



BUK7J2R4-80M

N-channel 80 V, 2.4 mOhm, Standard level MOSFET in LFPK56E

13 February 2024

Preliminary data sheet

1. General description

Automotive qualified N-channel MOSFET using the latest Trench 14 low ohmic split-gate technology, for ultra-low R_{DSon} capability, housed in a LFPK56E package. This product has been fully designed and qualified to meet AEC-Q101 requirements delivering high performance and endurance.

2. Features and benefits

- Fully automotive qualified to AEC-Q101:
 - 175 °C rating suitable for thermally demanding environments
- Trench 14 split-gate technology:
 - Reduced cell pitch enables enhanced power density and efficiency with lower R_{DSon} in same footprint
 - Fast and efficient switching with optimal damping and low spiking
- LFPK Gull Wing leads:
 - High Board Level Reliability absorbing mechanical stress during thermal cycling, unlike traditional QFN packages
 - Visual (AOI) soldering inspection, no need for expensive x-ray equipment
 - Easy solder wetting for good mechanical solder joints
- LFPK copper clip technology:
 - Improved reliability, with reduced R_{th} , R_{DSon} and package inductance
 - Increases maximum current capability and improved current spreading

3. Applications

- 12 V, 24 V and 48 V automotive systems
- Motor, lighting and solenoid control
- Ultra high-performance power switching

4. Quick reference data

Table 1. Quick reference data

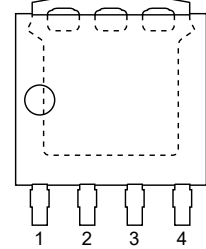
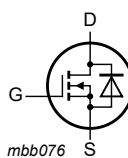
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$25\text{ °C} \leq T_j \leq 175\text{ °C}$	-	-	80	V
I_D	drain current	$V_{GS} = 10\text{ V}$; $T_{mb} = 25\text{ °C}$; Fig. 2	-	-	231	A
P_{tot}	total power dissipation	$T_{mb} = 25\text{ °C}$; Fig. 1	-	-	294	W
T_j	junction temperature		-55	-	175	°C
Static characteristics						
R_{DSon}	drain-source on-state resistance	$V_{GS} = 10\text{ V}$; $I_D = 25\text{ A}$; $T_j = 25\text{ °C}$; #unique_6/unique_6_Connect_42_idaaa-038795	1.3	1.9	2.4	mΩ

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Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Dynamic characteristics						
$Q_{G(tot)}$	total gate charge	$I_D = 25\text{ A}$; $V_{DS} = 40\text{ V}$; $V_{GS} = 10\text{ V}$; #unique_6/unique_6_Connect_42_idaaa-038796 ; #unique_6/unique_6_Connect_42_id003aaa508	42.5	85	127	nC

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	S	source	 LPAK56E; Power-SO8 (SOT1023)	 mbb076
2	S	source		
3	S	source		
4	G	gate		
mb	D	mounting base; connected to drain		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BUK7J2R4-80M	LPAK56E; Power-SO8	plastic, single-ended surface-mounted package (LPAK56E); 4 leads; 1.27 mm pitch	SOT1023

