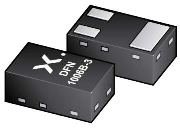


PMZB320UPE

30 V, P-channel Trench MOSFET

24 March 2015 — 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

- Trench MOSFET technology
- Low threshold voltage
- Very fast switching
- ElectroStatic Discharge (ESD) protection > 2 kV HBM
- Ultra thin package profile of 0.37 mm

3. Applications

- Relay driver
- High-speed line driver
- High-side loadswitch
- Switching circuits

4. Quick reference data

Table 1. Quick reference data

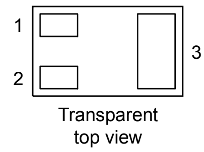
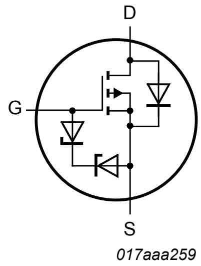
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DS}	drain-source voltage	T_j = 25 °C		-	-	-30	V
V_{GS}	gate-source voltage			-8	-	8	V
I_D	drain current	V_{GS} = -4.5 V; T_{amb} = 25 °C	[1]	-	-	-1	A
Static characteristics							
R_{DSon}	drain-source on-state resistance	V_{GS} = -4.5 V; I_D = -1 A; T_j = 25 °C		-	430	510	mΩ

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

nexperia

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	G	gate	 DFN1006B-3 (SOT883B)	
2	S	source		
3	D	drain		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMZB320UPE	DFN1006B-3	DFN1006B-3: leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.37 mm	SOT883B

7. Marking

Table 4. Marking codes

Type number	Marking code
PMZB320UPE	0101 0010

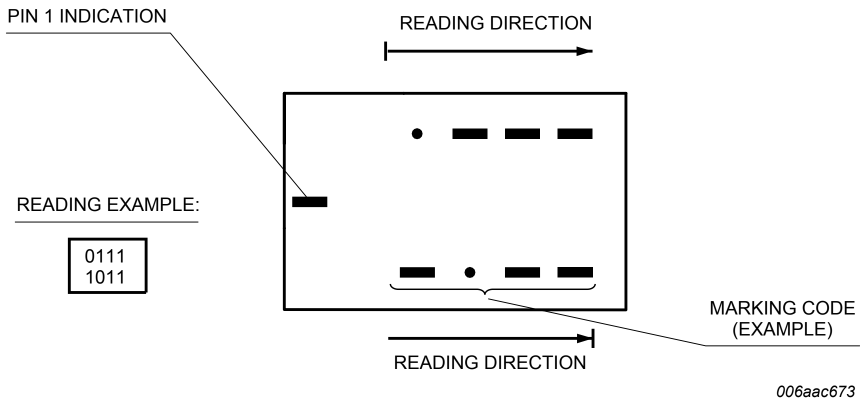


Fig. 1. DFN1006B-3 (SOT883B) binary marking code description

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		-	-30	V
V_{GS}	gate-source voltage			-8	8	V
I_D	drain current	V_{GS} = -4.5 V; T_{amb} = 25 °C	[1]	-	-1	A
		V_{GS} = -4.5 V; T_{amb} = 100 °C	[1]	-	-0.6	A
I_{DM}	peak drain current	T_{amb} = 25 °C; single pulse; t_p ≤ 10 µs		-	-4	A
P_{tot}	total power dissipation	T_{amb} = 25 °C	[2]	-	350	mW
			[1]	-	760	mW
		T_{sp} = 25 °C		-	6250	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]	-	-0.7	A

