# BUK9Q22-80L

## 80 V, 22 mOhm logic level N-channel MOSFET in MLPAK33

9 December 2025 Product data sheet

## 1. General description

Logic level N-channel MOSFET in a small MLPAK33-WF package using Trench12 technology. This product has been designed and qualified to meet AEC-Q101 requirements delivering high performance and endurance.

## 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

- LED lighting
- DC-to-DC conversion
- Solenoid, motor and other load switching
- Circuit protection

## 4. Quick reference data

**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{DS}$ | drain-source voltage | 25 °C ≤ $T_j$ ≤ 175 °C | | - | - | 80 | V |
| $I_D$ | drain current | $V_{GS}$ = 10 V; $T_{mb}$ = 25 °C; Fig. 2 | [1] | - | - | 30 | A |
| $P_{tot}$ | total power dissipation | $T_{mb}$ = 25 °C; Fig. 1 | | - | - | 41.7 | W |
| **Static characteristics** | | | | | | | |
| $R_{DSon}$ | drain-source on-state resistance | $V_{GS}$ = 10 V; $I_D$ = 6.6 A; $T_j$ = 25 °C; #unique_6/unique_6_Connect_42_idaaa-039951 | | - | 17 | 22 | mΩ |
| **Dynamic characteristics** | | | | | | | |
| $Q_{GD}$ | gate-drain charge | $I_D$ = 6.6 A; $V_{DS}$ = 40 V; $V_{GS}$ = 10 V; $T_j$ = 25 °C; #unique_6/unique_6_Connect_42_idaaa-039953; #unique_6/unique_6_Connect_42_id003aaa508 | | - | 2.2 | - | nC |

[1] 30 A continuous current has been successfully demonstrated during application tests. Practically the current will be limited by PCB, thermal design and operating temperature.

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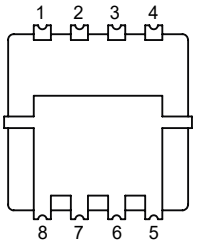
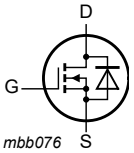
# 5. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | S | source |   MLPAK33-WF (SOT8002-3) |   |
| 2 | S | source | | |
| 3 | S | source | | |
| 4 | G | gate | | |
| 5 | D | drain | | |
| 6 | D | drain | | |
| 7 | D | drain | | |
| 8 | D | drain | | |

