



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

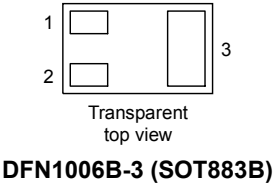
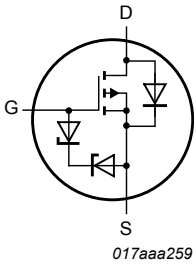
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$T_J = 25\text{ }^{\circ}\text{C}$		-	-	-30	V
V_{GS}	gate-source voltage			-8	-	8	V
I_D	drain current	$V_{GS} = -4.5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	-1	A
Static characteristics							
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = -4.5\text{ V}; I_D = -1\text{ A}; T_J = 25\text{ }^{\circ}\text{C}$		-	430	510	m Ω

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

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

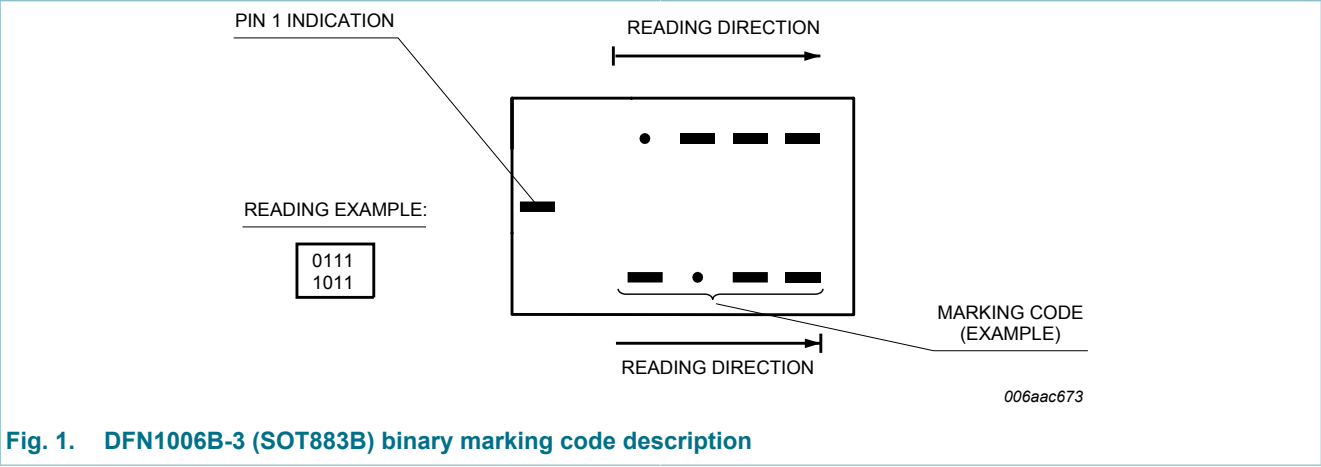
Table 3. Ordering information

Type number	Package		
	Name	Description	Version
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



