



PSMNR55-40SSH

12 December 2019

Objective data sheet

1. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$25\text{ °C} \leq T_j \leq 175\text{ °C}$	-	-	40	V
I_D	drain current	$V_{GS} = 10\text{ V}; T_{mb} = 25\text{ °C}$	[1]	-	425	A
P_{tot}	total power dissipation	$T_{mb} = 25\text{ °C}; \text{Fig. 1}$	-	-	375	W
T_j	junction temperature		-55	-	175	°C
Static characteristics						
R_{DSon}	drain-source on-state resistance	$V_{GS} = 10\text{ V}; I_D = 25\text{ A}; T_j = 25\text{ °C}$	0.32	0.46	0.54	mΩ
		$V_{GS} = 10\text{ V}; I_D = 25\text{ A}; T_j = 125\text{ °C}; \text{Fig. 5}$	0.51	0.76	0.95	mΩ
Dynamic characteristics						
Q_{GD}	gate-drain charge	$I_D = 25\text{ A}; V_{DS} = 32\text{ V}; V_{GS} = 10\text{ V}$	9	30	60	nC
$Q_{G(tot)}$	total gate charge		114	176	246	nC

[1] Continuous current will be demonstrated during application. Practically, the current will be limited by the PCB, thermal design and operating temperature.

2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	G	gate	<p>LFPAK88 (SOT1235)</p>	<p>mbb076</p>
2	S	Source		
3	S	Source		
4	S	Source		
mb	D	mounting base; connected to drain		

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PSMNR55-40SSH	LFPAK88	plastic, single-ended surface-mounted package (LFPAK88); 4 leads; 2 mm pitch; 8 mm x 8 mm x 1.6 mm body	SOT1235

