



# PMF370XN

## N-channel TrenchMOS extremely low level FET

5 July 2019

Product data sheet

### 1. General description

Extremely low level N-channel enhancement mode Field-Effect Transistor (FET) in a plastic package using TrenchMOS technology. This product is designed and qualified for use in computing, communications, consumer and industrial applications only.

### 2. Features and benefits

- Low conduction losses due to low on-state resistance
- Low threshold voltage
- Saves PCB space due to small footprint (40 % smaller than SOT23)
- Suitable for low gate drive sources
- Surface-mounted package

### 3. Applications

- Driver circuits
- Switching in portable appliances

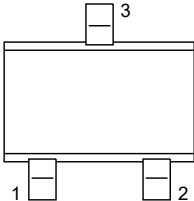
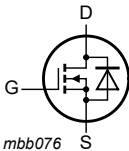
### 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{DS}$	drain-source voltage	$25\text{ °C} \leq T_j \leq 150\text{ °C}$	-	-	30	V
$I_D$	drain current	$V_{GS} = 4.5\text{ V}; T_{sp} = 25\text{ °C}$	-	-	0.87	A
$P_{tot}$	total power dissipation	$T_{sp} = 25\text{ °C}$	-	-	0.56	W
<b>Static characteristics</b>						
$R_{DSon}$	drain-source on-state resistance	$V_{GS} = 4.5\text{ V}; I_D = 0.2\text{ A}; T_j = 25\text{ °C}$	-	370	440	mΩ

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	G	gate	 SC-70 (SOT323)	 mbb076
2	S	source		
3	D	drain		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMF370XN	SC-70	plastic surface-mounted package; 3 leads	SOT323

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PMF370XN	F6%

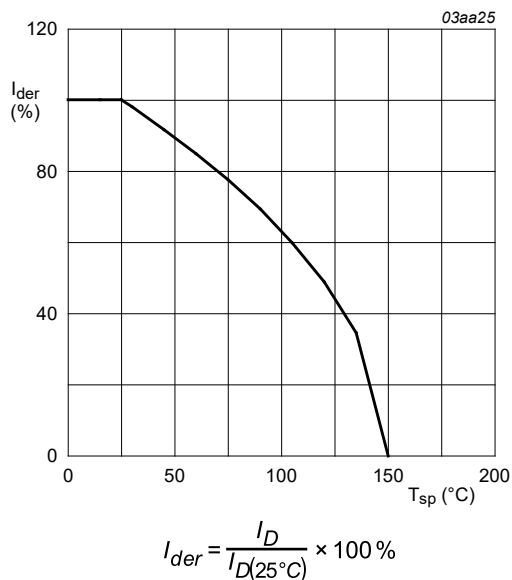
[1] % = placeholder for manufacturing site code

