



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.

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Thank you for your cooperation and understanding,

WeEn Semiconductors



1. General description

Ultrafast, epitaxial rectifier diode in a SOD59 (TO-220AC) plastic package

2. Features and benefits

- Fast switching
- Low thermal resistance
- Soft recovery characteristic
- Low forward voltage drop
- Low switching loss
- High thermal cycling performance

3. Applications

- Output rectifiers in high frequency switched-mode power supplies
- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)

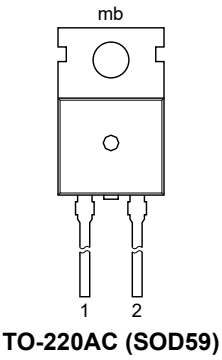
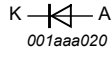
4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------------------------|--|-----|------|------|------|
| V_R | reverse voltage | Square-wave; $\delta = 1.0$ | - | - | 600 | V |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; $T_{mb} \leq 108\text{ }^\circ\text{C}$; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3 | - | - | 15 | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 108\text{ }^\circ\text{C}$; Square-wave | - | - | 30 | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; Sinusoidal waveform; Fig. 4 | - | - | 130 | A |
| | | $t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; Sinusoidal waveform | - | - | 143 | A |
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 15\text{ A}$; $T_j = 150\text{ }^\circ\text{C}$; Fig. 6 | - | 1 | 1.2 | V |
| | | $I_F = 15\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 6 | - | 1.17 | 1.38 | V |
| Dynamic characteristics | | | | | | |
| t_{rr} | reverse recovery time | $I_F = 1\text{ A}$; $V_R = 30\text{ V}$; $di_F/dt = 100\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 7 | - | 50 | 60 | ns |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|------------------------|---|--|
| 1 | K | cathode |  <p>TO-220AC (SOD59)</p> |  <p>K — — A 001aaa020</p> |
| 2 | A | anode | | |
| mb | mb | mounting base; cathode | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|----------|--|---------|
| | Name | Description | Version |
| BYT79-600 | TO-220AC | plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC | SOD59 |

7. 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 | Square-wave; $\delta = 1.0$ | - | 600 | V |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; $T_{mb} \leq 108\text{ }^\circ\text{C}$; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3 | - | 15 | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 108\text{ }^\circ\text{C}$; Square-wave | - | 30 | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; Sinusoidal waveform; Fig. 4 | - | 130 | A |
| | | $t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; Sinusoidal waveform | - | 143 | A |
| T_{stg} | storage temperature | | -55 | 150 | $^\circ\text{C}$ |
| T_j | junction temperature | | - | 150 | $^\circ\text{C}$ |

