



**THE DATASHEET OF
BYV25X-600,127**



1. General description

Ultrafast epitaxial rectifier diode in a SOD113 (2-lead TO-220F) plastic package.

2. Features and benefits

- Fast switching
- Isolated package
- Low forward voltage drop
- Low thermal resistance
- Soft recovery characteristic

3. Applications

- High frequency switched-mode power supplies
- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)

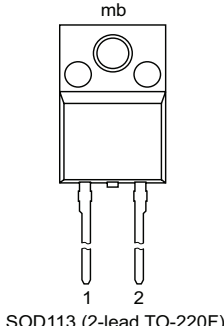
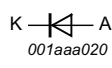
4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Values | | | Unit |
|--------------------------------|-------------------------------------|---|--------|------|------|------|
| Absolute maximum rating | | | | | | |
| V_{RRM} | repetitive peak reverse voltage | | 600 | | | V |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; square-wave pulse; $T_h \leq 115\text{ °C}$; Fig. 1 ; Fig. 2 | 5 | | | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; square-wave pulse; $T_h \leq 115\text{ °C}$ | 10 | | | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ °C}$; sine-wave pulse | 60 | | | A |
| | | $t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ °C}$; sine-wave pulse | 66 | | | A |
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 5\text{ A}$; $T_j = 25\text{ °C}$; Fig. 4 | - | 1.12 | 1.30 | V |
| | | $I_F = 5\text{ A}$; $T_j = 150\text{ °C}$; Fig. 4 | - | 0.97 | 1.11 | V |
| Dynamic characteristics | | | | | | |
| t_{rr} | reverse recovery time | $I_F = 1\text{ A}$; $V_R = 30\text{ V}$; $di_F/dt = 100\text{ A}/\mu\text{s}$; $T_j = 25\text{ °C}$; Fig. 5 | - | 50 | 60 | ns |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------------------|---|---|
| 1 | K | cathode |  <p>SOD113 (2-lead TO-220F)</p> |  |
| 2 | A | anode | | |
| mb | n.c. | mounting base; isolated | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|---|---------|
| | Name | Description | Version |
| BYV25X-600 | TO-220F | plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220 "full pack" | SOD113 |

7. Marking

Table 4. Marking codes

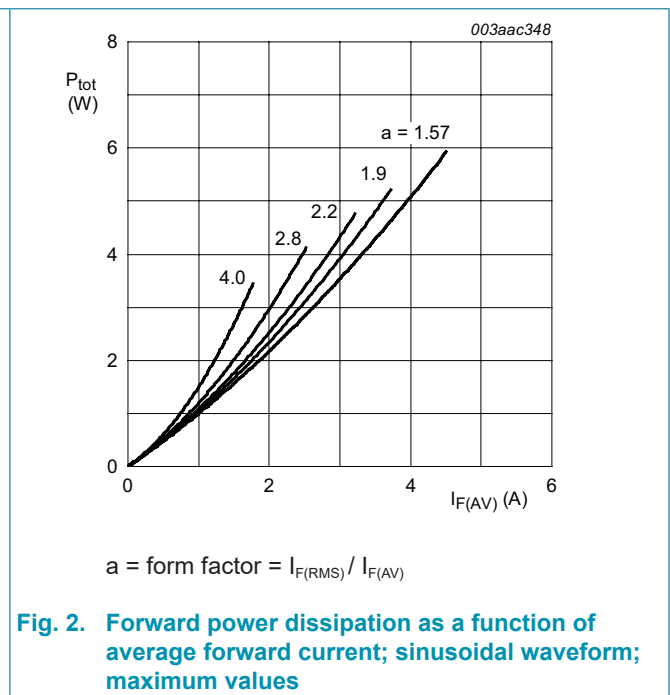
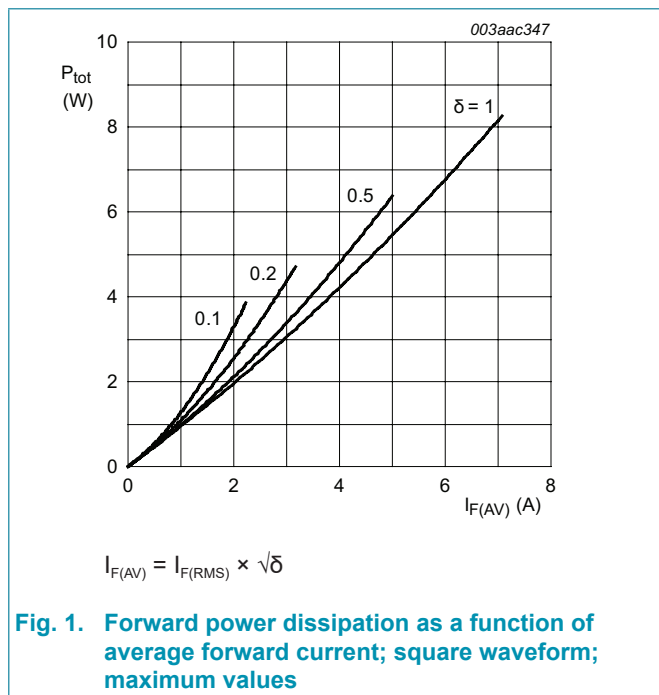
| Type number | Marking codes |
|-------------|---------------|
| BYV25X-600 | BYV25X-600 |

8. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | Values | Unit |
|-------------|-------------------------------------|--|------------|------------------|
| V_{RRM} | repetitive peak reverse voltage | | 600 | V |
| V_{RWM} | crest working reverse voltage | | 600 | V |
| V_R | reverse voltage | $\delta = 1.0$; square wave pulse; $T_h \leq 100\text{ }^\circ\text{C}$ | 600 | V |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; square-wave pulse; $T_h \leq 115\text{ }^\circ\text{C}$; Fig. 1 ; Fig. 2 | 5 | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; square-wave pulse; $T_h \leq 115\text{ }^\circ\text{C}$ | 10 | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse | 60 | A |
| | | $t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse | 66 | A |
| T_{stg} | storage temperature | | -40 to 150 | $^\circ\text{C}$ |
| T_j | junction temperature | | 150 | $^\circ\text{C}$ |



9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---------------|--|---|-----|-----|-----|------|
| $R_{th(j-h)}$ | thermal resistance from junction to heatsink | with heatsink compound; Fig 3 | - | - | 5.5 | K/W |
| | | without heatsink compound | - | - | 5.9 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | - | 60 | - | K/W |

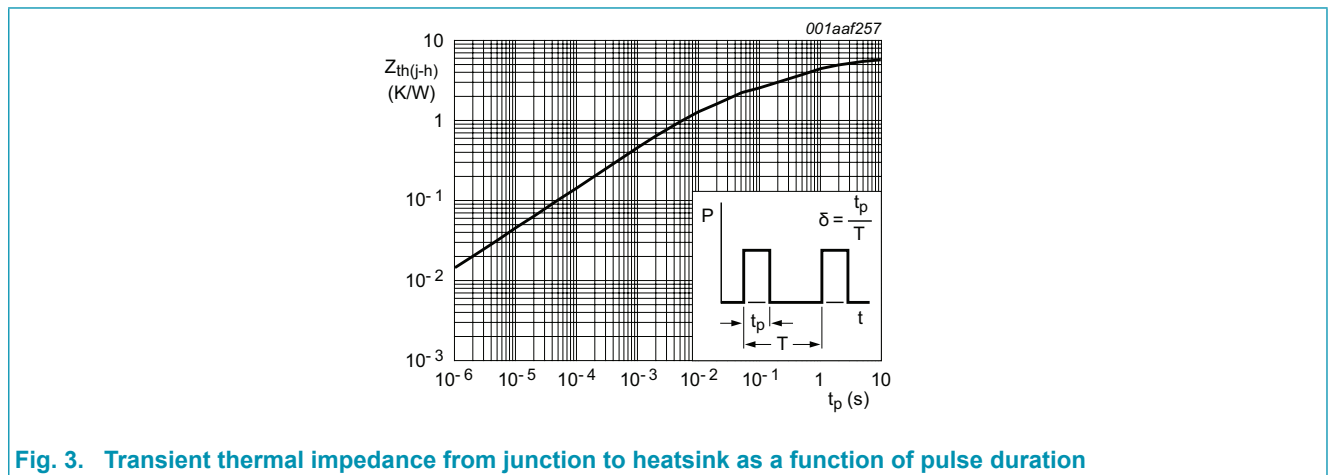


Fig. 3. Transient thermal impedance from junction to heatsink as a function of pulse duration

