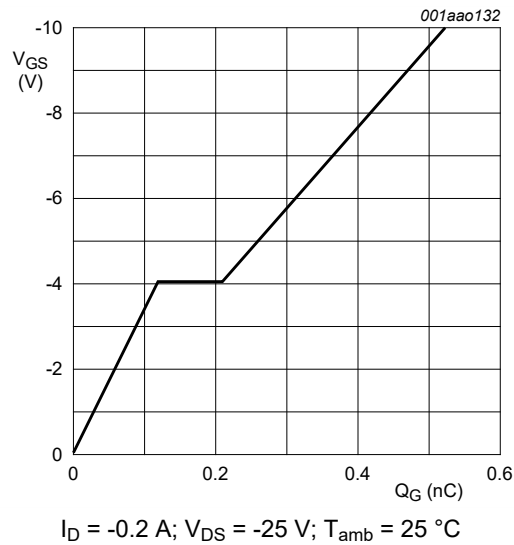


Fig. 15. Gate-source voltage as a function of gate charge; typical values

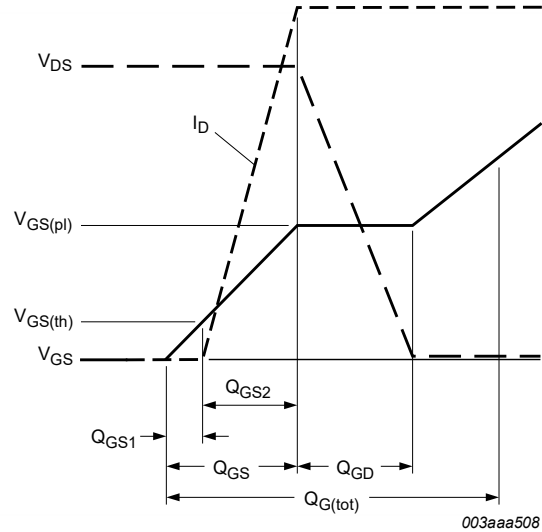


Fig. 16. Gate charge waveform definitions

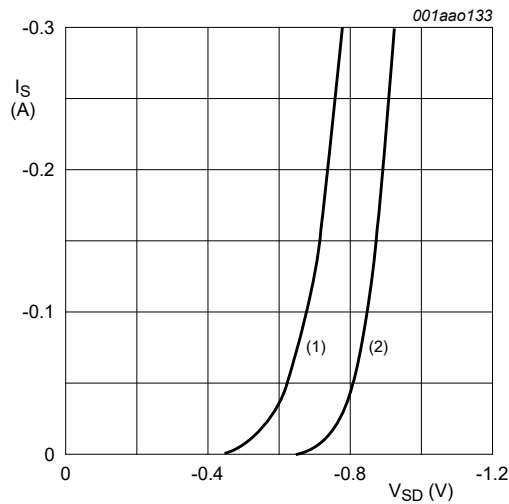


