



PMV213SN

N-channel TrenchMOS standard level FET

23 November 2020

Product data sheet

1. General description

N-channel enhancement mode field-effect transistor in a plastic package using TrenchMOS technology.

2. Features and benefits

- Low on-state resistance in a small surface mount package

3. Applications

- DC-to-DC primary side switching

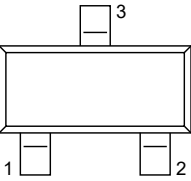
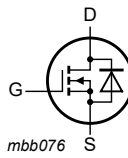
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$25\text{ °C} < T_j < 150\text{ °C}$	-	-	100	V
V_{GS}	gate-source voltage	$T_j = 25\text{ °C}$	-30	-	30	V
I_D	drain current	$V_{GS} = 10\text{ V}; T_{sp} = 25\text{ °C}$	-	-	1.9	A
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = 10\text{ V}; I_D = 0.5\text{ A}; T_j = 25\text{ °C}$	-	213	250	m Ω
P_{tot}	total power dissipation	$T_{sp} = 25\text{ °C}$	-	-	2	W

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	G	gate	 <p style="text-align: center;">SOT23</p>	 <p style="text-align: center;"><i>mbb076</i></p>
2	S	source		
3	D	drain		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMV213SN	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

7. Marking

Table 4. Marking codes

Type number	Marking code ^[1]
PMV213SN	%2N

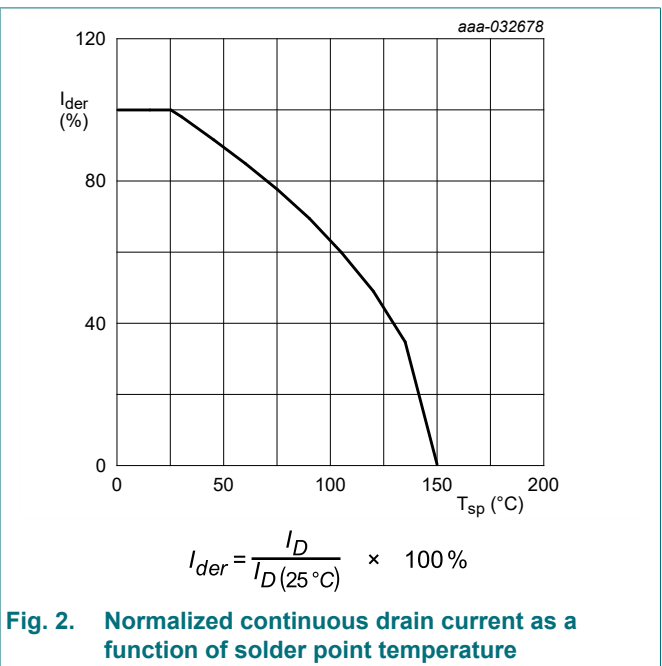
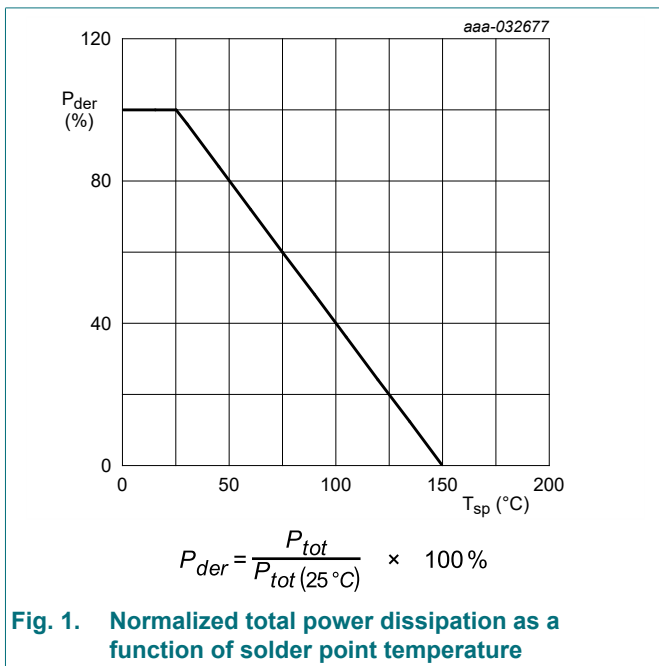
[1] % = placeholder for manufacturing site code