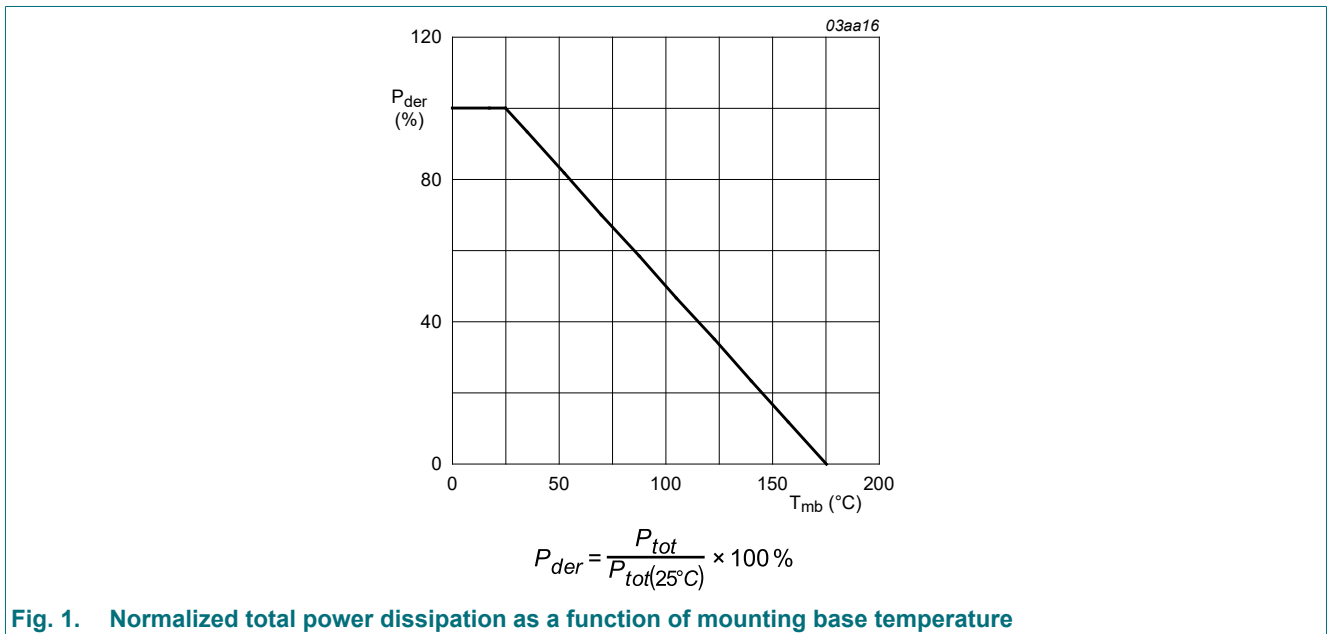
4. Limiting values

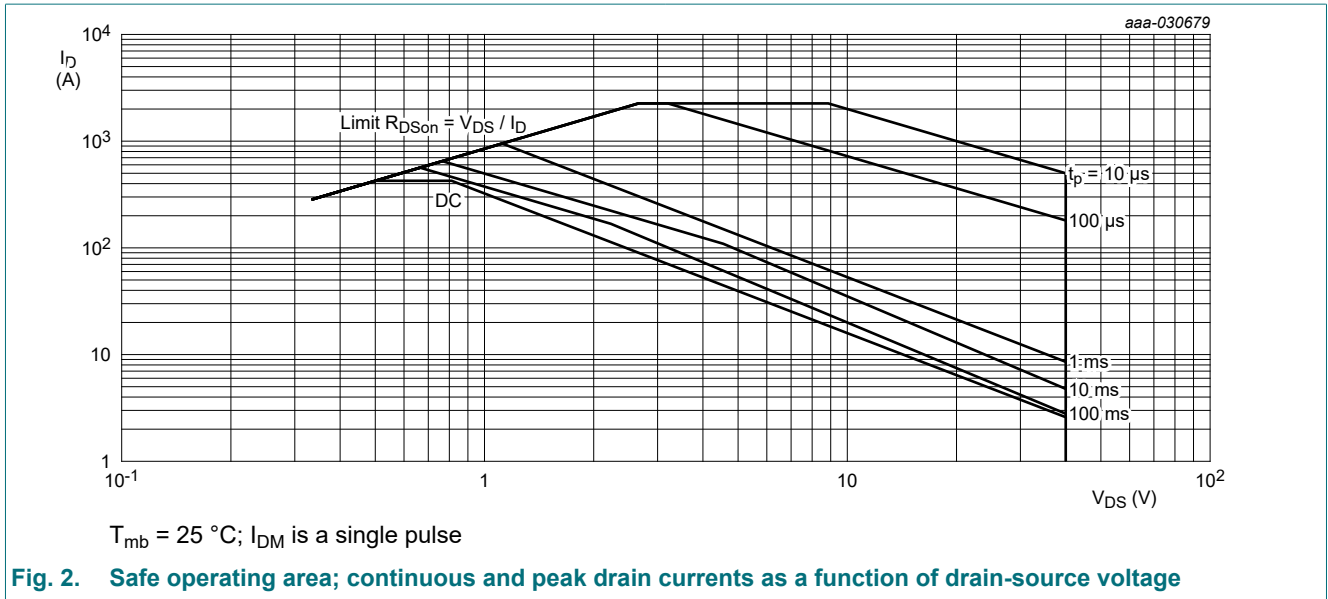
Table 4. Limiting values

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 ≤ 175 °C		-	40	V
V _{D5M}	peak drain-source voltage	t _p ≤ 20 ns; f ≤ 500 kHz; E _{DS(AL)} ≤ 200 nJ; pulsed		-	45	V
V _{DGR}	drain-gate voltage	25 °C ≤ T _j ≤ 175 °C; R _{GS} = 20 kΩ		-	40	V
V _{GS}	gate-source voltage			-20	20	V
P _{tot}	total power dissipation	T _{mb} = 25 °C; Fig. 1		-	375	W
I _D	drain current	V _{GS} = 10 V; T _{mb} = 25 °C	[1]	-	425	A
		V _{GS} = 10 V; T _{mb} = 100 °C		-	[tbd]	A
I _{DM}	peak drain current	pulsed; t _p ≤ 10 μs; T _{mb} = 25 °C; Fig. 2		-	2258	A
T _{stg}	storage temperature			-55	175	°C
T _j	junction temperature			-55	175	°C
Source-drain diode						
I _S	source current	T _{mb} = 25 °C	[1]	-	500	A