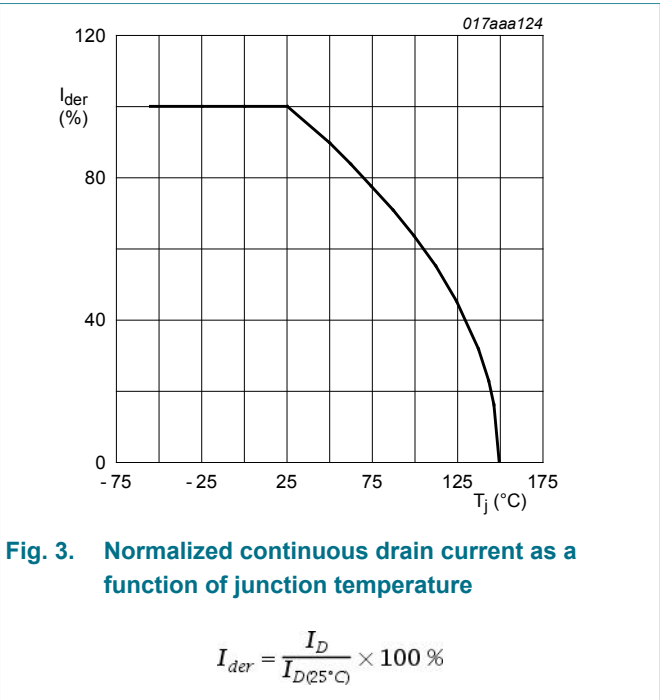
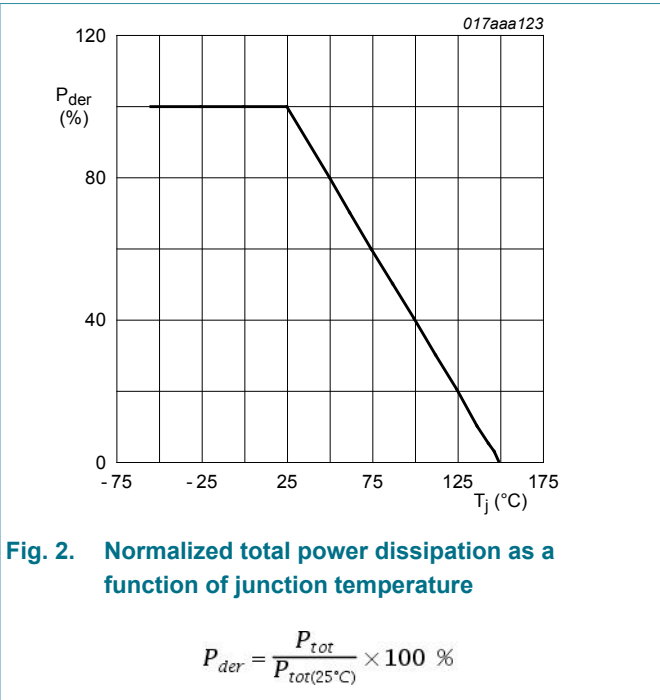
8. Limiting values

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 cm².
- [2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.