# 6. Marking

**Table 3. Marking codes**

| Type number | Marking code |
|---|---|
| BUK9Q22-80L | 7AF |

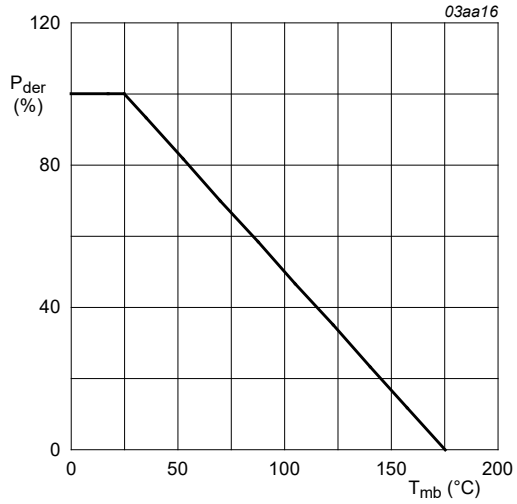
# 7. Limiting values

**Table 4. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134). Tj = 25 °C unless otherwise specified.*

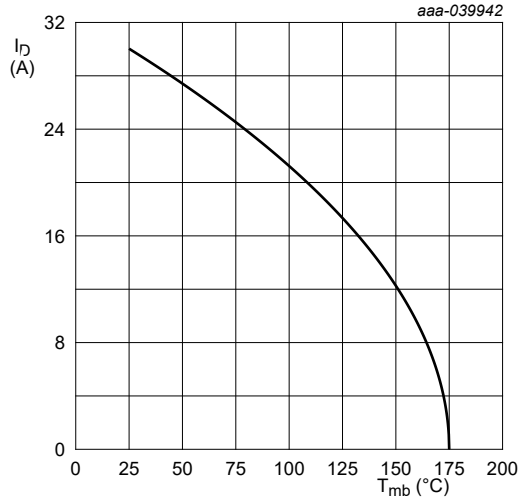
| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{DS}$ | drain-source voltage | 25 °C ≤ $T_j$ ≤ 175 °C | | - | 80 | V |
| $V_{GS}$ | gate-source voltage | | | -20 | 20 | V |
| $P_{tot}$ | total power dissipation | $T_{mb}$ = 25 °C; Fig. 1 | | - | 41.7 | W |
| $I_D$ | drain current | $V_{GS}$ = 10 V; $T_{mb}$ = 25 °C; Fig. 2 | [1] | - | 30 | A |
| | | $V_{GS}$ = 10 V; $T_{mb}$ = 100 °C; Fig. 2 | | - | 21 | A |
| $I_{DM}$ | peak drain current | pulsed; $t_p$ ≤ 10 µs; $T_{mb}$ = 25 °C; Fig. 3 | | - | 120 | 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 | | - | 30 | A |
| $I_{SM}$ | peak source current | pulsed; $t_p$ ≤ 10 µs; $T_{mb}$ = 25 °C | | - | 120 | A |
| **Avalanche ruggedness** | | | | | | |
| $E_{DS(AL)S}$ | non-repetitive drain-source avalanche energy | $I_D$ = 10.6 A; $V_{sup}$ ≤ 80 V; $R_{GS}$ = 50 Ω; $V_{GS}$ = 10 V; $T_{j(init)}$ = 25 °C; unclamped; $t_p$ = 119 µs; Fig. 4 | [2] [3] | - | 65.4 | mJ |
| $I_{AS}$ | non-repetitive avalanche current | $V_{sup}$ ≤ 80 V; $V_{GS}$ = 10 V; $T_{j(init)}$ = 25 °C; $R_{GS}$ = 50 Ω; Fig. 4 | [2] [3] | - | 10.6 | A |

[1] 30 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.



