



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

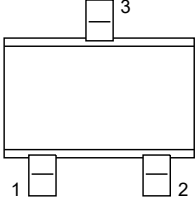
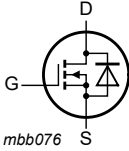
4. Quick reference data

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
Static characteristics						
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	 <p>SC-70 (SOT323)</p>	 <p>mbb076</p>
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%

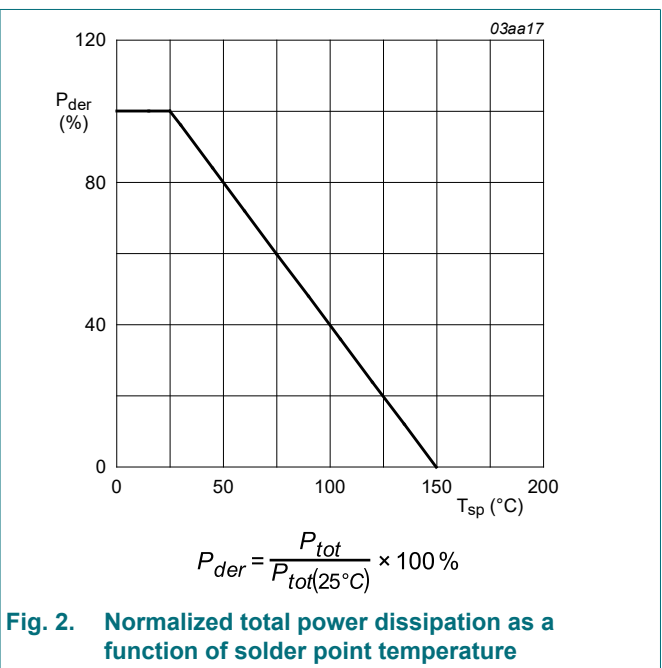
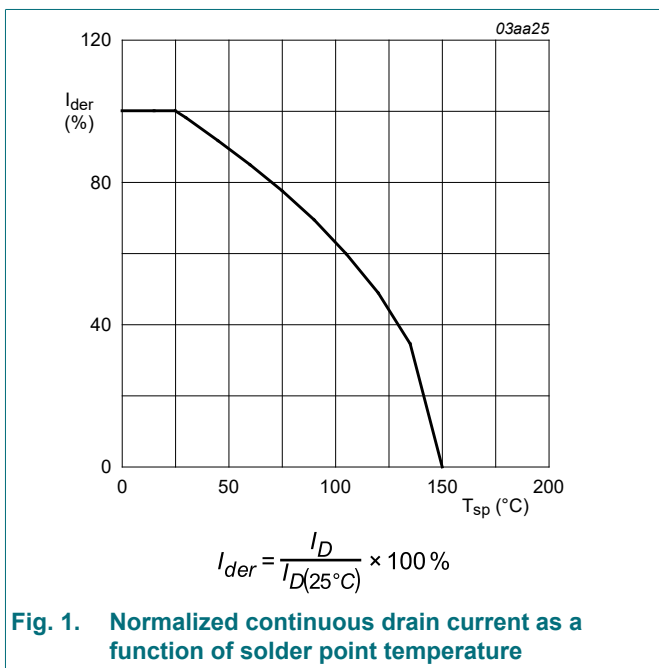
[1] % = placeholder for manufacturing site code