7. Marking

Table 4. Marking codes

Type number	Marking code
BUK7J2R4-80M	72M480J

8. Limiting values

Table 5. Limiting values

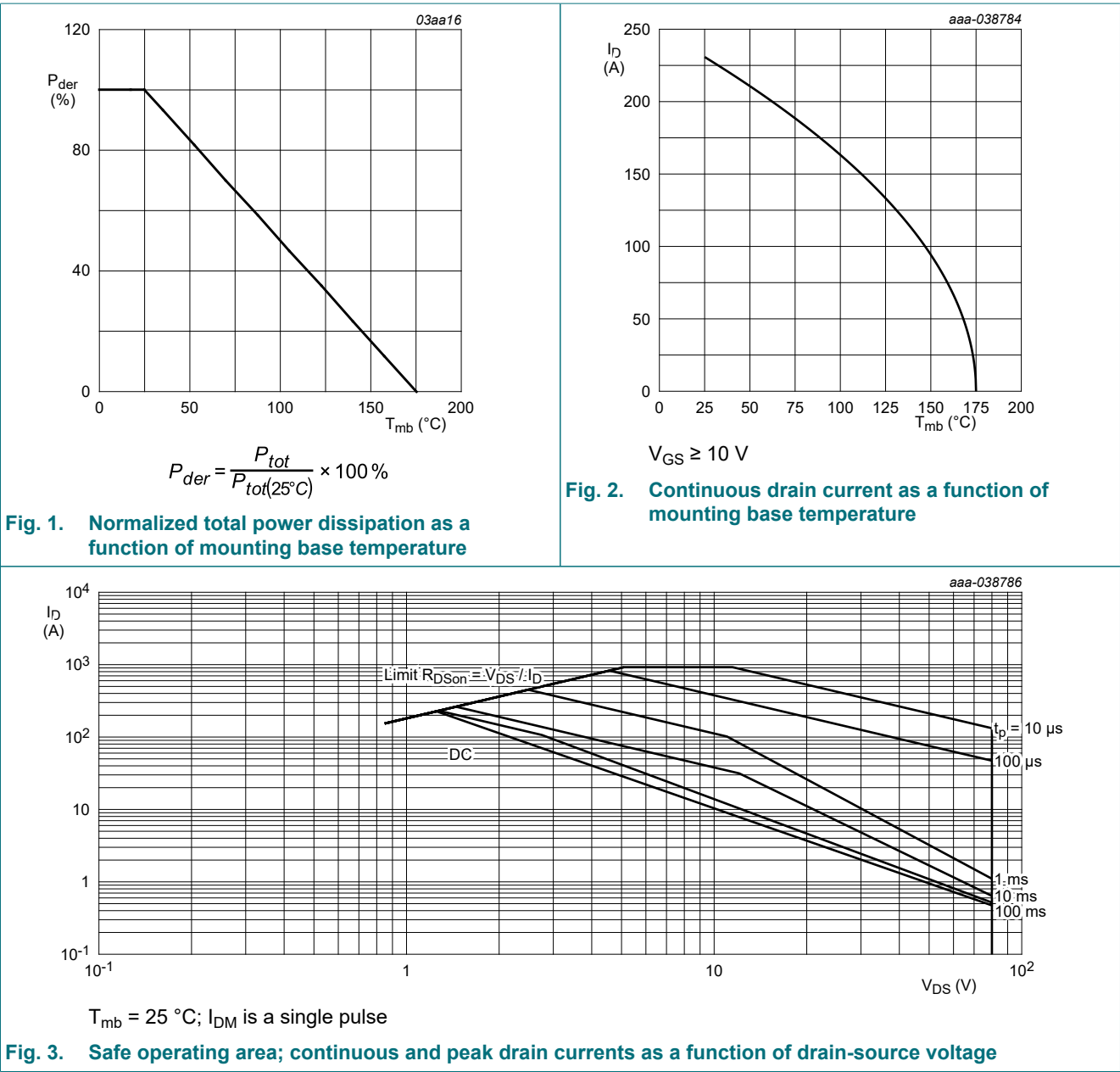
In accordance with the Absolute Maximum Rating System (IEC 60134). $T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise stated.

