



BUK9M48-80L

N-channel 80 V, 48 mOhm logic level MOSFET in LPAK33

3 September 2024

Product data sheet

1. General description

Logic level N-channel MOSFET in an LPAK33 (Power33) package using TrenchMOS technology. This product has been designed and qualified to AEC-Q101 standard for use in high performance automotive applications.

2. Features and benefits

- Logic-level compatible
- Trench12 MOSFET technology
- Efficient switching with soft body-diode recovery
- Automotive qualified to AEC-Q101 at 175 °C
- Side-wettable flanks for robust solder joints and automatic optical inspection

3. Applications

- 12 V, 24 V and 48 V automotive systems
- Motors, lamps and solenoid control
- Transmission control
- LED lighting
- Circuit protection

4. Quick reference data

Table 1. Quick reference data

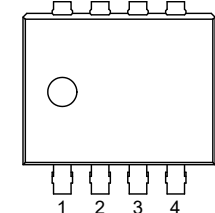
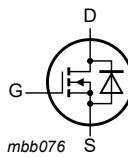
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$25\text{ °C} \leq T_j \leq 175\text{ °C}$	-	-	80	V
I_D	drain current	$V_{GS} = 10\text{ V}; T_{mb} = 25\text{ °C};$ Fig. 2	[1]	-	15	A
P_{tot}	total power dissipation	$T_{mb} = 25\text{ °C};$ Fig. 1	-	-	50	W
Static characteristics						
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = 10\text{ V}; I_D = 5\text{ A};$ $T_j = 25\text{ °C};$ #unique_6/unique_6_Connect_42_idaaa-039452	26.2	38.3	48	mΩ
Dynamic characteristics						
Q_{GD}	gate-drain charge	$I_D = 5\text{ A}; V_{DS} = 40\text{ V}; V_{GS} = 5\text{ V};$ $T_j = 25\text{ °C};$ #unique_6/unique_6_Connect_42_idaaa-039453; #unique_6/unique_6_Connect_42_id003aaa508	0.4	1.4	3.1	nC

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Source-drain diode						
Q_r	recovered charge	$I_S = 15 \text{ A}$; $di_S/dt = -100 \text{ A}/\mu\text{s}$; $V_{GS} = 0 \text{ V}$; $V_{DS} = 40 \text{ V}$; $T_j = 25 \text{ }^\circ\text{C}$; #unique_6/unique_6_Connect_42_id003aal160	-	7.5	-	nC

[1] 15 A continuous current has been successfully demonstrated during application tests. Practically the current will be limited by PCB, thermal design and operating temperature.

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	S	source	 <p>LFAK33 (SOT1210)</p>	 <p>mbb076</p>
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
BUK9M48-80L	LFAK33	Plastic, single ended surface mounted package (LFAK33); 8 leads; 0.65 mm pitch	SOT1210