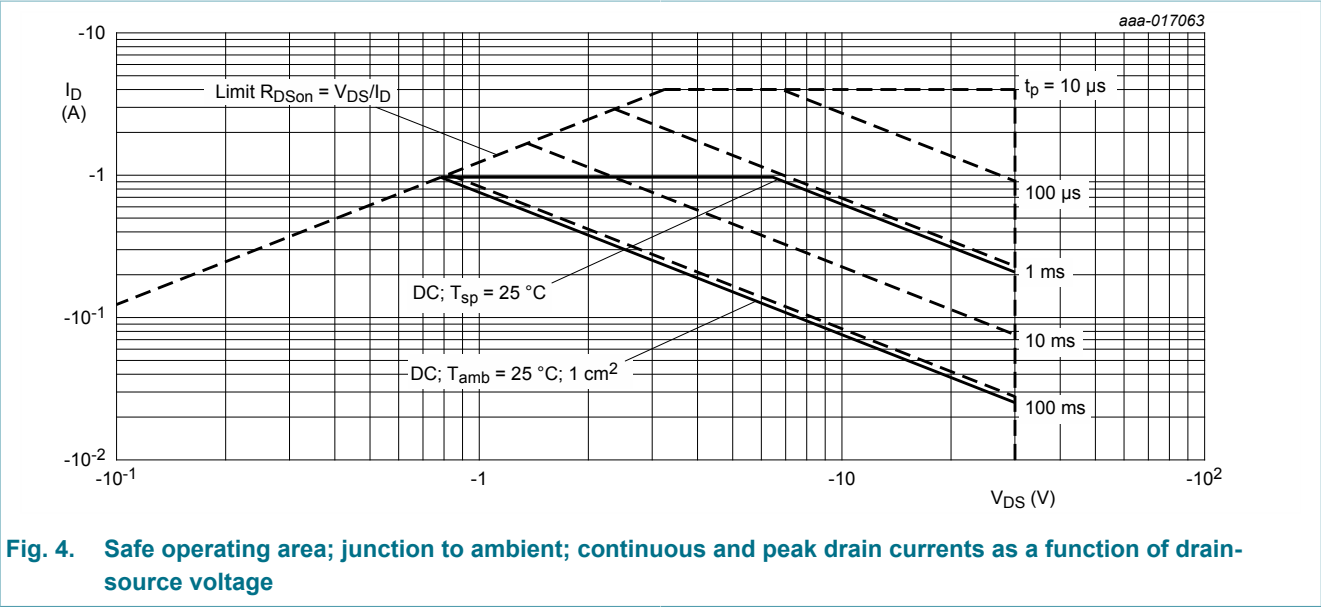


Fig. 4. Safe operating area; junction to ambient; continuous and peak drain currents as a function of drain-source voltage

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 $1\ \text{cm}^2$.