10. Isolation characteristics

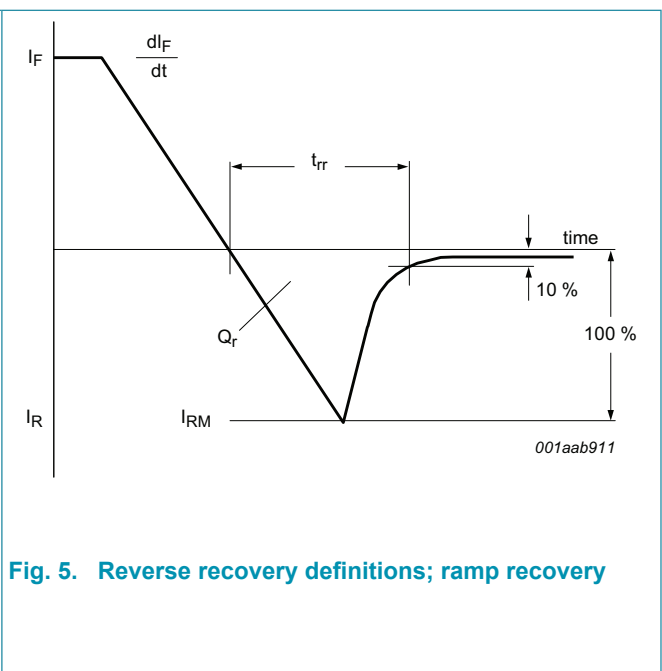
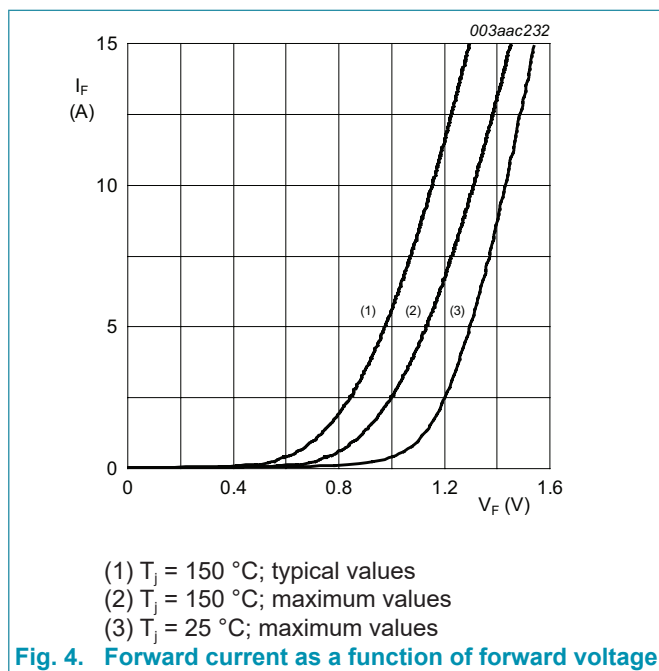
Table 7. Isolation characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------------|-----------------------|---|-----|-----|------|------|
| $V_{isol(RMS)}$ | RMS isolation voltage | 50 Hz \leq f \leq 60 Hz; RH \leq 65 %; from all pins to external heatsink; sinusoidal waveform; clean and dust free | - | - | 2500 | V |
| C_{isol} | isolation capacitance | f = 1 MHz; from cathode to external heatsink | - | 10 | - | pF |