## 8. Limiting values

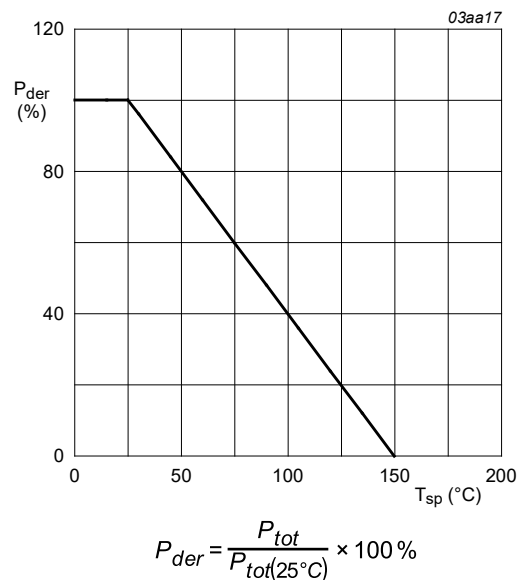
**Table 5. Limiting values**

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

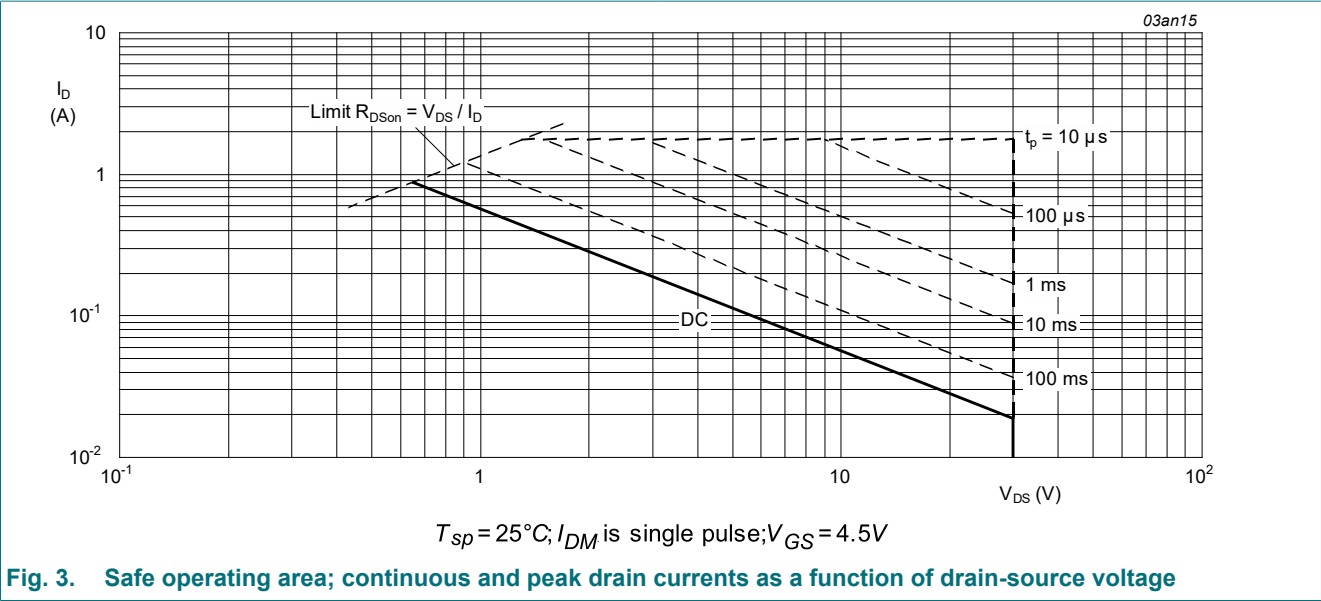
Symbol	Parameter	Conditions	Min	Max	Unit
$V_{DS}$	drain-source voltage	$25\text{ }^{\circ}\text{C} \leq T_j \leq 150\text{ }^{\circ}\text{C}$	-	30	V
$V_{DGR}$	drain-gate voltage	$25\text{ }^{\circ}\text{C} \leq T_j \leq 150\text{ }^{\circ}\text{C}; R_{GS} = 20\text{ k}\Omega$	-	30	V
$V_{GS}$	gate-source voltage		-12	12	V
$I_D$	drain current	$V_{GS} = 4.5\text{ V}; T_{sp} = 25\text{ }^{\circ}\text{C}$	-	0.87	A
		$V_{GS} = 4.5\text{ V}; T_{sp} = 100\text{ }^{\circ}\text{C}$	-	0.55	A
$I_{DM}$	peak drain current	$T_{sp} = 25\text{ }^{\circ}\text{C}$ ; pulsed; $t_p \leq 10\text{ }\mu\text{s}$	-	1.74	A
$P_{tot}$	total power dissipation	$T_{sp} = 25\text{ }^{\circ}\text{C}$	-	0.56	W
$T_j$	junction temperature		-55	150	$^{\circ}\text{C}$
$T_{stg}$	storage temperature		-55	150	$^{\circ}\text{C}$
$I_S$	source current	$T_{sp} = 25\text{ }^{\circ}\text{C}$	-	0.47	A
$I_{SM}$	peak source current	pulsed; $t_p \leq 10\text{ }\mu\text{s}$ ; $T_{sp} = 25\text{ }^{\circ}\text{C}$	-	0.94	A