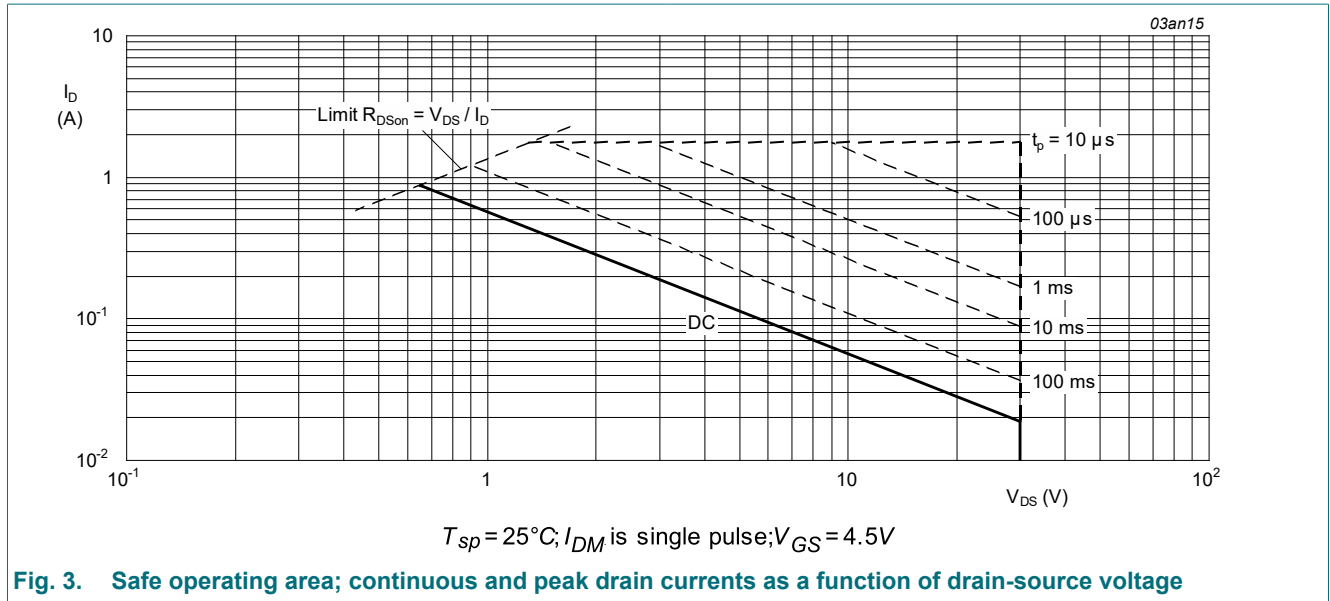
8. Limiting values

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 °C ≤ T _j ≤ 150 °C	-	30	V
V _{DGR}	drain-gate voltage	25 °C ≤ T _j ≤ 150 °C; R _{GS} = 20 kΩ	-	30	V
V _{GS}	gate-source voltage		-12	12	V
I _D	drain current	V _{GS} = 4.5 V; T _{sp} = 25 °C	-	0.87	A
		V _{GS} = 4.5 V; T _{sp} = 100 °C	-	0.55	A
I _{DM}	peak drain current	T _{sp} = 25 °C; pulsed; t _p ≤ 10 μs	-	1.74	A
P _{tot}	total power dissipation	T _{sp} = 25 °C	-	0.56	W
T _j	junction temperature		-55	150	°C
T _{stg}	storage temperature		-55	150	°C
I _S	source current	T _{sp} = 25 °C	-	0.47	A
I _{SM}	peak source current	pulsed; t _p ≤ 10 μs; T _{sp} = 25 °C	-	0.94	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		-	-	220	K/W