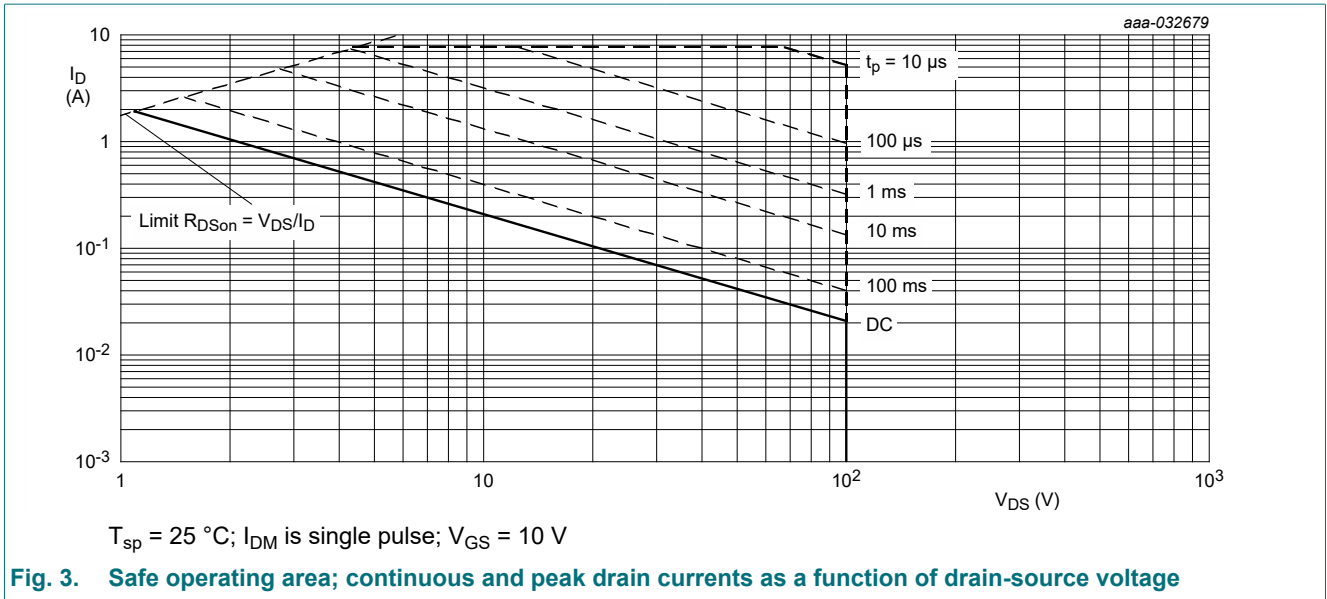
8. Limiting values

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	25 °C < T _j < 150 °C	-	100	V
V _{DGR}	drain-gate voltage	R _{GS} = 20 kΩ; 25 °C < T _j < 150 °C	-	100	V
V _{GS}	gate-source voltage	T _j = 25 °C	-30	30	V
I _D	drain current	V _{GS} = 10 V; T _{sp} = 25 °C	-	1.9	A
		V _{GS} = 10 V; T _{sp} = 100 °C	-	1.2	A
I _{DM}	peak drain current	T _{sp} = 25 °C; single pulse; t _p ≤ 10 μs	-	7.6	A
P _{tot}	total power dissipation	T _{sp} = 25 °C	-	2	W
T _j	junction temperature		-55	150	°C
T _{stg}	storage temperature		-55	150	°C
Source-drain diode					
I _S	source current	T _{sp} = 25 °C	-	1.7	A
I _{SM}	peak source current	single pulse; t _p ≤ 10 μs; T _{sp} = 25 °C	-	6.9	A





