



PMDXB600UNE

20 V, dual N-channel Trench MOSFET

1 July 2015

Product data sheet

1. General description

Dual N-channel enhancement mode Field-Effect Transistor (FET) in a leadless ultra small DFN1010B-6 (SOT1216) Surface-Mounted Device (SMD) plastic package using Trench MOSFET technology.

2. Features and benefits

- Trench MOSFET technology
- Leadless ultra small and ultra thin SMD plastic package: $1.1 \times 1.0 \times 0.37$ mm
- Exposed drain pad for excellent thermal conduction
- ElectroStatic Discharge (ESD) protection > 1 kV HBM
- Drain-source on-state resistance $R_{DSon} = 470$ m Ω

3. Applications

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

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor							
V_{DS}	drain-source voltage	$T_j = 25$ °C		-	-	20	V
V_{GS}	gate-source voltage			-8	-	8	V
I_D	drain current	$V_{GS} = 4.5$ V; $T_{amb} = 25$ °C	[1]	-	-	600	mA
Static characteristics (per transistor)							
R_{DSon}	drain-source on-state resistance	$V_{GS} = 4.5$ V; $I_D = 600$ mA; $T_j = 25$ °C		-	470	620	m Ω

[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	S1	source TR1		
2	G1	gate TR1		
3	D2	drain TR2		
4	S2	source TR2		
5	G2	gate TR2		
6	D1	drain TR1		
7	D1	drain TR1		
8	D2	drain TR2		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMDXB600UNE	DFN1010B-6	DFN1010B-6: plastic thermal enhanced ultra thin small outline package; no leads; 6 terminals	SOT1216