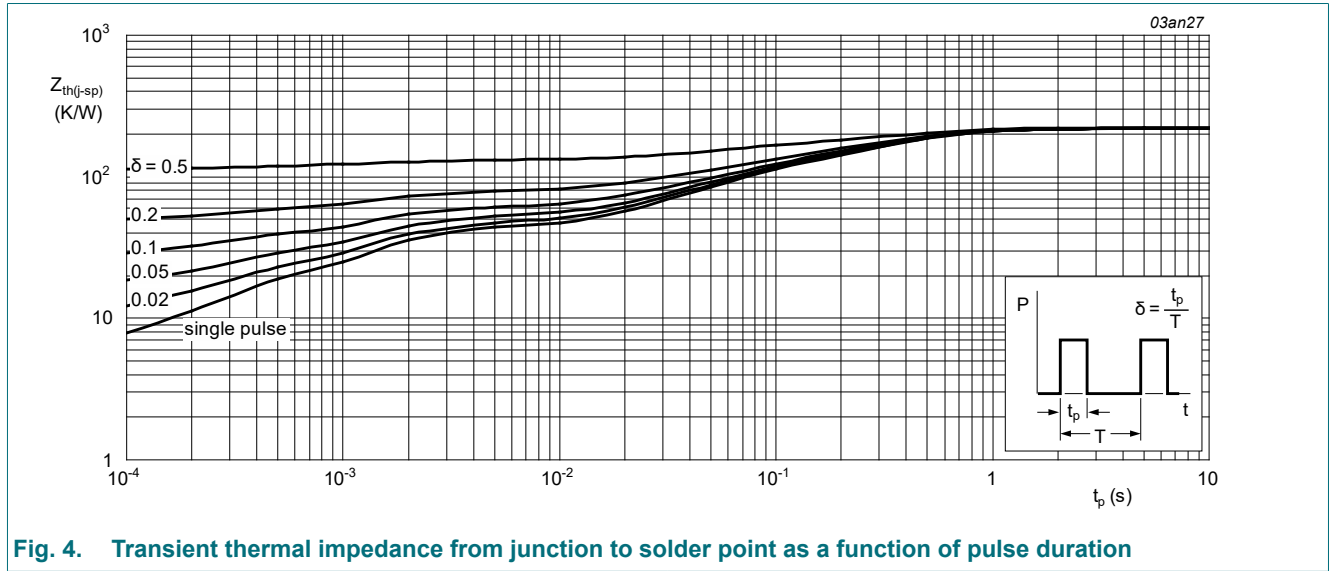


Fig. 4. Transient thermal impedance from junction to solder point as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
$V_{(BR)DSS}$	drain-source breakdown voltage	$I_D = 250 \mu A; V_{GS} = 0 V; T_j = -55 \text{ }^\circ C$	27	-	-	V
		$I_D = 250 \mu A; V_{GS} = 0 V; T_j = 25 \text{ }^\circ C$	30	-	-	V
V_{GSth}	gate-source threshold voltage	$I_D = 250 \mu A; V_{DS} = V_{GS}; T_j = -55 \text{ }^\circ C$	-	-	1.8	V
		$I_D = 250 \mu A; V_{DS} = V_{GS}; T_j = 150 \text{ }^\circ C$	0.35	-	-	V
		$I_D = 250 \mu A; V_{DS} = V_{GS}; T_j = 25 \text{ }^\circ C$	0.5	1	1.5	V
I_{DSS}	drain leakage current	$V_{DS} = 30 V; V_{GS} = 0 V; T_j = 25 \text{ }^\circ C$	-	-	1	μA
		$V_{DS} = 30 V; V_{GS} = 0 V; T_j = 70 \text{ }^\circ C$	-	-	2	μA
		$V_{DS} = 30 V; V_{GS} = 0 V; T_j = 150 \text{ }^\circ C$	-	-	10	μA
I_{GSS}	gate leakage current	$V_{GS} = 12 V; V_{DS} = 0 V; T_j = 25 \text{ }^\circ C$	-	10	100	nA
		$V_{GS} = -12 V; V_{DS} = 0 V; T_j = 25 \text{ }^\circ C$	-	10	100	nA
R_{DSon}	drain-source on-state resistance	$V_{GS} = 2.5 V; I_D = 0.1 A; T_j = 25 \text{ }^\circ C$	-	550	650	m Ω
		$V_{GS} = 4.5 V; I_D = 0.2 A; T_j = 150 \text{ }^\circ C$	-	629	748	m Ω
		$V_{GS} = 4.5 V; I_D = 0.2 A; T_j = 25 \text{ }^\circ C$	-	370	440	m Ω
Dynamic characteristics						
$Q_{G(tot)}$	total gate charge	$V_{DS} = 15 V; I_D = 1 A; V_{GS} = 4.5 V; T_j = 25 \text{ }^\circ C$	-	0.65	-	nC
Q_{GS}	gate-source charge		-	0.14	-	nC
Q_{GD}	gate-drain charge		-	0.18	-	nC
C_{iss}	input capacitance	$V_{DS} = 25 V; f = 1 \text{ MHz}; V_{GS} = 0 V; T_j = 25 \text{ }^\circ C$	-	37	-	pF
C_{oss}	output capacitance		-	8.5	-	pF
C_{rss}	reverse transfer capacitance		-	5.5	-	pF
$t_{d(on)}$	turn-on delay time	$V_{DS} = 15 V; R_L = 15 \Omega; V_{GS} = 4.5 V; R_{G(ext)} = 6 \Omega; T_j = 25 \text{ }^\circ C$	-	6.5	-	ns
t_r	rise time		-	9.5	-	ns
$t_{d(off)}$	turn-off delay time		-	14	-	ns
t_f	fall time		-	5.5	-	ns
Source-drain diode						
V_{SD}	source-drain voltage	$I_S = 0.3 A; V_{GS} = 0 V; T_j = 25 \text{ }^\circ C$	-	0.81	1.2	V