11. Characteristics

Table 8. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------------------|--|-----|------|------|---------------|
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 5 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 4}$ | - | 1.12 | 1.30 | V |
| | | $I_F = 5 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{ Fig. 4}$ | - | 0.97 | 1.11 | V |
| I_R | reverse current | $V_R = 600 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$ | - | 2 | 50 | μA |
| | | $V_R = 600 \text{ V}; T_j = 100 \text{ }^\circ\text{C}$ | - | 0.1 | 0.35 | mA |
| Dynamic characteristics | | | | | | |
| Q_r | recovered charge | $I_F = 2 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 20 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 5}$ | - | 40 | 70 | nC |
| t_{rr} | reverse recovery time | $I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 5}$ | - | 50 | 60 | ns |
| I_{RM} | peak reverse recovery current | $I_F = 10 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 50 \text{ A}/\mu\text{s}; T_j = 100 \text{ }^\circ\text{C}; \text{ Fig. 5}$ | - | 3 | 5.5 | A |
| V_{FR} | forward recovery voltage | $I_F = 10 \text{ A}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 6}$ | - | 3.2 | - | V |



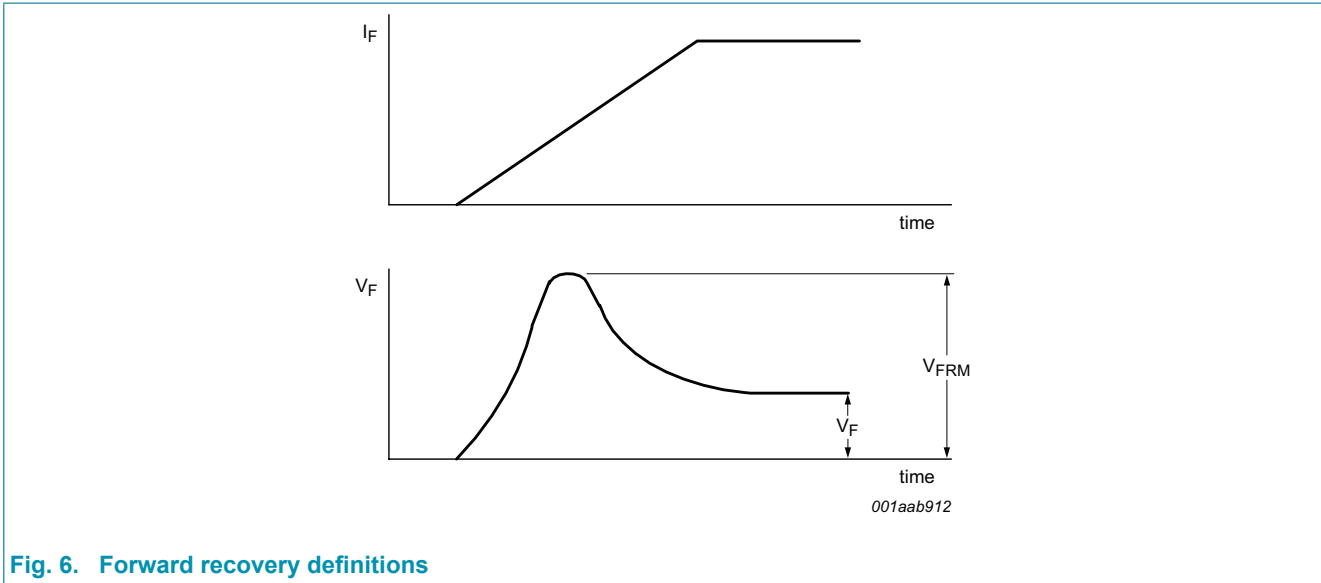
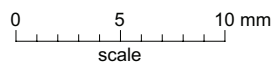
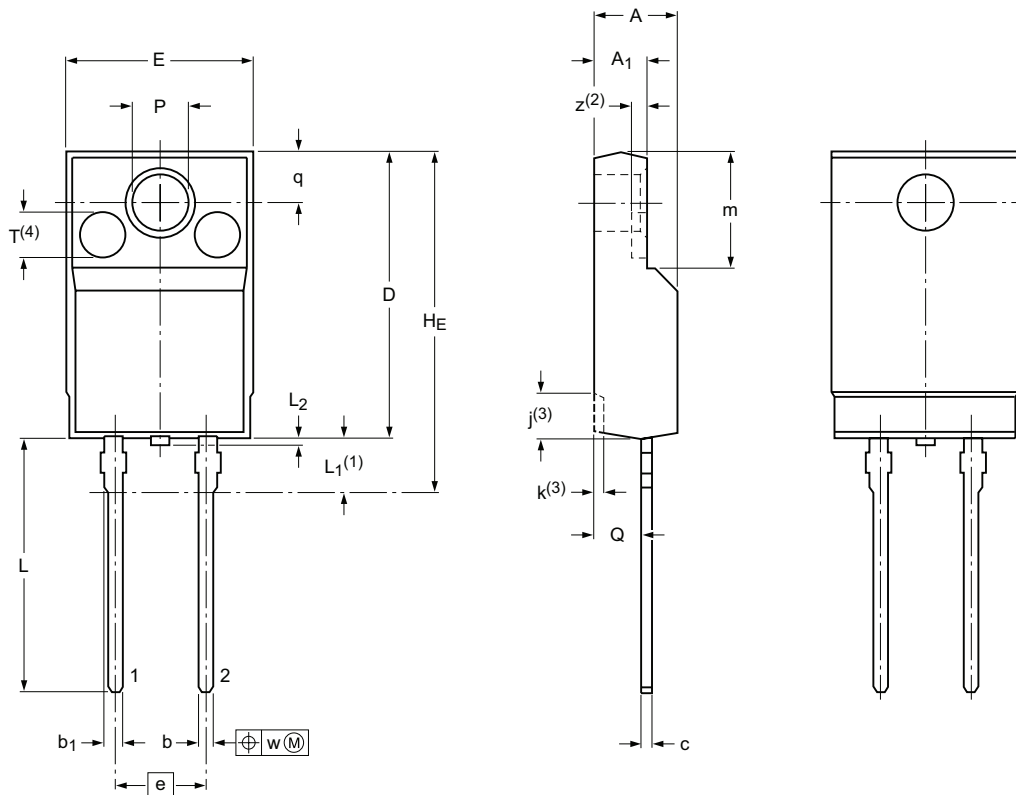