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

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

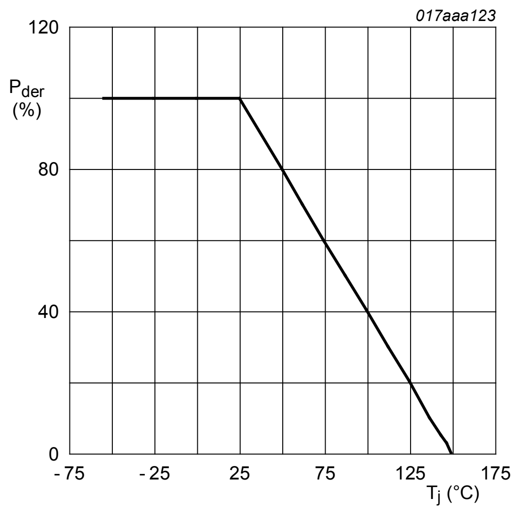


Fig. 2. Normalized total power dissipation as a function of junction temperature

$$P_{der} = \frac{P_{tot}}{P_{tot(25°C)}} \times 100\ \%$$

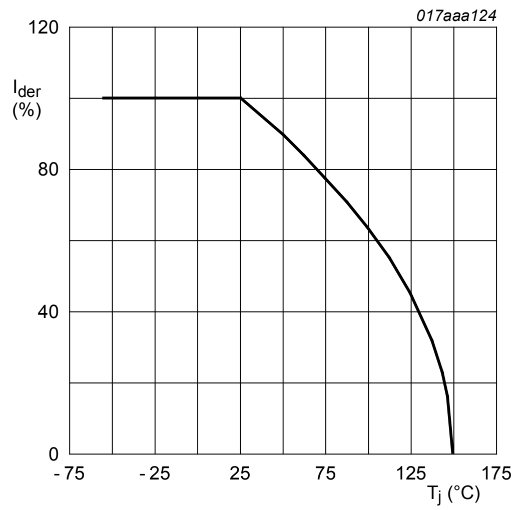


Fig. 3. Normalized continuous drain current as a function of junction temperature