I _{SM}	peak source current	pulsed; t _p ≤ 10 μs; T _{mb} = 25 °C		-	2258	A
Avalanche ruggedness						
E _{DS(AL)S}	non-repetitive drain-source avalanche energy	I _D = 120 A; V _{sup} ≤ 40 V; R _{GS} = 50 Ω; V _{GS} = 10 V; T _{j(init)} = 25 °C; unclamped	[2]	-	1360	mJ
I _{AS}	non-repetitive avalanche current	V _{sup} ≤ 40 V; V _{GS} = 10 V; T _{j(init)} = 25 °C; R _{GS} = 50 Ω		-	[tbd]	A

- [1] Continuous current will be demonstrated during application. Practically, the current will be limited by the PCB, thermal design and operating temperature.
- [2] Single-pulse avalanche rating limited by maximum junction temperature of 175 °C.

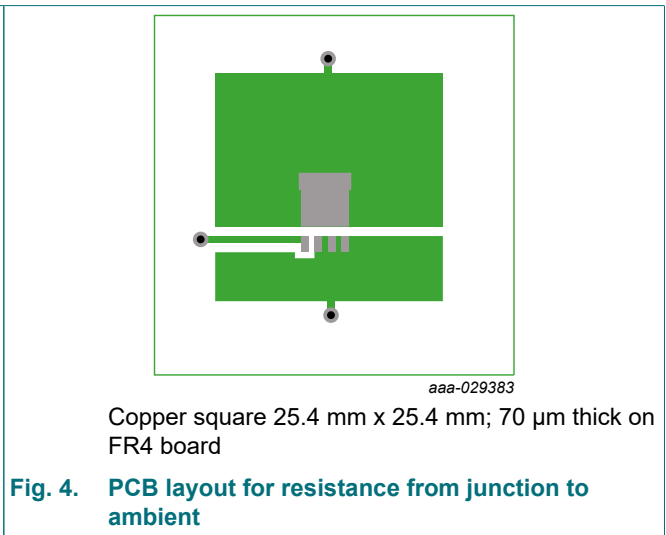
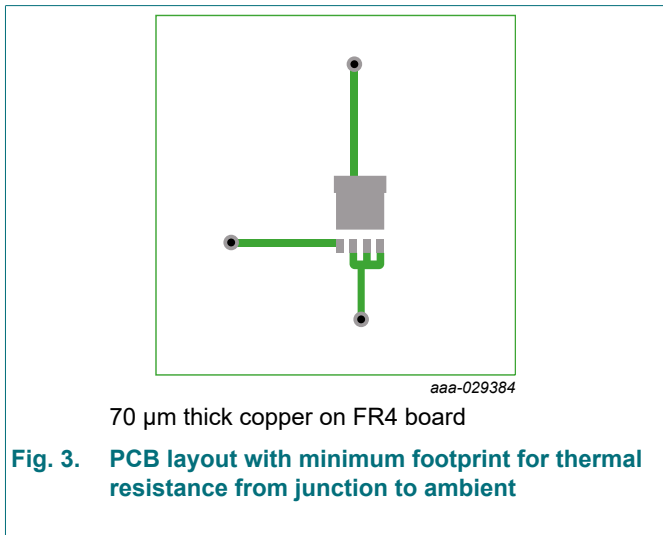




5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base		-	[tbd]	0.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	Fig. 3	-	70	-	K/W
		Fig. 4	-	35	-	K/W