9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point		-	-	60	K/W

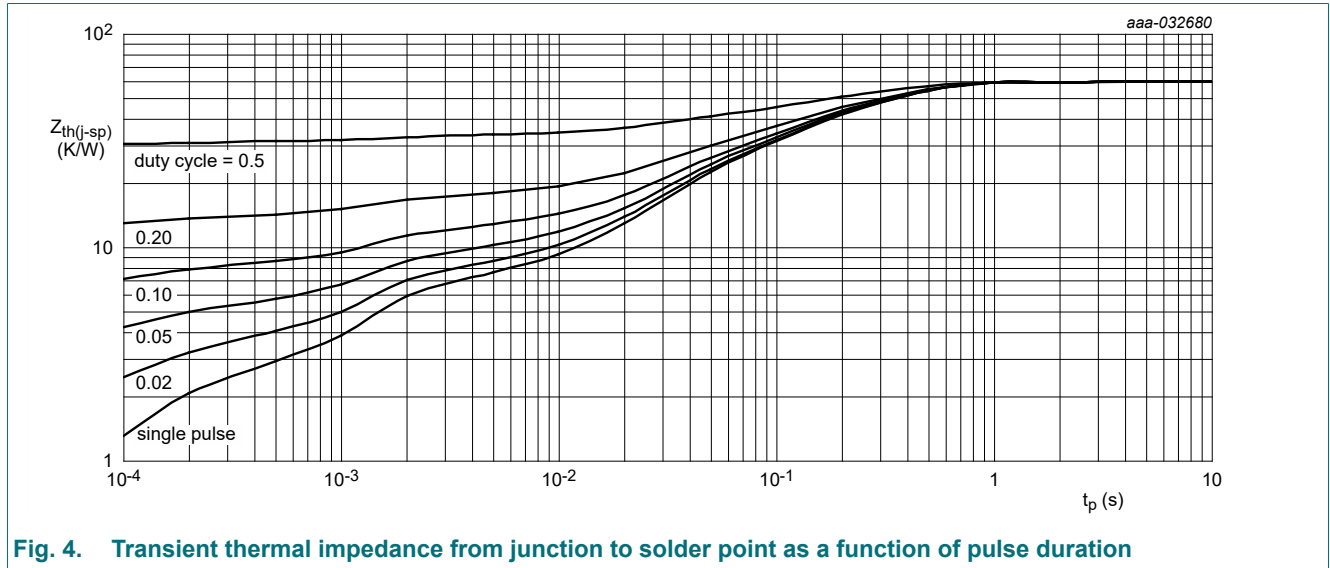


Fig. 4. Transient thermal impedance from junction to solder point as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$I_D = 250 \mu\text{A}; V_{GS} = 0 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	100	-	-	V
		$I_D = 250 \mu\text{A}; V_{GS} = 0 \text{ V}; T_j = -55 \text{ }^\circ\text{C}$	90	-	-	V
V_{GSth}	gate-source threshold voltage	$I_D = 1 \text{ mA}; V_{DS} = V_{GS}; T_j = 25 \text{ }^\circ\text{C}$	2	3	4	V
		$I_D = 1 \text{ mA}; V_{DS} = V_{GS}; T_j = 150 \text{ }^\circ\text{C}$	1.2	-	-	V
		$I_D = 1 \text{ mA}; V_{DS} = V_{GS}; T_j = -55 \text{ }^\circ\text{C}$	-	-	4.4	V
I_{DSS}	drain leakage current	$V_{DS} = 100 \text{ V}; V_{GS} = 0 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	-	1	μA
		$V_{DS} = 100 \text{ V}; V_{GS} = 0 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	100	μA
I_{GSS}	gate leakage current	$V_{GS} = 20 \text{ V}; V_{DS} = 0 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	10	100	nA
		$V_{GS} = -20 \text{ V}; V_{DS} = 0 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	-10	-100	μA
R_{DSon}	drain-source on-state resistance	$V_{GS} = 10 \text{ V}; I_D = 0.5 \text{ A}; T_j = 25 \text{ }^\circ\text{C}$	-	213	250	m Ω
		$V_{GS} = 10 \text{ V}; I_D = 0.5 \text{ A}; T_j = 150 \text{ }^\circ\text{C}$	-	490	575	m Ω
$Q_{G(tot)}$	total gate charge	$V_{DS} = 80 \text{ V}; I_D = 1.2 \text{ A}; V_{GS} = 10 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	7	-	nC
Q_{GS}	gate-source charge		-	1.4	-	nC
$Q_{GS(th)}$	pre-threshold gate-source charge		-	2.5	-	nC
C_{iss}	input capacitance	$V_{DS} = 20 \text{ V}; f = 1 \text{ MHz}; V_{GS} = 0 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	330	-	pF
C_{oss}	output capacitance		-	36	-	pF
C_{rss}	reverse transfer capacitance		-	22	-	pF
$t_{d(on)}$	turn-on delay time	$V_{DS} = 50 \text{ V}; R_L = 33 \text{ } \Omega; V_{GS} = 10 \text{ V}; R_{G(ext)} = 6 \text{ } \Omega; T_j = 25 \text{ }^\circ\text{C}$	-	5.5	-	ns
t_r	rise time		-	5	-	ns
$t_{d(off)}$	turn-off delay time		-	9.5	-	ns
t_f	fall time		-	3	-	ns
Source-drain diode						
V_{SD}	source-drain voltage	$I_S = 1.5 \text{ A}; V_{GS} = 0 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	0.83	1.2	V
t_{rr}	reverse recovery time	$I_S = 1.2 \text{ A}; dI_S/dt = -100 \text{ A}/\mu\text{s}; V_{GS} = 0 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	36	-	ns
Q_r	recovered charge		-	23	-	nC