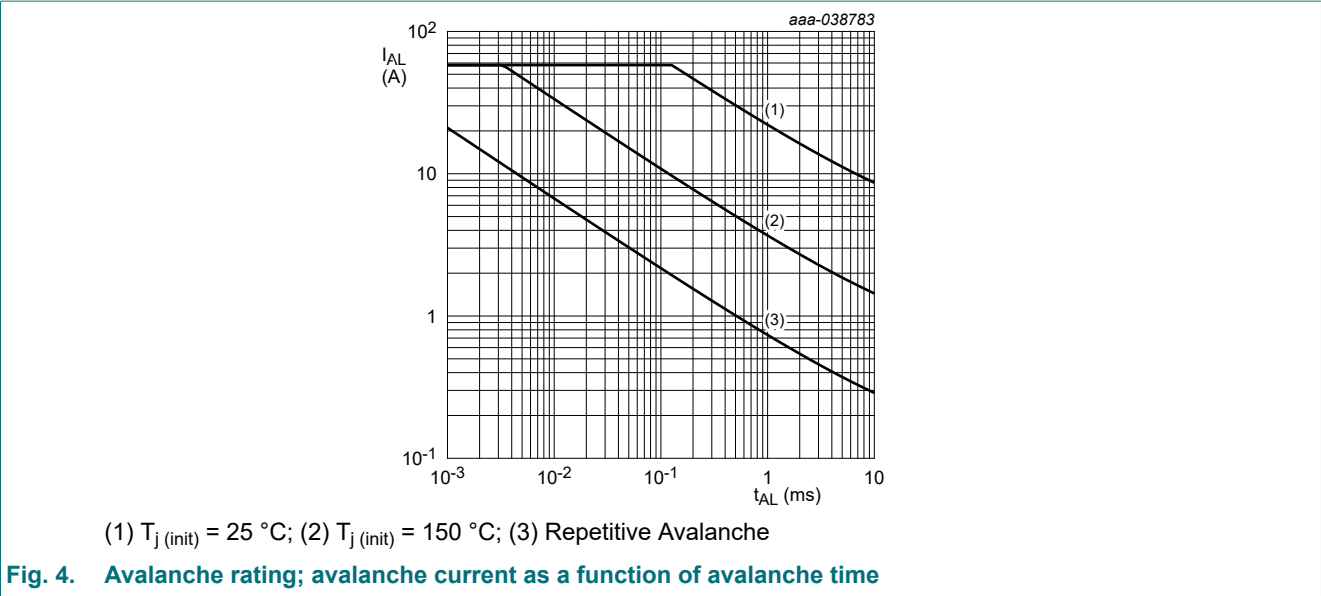
Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	drain-source voltage	$25\text{ }^{\circ}\text{C} \leq T_j \leq 175\text{ }^{\circ}\text{C}$	-	80	V
V_{GS}	gate-source voltage		-20	20	V
P_{tot}	total power dissipation	$T_{mb} = 25\text{ }^{\circ}\text{C}$; Fig. 1	-	294	W
I_D	drain current	$V_{GS} = 10\text{ V}$; $T_{mb} = 25\text{ }^{\circ}\text{C}$; Fig. 2	-	231	A
		$V_{GS} = 10\text{ V}$; $T_{mb} = 100\text{ }^{\circ}\text{C}$; Fig. 2	-	163	A
I_{DM}	peak drain current	pulsed; $t_p \leq 10\text{ }\mu\text{s}$; $T_{mb} = 25\text{ }^{\circ}\text{C}$; Fig. 3	-	923	A
T_{stg}	storage temperature		-55	175	$^{\circ}\text{C}$

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Symbol	Parameter	Conditions		Min	Max	Unit
T _j	junction temperature			-55	175	°C
Source-drain diode						
I _S	source current	T _{mb} = 25 °C		-	231	A
I _{SM}	peak source current	pulsed; t _p ≤ 10 μs; T _{mb} = 25 °C		-	923	A
Avalanche ruggedness						
E _{DS(AL)S}	non-repetitive drain-source avalanche energy	I _D = 58 A; V _{sup} ≤ 80 V; R _{GS} = 50 Ω; V _{GS} = 10 V; T _{j(init)} = 25 °C; unclamped; Fig. 4	[1] [2] [3]	-	383	mJ

- [1] Protected by 100% test.
- [2] Single-pulse avalanche rating limited by maximum junction temperature of 175 °C.
- [3] Refer to application note AN10273 for further information.