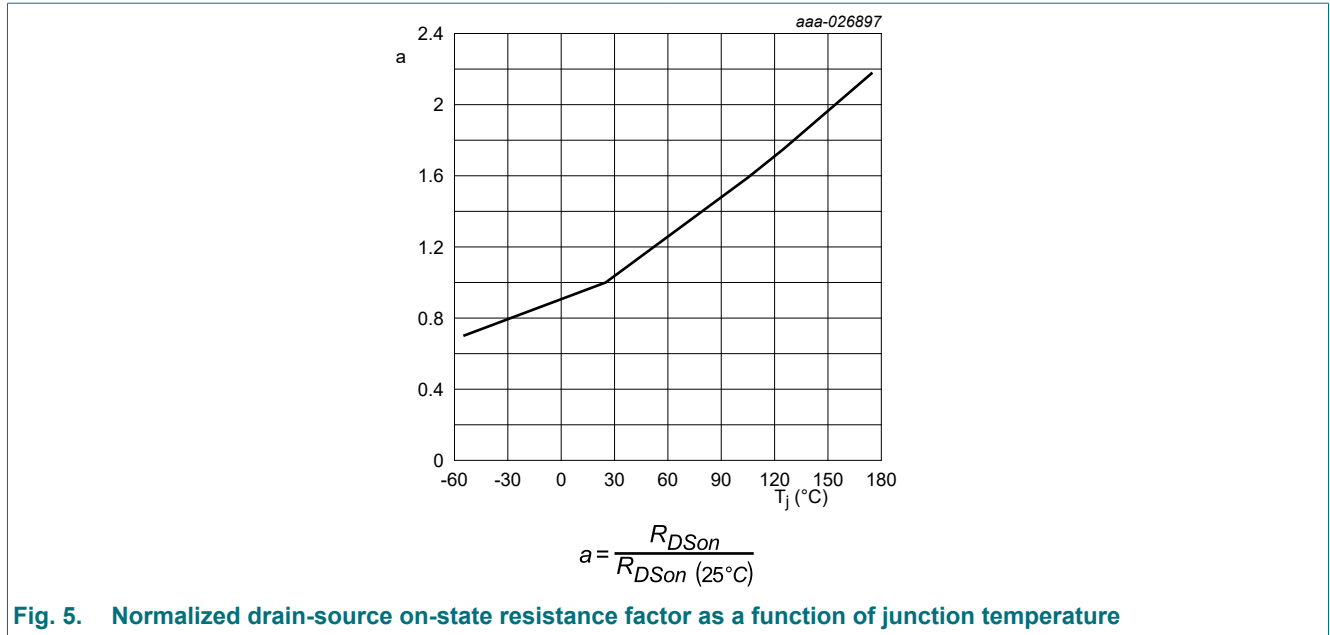


6. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
$V_{(BR)DSS}$	drain-source breakdown voltage	$I_D = 250 \mu A; V_{GS} = 0 V; T_j = 25 \text{ }^\circ C$	40	-	-	V
		$I_D = 250 \mu A; V_{GS} = 0 V; T_j = -55 \text{ }^\circ C$	36	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$I_D = 1 \text{ mA}; V_{DS} = V_{GS}; T_j = 25 \text{ }^\circ C$	2.4	3	3.6	V
$\Delta V_{GS(th)}/\Delta T$	gate-source threshold voltage variation with temperature	$25 \text{ }^\circ C \leq T_j \leq 175 \text{ }^\circ C$	-	[tbd]	-	mV/K
I_{DSS}	drain leakage current	$V_{DS} = 32 \text{ V}; V_{GS} = 0 \text{ V}; T_j = 25 \text{ }^\circ C$	-	[tbd]	[tbd]	μA
		$V_{DS} = 32 \text{ V}; V_{GS} = 0 \text{ V}; T_j = 175 \text{ }^\circ C$	-	[tbd]	-	μA
I_{GSS}	gate leakage current	$V_{GS} = 20 \text{ V}; V_{DS} = 0 \text{ V}; T_j = 25 \text{ }^\circ C$	-	2	100	nA
		$V_{GS} = -20 \text{ V}; V_{DS} = 0 \text{ V}; T_j = 25 \text{ }^\circ C$	-	2	100	nA
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = 10 \text{ V}; I_D = 25 \text{ A}; T_j = 25 \text{ }^\circ C$	0.32	0.46	0.54	m Ω
		$V_{GS} = 10 \text{ V}; I_D = 25 \text{ A}; T_j = 105 \text{ }^\circ C$; Fig. 5	0.46	0.69	0.86	m Ω
		$V_{GS} = 10 \text{ V}; I_D = 25 \text{ A}; T_j = 125 \text{ }^\circ C$; Fig. 5	0.51	0.76	0.95	m Ω
		$V_{GS} = 10 \text{ V}; I_D = 25 \text{ A}; T_j = 175 \text{ }^\circ C$; Fig. 5	0.63	0.96	1.18	m Ω
R_G	gate resistance	$f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ C$	0.4	0.97	2.4	Ω
Dynamic characteristics						