7. Marking

Table 4. Marking codes

Type number	Marking code
BUK9M48-80L	94880L

8. Limiting values

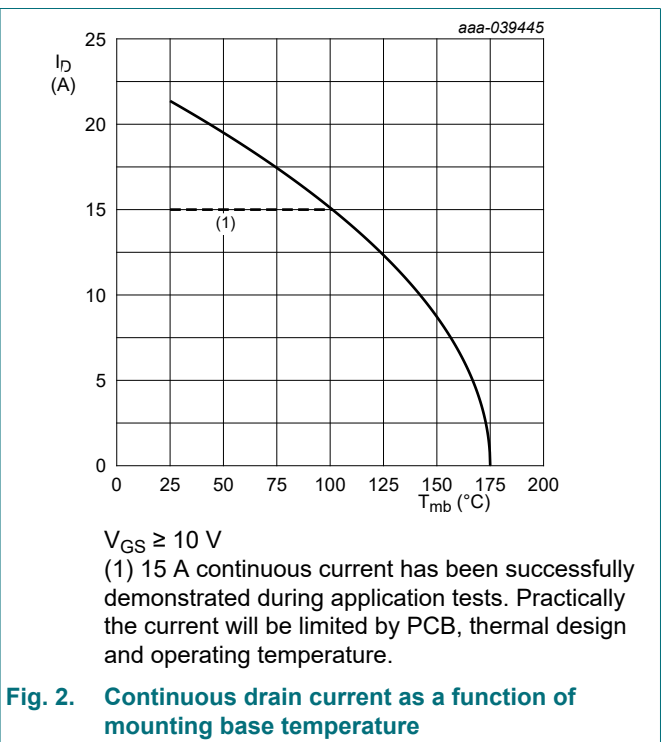
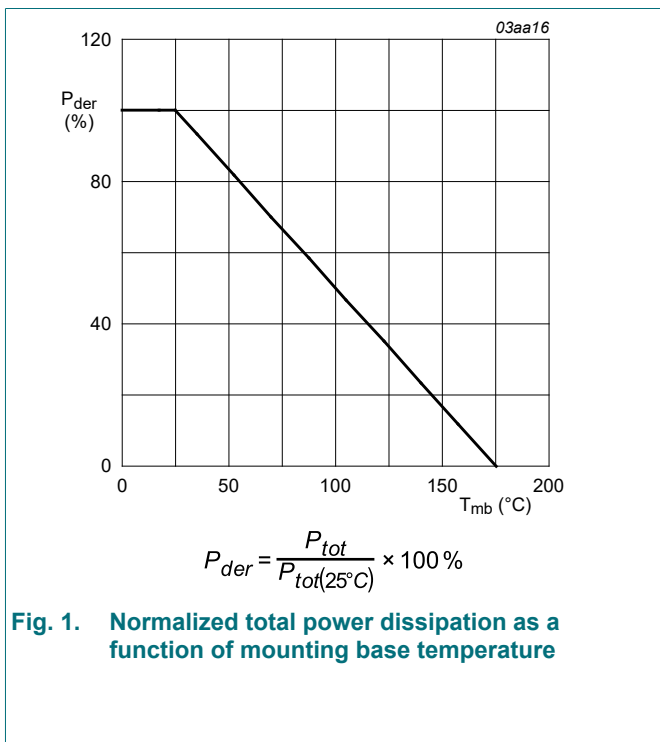
Table 5. Limiting values

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	-	50	W	
I_D	drain current	$V_{GS} = 10 \text{ V}$; $T_{mb} = 25 \text{ }^\circ\text{C}$; Fig. 2	[1]	-	15	A
		$V_{GS} = 10 \text{ V}$; $T_{mb} = 100 \text{ }^\circ\text{C}$; Fig. 2		-	15	A
I_{DM}	peak drain current	pulsed; $t_p \leq 10 \mu\text{s}$; $T_{mb} = 25 \text{ }^\circ\text{C}$; Fig. 3		-	85	A
T_{stg}	storage temperature		-55	175	$^\circ\text{C}$	
T_j	junction temperature		-55	175	$^\circ\text{C}$	

Symbol	Parameter	Conditions	Min	Max	Unit
Source-drain diode					
I_S	source current	$T_{mb} = 25\text{ °C}$	-	15	A
I_{SM}	peak source current	pulsed; $t_p \leq 10\text{ }\mu\text{s}$; $T_{mb} = 25\text{ °C}$	-	85	A
Avalanche ruggedness					
$E_{DS(AL)S}$	non-repetitive drain-source avalanche energy	$I_D = 4.8\text{ A}$; $V_{sup} \leq 80\text{ V}$; $R_{GS} = 50\text{ }\Omega$; $V_{GS} = 10\text{ V}$; $T_{j(\text{init})} = 25\text{ °C}$; unclamped; $t_{AL} = 110\text{ }\mu\text{s}$; Fig. 4	[2] [3]	-	27.4 mJ
I_{AS}	non-repetitive avalanche current	$V_{sup} = 80\text{ V}$; $V_{GS} = 10\text{ V}$; $T_{j(\text{init})} = 25\text{ °C}$; $R_{GS} = 50\text{ }\Omega$; Fig. 4	[2] [3]	-	4.8 A

- [1] 15 A continuous current has been successfully demonstrated during application tests. Practically the current will be limited by PCB, thermal design and operating temperature.
- [2] Single-pulse avalanche rating limited by maximum junction temperature of 175 °C.
- [3] Refer to application note AN10273 for further information.



