



IMPORTANT NOTICE

10 December 2015

1. Global joint venture starts operations as WeEn Semiconductors

Dear customer,

As from November 9th, 2015 NXP Semiconductors N.V. and Beijing JianGuang Asset Management Co. Ltd established Bipolar Power joint venture (JV), **WeEn Semiconductors**, which will be used in future Bipolar Power documents together with new contact details.

In this document where the previous NXP references remain, please use the new links as shown below.

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WeEn Semiconductors





BYV29FB-600

Enhanced ultrafast power diode

Rev. 02 — 7 March 2011

Product data sheet

1. Product profile

1.1 General description

Enhanced ultrafast power diode in a SOT404 (D2PAK) surface-mountable plastic package.

1.2 Features and benefits

- High thermal cycling performance
- Low on-state losses
- Low thermal resistance
- Soft recovery characteristic
- Surface-mountable package

1.3 Applications

- Dual Mode (DCM and CCM) PFC
- Power Factor Correction (PFC) for Interleaved Topology

1.4 Quick reference data

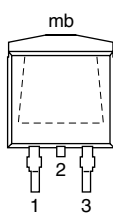

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|---------------------------------|---|-----|------|-----|------|
| V_{RRM} | repetitive peak reverse voltage | | - | - | 600 | V |
| $I_{F(AV)}$ | average forward current | square-wave pulse; $\delta = 0.5$; $T_{mb} \leq 115$ °C; see Figure 1 ; see Figure 2 | - | - | 9 | A |
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 8$ A; $T_j = 25$ °C; see Figure 5 | - | 1.45 | 1.9 | V |
| | | $I_F = 8$ A; $T_j = 150$ °C; see Figure 5 | - | 1.25 | 1.7 | V |
| Dynamic characteristics | | | | | | |
| t_{rr} | reverse recovery time | $I_F = 1$ A; $V_R = 30$ V; $di_F/dt = 100$ A/ μ s; $T_j = 25$ °C; see Figure 6 | - | 17.5 | 35 | ns |



2. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|------------------------|---|---|
| 1 | n.c. | no connection |  |  |
| 2 | K | cathode ^[1] | | |
| 3 | A | anode | | |
| mb | K | mounting base; cathode | | |

SOT404 (D2PAK)

[1] It is not possible to connect to pin 2 of the SOT404 package.

3. Ordering information

Table 3. Ordering information

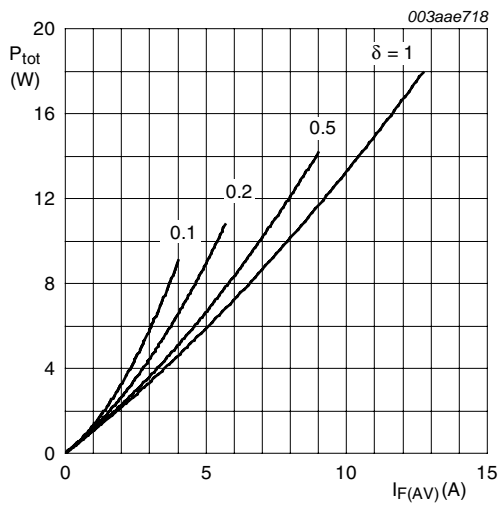
| Type number | Package | | |
|-------------|---------|--|---------|
| | Name | Description | Version |
| BYV29FB-600 | D2PAK | plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped) | SOT404 |

4. Limiting values

Table 4. Limiting values

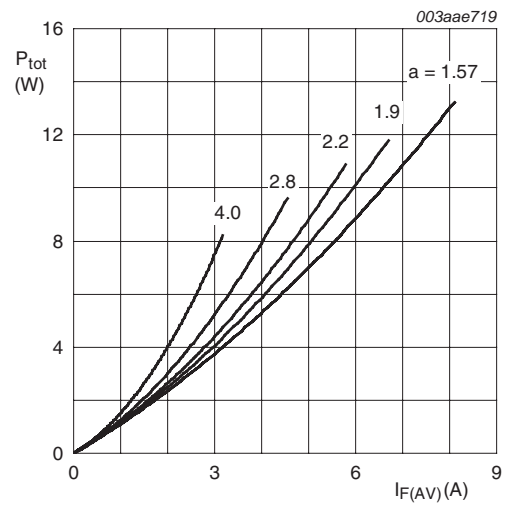
In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-------------|-------------------------------------|---|-----|-----|------|
| V_{RRM} | repetitive peak reverse voltage | | - | 600 | V |
| V_{RWM} | crest working reverse voltage | | - | 600 | V |
| V_R | reverse voltage | DC | - | 600 | V |
| $I_{F(AV)}$ | average forward current | square-wave pulse; $\delta = 0.5$; $T_{mb} \leq 115$ °C; see Figure 1 ; see Figure 2 | - | 9 | A |
| I_{FRM} | repetitive peak forward current | square-wave pulse; $\delta = 0.5$; $t_p = 25$ μ s; $T_{mb} \leq 115$ °C | - | 18 | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 10$ ms; sine-wave pulse; $T_{j(init)} = 25$ °C; see Figure 3 | - | 91 | A |
| | | $t_p = 8.3$ ms; sine-wave pulse; $T_{j(init)} = 25$ °C; see Figure 3 | - | 100 | A |
| T_{stg} | storage temperature | | -40 | 150 | °C |
| T_j | junction temperature | | - | 150 | °C |