$Q_{G(tot)}$	total gate charge	$I_D = 25 \text{ A}; V_{DS} = 32 \text{ V}; V_{GS} = 10 \text{ V}$	114	176	246	nC
		$I_D = 0 \text{ A}; V_{DS} = 0 \text{ V}; V_{GS} = 10 \text{ V}$	-	[tbd]	-	nC
Q_{GS}	gate-source charge	$I_D = 25 \text{ A}; V_{DS} = 32 \text{ V}; V_{GS} = 10 \text{ V}$	29	49	74	nC
$Q_{GS(th)}$	pre-threshold gate-source charge		-	[tbd]	-	nC
$Q_{GS(th-pl)}$	post-threshold gate-source charge		-	[tbd]	-	nC
Q_{GD}	gate-drain charge		9	30	60	nC
$V_{GS(pl)}$	gate-source plateau voltage	$I_D = 25 \text{ A}; V_{DS} = 32 \text{ V}$	-	[tbd]	-	V
C_{iss}	input capacitance	$V_{DS} = 25 \text{ V}; V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ C$	8427	14045	19663	pF
C_{oss}	output capacitance		1721	2882	4034	pF
C_{rss}	reverse transfer capacitance		153	510	1122	pF
$t_{d(on)}$	turn-on delay time	$V_{DS} = 30 \text{ V}; R_L = 1.2 \text{ } \Omega; V_{GS} = 10 \text{ V}; R_{G(ext)} = 5 \text{ } \Omega$	-	43	-	ns
t_r	rise time		-	37	-	ns
$t_{d(off)}$	turn-off delay time		-	117	-	ns
t_f	fall time		-	51	-	ns
Q_{oss}	output charge	$V_{GS} = 0 \text{ V}; V_{DS} = 25 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ C$	-	[tbd]	-	nC
Source-drain diode						
V_{SD}	source-drain voltage	$I_S = 25 \text{ A}; V_{GS} = 0 \text{ V}; T_j = 25 \text{ }^\circ C$	-	0.8	1	V

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{rr}	reverse recovery time	$I_S = 25 \text{ A}; di_S/dt = -100 \text{ A}/\mu\text{s}; V_{GS} = 0 \text{ V}; V_{DS} = 20 \text{ V}$	-	61	-	ns
Q_r	recovered charge		-	91	-	nC
t_a	reverse recovery rise time		-	[tbd]	-	ns
t_b	reverse recovery fall time		-	[tbd]	-	ns