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

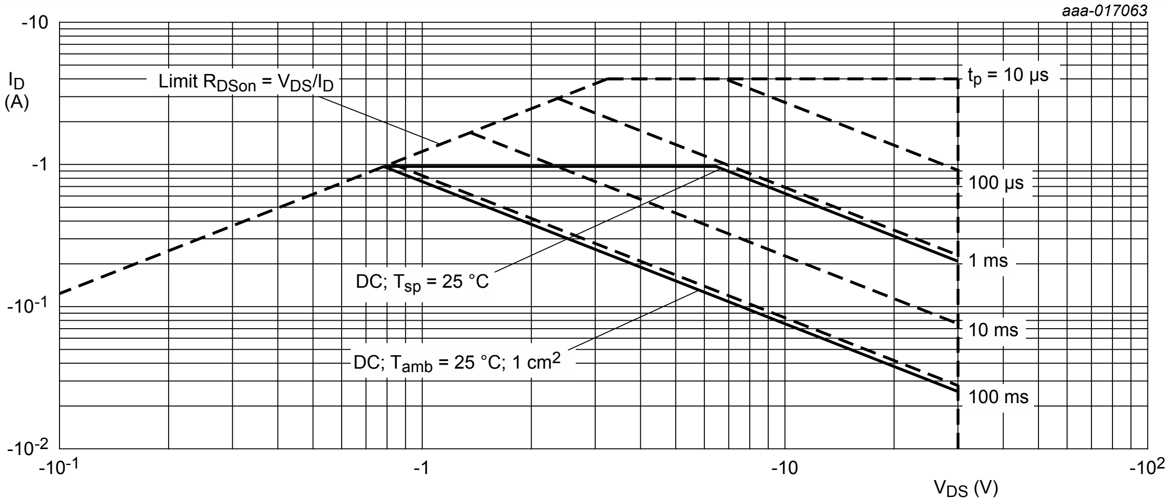


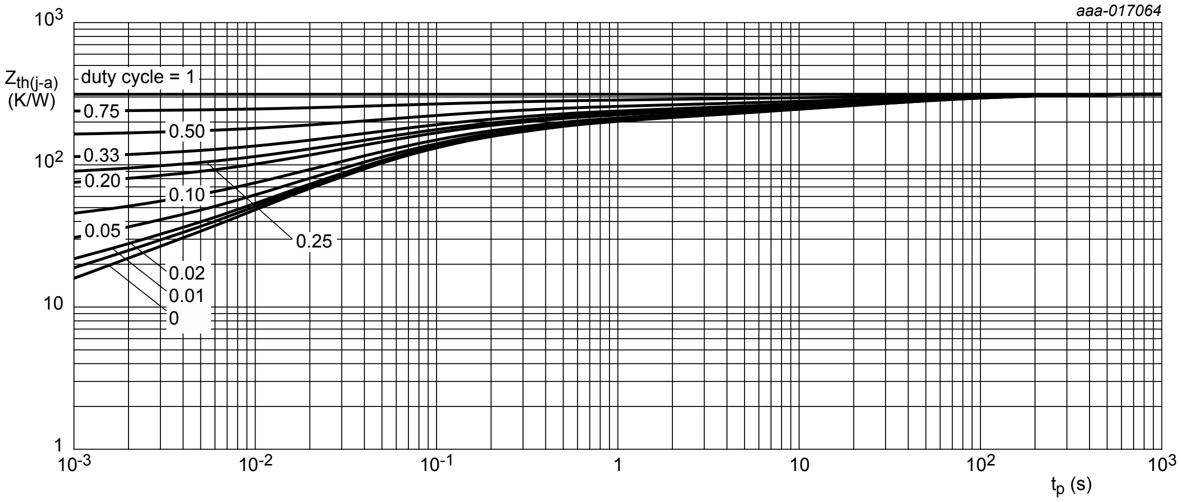
Fig. 4. Safe operating area; junction to ambient; continuous and peak drain currents as a function of drain-source voltage

9. Thermal characteristics

Table 6. Thermal characteristics

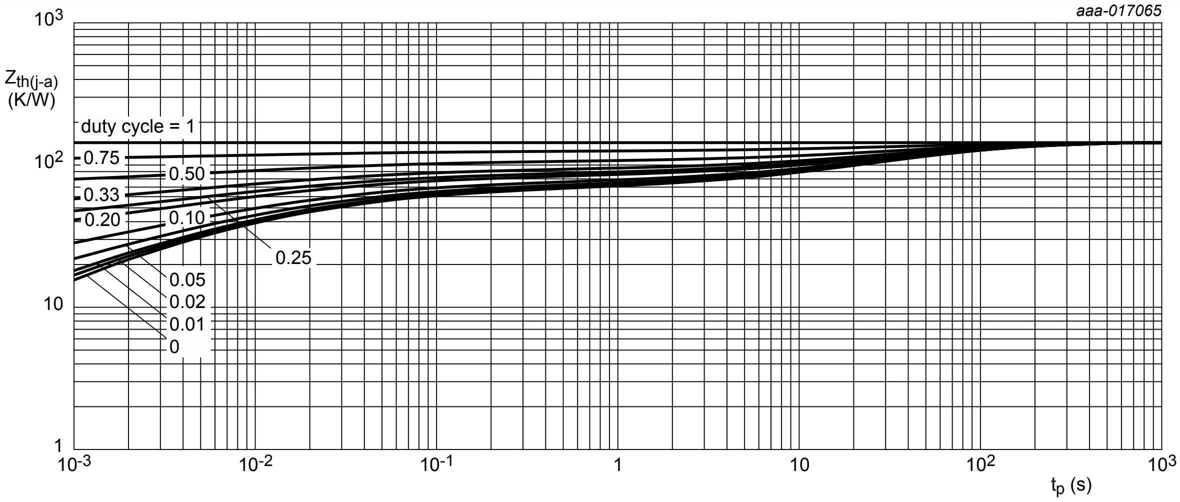
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	315	360	K/W
			[2]	-	145	165	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	17	20	K/W

[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 cm^2.