$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$

Fig 1. Forward power dissipation as a function of average forward current; square waveform; maximum values



$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$

Fig 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

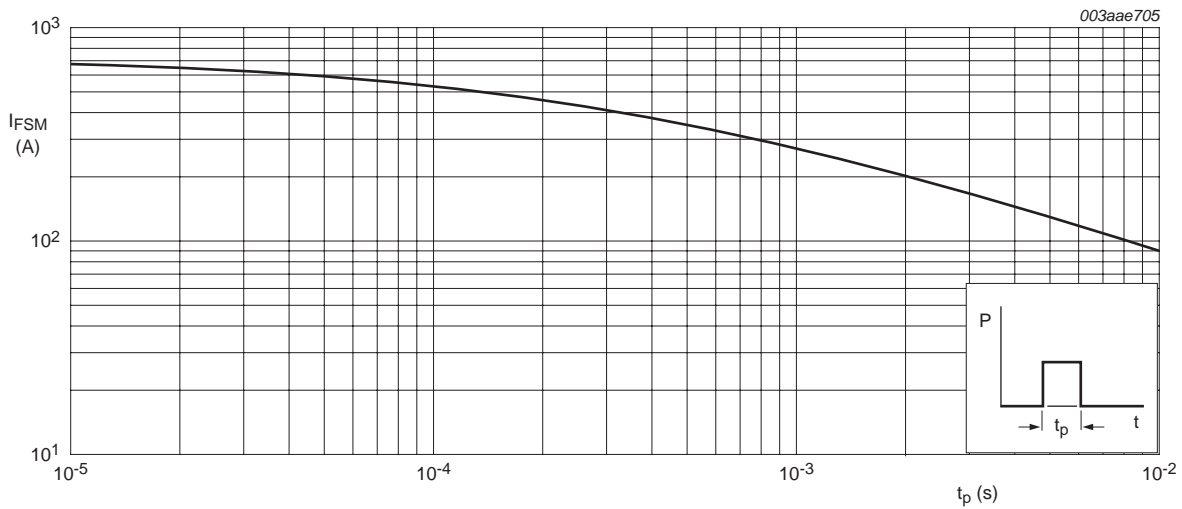


Fig 3. Non-repetitive peak forward current as a function of pulse width; square waveform; maximum values

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 | see Figure 4 | - | - | 2.5 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] | 50 | - | K/W |

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

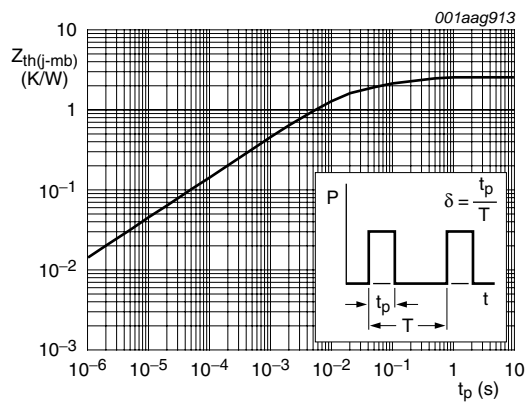
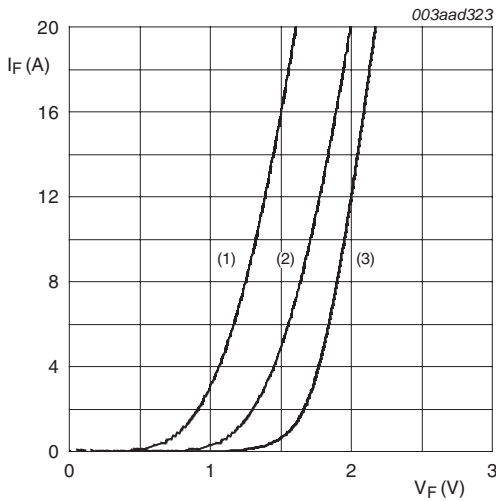