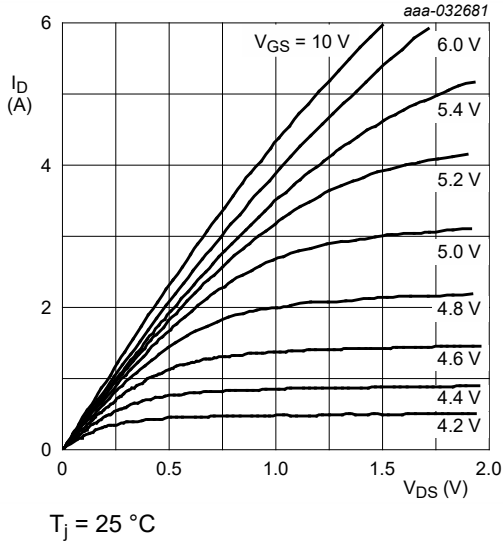


Fig. 5. Output characteristics: drain current as a function of drain-source voltage; typical values

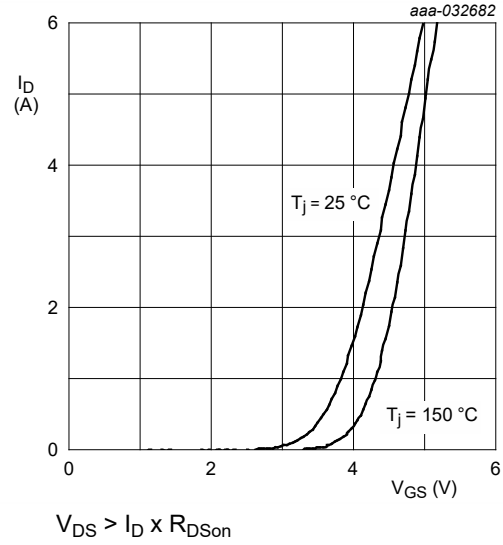


Fig. 6. Transfer characteristics: drain current as a function of gate-source voltage; typical values

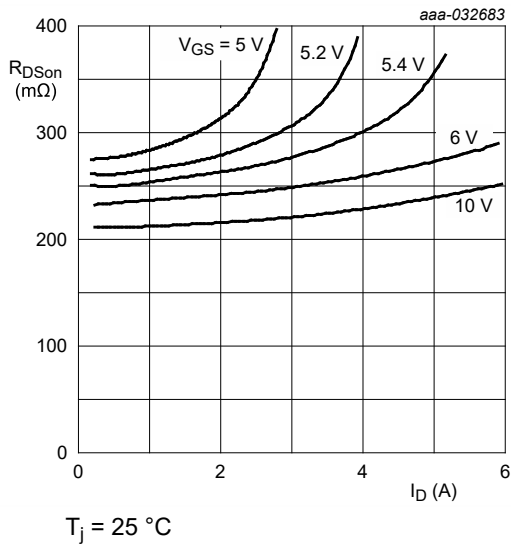


Fig. 7. Drain-source on-state resistance as a function of drain current; typical values