**Fig. 1. Normalized continuous drain current as a function of solder point temperature**



**Fig. 2. Normalized total power dissipation as a function of solder point temperature**



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		-	-	220	K/W

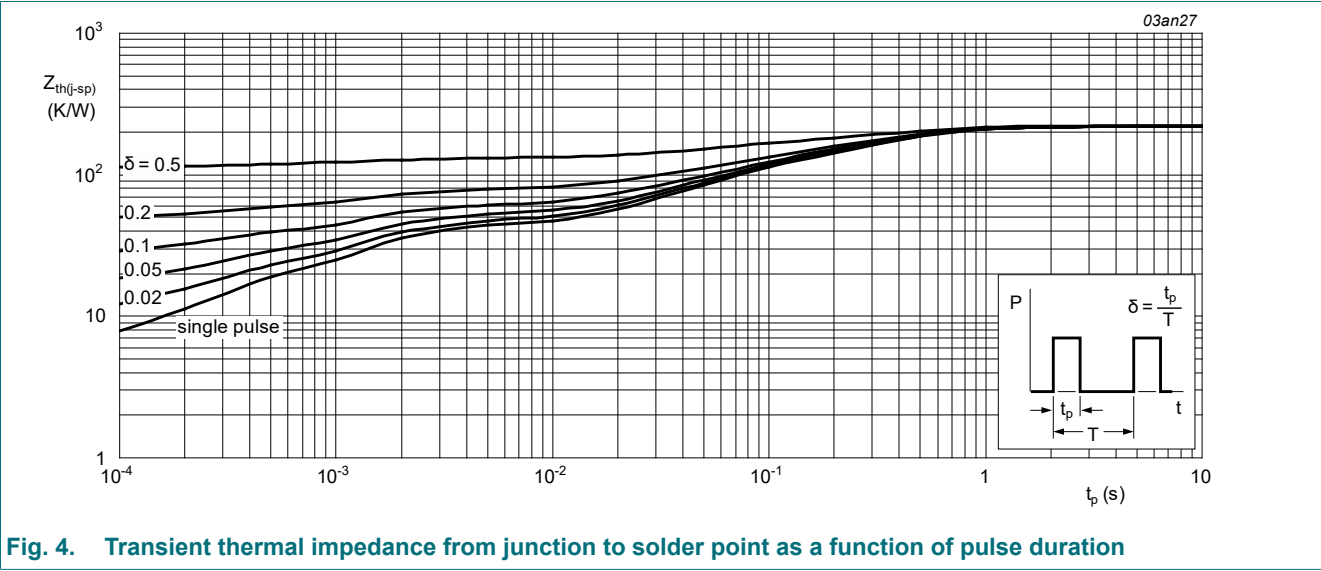


Fig. 4. Transient thermal impedance from junction to solder point as a function of pulse duration