7. Marking

Table 4. Marking codes

Type number	Marking code
PMDXB600UNE	00 10 00

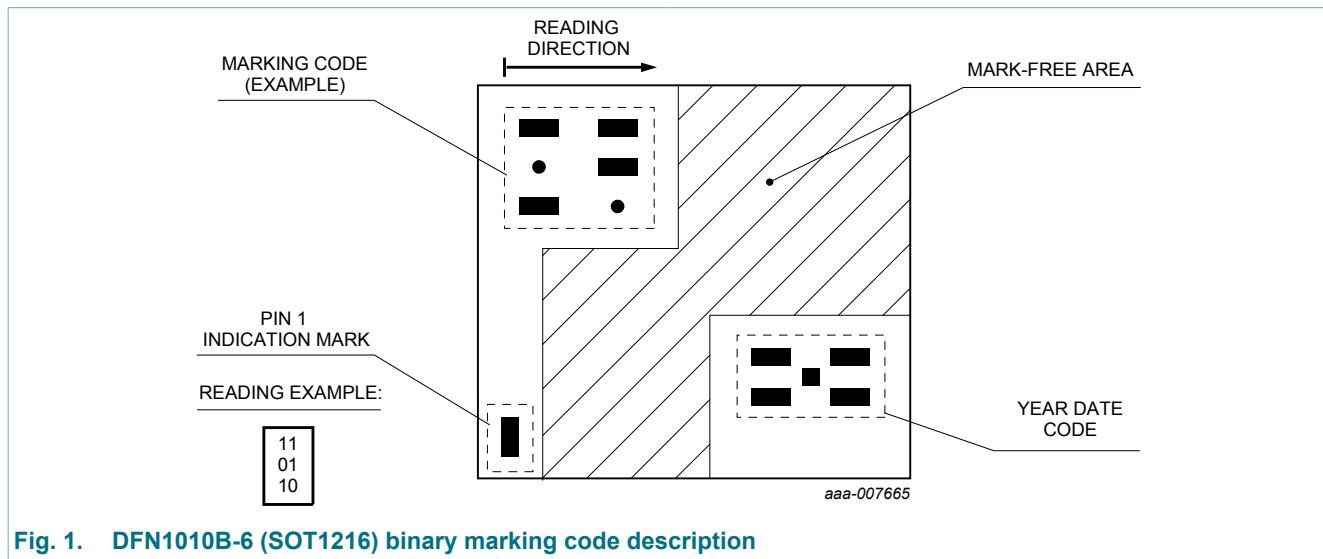


Fig. 1. DFN1010B-6 (SOT1216) binary marking code description

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per transistor						
V_{DS}	drain-source voltage	$T_j = 25^\circ\text{C}$		-	20	V
V_{GS}	gate-source voltage			-8	8	V
I_D	drain current	$V_{GS} = 4.5\text{ V}; T_{amb} = 25^\circ\text{C}$	[1]	-	600	mA
		$V_{GS} = 4.5\text{ V}; T_{amb} = 100^\circ\text{C}$	[1]	-	400	mA
I_{DM}	peak drain current	$T_{amb} = 25^\circ\text{C}$; single pulse; $t_p \leq 10\text{ }\mu\text{s}$		-	2.5	A
P_{tot}	total power dissipation	$T_{amb} = 25^\circ\text{C}$	[2]	-	265	mW
			[1]	-	380	mW
		$T_{sp} = 25^\circ\text{C}$		-	4025	mW
Source-drain diode						
I_S	source current	$T_{amb} = 25^\circ\text{C}$	[1]	-	0.4	A
Per device						
T_j	junction temperature			-55	150	°C
T_{amb}	ambient temperature			-55	150	°C
T_{stg}	storage temperature			-65	150	°C

[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.