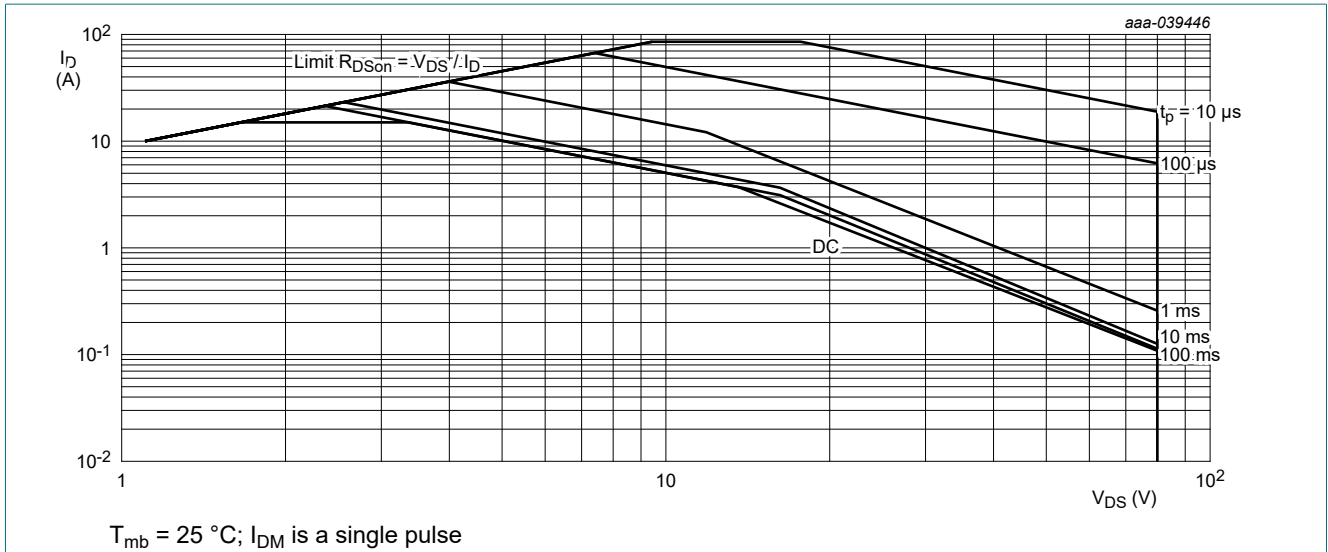


Fig. 3. Safe operating area; continuous and peak drain currents as a function of drain-source voltage