FR4 PCB, standard footprint

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



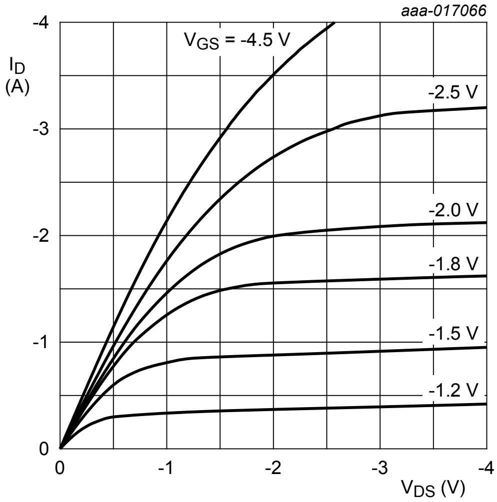
FR4 PCB, mounting pad for drain 1 cm^2

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

10. Characteristics

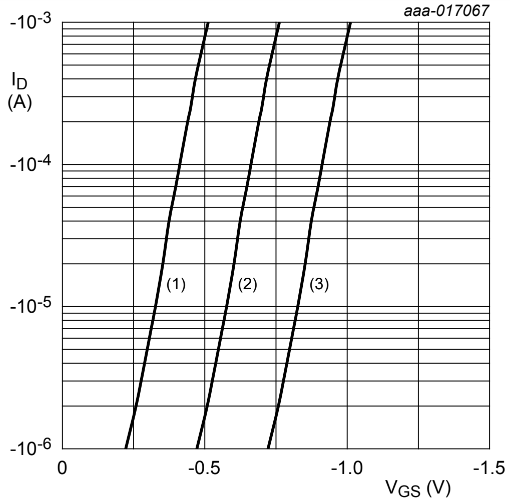
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
$V_{(BR)DSS}$	drain-source breakdown voltage	I_D = -250 µA; V_{GS} = 0 V; T_j = 25 °C		-30	-	-	V
V_{GSth}	gate-source threshold voltage	I_D = -250 µA; V_{DS} = V_{GS}; T_j = 25 °C		-0.45	-0.7	-0.95	V
I_{DSS}	drain leakage current	V_{DS} = -30 V; V_{GS} = 0 V; T_j = 25 °C		-	-	-1	µA
I_{GSS}	gate leakage current	V_{GS} = 8 V; V_{DS} = 0 V; T_j = 25 °C		-	-	5	µA
		V_{GS} = -8 V; V_{DS} = 0 V; T_j = 25 °C		-	-	-5	µA
		V_{GS} = 4.5 V; V_{DS} = 0 V; T_j = 25 °C		-	-	1	µA
		V_{GS} = -4.5 V; V_{DS} = 0 V; T_j = 25 °C		-	-	-1	µA
		V_{GS} = 2.5 V; V_{DS} = 0 V; T_j = 25 °C		-	-	100	nA
		V_{GS} = -2.5 V; V_{DS} = 0 V; T_j = 25 °C		-	-	-100	nA
R_{DSon}	drain-source on-state resistance	V_{GS} = -4.5 V; I_D = -1 A; T_j = 25 °C		-	430	510	mΩ
		V_{GS} = -4.5 V; I_D = -1 A; T_j = 150 °C		-	680	810	mΩ
		V_{GS} = -2.5 V; I_D = -0.8 A; T_j = 25 °C		-	570	770	mΩ
		V_{GS} = -1.8 V; I_D = -0.25 A; T_j = 25 °C		-	750	1140	mΩ
		V_{GS} = -1.5 V; I_D = -0.01 A; T_j = 25 °C		-	950	1610	mΩ
g_{fs}	forward transconductance	V_{DS} = -10 V; I_D = -1 A; T_j = 25 °C		-	2.1	-	S
Dynamic characteristics							
$Q_{G(tot)}$	total gate charge	V_{DS} = -15 V; I_D = -1 A; V_{GS} = -4.5 V; T_j = 25 °C		-	1.4	-	nC
Q_{GS}	gate-source charge			-	0.2	-	nC
Q_{GD}	gate-drain charge			-	0.3	-	nC
C_{iss}	input capacitance	V_{DS} = -15 V; f = 1 MHz; V_{GS} = 0 V; T_j = 25 °C		-	122	-	pF
C_{oss}	output capacitance			-	11	-	pF
C_{rss}	reverse transfer capacitance			-	9	-	pF
$t_{d(on)}$	turn-on delay time	V_{DS} = -15 V; I_D = -1 A; V_{GS} = -4.5 V; $R_{G(ext)}$ = 6 Ω; T_j = 25 °C		-	3	-	ns
t_r	rise time			-	6	-	ns
$t_{d(off)}$	turn-off delay time			-	22	-	ns
t_f	fall time			-	5	-	ns
Source-drain diode							
V_{SD}	source-drain voltage	I_S = -0.7 A; V_{GS} = 0 V; T_j = 25 °C		-	-1	-1.2	V