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V <sub>(BR)DSS</sub>	drain-source breakdown voltage	I <sub>D</sub> = 250 μA; V <sub>GS</sub> = 0 V; T <sub>j</sub> = -55 °C		27	-	-	V
		I <sub>D</sub> = 250 μA; V <sub>GS</sub> = 0 V; T <sub>j</sub> = 25 °C		30	-	-	V
V <sub>GSth</sub>	gate-source threshold voltage	I <sub>D</sub> = 250 μA; V <sub>DS</sub> = V <sub>GS</sub> ; T <sub>j</sub> = -55 °C		-	-	1.8	V
		I <sub>D</sub> = 250 μA; V <sub>DS</sub> = V <sub>GS</sub> ; T <sub>j</sub> = 150 °C		0.35	-	-	V
		I <sub>D</sub> = 250 μA; V <sub>DS</sub> = V <sub>GS</sub> ; T <sub>j</sub> = 25 °C		0.5	1	1.5	V
I <sub>DSS</sub>	drain leakage current	V <sub>DS</sub> = 30 V; V <sub>GS</sub> = 0 V; T <sub>j</sub> = 25 °C		-	-	1	μA
		V <sub>DS</sub> = 30 V; V <sub>GS</sub> = 0 V; T <sub>j</sub> = 70 °C		-	-	2	μA
		V <sub>DS</sub> = 30 V; V <sub>GS</sub> = 0 V; T <sub>j</sub> = 150 °C		-	-	10	μA
I <sub>GSS</sub>	gate leakage current	V <sub>GS</sub> = 12 V; V <sub>DS</sub> = 0 V; T <sub>j</sub> = 25 °C		-	10	100	nA
		V <sub>GS</sub> = -12 V; V <sub>DS</sub> = 0 V; T <sub>j</sub> = 25 °C		-	10	100	nA
R <sub>DSon</sub>	drain-source on-state resistance	V <sub>GS</sub> = 2.5 V; I <sub>D</sub> = 0.1 A; T <sub>j</sub> = 25 °C		-	550	650	mΩ
		V <sub>GS</sub> = 4.5 V; I <sub>D</sub> = 0.2 A; T <sub>j</sub> = 150 °C		-	629	748	mΩ
		V <sub>GS</sub> = 4.5 V; I <sub>D</sub> = 0.2 A; T <sub>j</sub> = 25 °C		-	370	440	mΩ
Dynamic characteristics							
Q <sub>G(tot)</sub>	total gate charge	V <sub>DS</sub> = 15 V; I <sub>D</sub> = 1 A; V <sub>GS</sub> = 4.5 V; T <sub>j</sub> = 25 °C		-	0.65	-	nC
Q <sub>GS</sub>	gate-source charge			-	0.14	-	nC
Q <sub>GD</sub>	gate-drain charge			-	0.18	-	nC
C <sub>iss</sub>	input capacitance	V <sub>DS</sub> = 25 V; f = 1 MHz; V <sub>GS</sub> = 0 V; T <sub>j</sub> = 25 °C		-	37	-	pF
C <sub>oss</sub>	output capacitance			-	8.5	-	pF
C <sub>rss</sub>	reverse transfer capacitance			-	5.5	-	pF
t <sub>d(on)</sub>	turn-on delay time	V <sub>DS</sub> = 15 V; R <sub>L</sub> = 15 Ω; V <sub>GS</sub> = 4.5 V; R <sub>G(ext)</sub> = 6 Ω; T <sub>j</sub> = 25 °C		-	6.5	-	ns
t <sub>r</sub>	rise time			-	9.5	-	ns
t <sub>d(off)</sub>	turn-off delay time			-	14	-	ns
t <sub>f</sub>	fall time			-	5.5	-	ns
Source-drain diode							
V <sub>SD</sub>	source-drain voltage	I <sub>S</sub> = 0.3 A; V <sub>GS</sub> = 0 V; T <sub>j</sub> = 25 °C		-	0.81	1.2	V

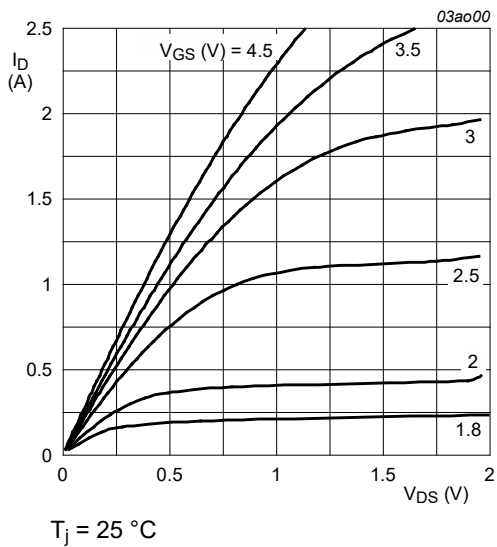


Fig. 5. Output characteristics: drain current as a function of drain-source voltage; typical values

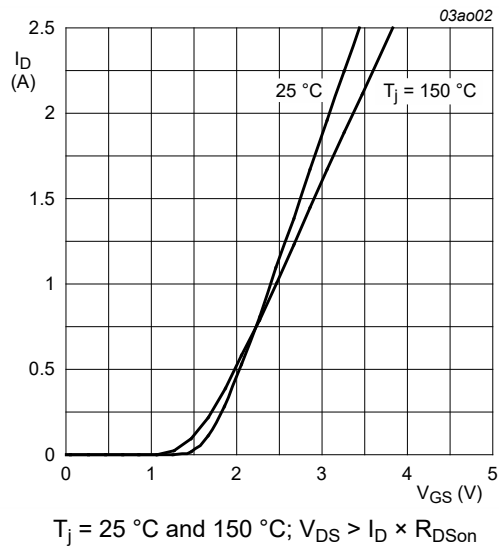


Fig. 6. Transfer characteristics: drain current as a function of gate-source voltage; typical values