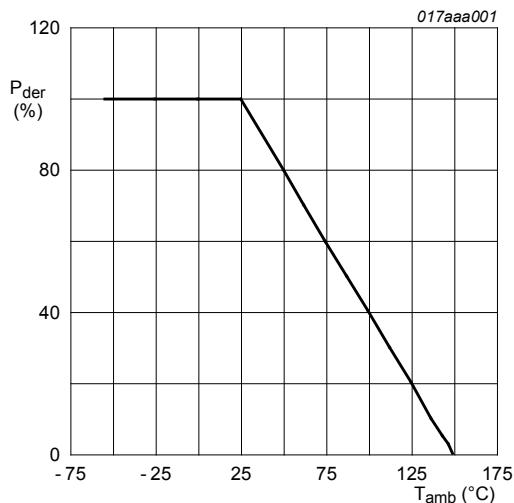


Fig. 2. Normalized total power dissipation as a function of ambient temperature

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

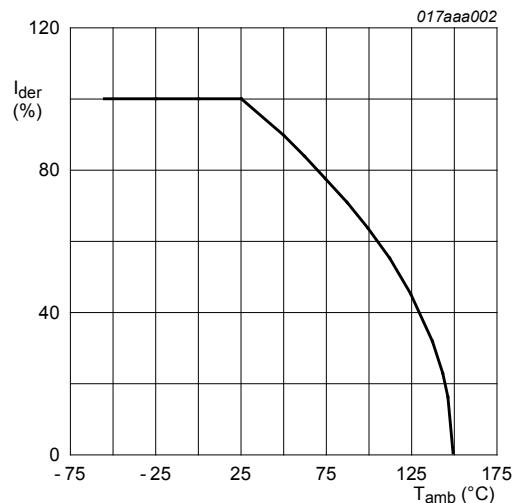


Fig. 3. Normalized continuous drain current as a function of ambient temperature

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

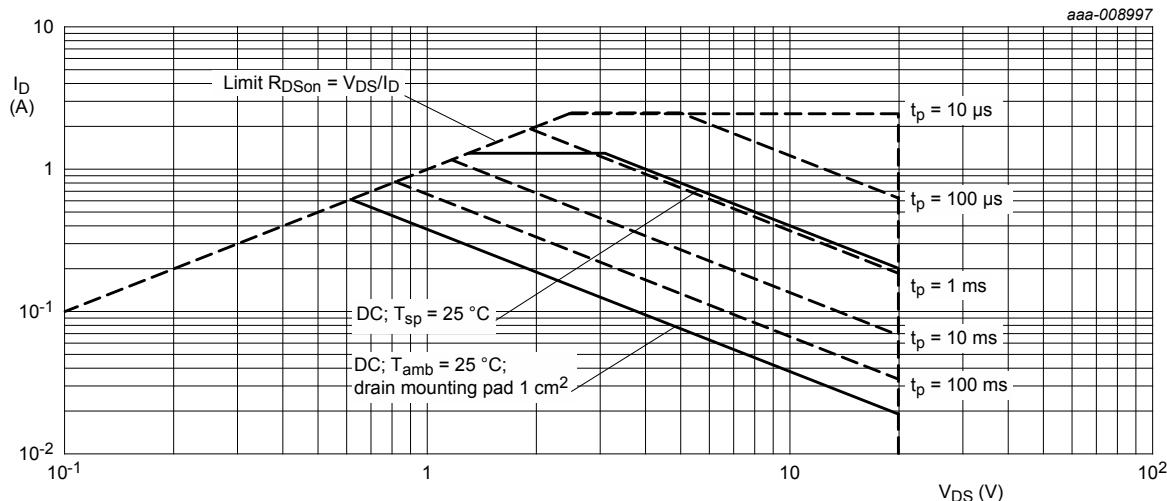


Fig. 4. Safe operating area; junction to ambient; continuous and peak drain currents as a function of drain-source voltage

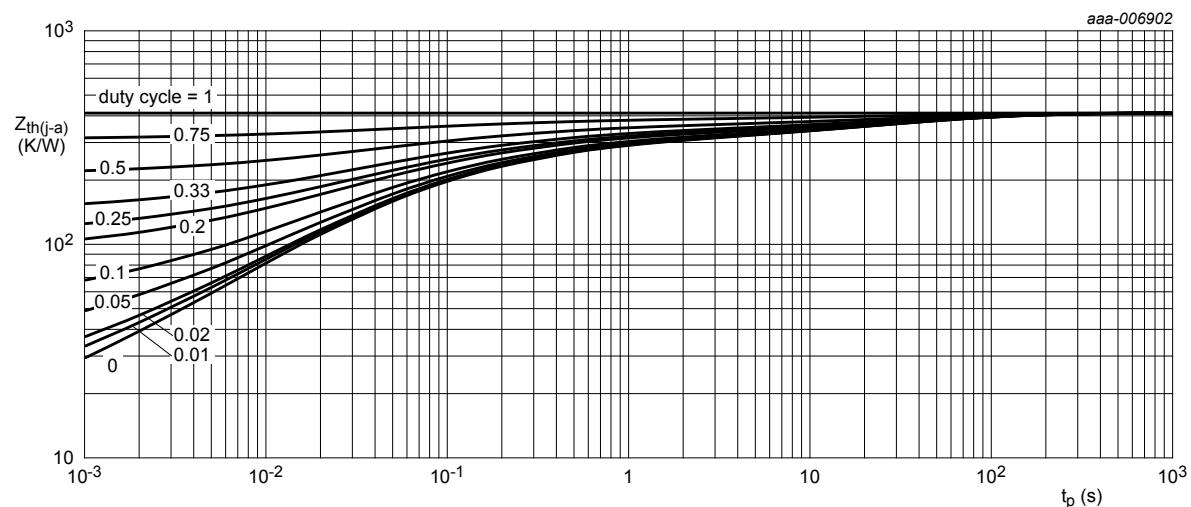
9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	410	475	K/W
			[2]	-	285	330	K/W