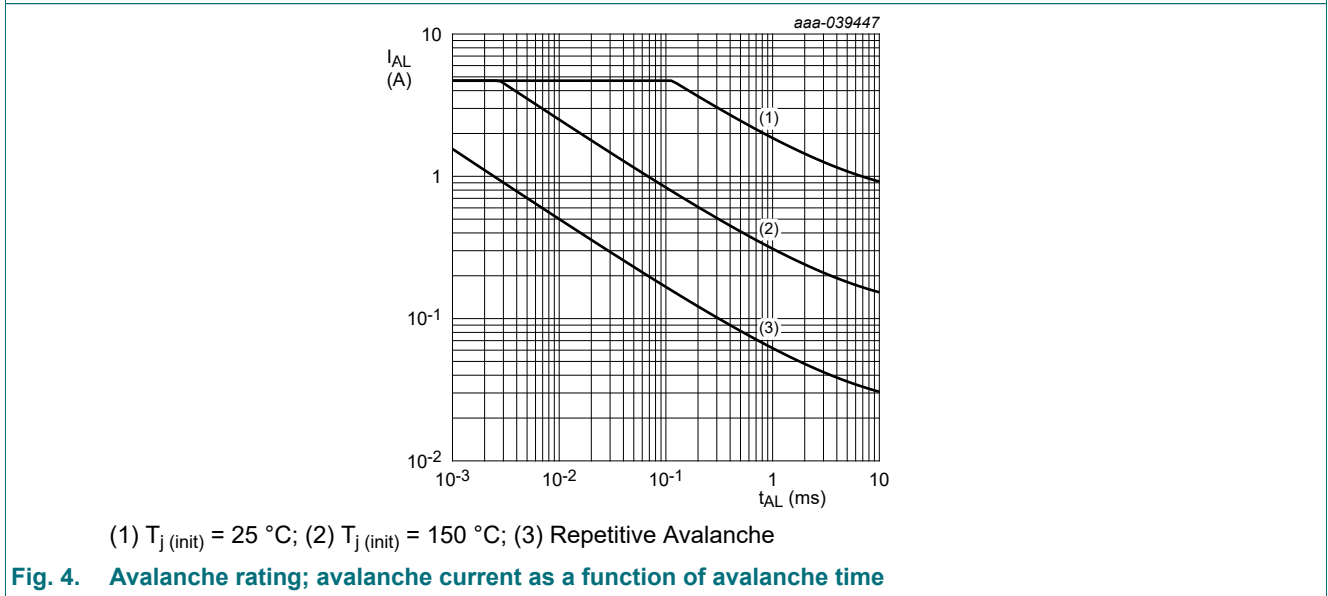


Fig. 4. Avalanche rating; avalanche current as a function of avalanche time

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	-	2.75	2.98	K/W