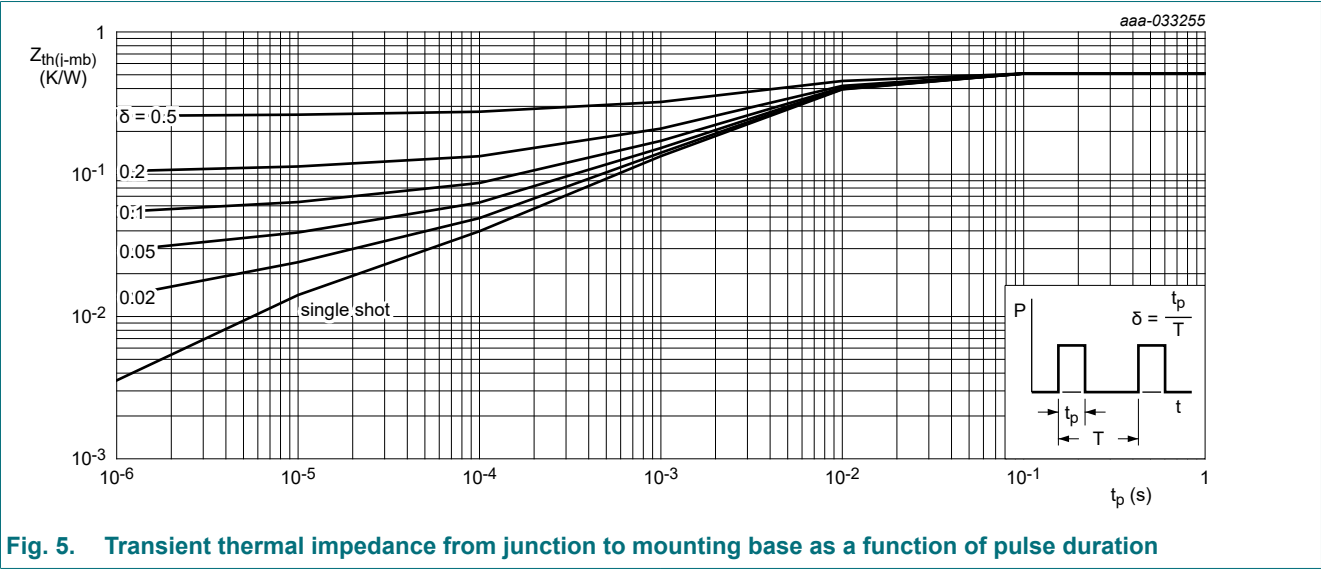


9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Fig. 5		-	0.45	0.51	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient		[1]	-	24	-	K/W

[1] Device on 4 layer PCB. Refer to TN00008 for further information.