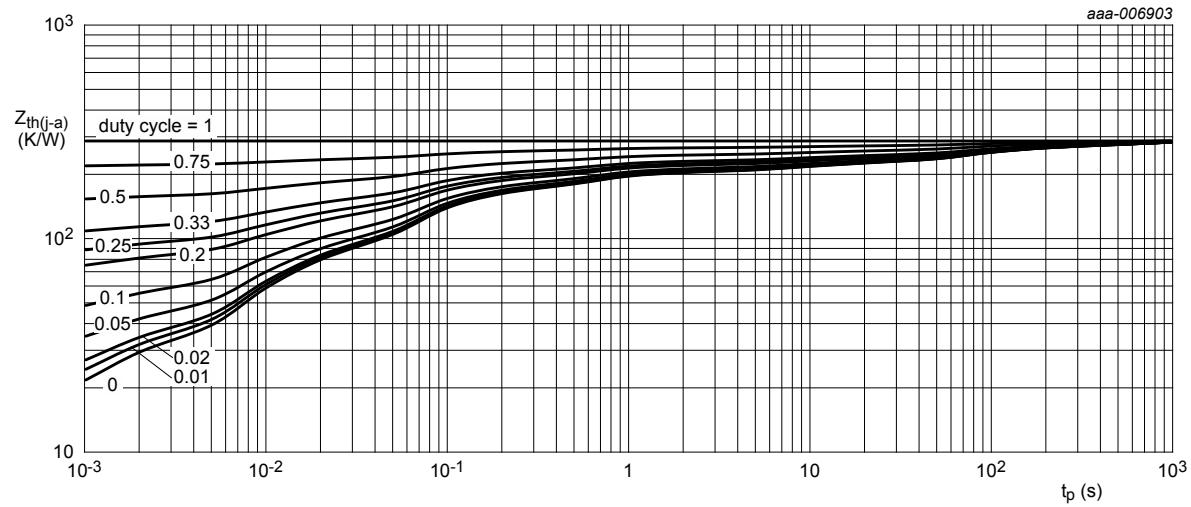
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	27	31	K/W

[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.