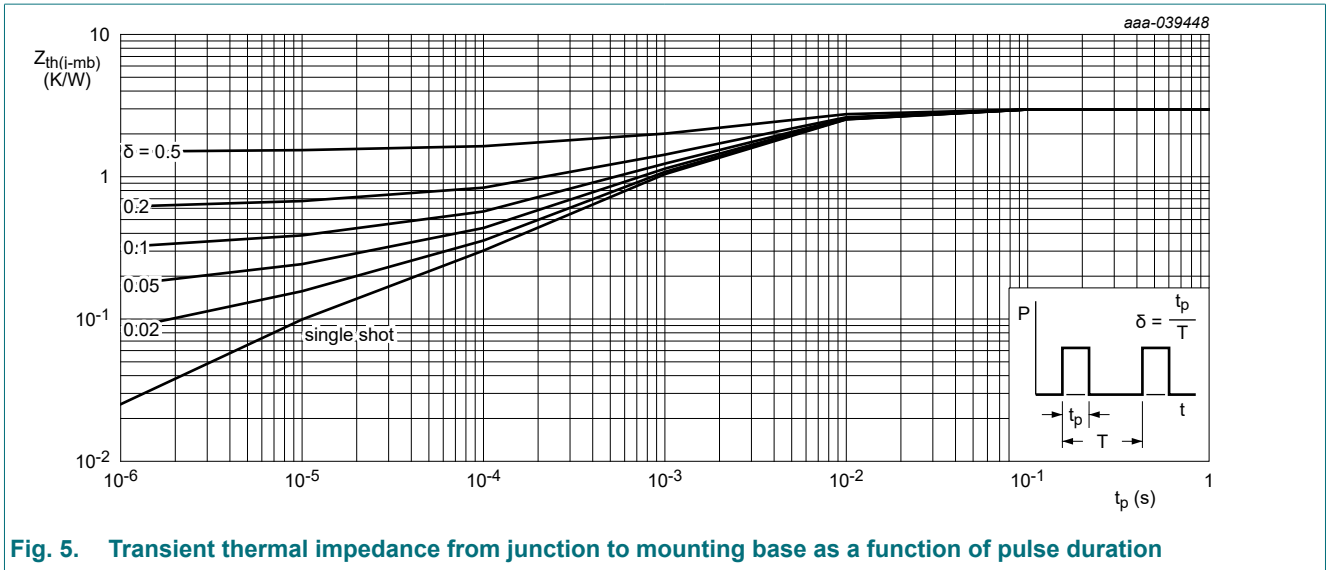


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Package outline

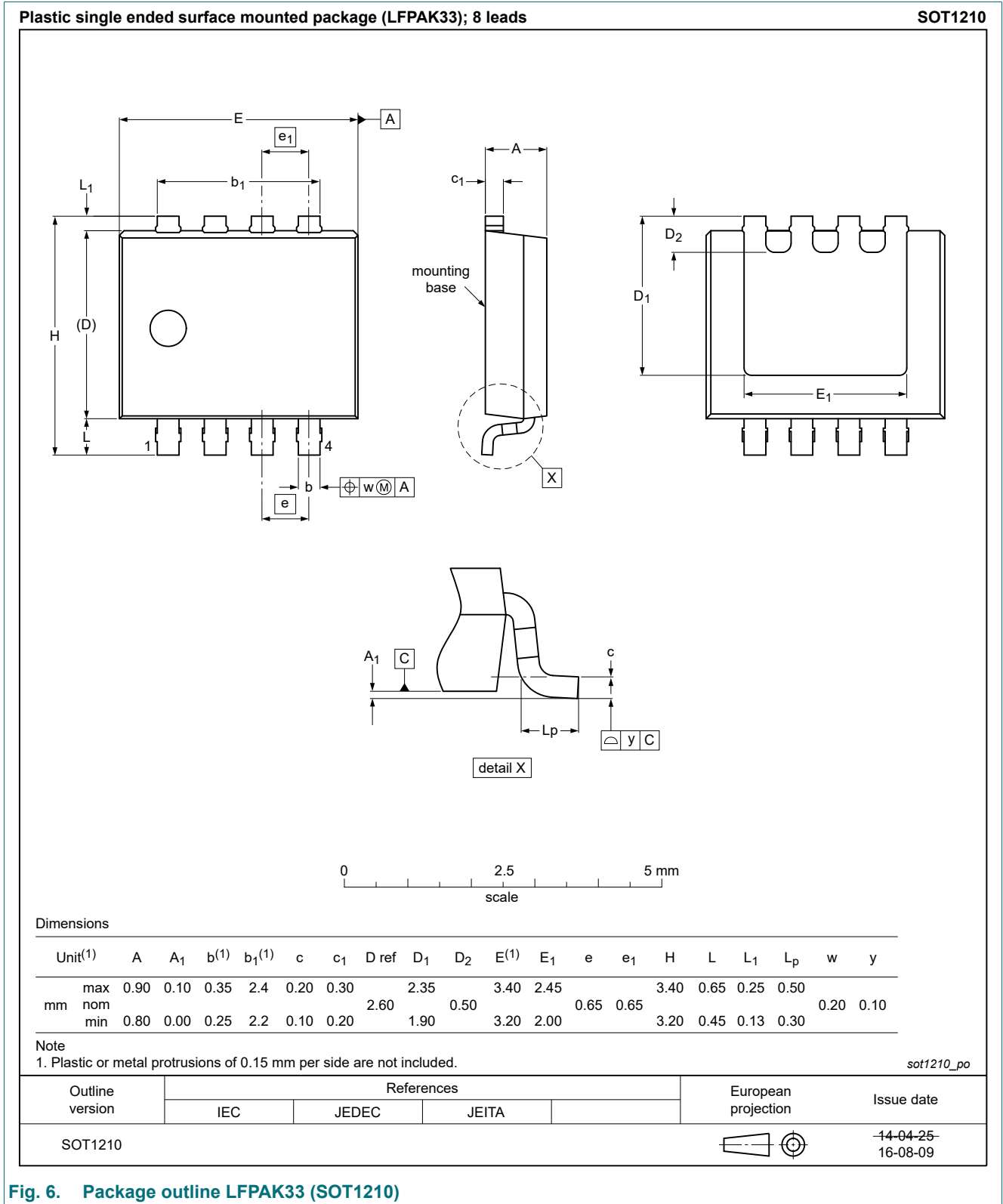


Fig. 6. Package outline LPAK33 (SOT1210)