T_j = 25 °C

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



V_{DS} = -5 V

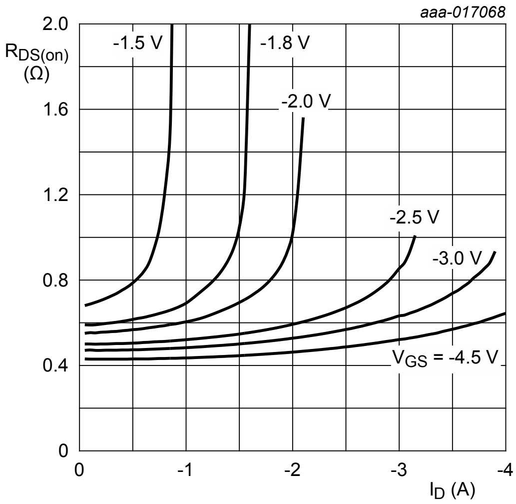
T_j = 25 °C

(1) minimum values

(2) typical values

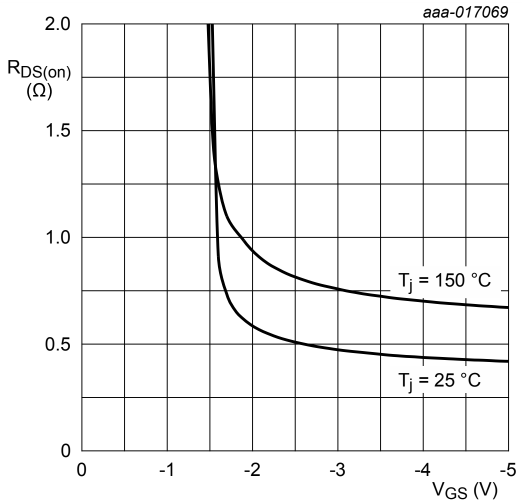
(3) maximum values

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



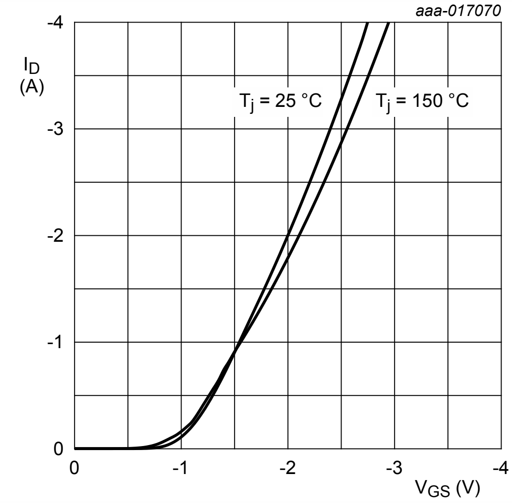
T_j = 25 °C

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



I_D = -1.7 A

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



$V_{DS} > I_D \times R_{DSon}$

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

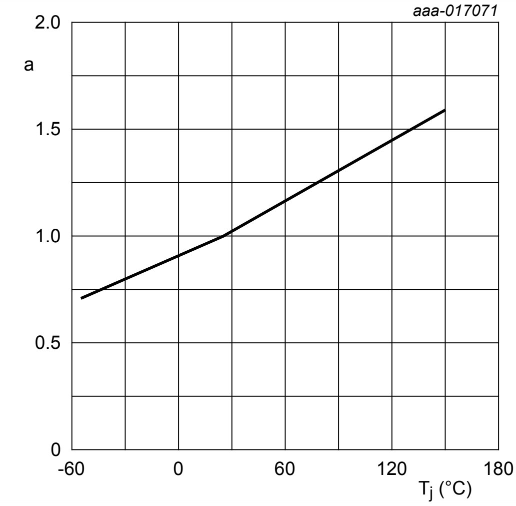
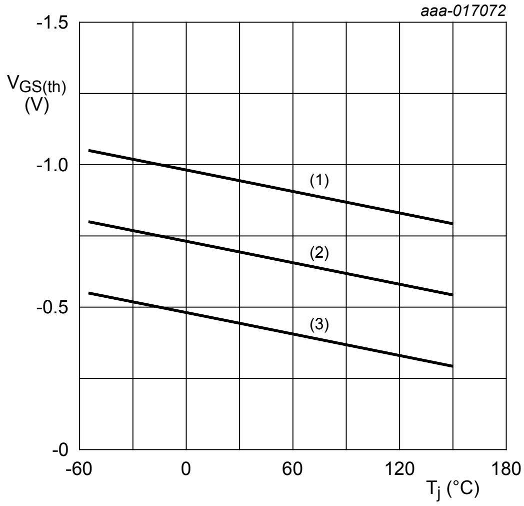