FR4 PCB, standard footprint

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



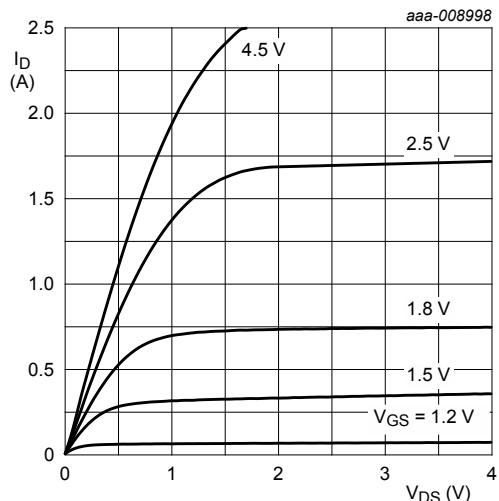
FR4 PCB, mounting pad for drain 1 cm²

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

10. Characteristics

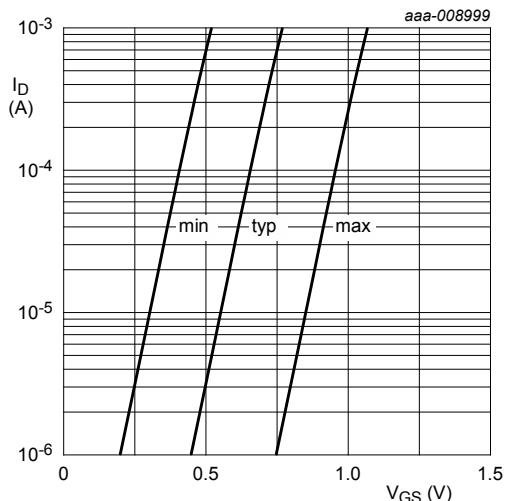
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics (per transistor)							
$V_{(BR)DSS}$	drain-source breakdown voltage	$I_D = 250 \mu A$; $V_{GS} = 0 V$; $T_j = 25^\circ C$		20	-	-	V
V_{GSth}	gate-source threshold voltage	$I_D = 250 \mu A$; $V_{DS} = V_{GS}$; $T_j = 25^\circ C$		0.45	0.7	0.95	V
I_{DSS}	drain leakage current	$V_{DS} = 20 V$; $V_{GS} = 0 V$; $T_j = 25^\circ C$		-	-	1	μA
I_{GSS}	gate leakage current	$V_{GS} = 8 V$; $V_{DS} = 0 V$; $T_j = 25^\circ C$		-	-	10	μA
		$V_{GS} = -8 V$; $V_{DS} = 0 V$; $T_j = 25^\circ C$		-	-	-10	μA
		$V_{GS} = 4.5 V$; $V_{DS} = 0 V$; $T_j = 25^\circ C$		-	-	1	μA
		$V_{GS} = -4.5 V$; $V_{DS} = 0 V$; $T_j = 25^\circ C$		-	-	-1	μA
R_{DSon}	drain-source on-state resistance	$V_{GS} = 4.5 V$; $I_D = 600 mA$; $T_j = 25^\circ C$		-	470	620	$m\Omega$
		$V_{GS} = 4.5 V$; $I_D = 600 mA$; $T_j = 150^\circ C$		-	760	1000	$m\Omega$
		$V_{GS} = 2.5 V$; $I_D = 500 mA$; $T_j = 25^\circ C$		-	620	850	$m\Omega$
		$V_{GS} = 1.8 V$; $I_D = 100 mA$; $T_j = 25^\circ C$		-	845	1300	$m\Omega$
		$V_{GS} = 1.5 V$; $I_D = 10 mA$; $T_j = 25^\circ C$		-	1125	3000	$m\Omega$
		$V_{GS} = 1.2 V$; $I_D = 1 mA$; $T_j = 25^\circ C$		-	2210	-	$m\Omega$
g_{fs}	forward transconductance	$V_{DS} = 5 V$; $I_D = 0.6 A$; $T_j = 25^\circ C$		-	1	-	S
Dynamic characteristics (per transistor)							
$Q_{G(tot)}$	total gate charge	$V_{DS} = 10 V$; $I_D = 600 mA$; $V_{GS} = 4.5 V$; $T_j = 25^\circ C$		-	0.4	0.7	nC
Q_{GS}	gate-source charge			-	0.1	-	nC
Q_{GD}	gate-drain charge			-	0.1	-	nC
C_{iss}	input capacitance	$V_{DS} = 10 V$; $f = 1 MHz$; $V_{GS} = 0 V$; $T_j = 25^\circ C$		-	21.3	-	pF
C_{oss}	output capacitance			-	5.4	-	pF
C_{rss}	reverse transfer capacitance			-	4.2	-	pF
$t_{d(on)}$	turn-on delay time	$V_{DS} = 10 V$; $I_D = 600 mA$; $V_{GS} = 4.5 V$; $R_{G(ext)} = 6 \Omega$; $T_j = 25^\circ C$		-	5.6	-	ns
t_r	rise time			-	9.2	-	ns
$t_{d(off)}$	turn-off delay time			-	19	-	ns
t_f	fall time			-	51	-	ns
Source-drain diode (per transistor)							
V_{SD}	source-drain voltage	$I_S = 0.36 A$; $V_{GS} = 0 V$; $T_j = 25^\circ C$		-	0.8	1.2	V