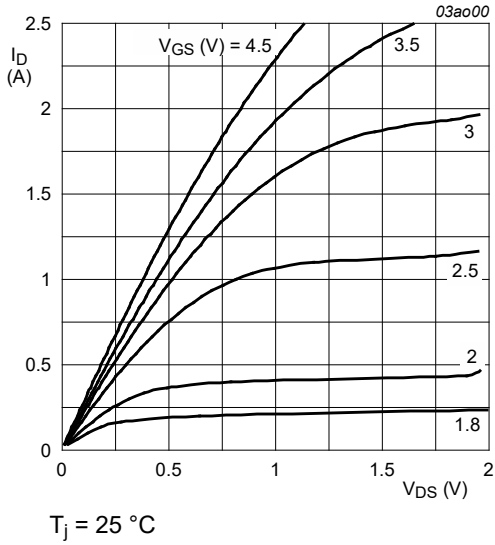


Fig. 5. Output characteristics: drain current as a function of drain-source voltage; typical values

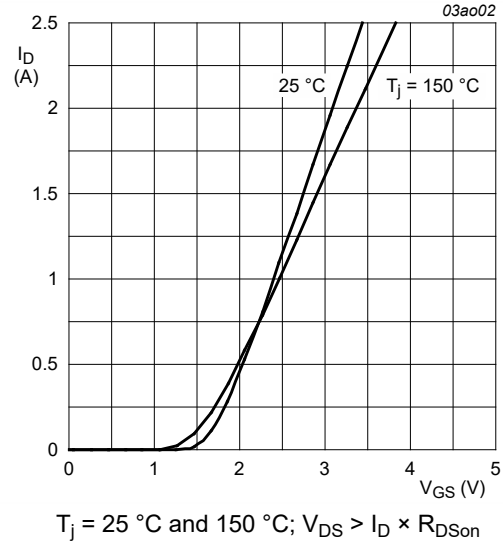


Fig. 6. Transfer characteristics: drain current as a function of gate-source voltage; typical values