Fig 4. Transient thermal impedance from junction to mounting base as a function of pulse width

6. Characteristics

Table 6. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------------------|--|-----|------|-----|---------------|
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 8\text{ A}; T_j = 25\text{ °C};$ see Figure 5 | - | 1.45 | 1.9 | V |
| | | $I_F = 8\text{ A}; T_j = 150\text{ °C};$ see Figure 5 | - | 1.25 | 1.7 | V |
| I_R | reverse current | $V_R = 600\text{ V}; T_j = 100\text{ °C}$ | - | - | 1.5 | mA |
| | | $V_R = 600\text{ V}; T_j = 25\text{ °C}$ | - | - | 50 | μA |
| Dynamic characteristics | | | | | | |
| Q_r | recovered charge | $I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s};$ see Figure 6 | - | 13 | - | nC |
| t_{rr} | reverse recovery time | $I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s};$ $T_j = 25\text{ °C};$ see Figure 6 | - | 17.5 | 35 | ns |
| I_{RM} | peak reverse recovery current | $I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s};$ see Figure 6 | - | 1.5 | - | A |
| V_{FR} | forward recovery voltage | $I_F = 1\text{ A}; dI_F/dt = 100\text{ A}/\mu\text{s};$ see Figure 7 | - | 3.2 | - | V |



- (1) $T_j = 150\text{ °C};$ typical values
- (2) $T_j = 150\text{ °C};$ maximum values
- (3) $T_j = 25\text{ °C};$ maximum values