Fig. 6. Forward recovery definitions

12. Package outline

Plastic single-ended package; isolated heatsink mounted;
1 mounting hole; 2-lead TO-220 'full pack'

SOD113



Dimensions (mm are the original dimensions)

| Unit | A | A ₁ | b | b ₁ | c | D | E | e | H _E max | j ⁽³⁾ | k ⁽³⁾ | L | L ₁ ⁽¹⁾ | L ₂ max | m | P | Q | q | T ⁽⁴⁾ | w | z ⁽²⁾ | |
|------|-----|----------------|-----|----------------|-----|------|------|------|-----------------------|------------------|------------------|------|-------------------------------|-----------------------|-----|-----|-----|---|------------------|------|------------------|-----|
| max | 4.6 | 2.9 | 0.9 | 1.1 | 0.7 | 15.8 | 10.3 | | | 2.7 | 0.6 | 14.4 | 3.3 | | 6.5 | 3.2 | 2.6 | | | | | |
| nom | | | | | | | | 5.08 | 19.0 | | | | | 0.5 | | | | | 2.6 | 2.55 | 0.4 | 0.8 |
| min | 4.0 | 2.5 | 0.7 | 0.9 | 0.4 | 15.2 | 9.7 | | | 1.7 | 0.4 | 13.5 | 2.8 | | 6.3 | 3.0 | 2.3 | | | | | |

Notes

1. Terminals are uncontrolled within zone L1.
2. z is depth of T.
3. Dot lines area designs may vary.
4. Eject pin mark is for reference only.

sod113_po

| Outline version | References | | | European projection | Issue date |
|-----------------|----------------|-------|-------|---------------------|----------------------|
| | IEC | JEDEC | JEITA | | |
| SOD113 | 2-lead TO-220F | | | | 07-06-08 15-08-28 |

13. Revision history

Table 8. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|---|--------------------|---------------|--------------|
| BYV25X-600 v.2 | 20180130 | Product data sheet | - | BYV25X-600_1 |
| Modifications: | Change from NXP version to WeEn version | | | |
| BYV25X-600_1 | 20080812 | Product data sheet | - | - |

14. 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. |
| 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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Date of release: 30 January 2018

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