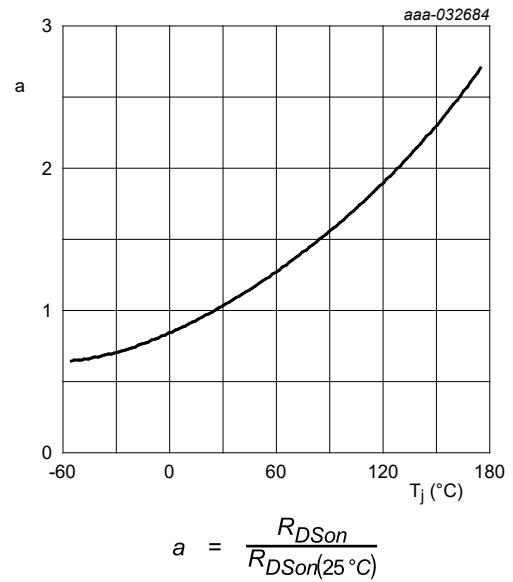


Fig. 8. Normalized drain-source on-state resistance as a function of junction temperature

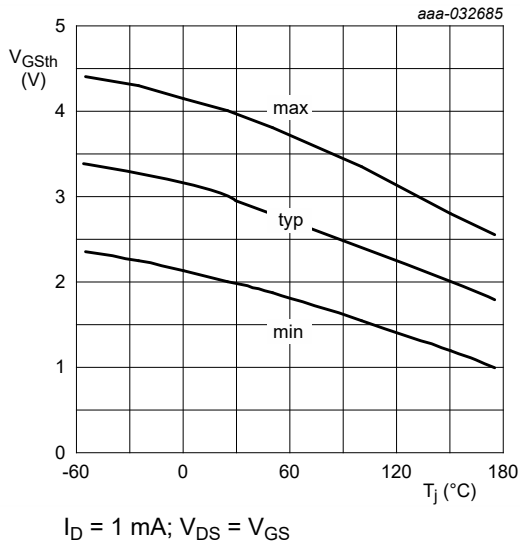


Fig. 9. Gate-source threshold voltage as a function of junction temperature

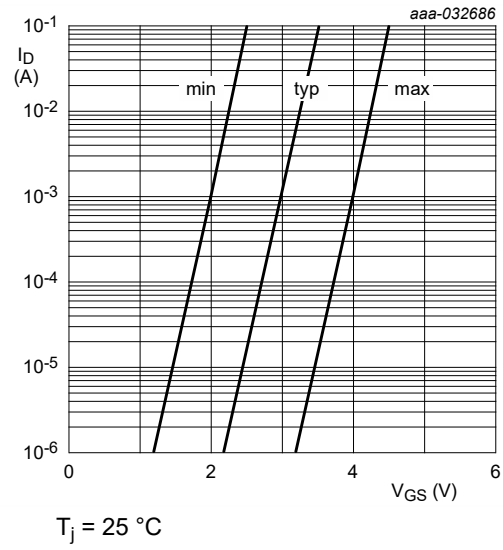


Fig. 10. Subthreshold drain current as a function of gate-source voltage

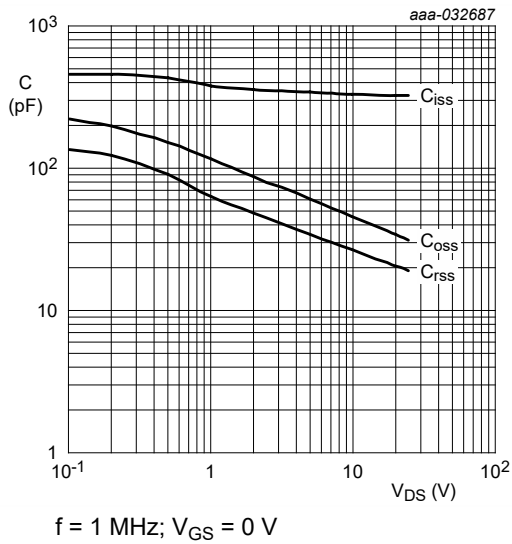


Fig. 11. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

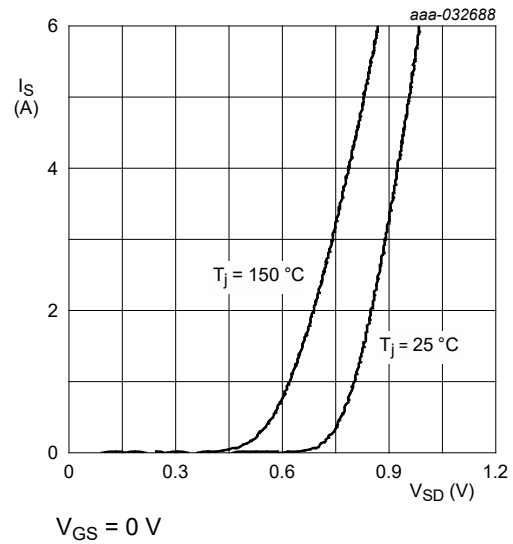
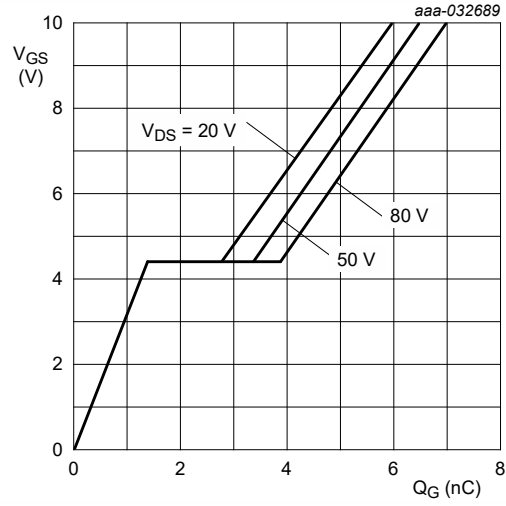


Fig. 12. Source (diode forward) current as a function of source-drain (diode forward) voltage; typical values