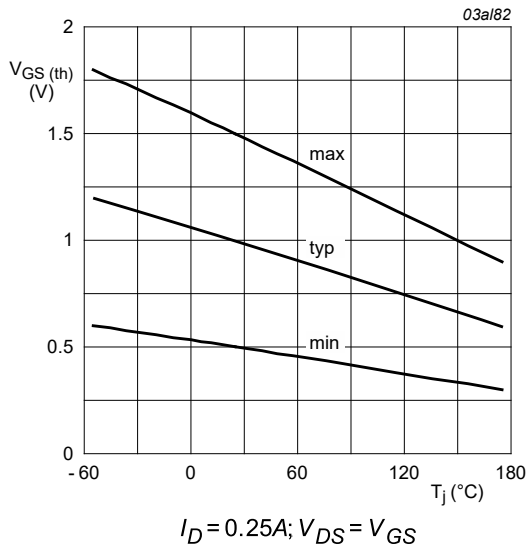


Fig. 7. Gate-source threshold voltage as a function of junction temperature

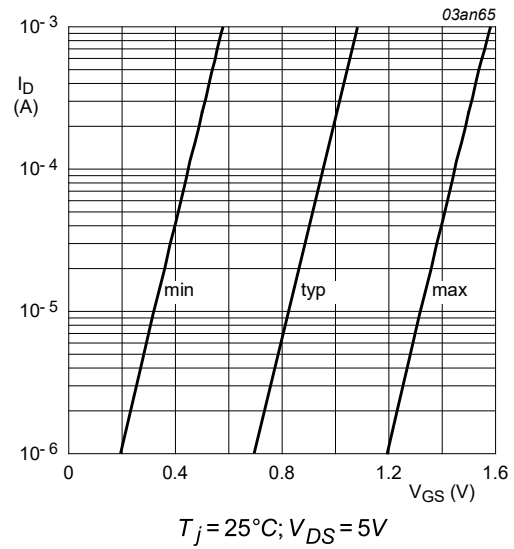


Fig. 8. Subthreshold drain current as a function of gate-source voltage

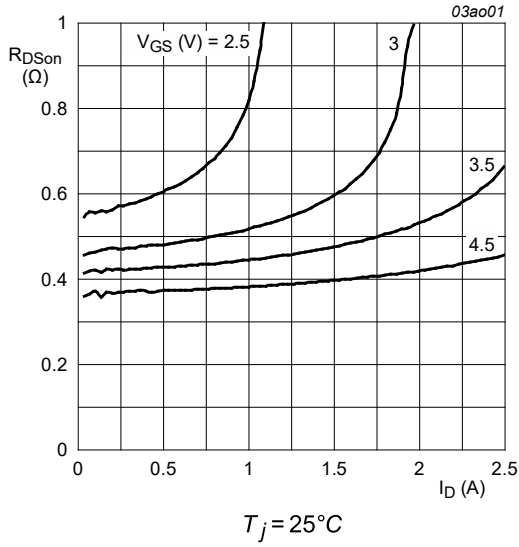


Fig. 9. Drain-source on-state resistance as a function of drain current; typical values

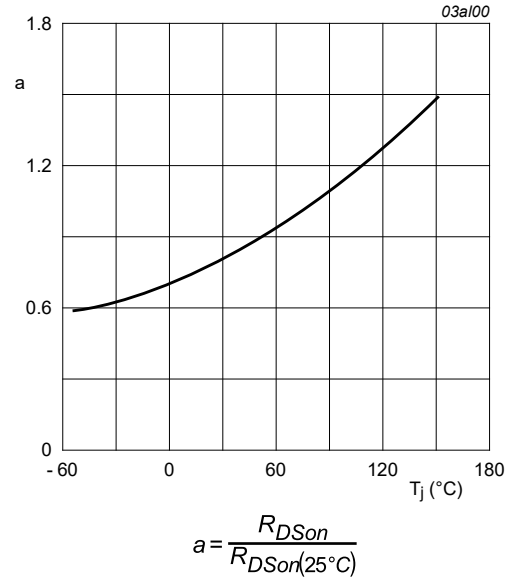


Fig. 10. Normalized drain-source on-state resistance factor as a function of junction temperature