Fig. 17. Source current as a function of source-drain voltage; typical values

11. Test information

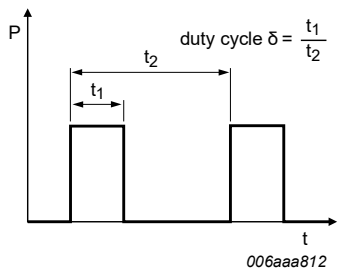


Fig. 18. Duty cycle definition

12. Package outline

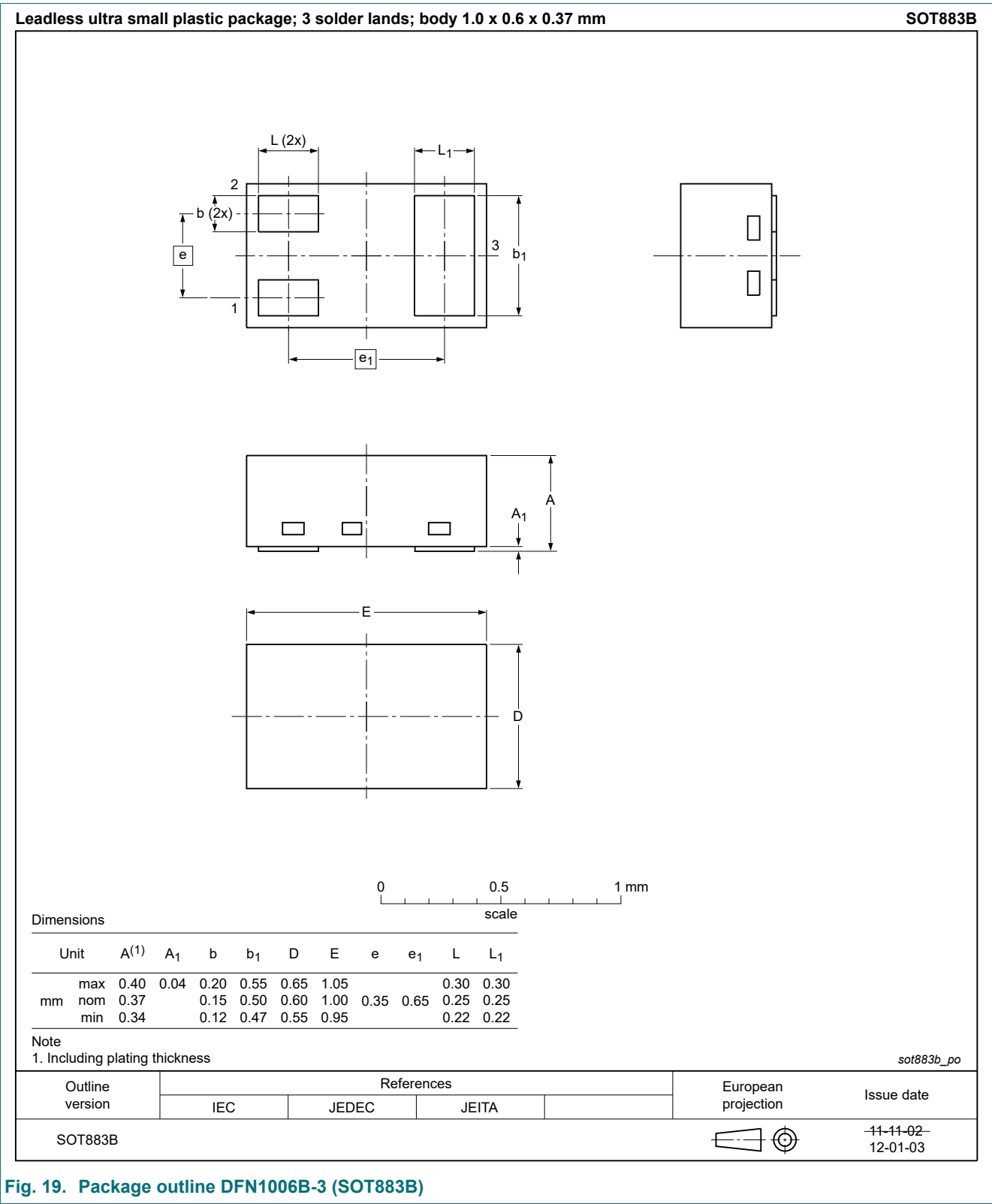


Fig. 19. Package outline DFN1006B-3 (SOT883B)