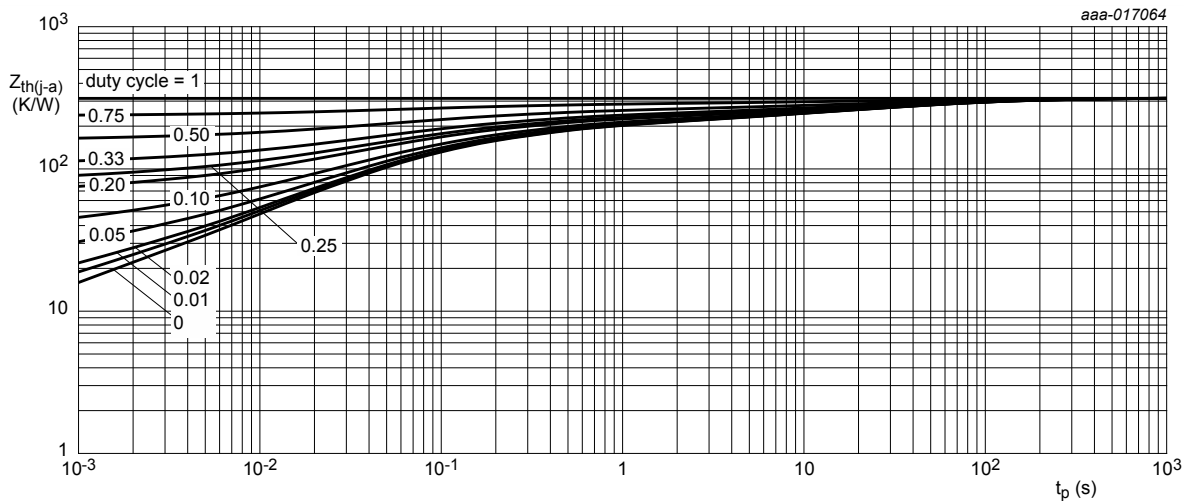


Fig. 5. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

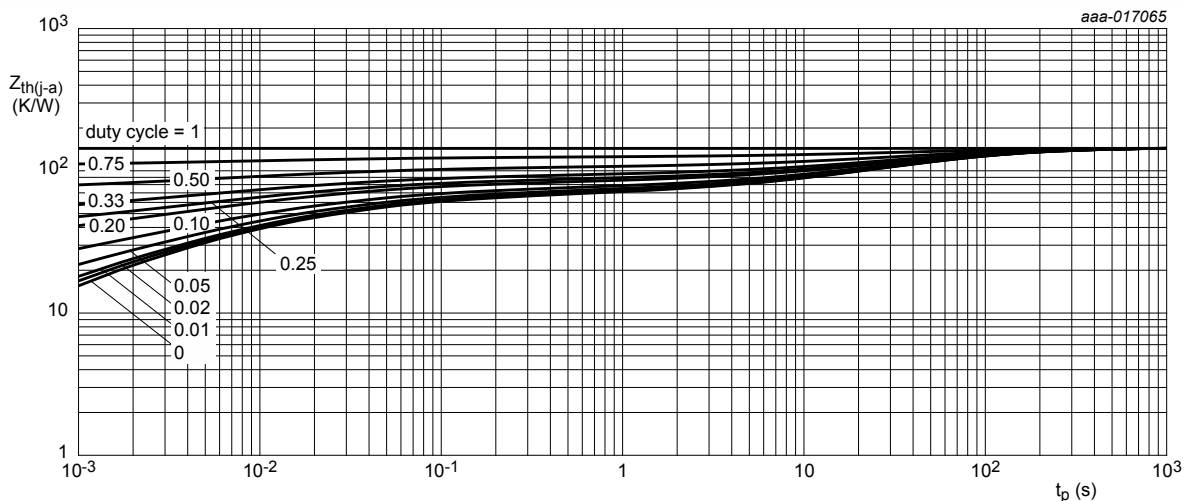


Fig. 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V _{(BR)DSS}	drain-source breakdown voltage	I _D = -250 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

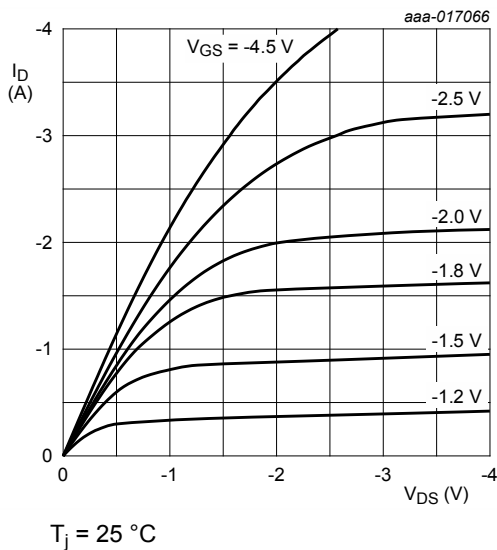


Fig. 7. Output characteristics: drain current as a function of drain-source voltage; typical values

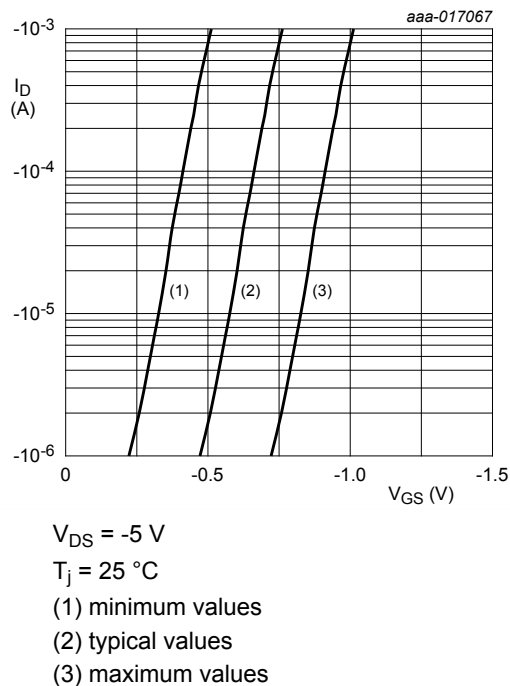


Fig. 8. Sub-threshold drain current as a function of gate-source voltage

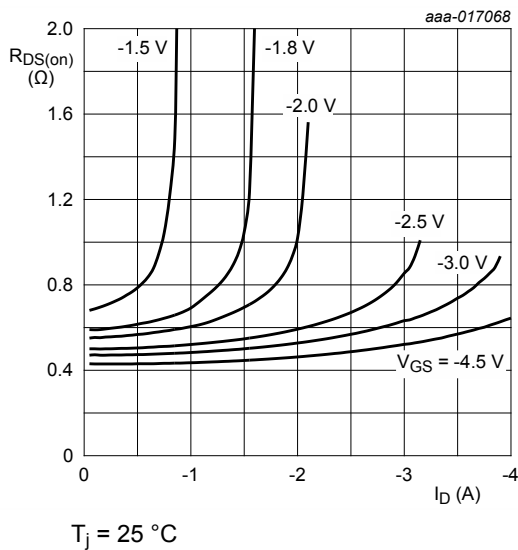


Fig. 9. Drain-source on-state resistance as a function of drain current; typical values