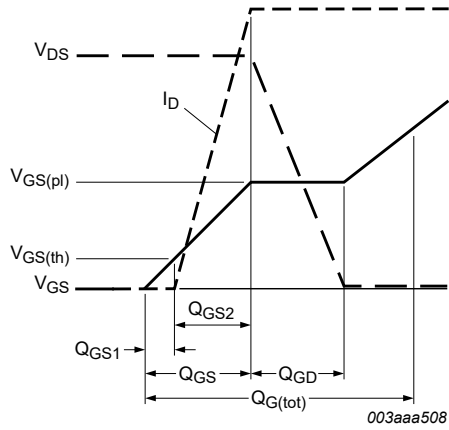


Fig. 11. Gate charge waveform definitions

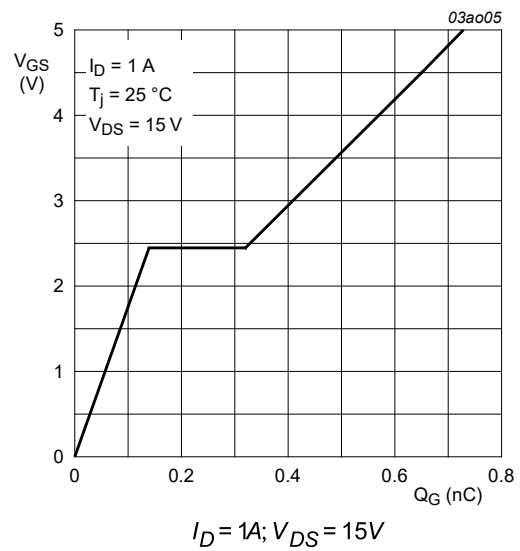
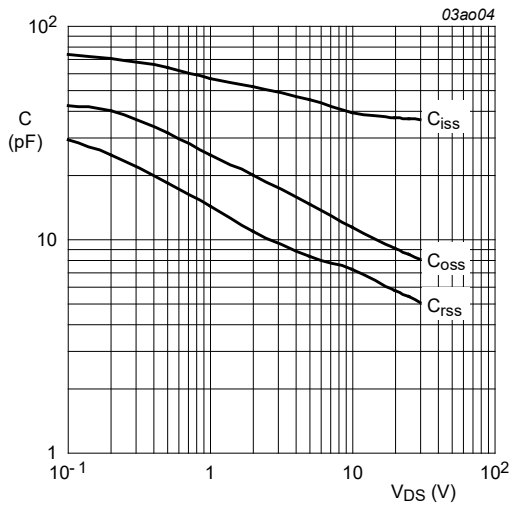
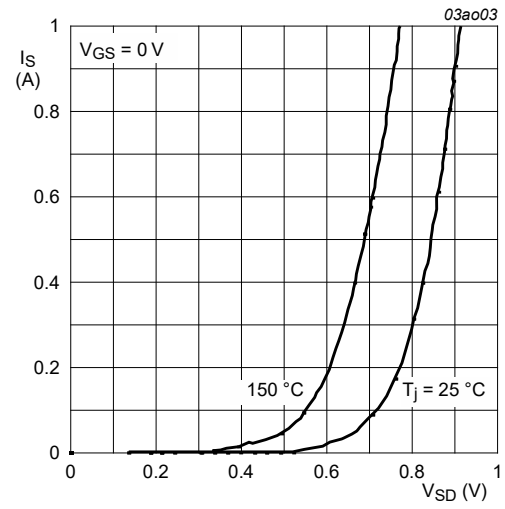