$I_D = 1.2 \text{ A}; T_j = 25 \text{ }^\circ\text{C}$

Fig. 13. Gate-source voltage as a function of gate charge; typical values

11. Package outline

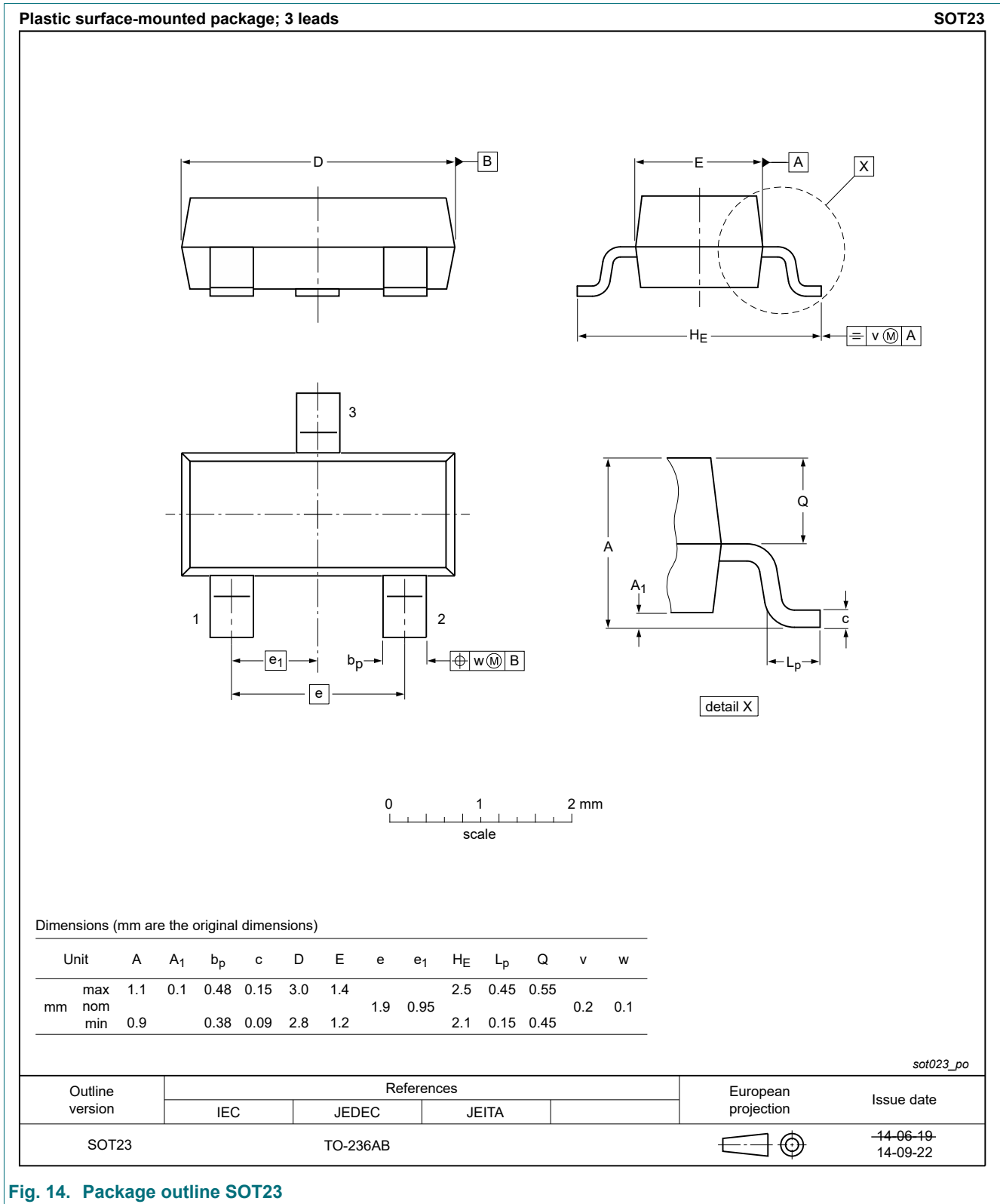


Fig. 14. Package outline SOT23

12. Soldering

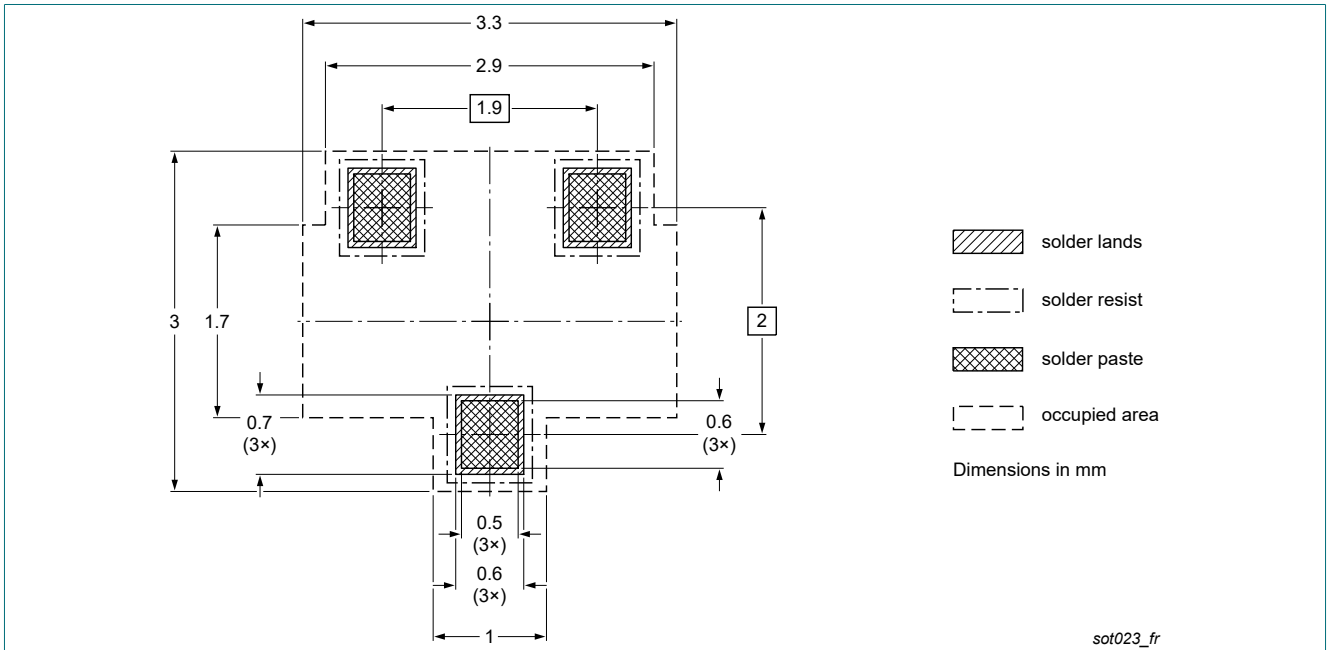


Fig. 15. Reflow soldering footprint for SOT23