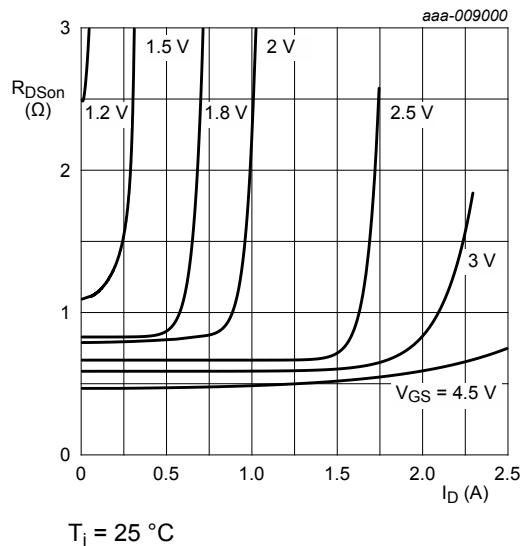
$T_j = 25^\circ\text{C}$

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



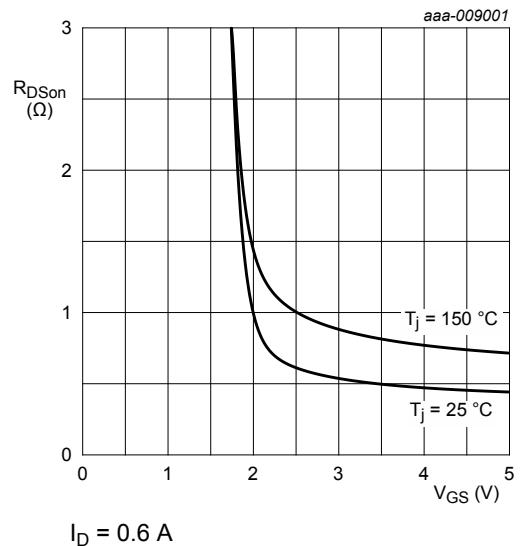
$T_j = 25^\circ\text{C}; V_{DS} = 5\text{ V}$

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



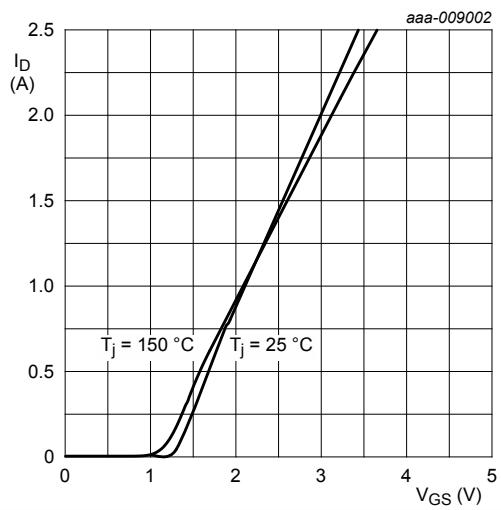
$T_j = 25^\circ\text{C}$

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



$I_D = 0.6\text{ A}$

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

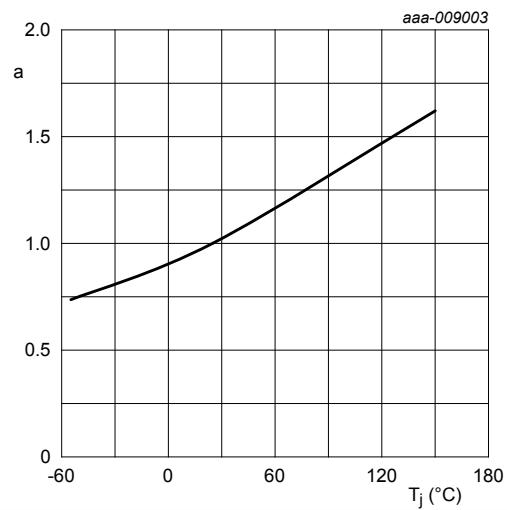
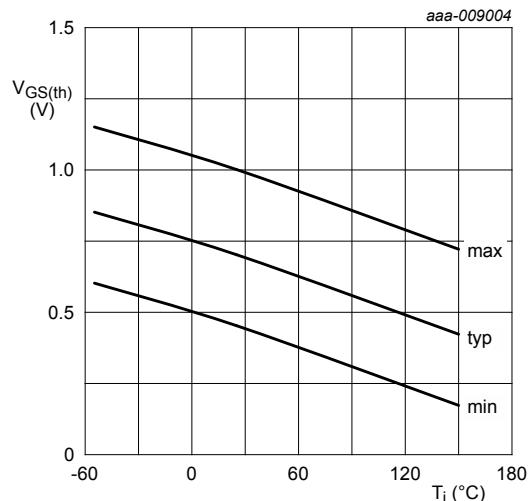