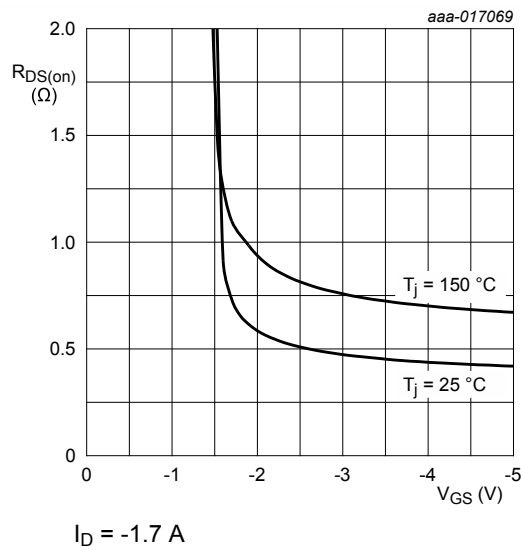


Fig. 10. Drain-source on-state resistance as a function of gate-source voltage; typical values

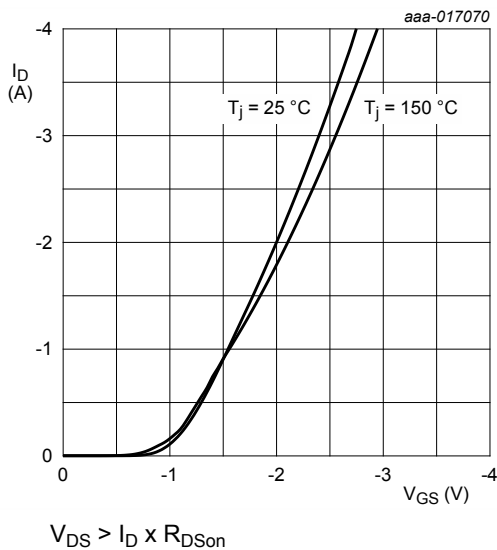


Fig. 11. Transfer characteristics: drain current as a function of gate-source voltage; typical values

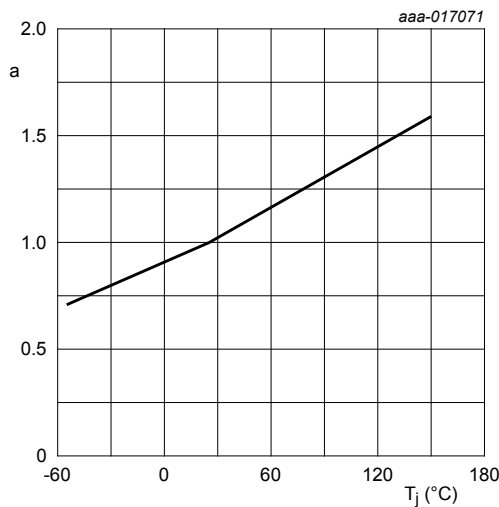
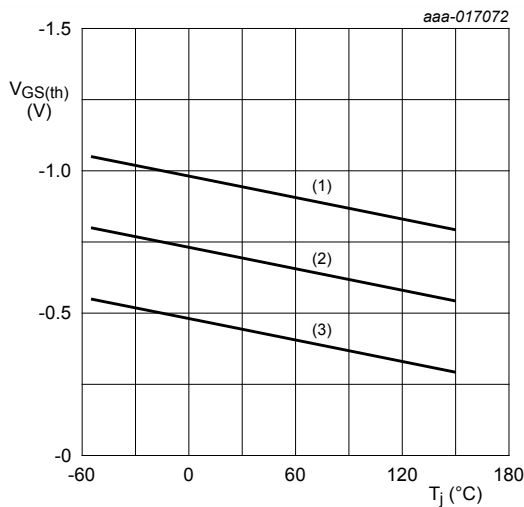