Fig. 12. Gate-source voltage as a function of gate charge; typical values



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

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



$T_j = 25$ °C and 150 °C; $V_{GS} = 0$ V

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

11. Package outline

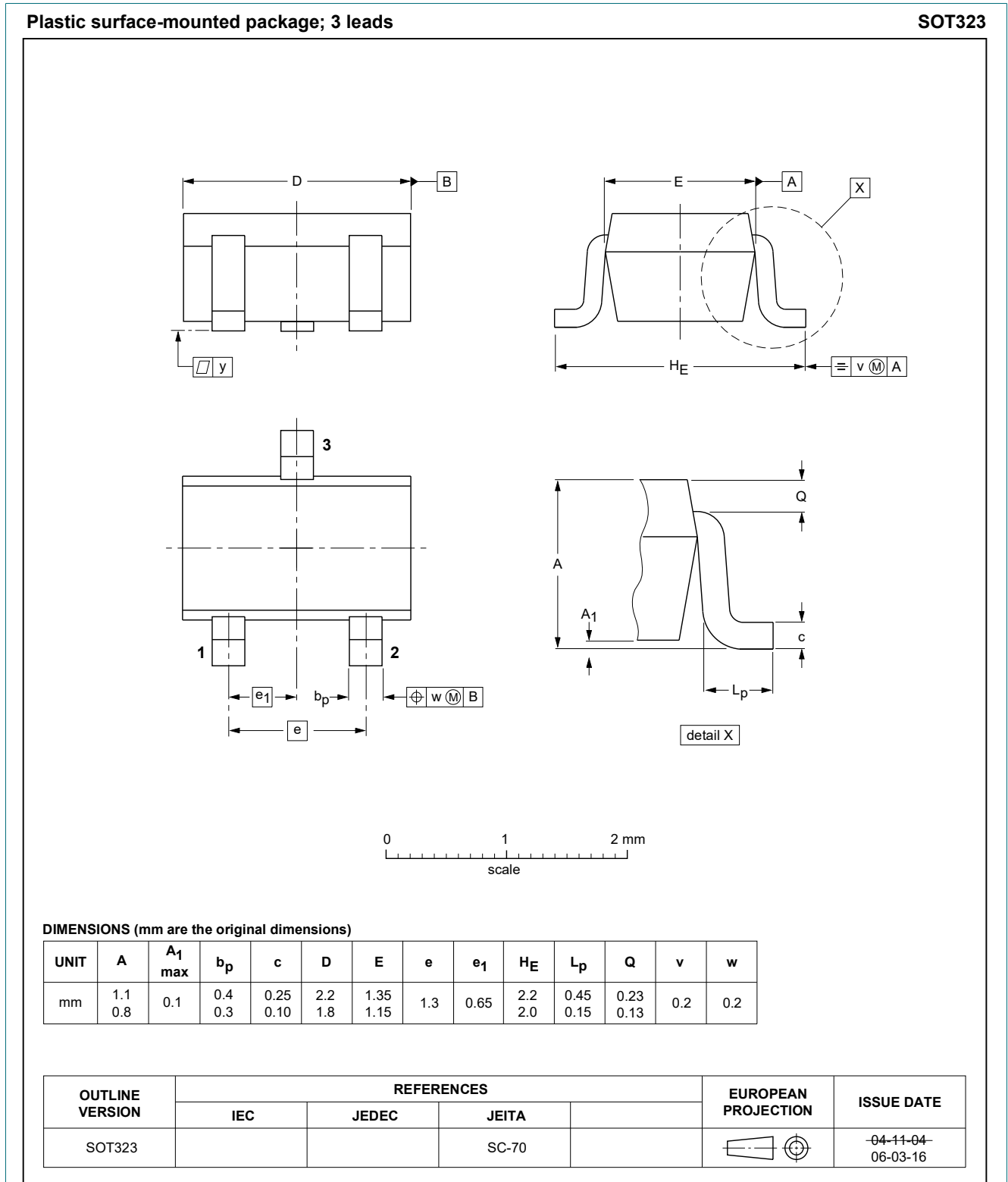


Fig. 15. Package outline SC-70 (SOT323)