13. Soldering

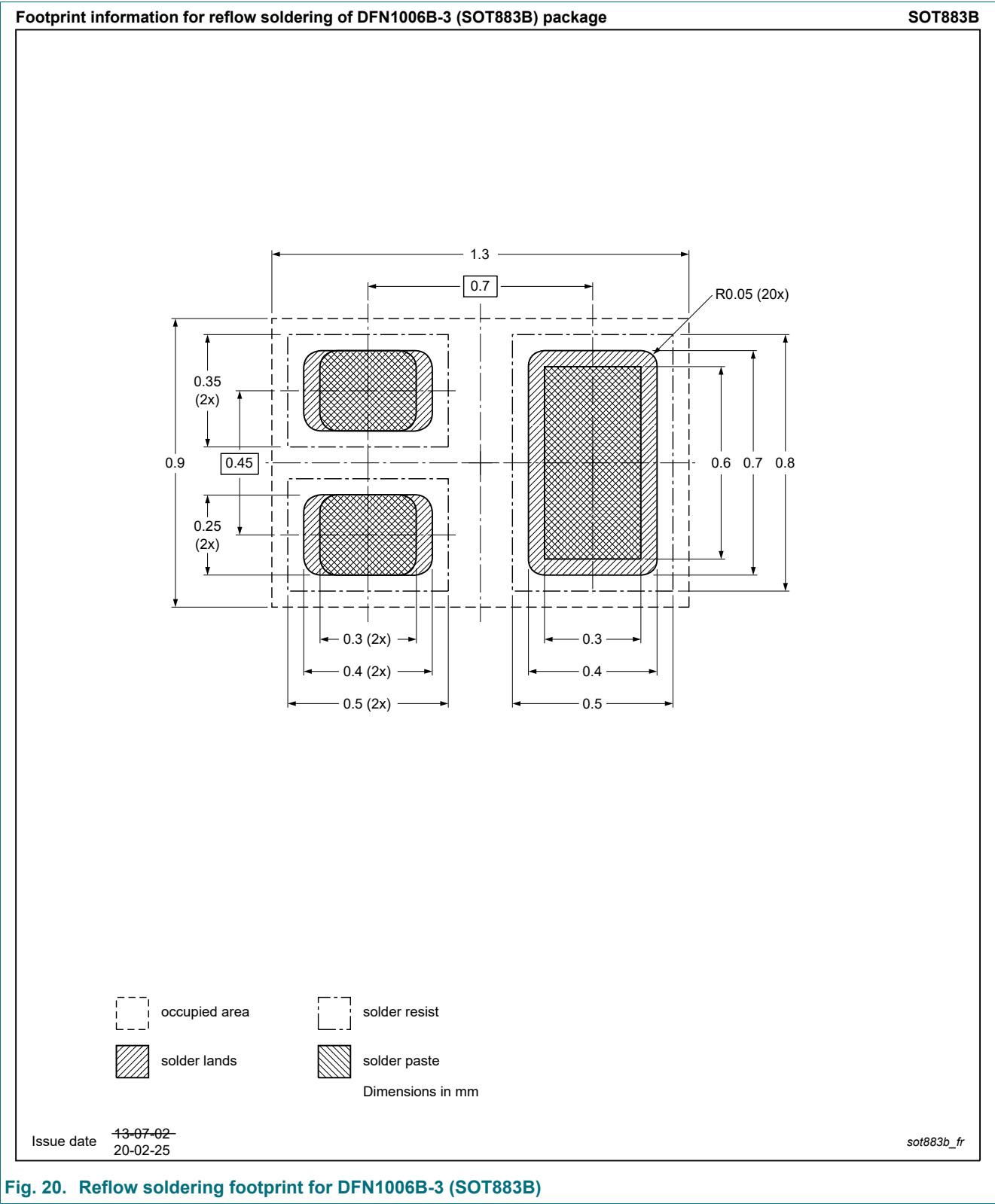


Fig. 20. Reflow soldering footprint for DFN1006B-3 (SOT883B)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BSS84AKMB v.2	20201027	Product data sheet	-	BSS84AKMB v.1
Modifications:	- The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. - Legal texts have been adapted to the new company name where appropriate.			
BSS84AKMB v.1	20120606	Product data sheet	-	-

15. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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