Fig 5. Forward current as a function of forward voltage

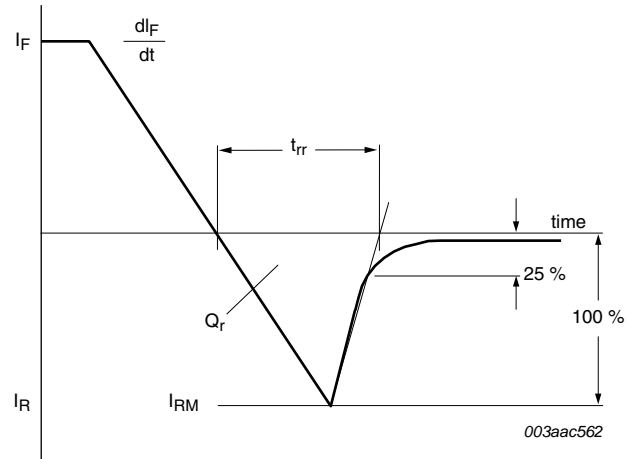


Fig 6. Reverse recovery definitions; ramp recovery

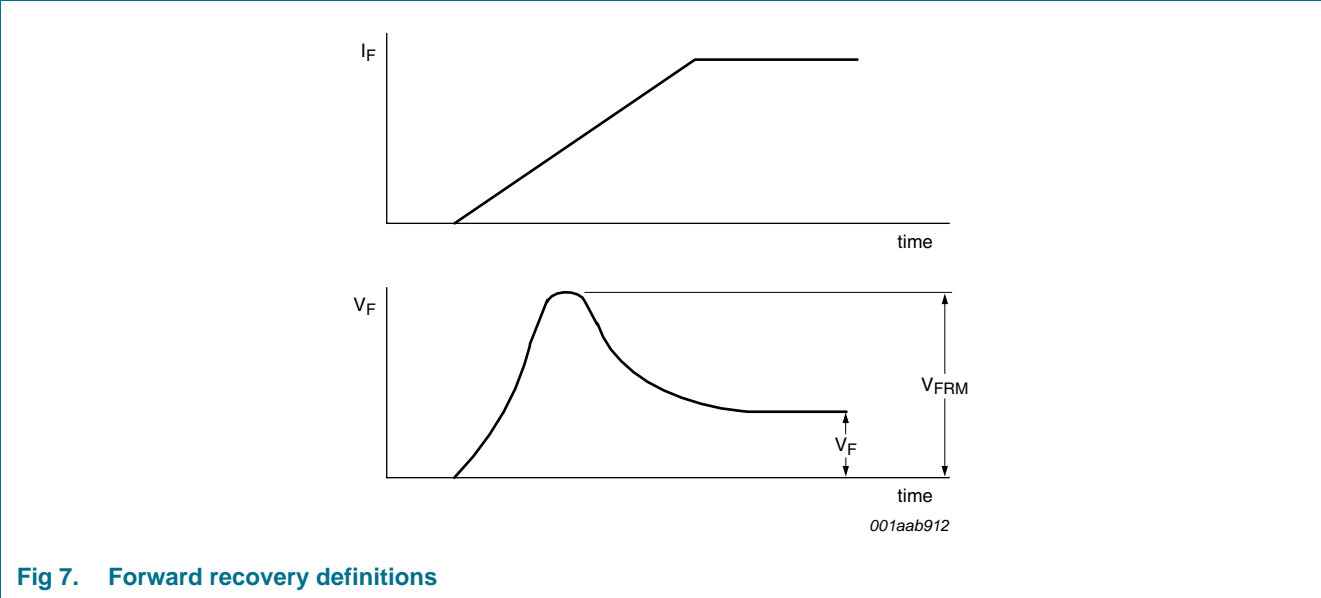


Fig 7. Forward recovery definitions

7. Package outline

Plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped)

SOT404

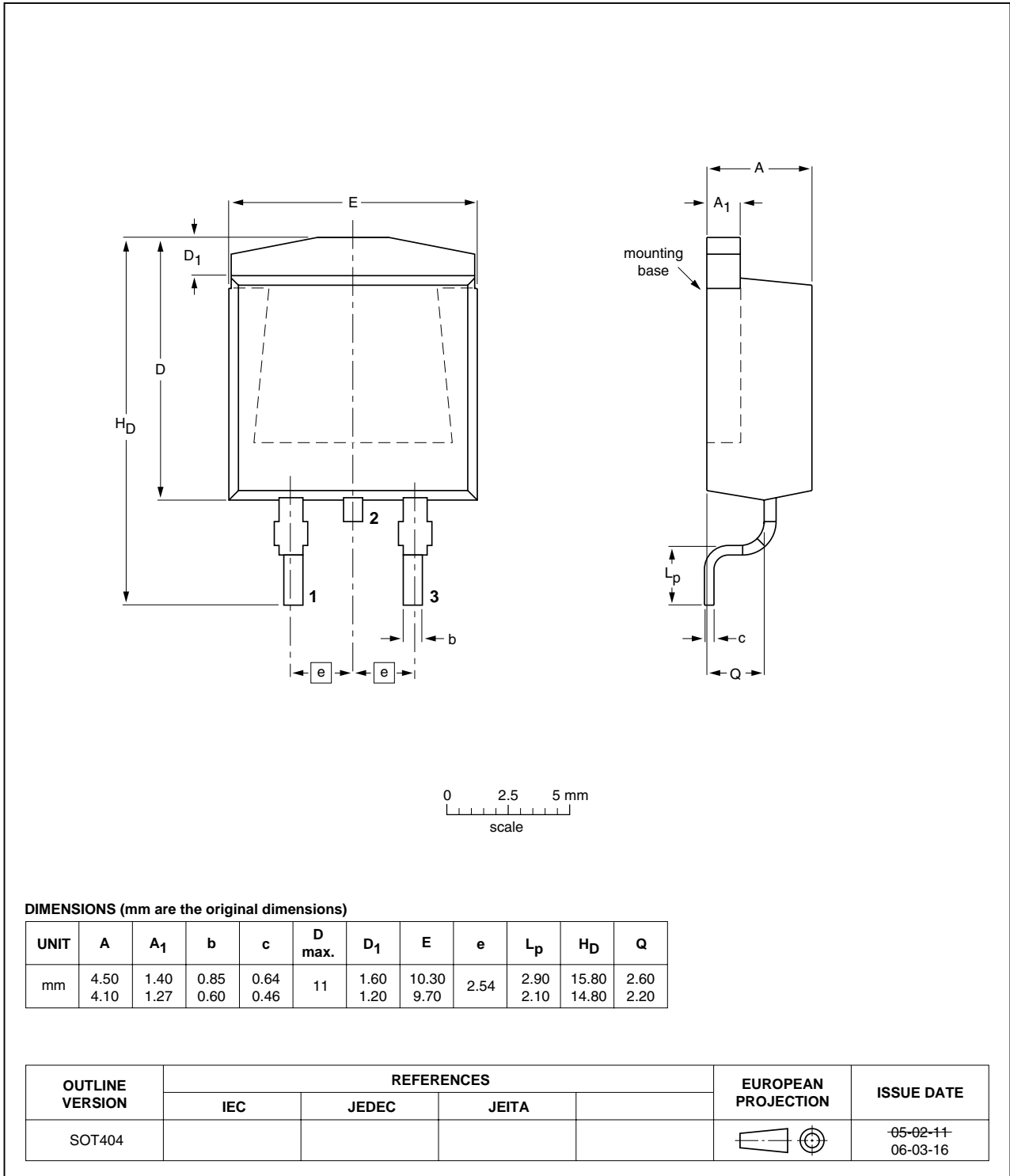


Fig 8. Package outline SOT404 (D2PAK)