Fig. 12. Normalized drain-source on-state resistance as a function of ambient temperature; typical values

$$a = \frac{R_{DSon}}{R_{DSon(25°C)}}$$



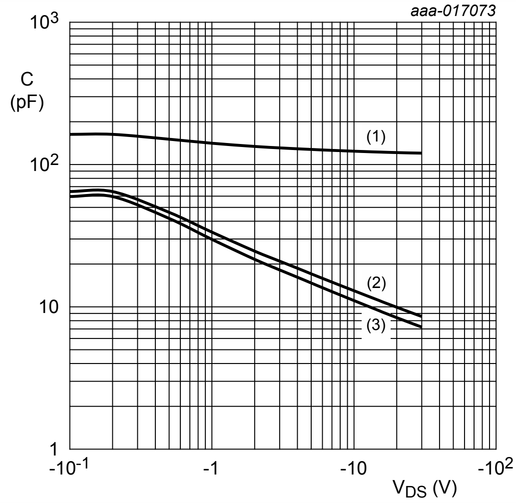
I_D = -250 µA; $V_{DS} = V_{GS}$

(1) maximum values

(2) typical values

(3) maximum values

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



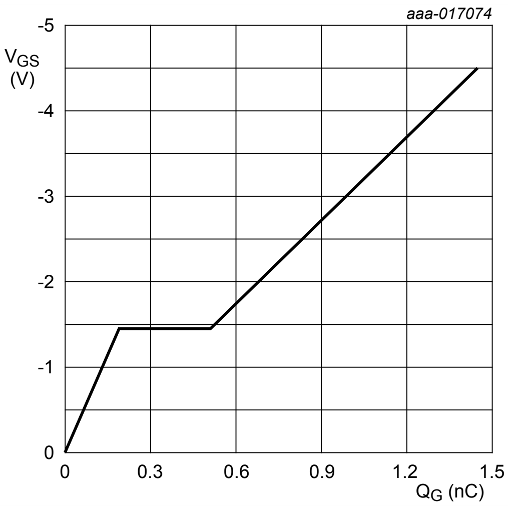
f = 1 MHz; V_{GS} = 0 V

(1) C_{iss}

(2) C_{oss}

(3) C_{rss}

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



V_{DS} = -15 V; I_D = -1 A; T_{amb} = 25 °C

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

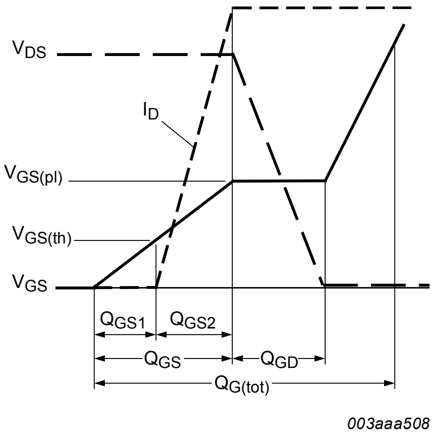
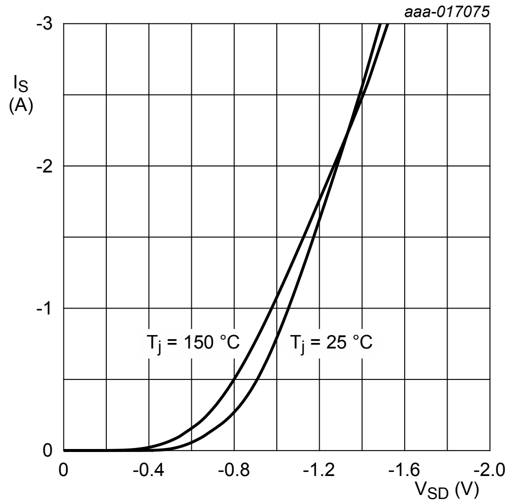