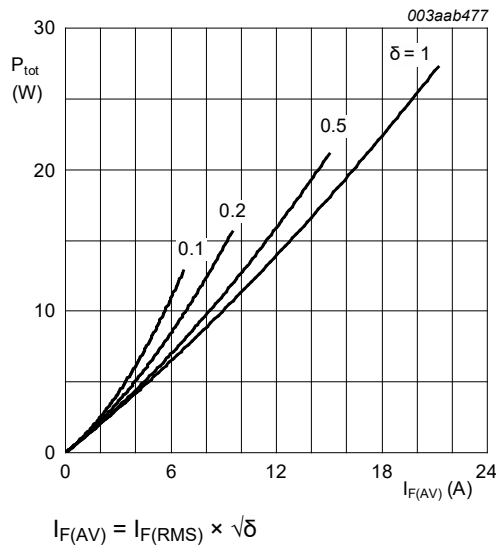


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

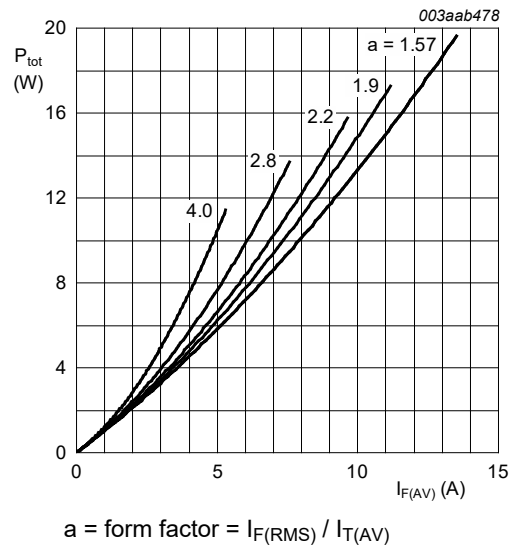


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

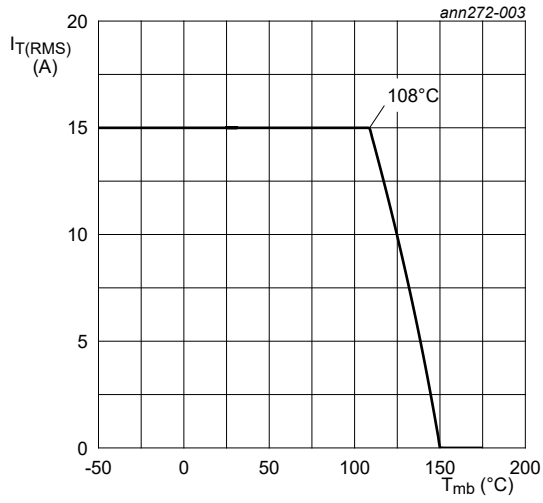


Fig. 3. RMS on-state current as a function of mounting base temperature; maximum values

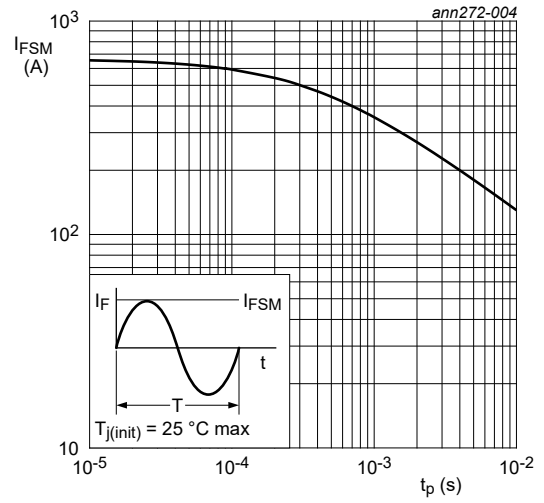
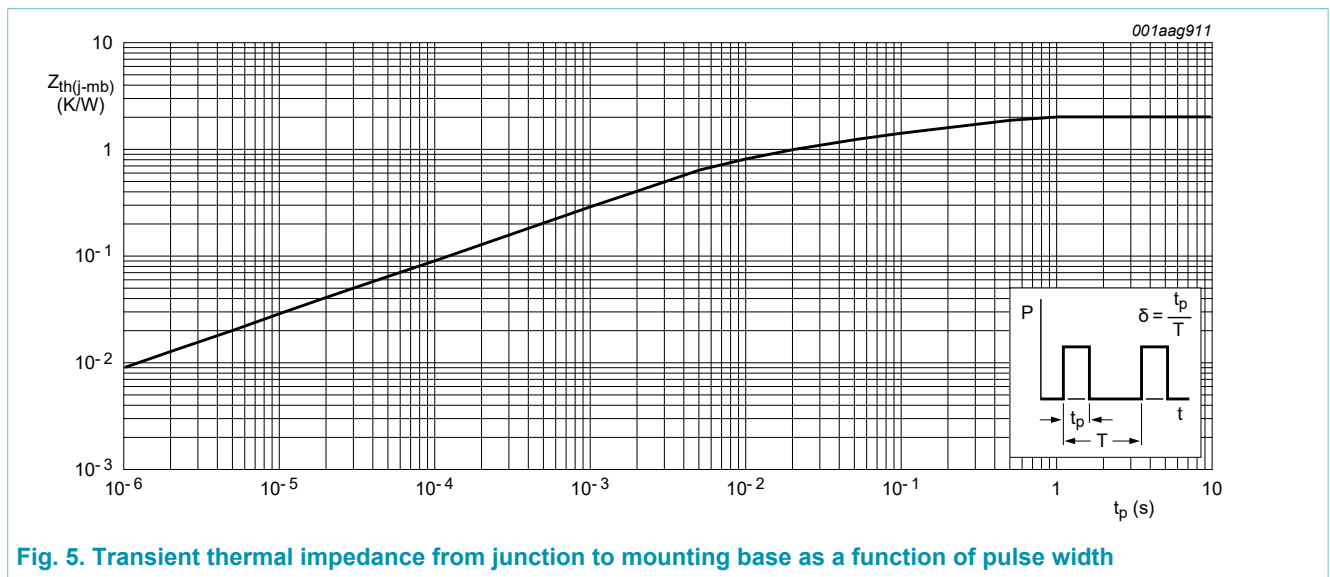