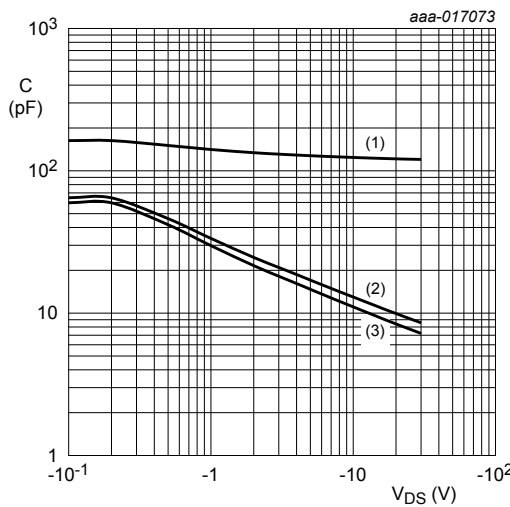
Fig. 12. Normalized drain-source on-state resistance as a function of ambient temperature; typical values

$$a = \frac{R_{DSon}}{R_{DSon(25^{\circ}\text{C})}}$$



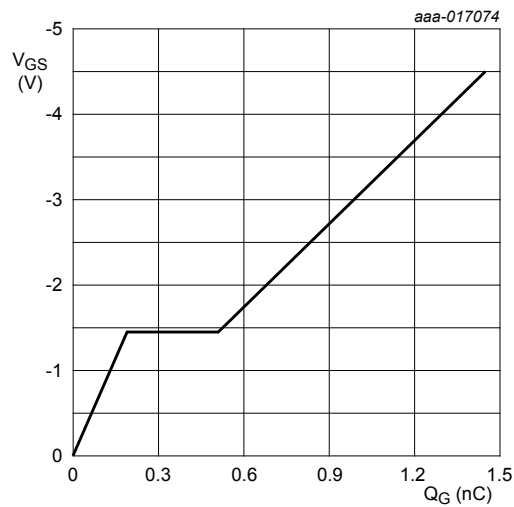
$I_D = -250\text{ }\mu\text{A}$; $V_{DS} = V_{GS}$
(1) maximum values
(2) typical values
(3) maximum values

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



$f = 1\text{ MHz}$; $V_{GS} = 0\text{ V}$
(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



$V_{DS} = -15\text{ V}; I_D = -1\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$

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

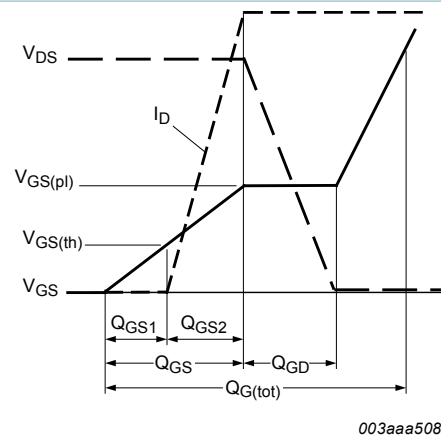
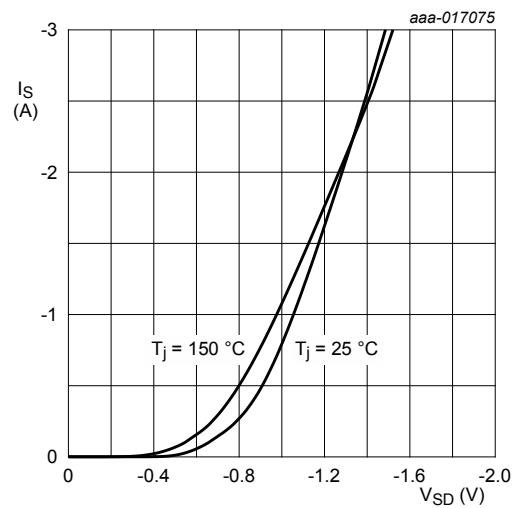