11. Soldering

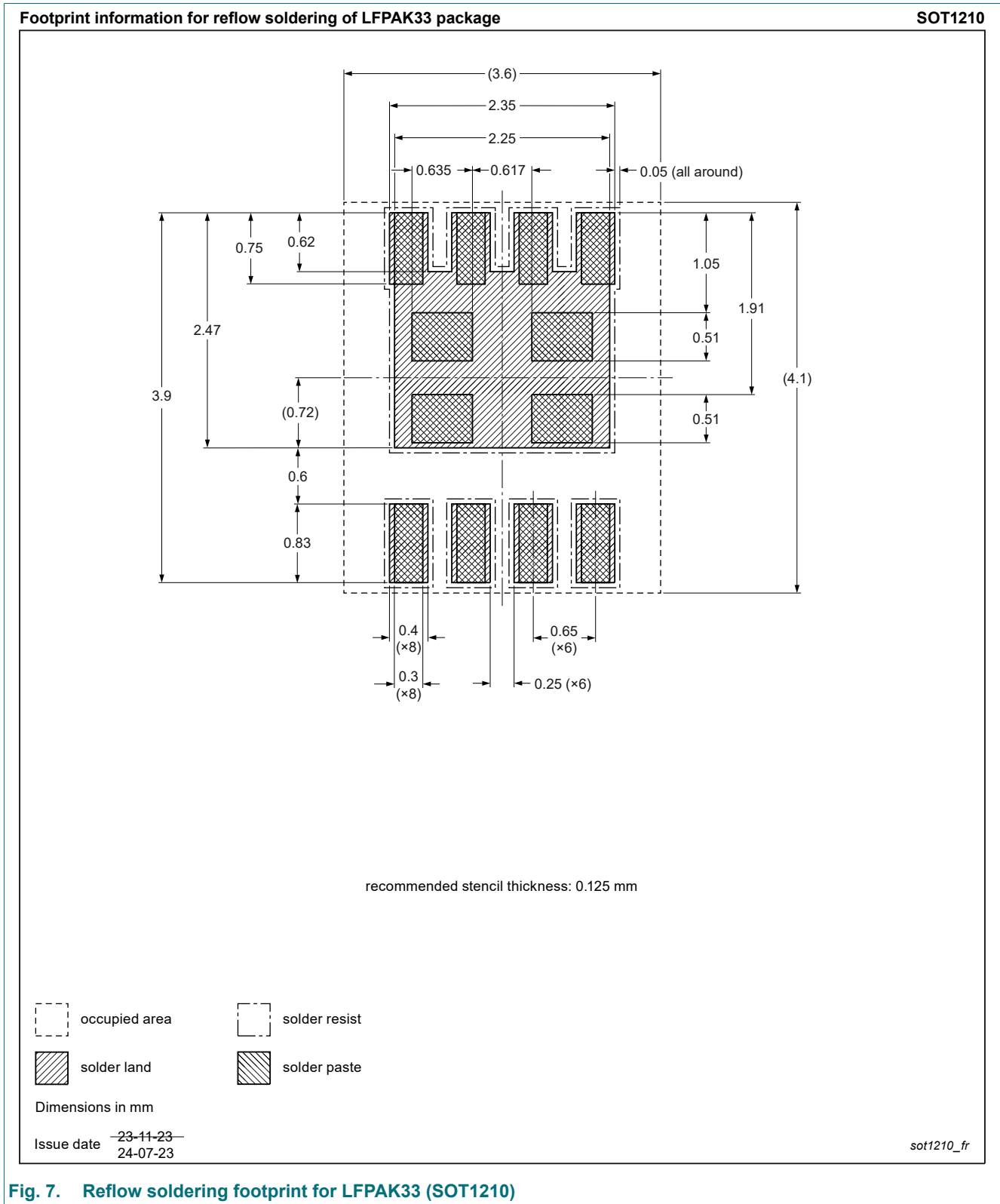


Fig. 7. Reflow soldering footprint for LFPAK33 (SOT1210)

12. 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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