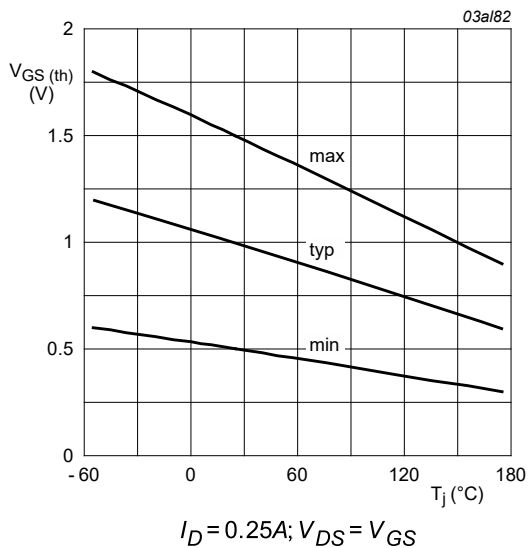


Fig. 7. Gate-source threshold voltage as a function of junction temperature

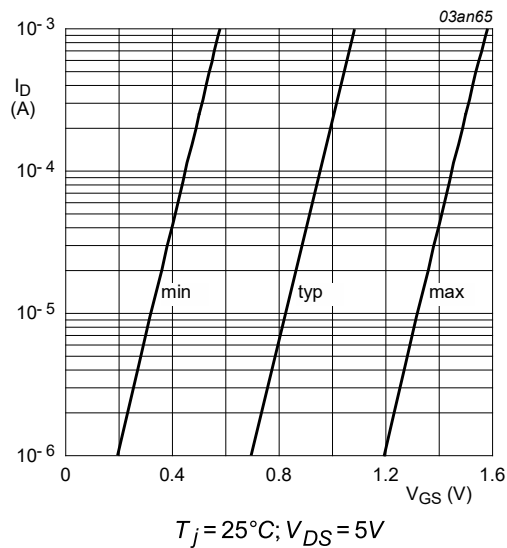


Fig. 8. Subthreshold drain current as a function of gate-source voltage

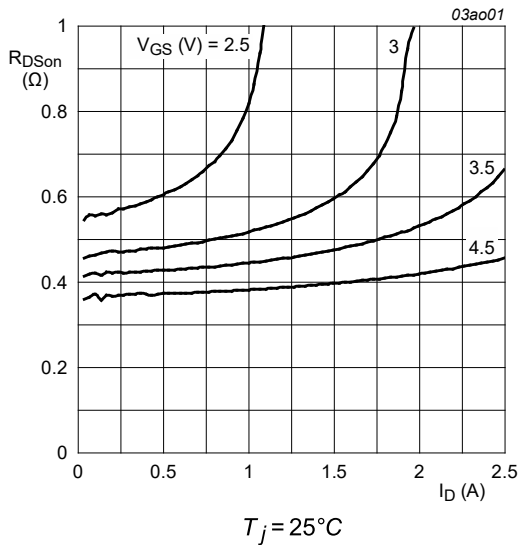


Fig. 9. Drain-source on-state resistance as a function of drain current; typical values

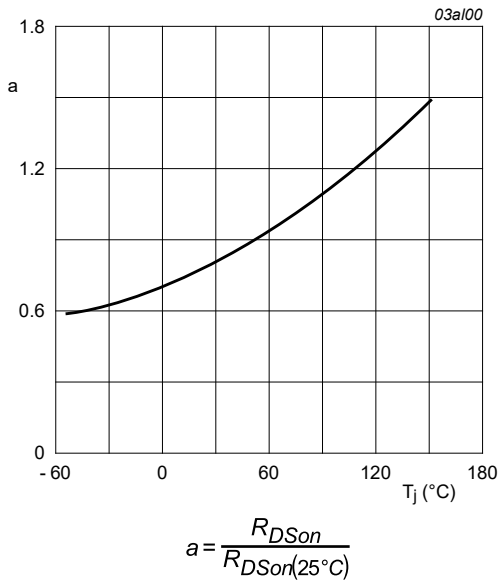


Fig. 10. Normalized drain-source on-state resistance factor as a function of junction temperature