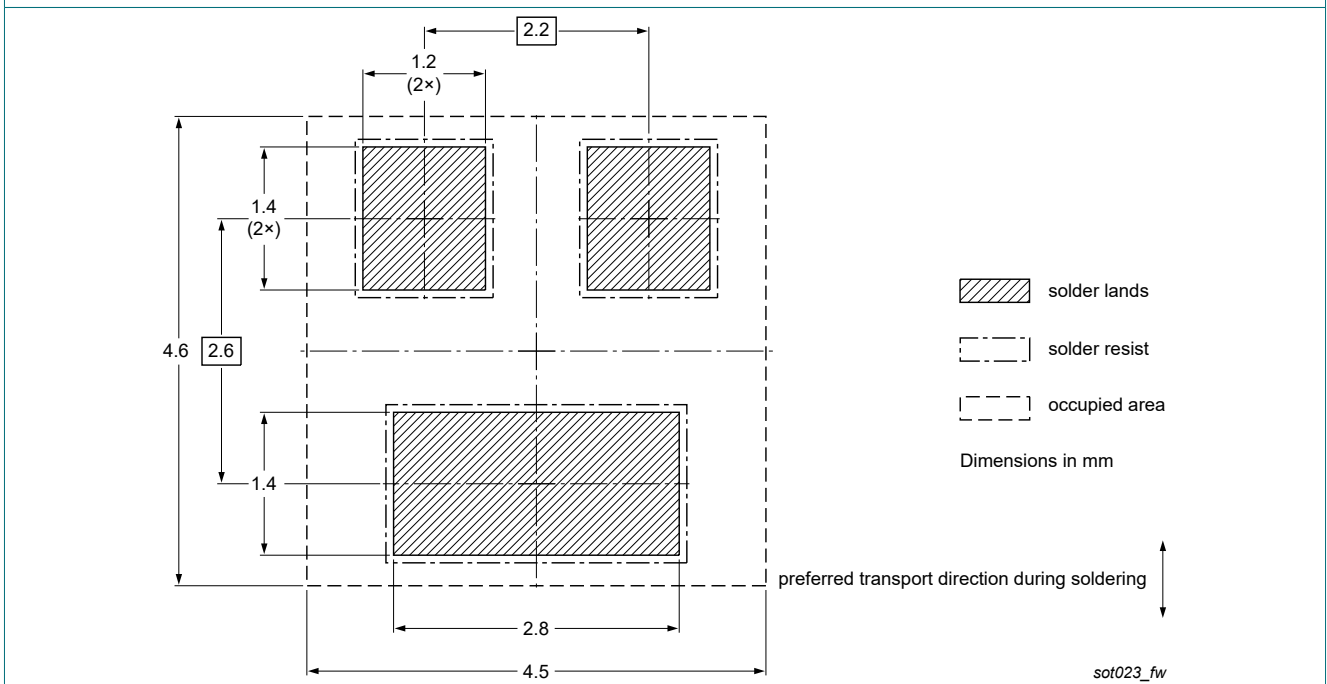


Fig. 16. Wave soldering footprint for SOT23

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMV213SN v.3	20201123	Product data sheet	-	PMV213SN v.2
Modifications:	<ul style="list-style-type: none">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.			
PMV213SN v.2	20030219	Product data sheet	-	PMV213SN v.1
PMV213SN v.1	20030115	Product data sheet	-	-

14. 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".
- [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 <https://www.nexperia.com>.

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