12. Soldering

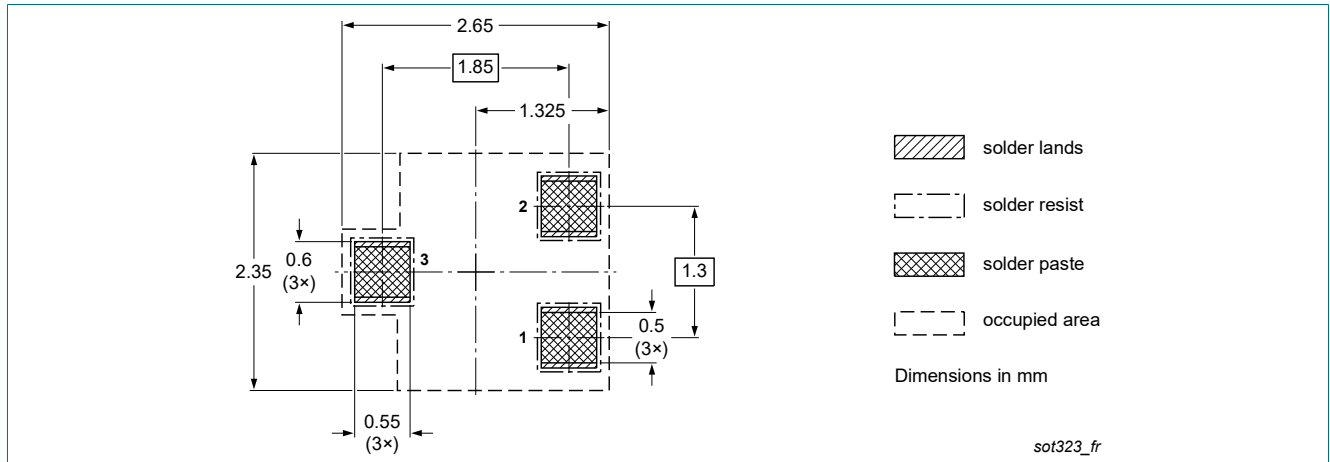


Fig. 16. Reflow soldering footprint for SC-70 (SOT323)

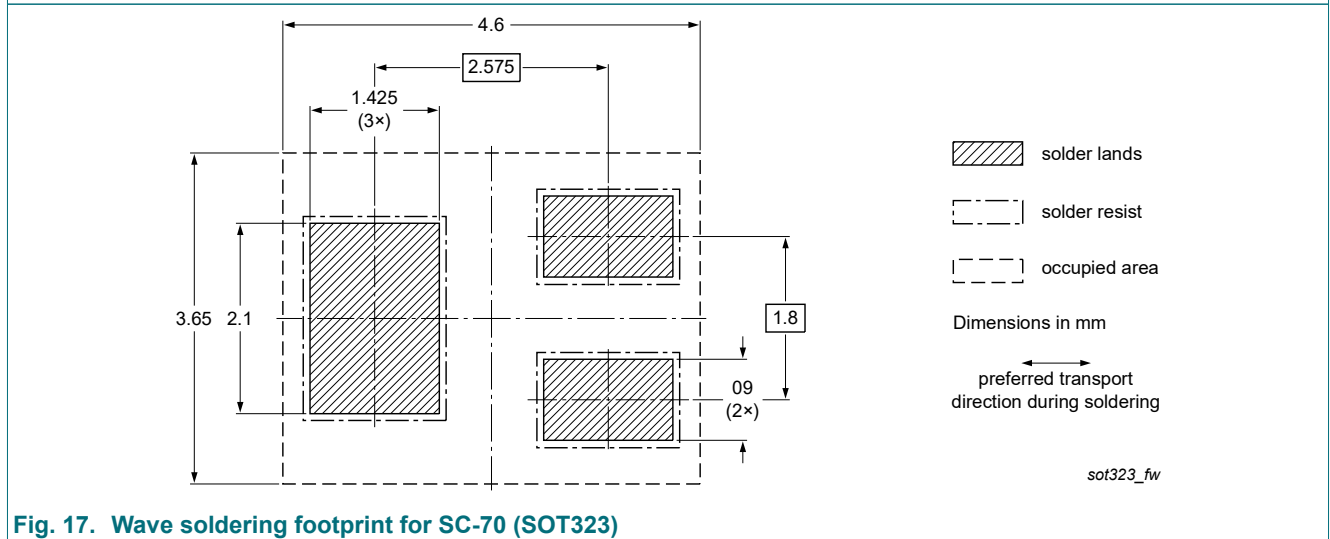


Fig. 17. Wave soldering footprint for SC-70 (SOT323)

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">• Measurement conditions for $V_{(BR)DSS}$ revised.• Legal texts have been adapted to the new company name where appropriate.• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.			
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".
- [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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