7. Package outline

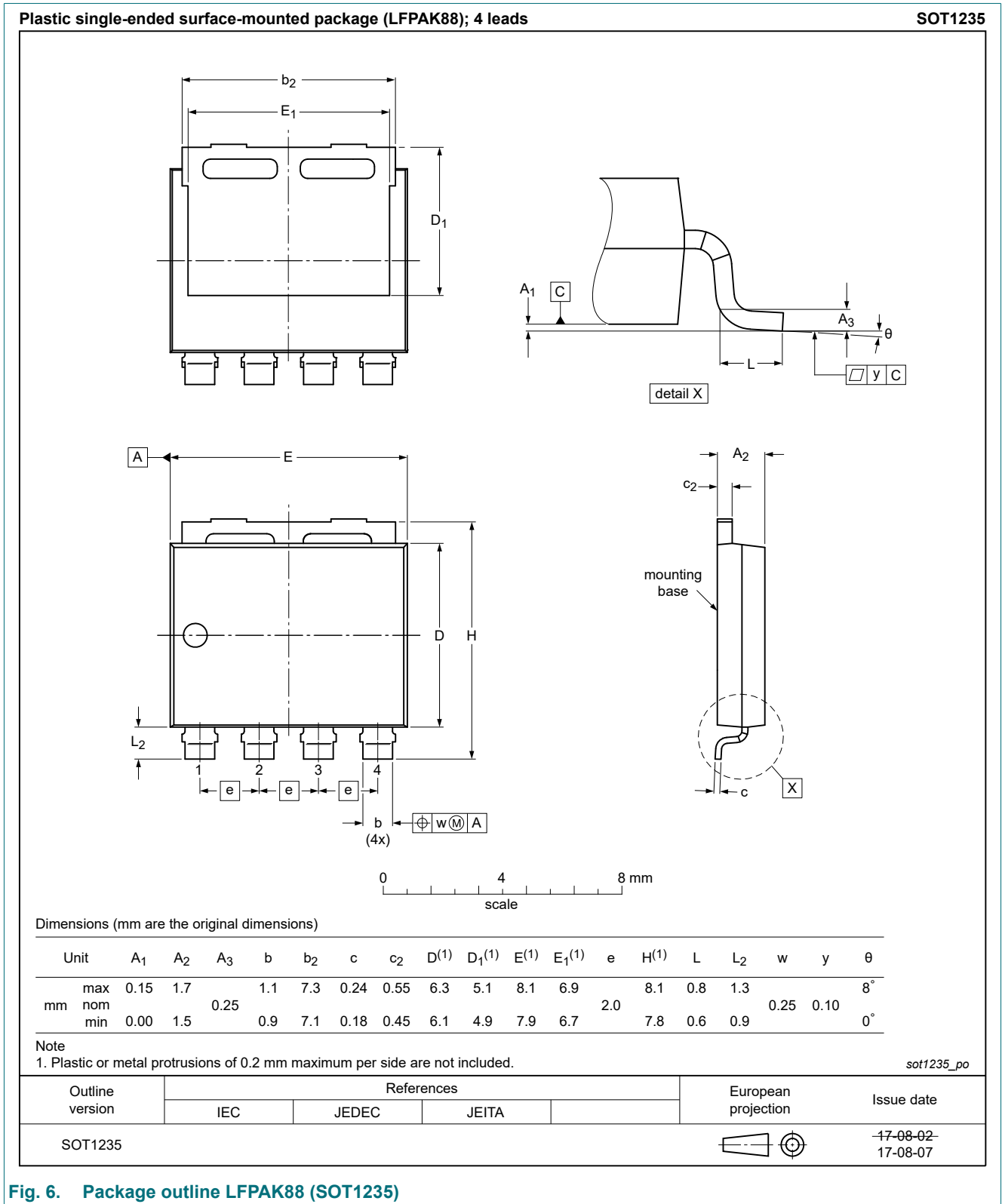


Fig. 6. Package outline LPAK88 (SOT1235)