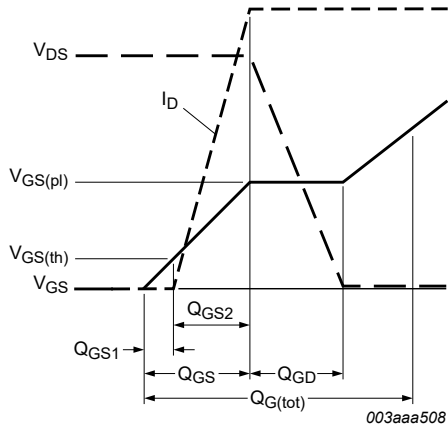


Fig. 11. Gate charge waveform definitions

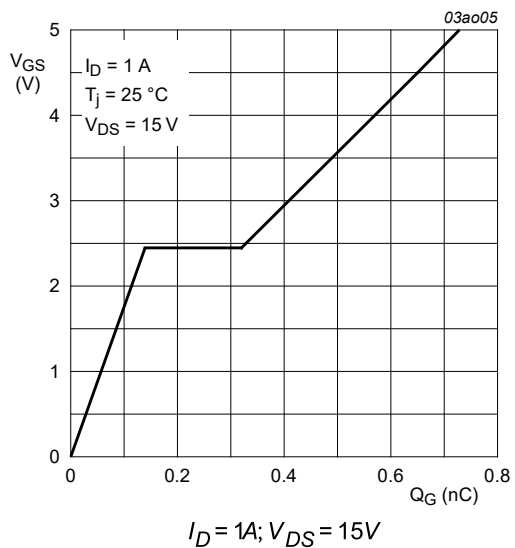


Fig. 12. Gate-source voltage as a function of gate charge; typical values



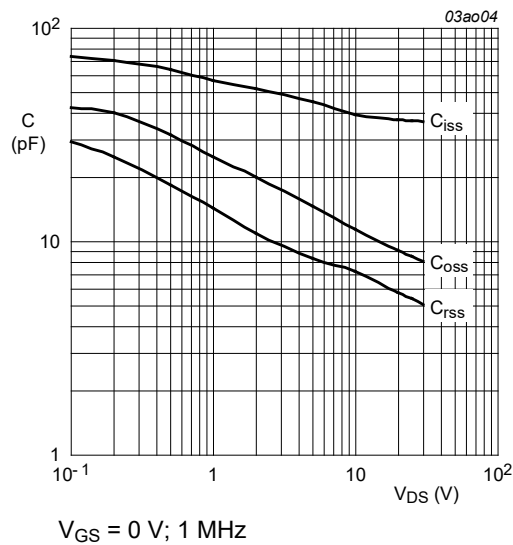