Fig. 16. Gate charge waveform definitions



V_{GS} = 0 V

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

11. Test information

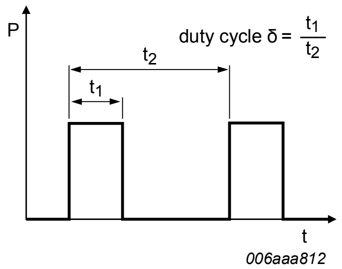
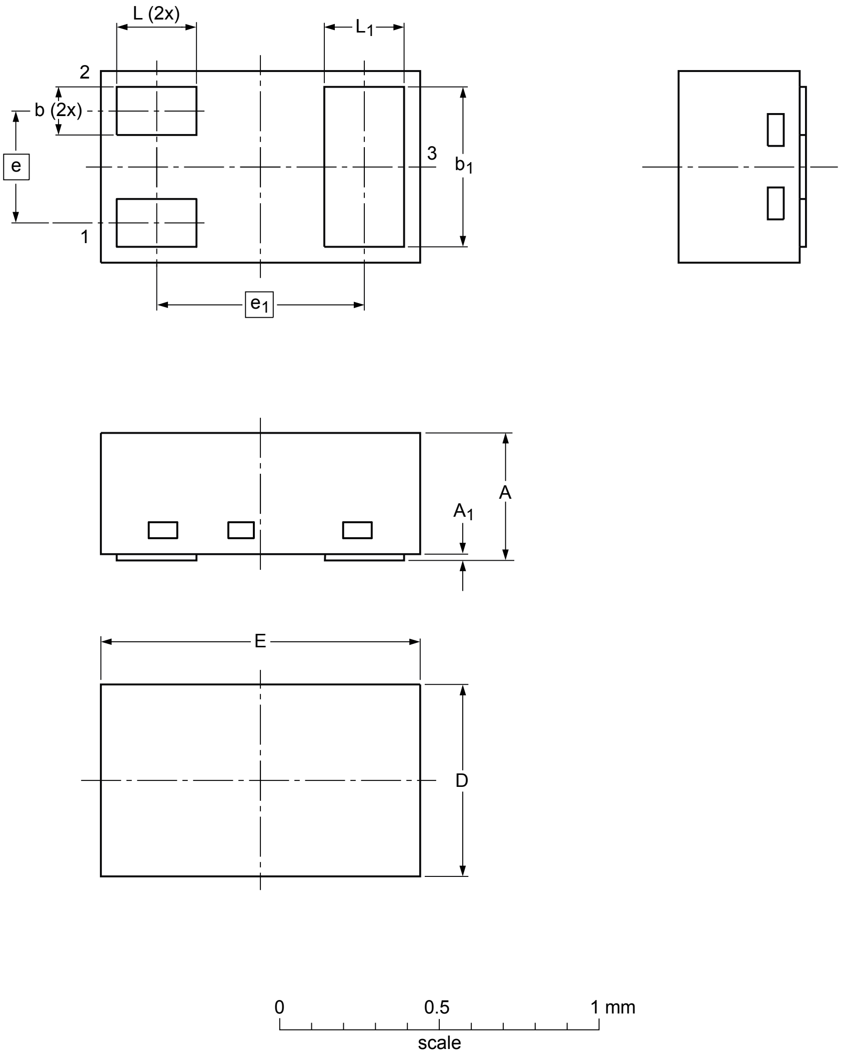