Fig. 16. Gate charge waveform definitions



$V_{GS} = 0\text{ V}$

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

11. Test information

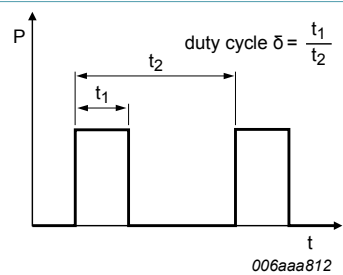


Fig. 18. Duty cycle definition

12. Package outline

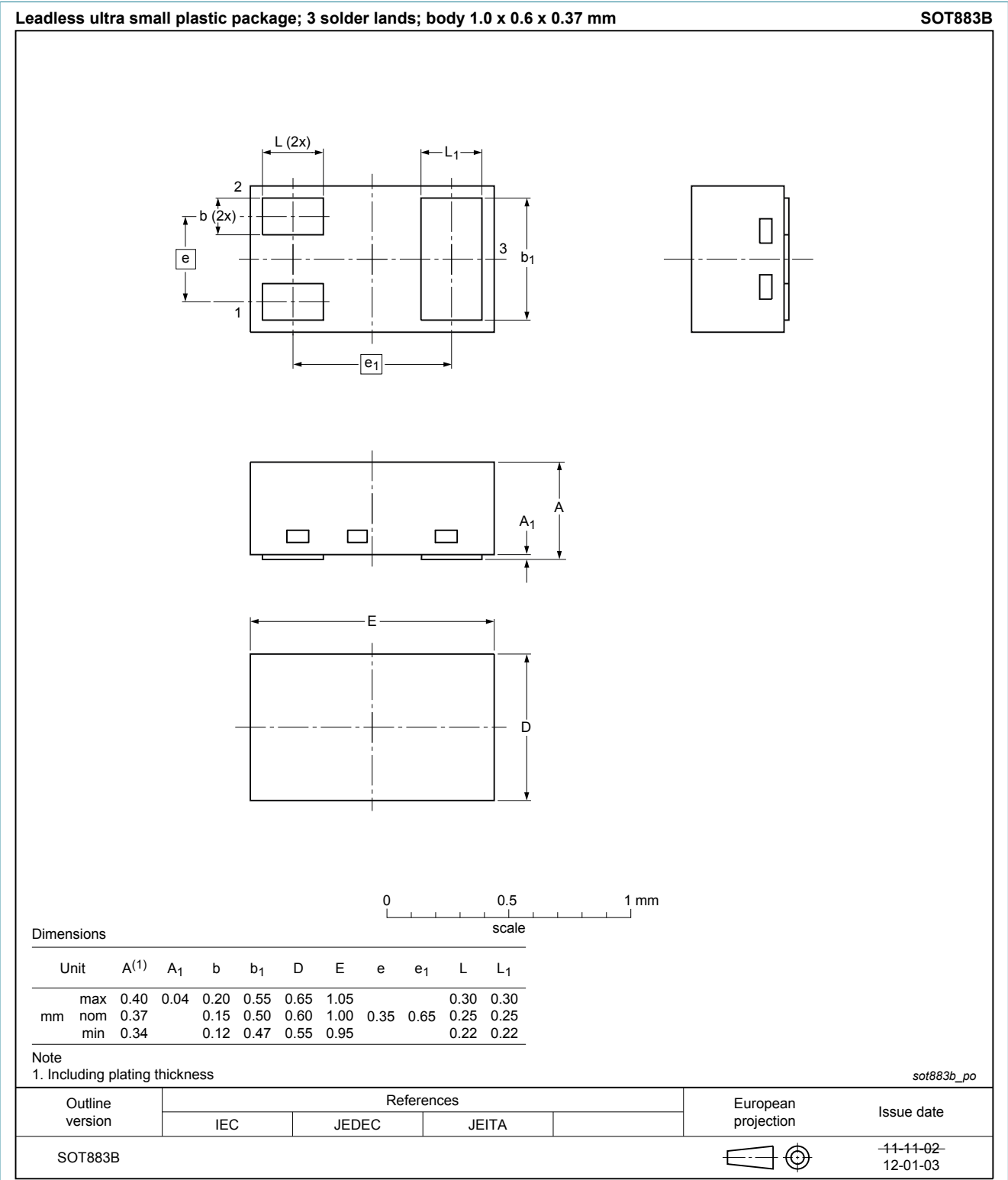


Fig. 19. Package outline DFN1006B-3 (SOT883B)

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.

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