8. Soldering

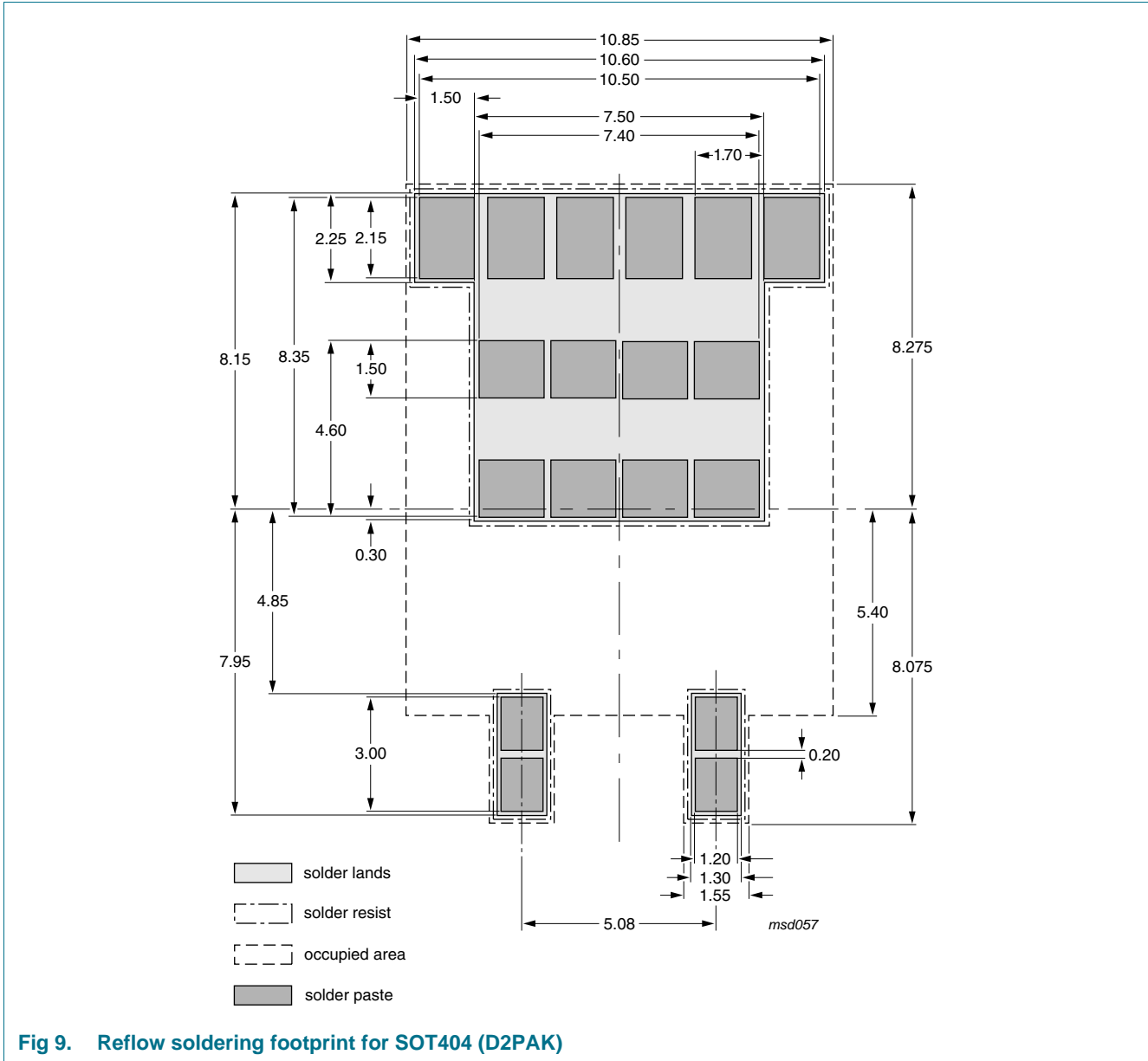


Fig 9. Reflow soldering footprint for SOT404 (D2PAK)

9. Revision history

Table 7. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|-----------------|-------------------------------|--------------------|---------------|-----------------|
| BYV29FB-600 v.2 | 20110307 | Product data sheet | - | BYV29FB-600 v.1 |
| Modifications: | • Various changes to content. | | | |
| BYV29FB-600 v.1 | 20100907 | Product data sheet | - | - |

10. Legal information

10.1 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".

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