8. Soldering

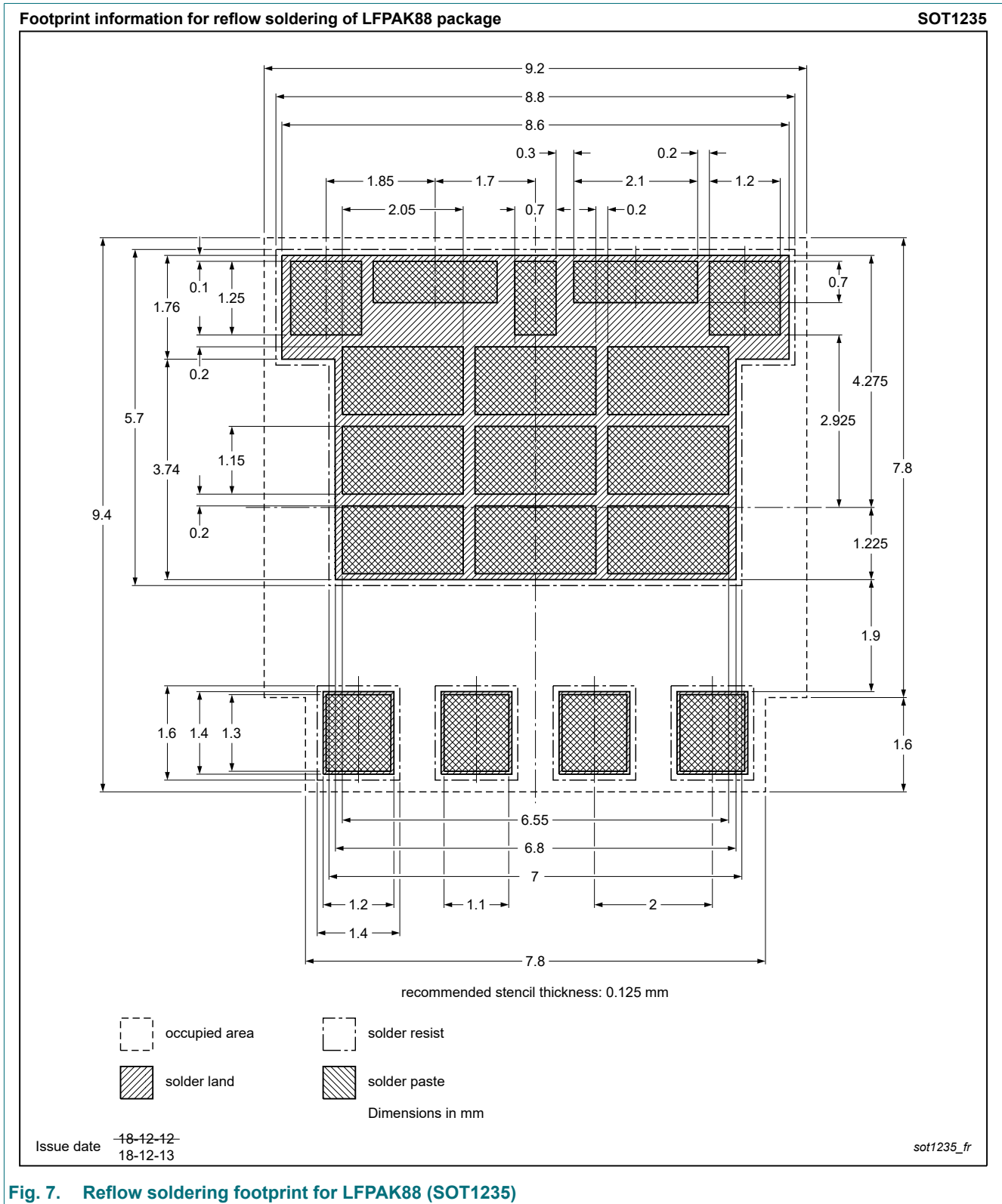


Fig. 7. Reflow soldering footprint for LPAK88 (SOT1235)

9. Legal information

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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.
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Date of release: 12 December 2019