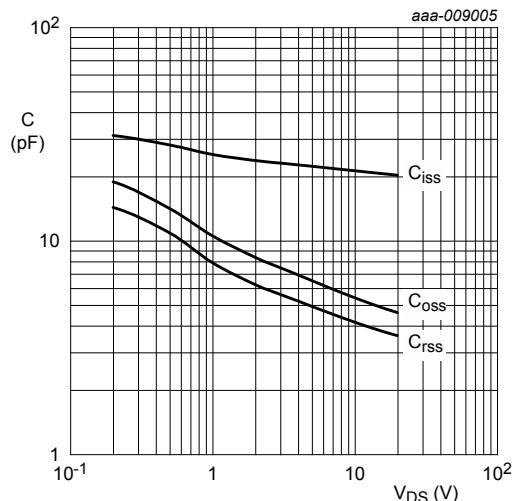
Fig. 12. Normalized drain-source on-state resistance as a function of junction temperature; typical values

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



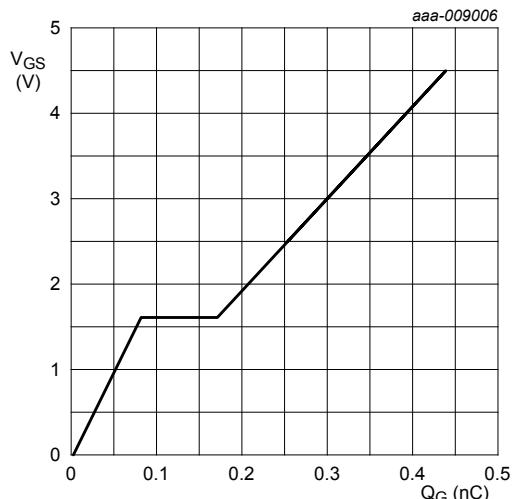
$I_D = 0.25\text{ mA}; V_{DS} = V_{GS}$

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



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

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



$I_D = 0.6 \text{ A}$; $V_{DS} = 10 \text{ V}$; $T_{amb} = 25 \text{ }^\circ\text{C}$

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

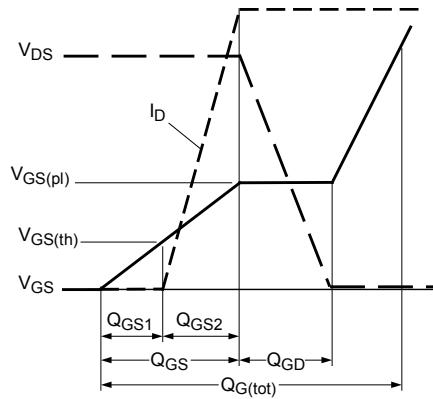
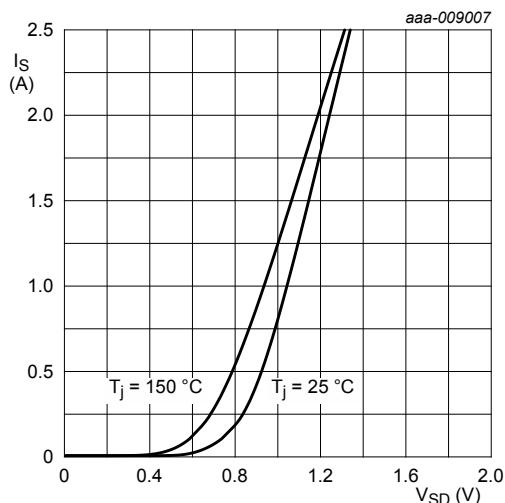