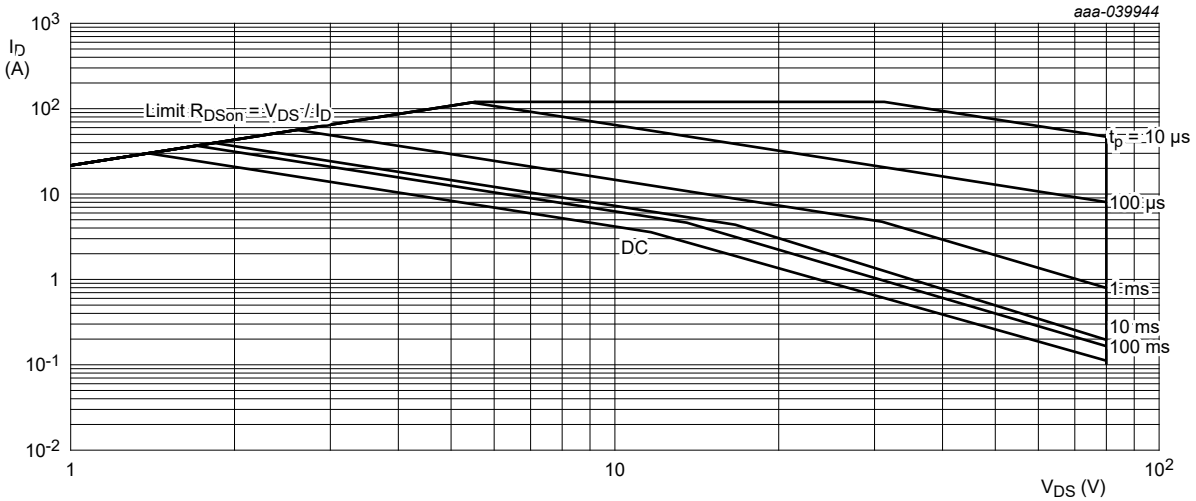

$$P_{der} = \frac{P_{tot}}{P_{tot(25°C)}} \times 100\ \%$$

**Fig. 1. Normalized total power dissipation as a function of mounting base temperature**



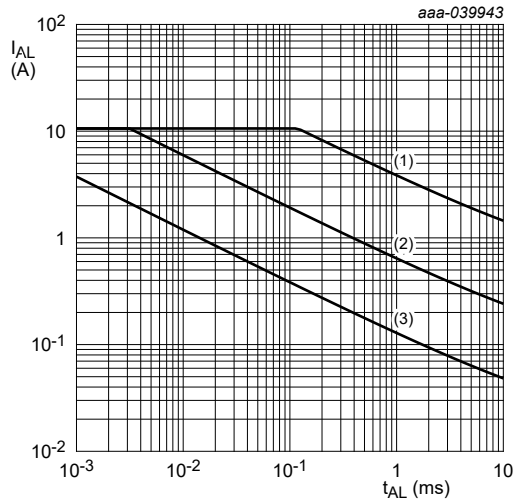

$V_{GS} \geq 10$ V

**Fig. 2. Continuous drain current as a function of mounting base temperature**




Tmb = 25 °C; IDM is a single pulse

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




(1) $T_{j\ (init)}$ = 25 °C; (2) $T_{j\ (init)}$ = 150 °C; (3) Repetitive Avalanche

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

# 8. Thermal characteristics

**Table 5. Thermal characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-mb)}$ | thermal resistance from junction to mounting base | Fig. 5 | | - | 2.4 | 3.6 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | | [1] | - | 40 | - | K/W |

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

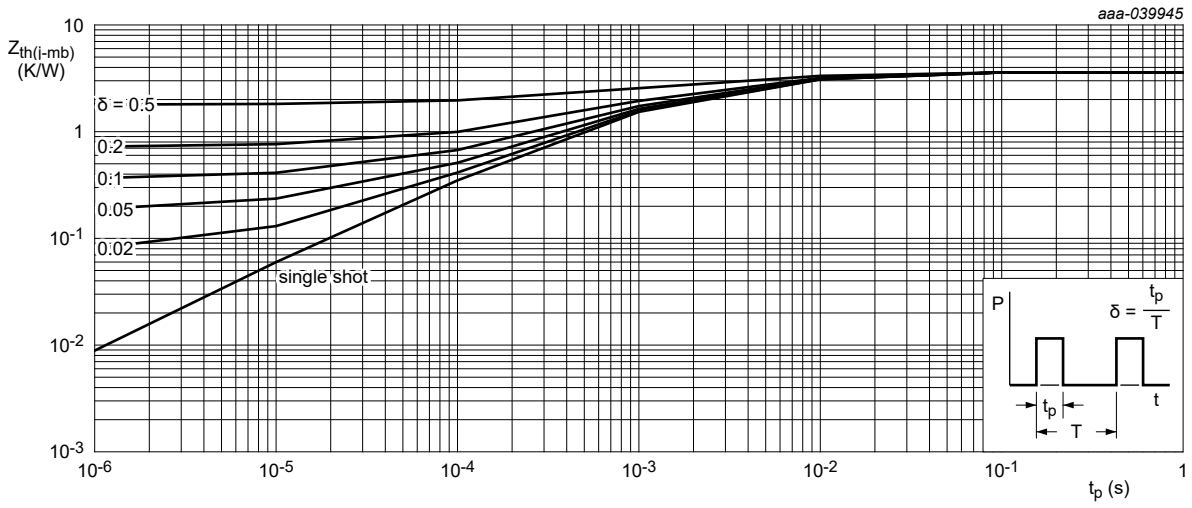
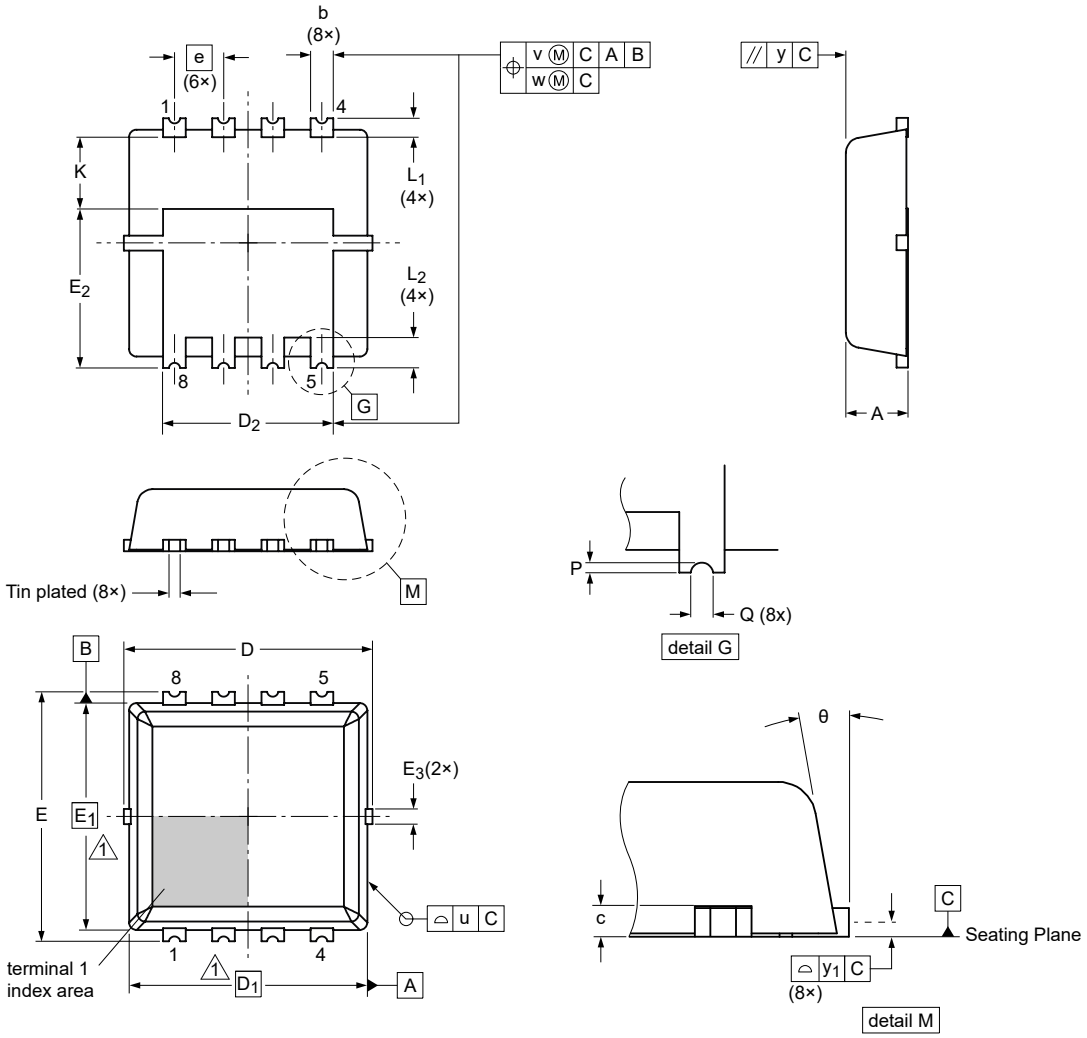



**Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration**

# 9. Package outline

**MLPAK33-WF: plastic thermal enhanced surface mounted package with side-wettable flanks (SWF); mini leads; 8 terminals;pitch 0.65 mm; 3.3 x 3.3 x 0.8 mm body** **SOT8002-3**




1 Dimensions do not include mold flash, protrusions of gate burrs, mold flash, tie bar protrusion or tie bar flash. Mold flash shall not be greater than 0.05 mm

| w |
|---|
| 0.05 |

0 5 mm
scale

Dimensions (mm are the original dimensions)

| Unit | | A | b | c | D | $D_1$ | $D_2$ | e | E | $E_1$ | $E_2$ | $E_3$ | K | $L_1$ | $L_2$ | P | Q | θ | y | $y_1$ | u | v |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 0.90 | 0.40 | 0.18 | 3.40 | 3.15 | 2.35 | 0.65 | 3.40 | 3.0 | 2.20 | 0.2 | 0.95 | 0.40 | 0.55 | 0.1 | 0.15 | 12° | 0.05 | 0.05 | 0.1 | 0.1 |
| | nom | 0.80 | 0.32 | 0.15 | 3.30 | BSC | 2.25 | BSC | 3.30 | BSC | 2.10 | REF | REF | 0.25 | 0.40 | REF | REF | 10° | | | | |
| | min | 0.70 | 0.25 | 0.12 | 3.20 | | 2.15 | | 3.20 | | 2.00 | | | 0.10 | 0.25 | | | 8° | | | | |