Fig. 13. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

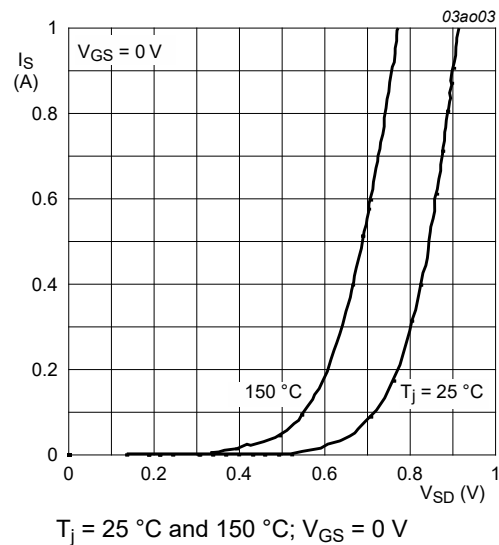


Fig. 14. Source current as a function of source-drain voltage; typical values

11. Package outline

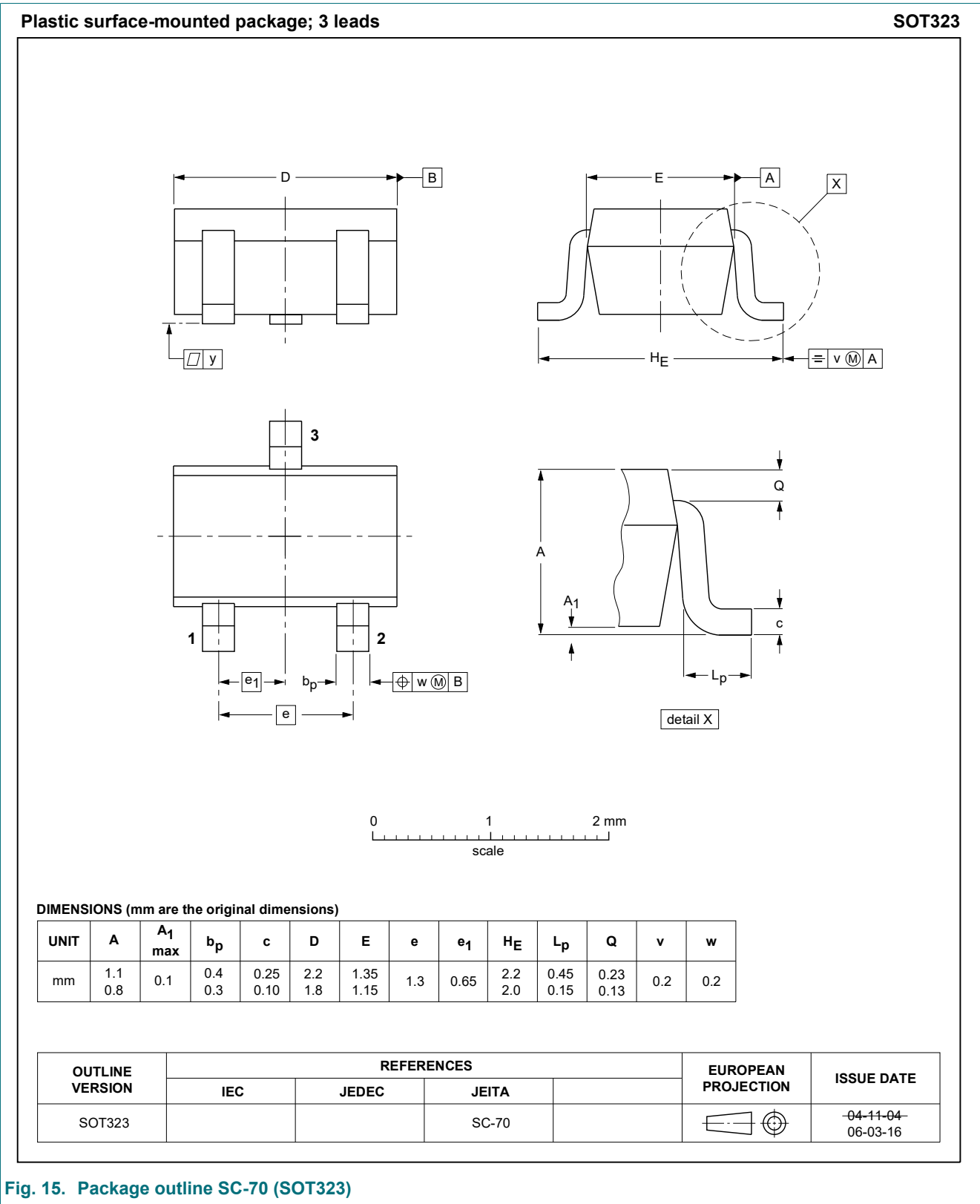


Fig. 15. Package outline SC-70 (SOT323)