Fig. 16. MOSFET transistor: Gate charge waveform definitions



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

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

11. Test information

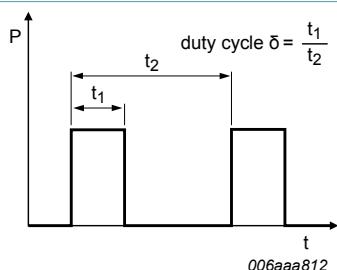


Fig. 18. Duty cycle definition

12. Package outline

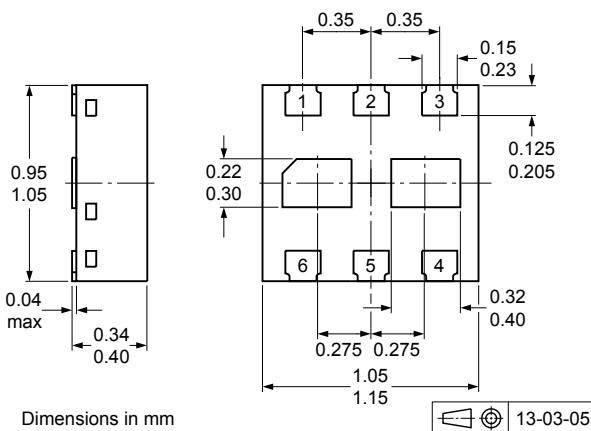
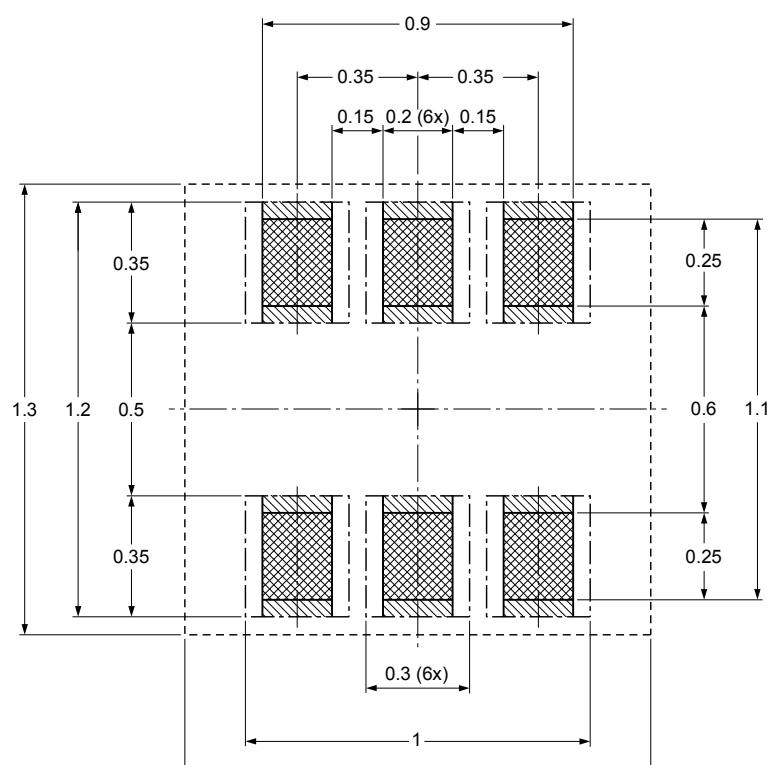


Fig. 19. Package outline DFN1010B-6 (SOT1216)

13. Soldering

Footprint information for reflow soldering of DFN1010B-6 package

SOT1216



 solder land

 solder land plus solder paste

----- | occupied area

 solder resist

Dimensions in mm

Issue date 13-03-06
14-07-28

sot1216_fr

Fig. 20. Reflow soldering footprint for DFN1010B-6 (SOT1216)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMDXB600UNE v.2	20150701	Product data sheet	-	PMDXB600UNE v.1
Modifications:	<ul style="list-style-type: none">Change of binary marking code position.			
PMDXB600UNE v.1	20130916	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".
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Date of release: 01 July 2015