Fig. 18. Duty cycle definition

12. Package outline

Leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.37 mm **SOT883B**



Dimensions

Unit		$A^{(1)}$	A_1	b	b_1	D	E	e	e_1	L	L_1
mm	max	0.40	0.04	0.20	0.55	0.65	1.05			0.30	0.30
	nom	0.37		0.15	0.50	0.60	1.00	0.35	0.65	0.25	0.25
	min	0.34		0.12	0.47	0.55	0.95			0.22	0.22

Note
1. Including plating thickness

sot883b_po

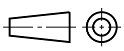
Outline version	References: IEC	References: JEDEC	References: JEITA		European projection	Issue date
SOT883B						~~11-11-02~~ 12-01-03

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

13. Soldering

Footprint information for reflow soldering **SOT883B**

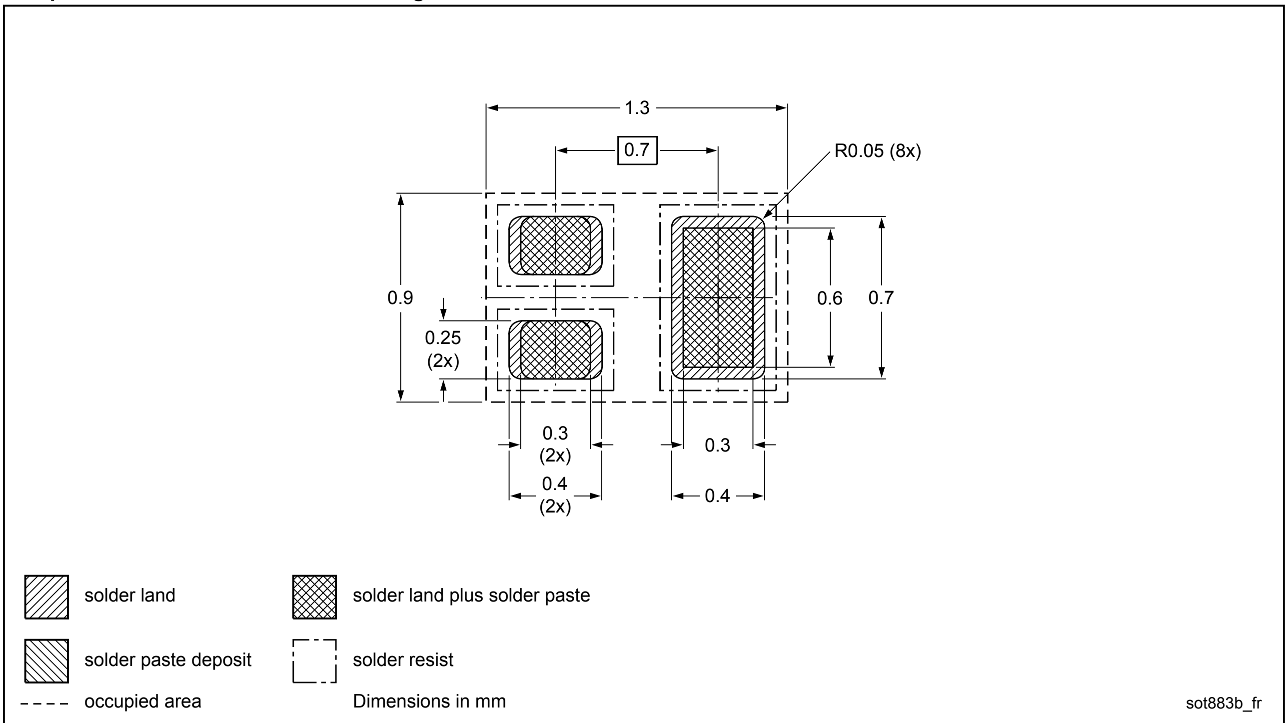


Fig. 20. Reflow soldering footprint for DFN1006B-3 (SOT883B)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMZB320UPE v.1	20150324	Product data sheet	-	-

15. Legal information

15.1 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".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nexperia.com.

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16. Contents

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Date of release: 24 March 2015