*sot8002-3_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT8002-3 | | | | | | ~~23-07-21~~ 25-08-06 |

**Fig. 6. Package outline MLPAK33-WF (SOT8002-3)**

## 10. Soldering

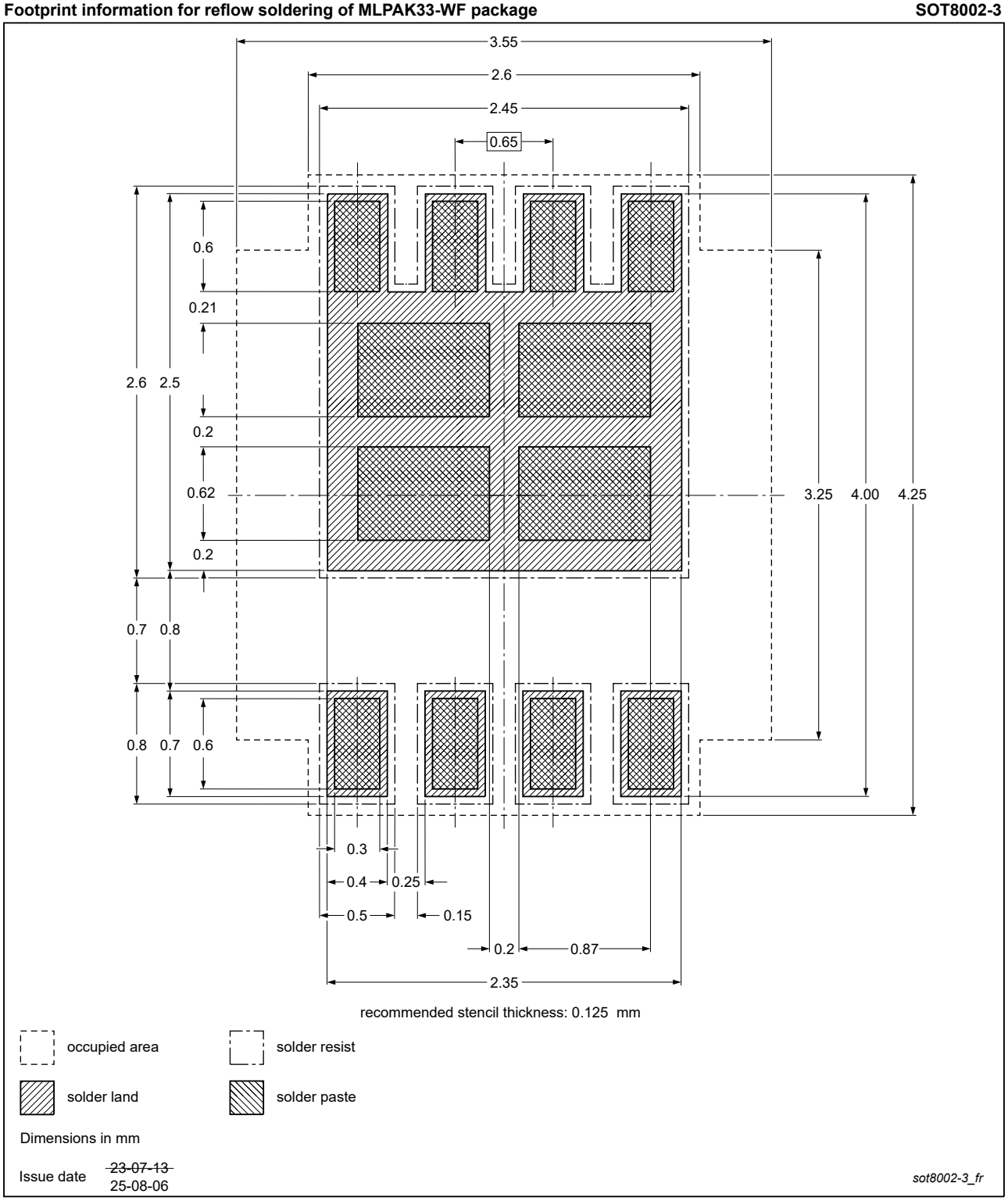



**Fig. 7. Reflow soldering footprint for MLPAK33-WF (SOT8002-3)**

# 11. 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. |
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[2] The term 'short data sheet' is explained in section "Definitions".
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