10. Package outline

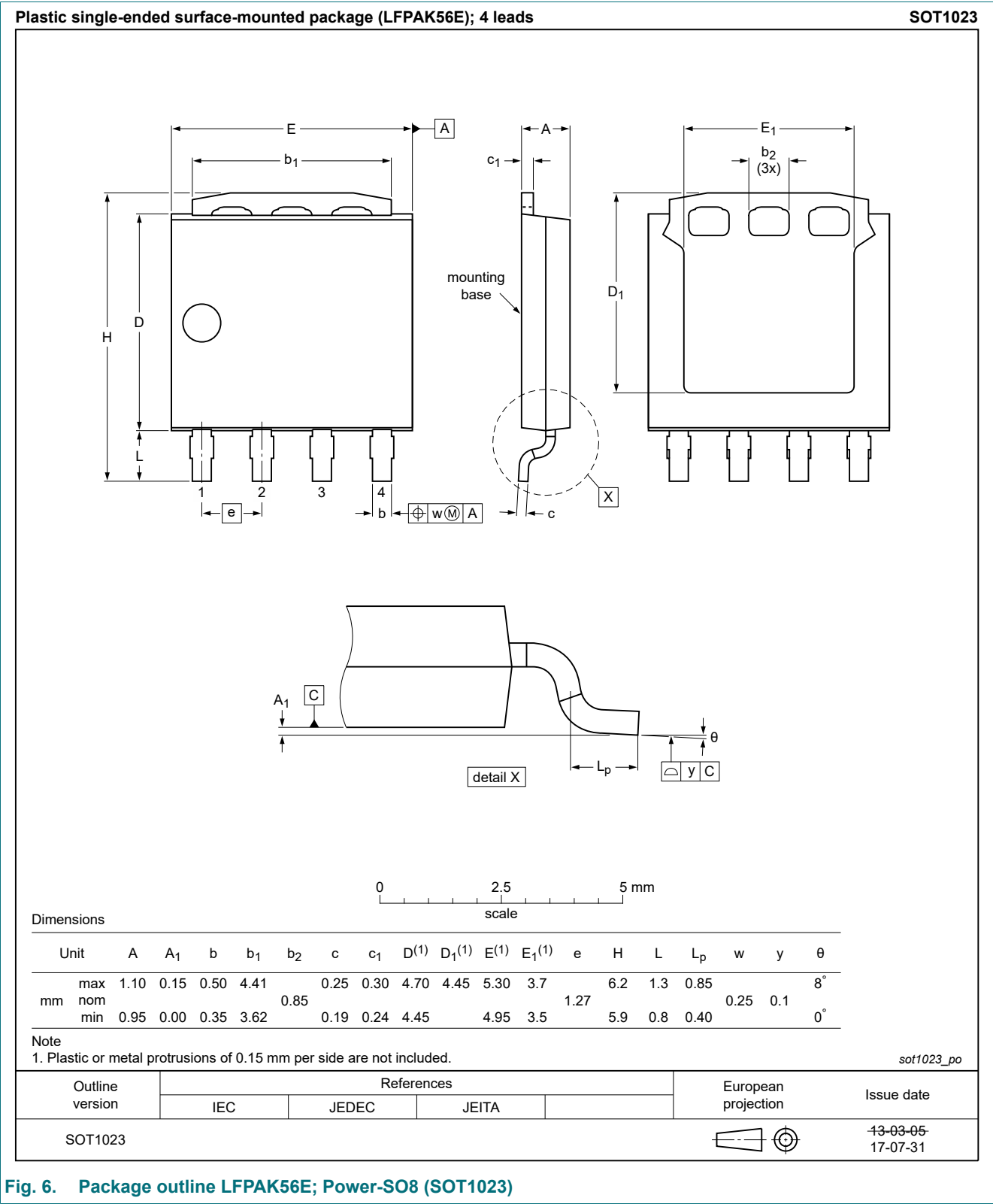
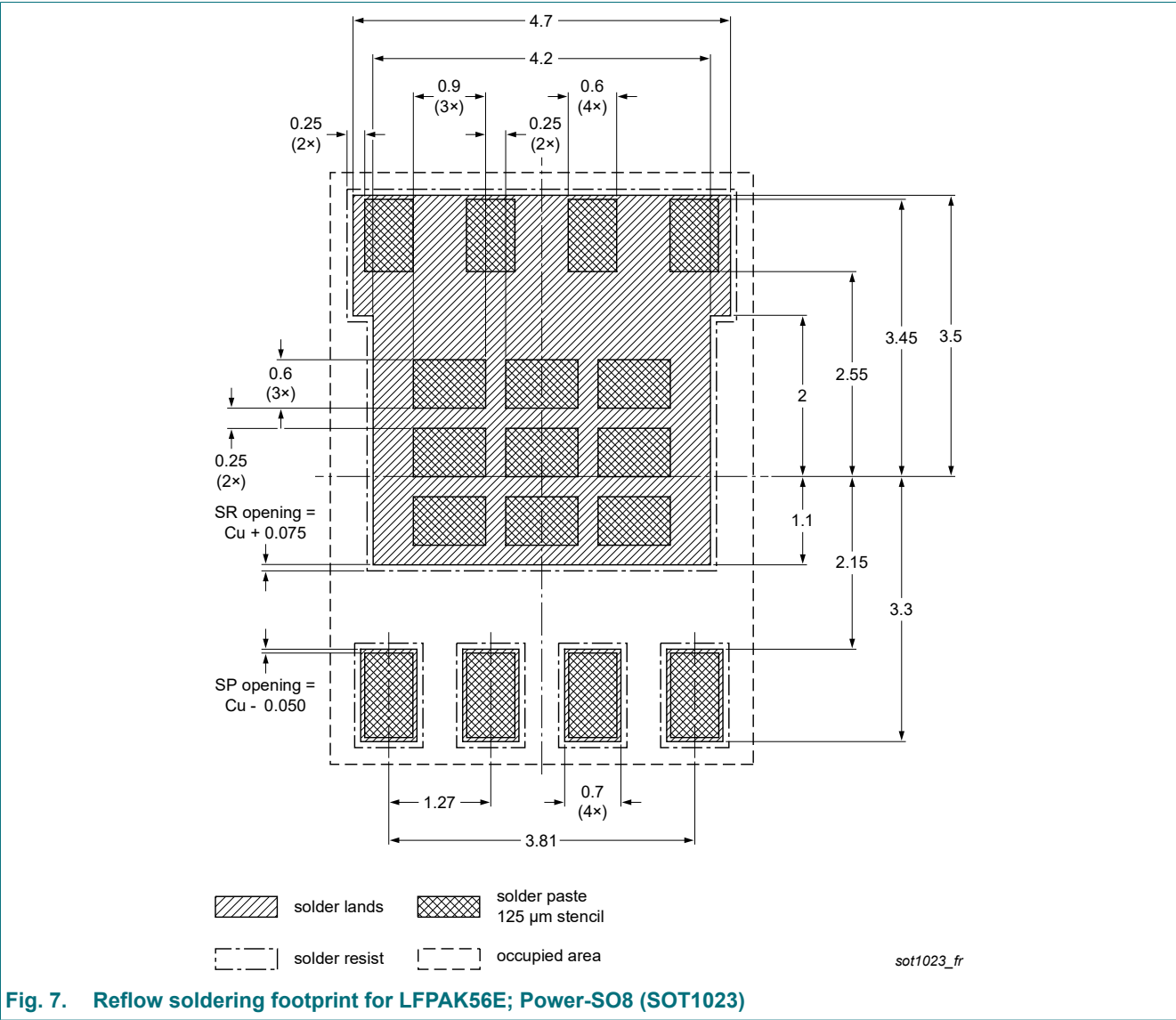


Fig. 6. Package outline LPAK56E; Power-SO8 (SOT1023)

11. Soldering



12. 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.
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