12. Soldering

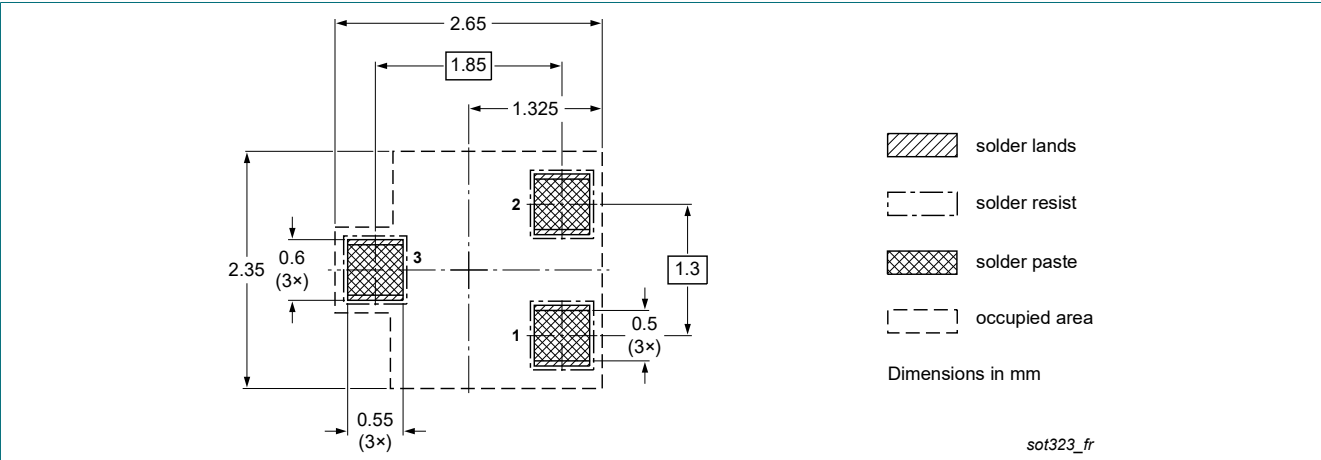


Fig. 16. Reflow soldering footprint for SC-70 (SOT323)

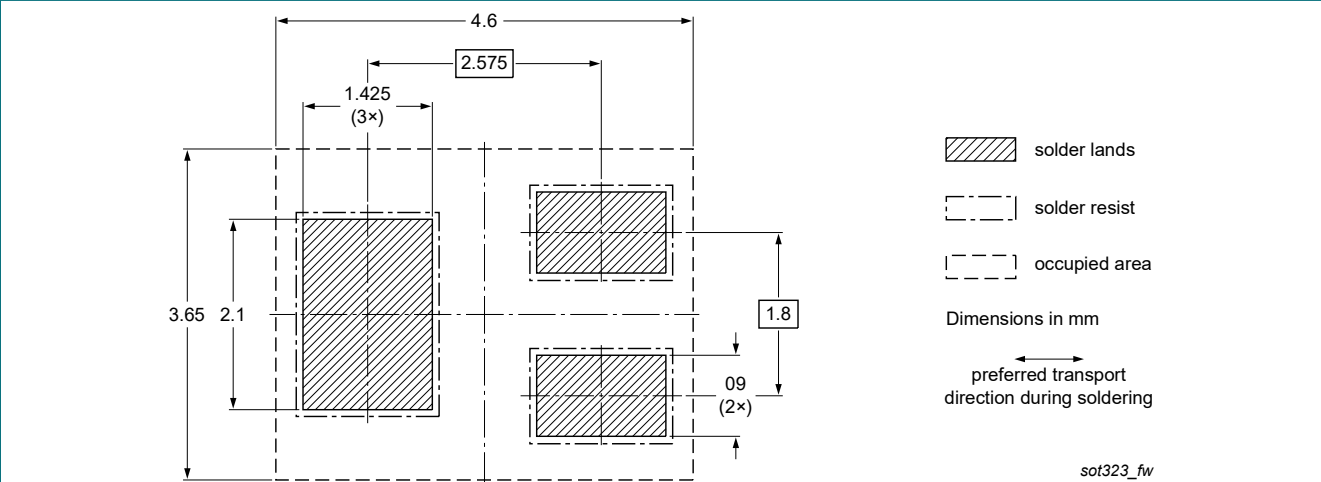


Fig. 17. Wave soldering footprint for SC-70 (SOT323)

## 13. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMF370XN v.4	20190705	Product data sheet	-	PMF370XN v.3
Modifications:	<ul style="list-style-type: none"><li>• Measurement conditions for <math>V_{(BR)DSS}</math> revised.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li></ul>			
PMF370XN v.3	20080620	Product data sheet	-	PMF370XN v.2
PMF370XN v.2	20051206	Product data sheet	-	PMF370XN v.1
PMF370XN v.1	20040211	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".
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