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

8. Thermal characteristics

Table 5. Thermal characteristics

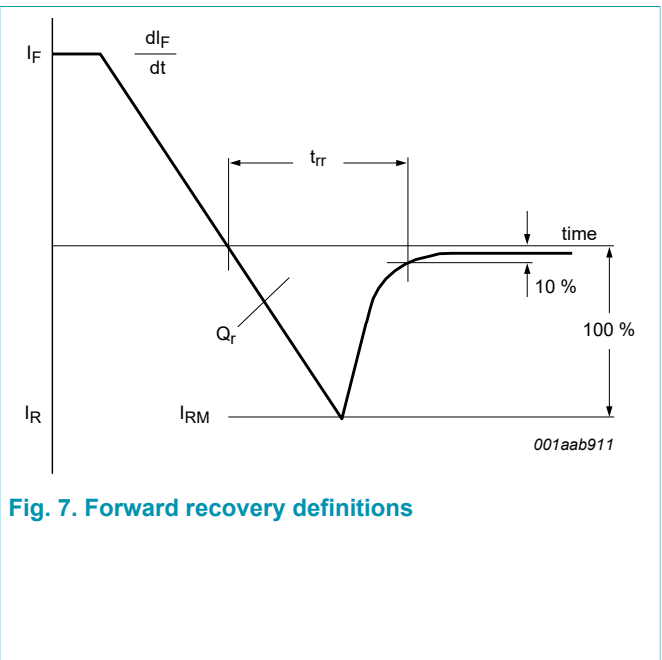
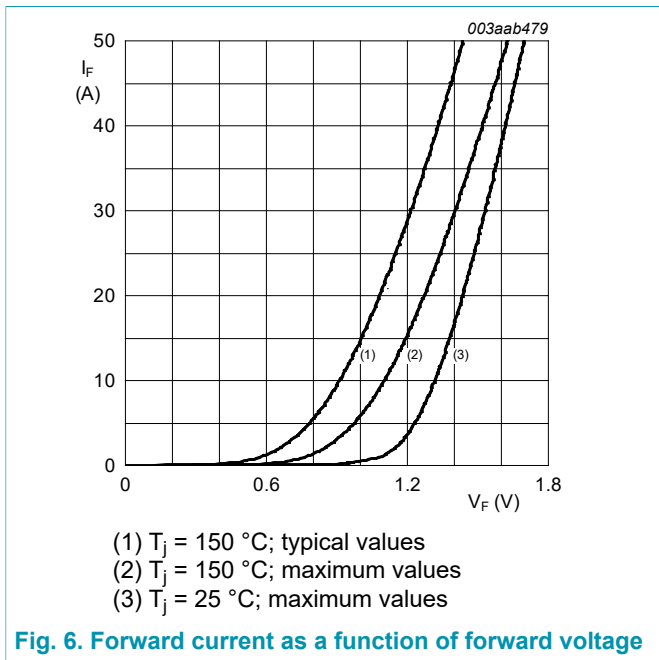
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------------|--|--|-----|-----|-----|------|
| $R_{th(j-mb)}$ | thermal resistance from junction to mounting base | with heatsink compound; Fig. 5 | - | - | 2 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient free air | | - | 60 | - | K/W |



9. Characteristics

Table 6. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------------------|---|-----|------|------|---------------|
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 15 \text{ A}; T_j = 150 \text{ }^\circ\text{C};$ Fig. 6 | - | 1 | 1.2 | V |
| | | $I_F = 15 \text{ A}; T_j = 25 \text{ }^\circ\text{C};$ Fig. 6 | - | 1.17 | 1.38 | V |
| I_R | reverse current | $V_R = 600 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$ | - | 5 | 50 | μA |
| | | $V_R = 600 \text{ V}; T_j = 100 \text{ }^\circ\text{C}$ | - | 0.2 | 0.8 | mA |
| Dynamic characteristics | | | | | | |
| Q_r | recovered charge | $I_F = 2 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 20 \text{ A}/\mu\text{s};$ Fig. 7 | - | 40 | 70 | nC |
| t_{rr} | reverse recovery time | $I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s};$ $T_j = 25 \text{ }^\circ\text{C};$ Fig. 7 | - | 50 | 60 | ns |
| I_{RM} | peak reverse recovery current | $I_F = 10 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 50 \text{ A}/\mu\text{s};$ $T_j = 100 \text{ }^\circ\text{C};$ Fig. 7 | - | 3 | 5.2 | A |
| V_{FR} | forward recovery voltage | $I_F = 10 \text{ A}; dI_F/dt = 10 \text{ A}/\mu\text{s};$ Fig. 8 | - | 3.2 | - | V |



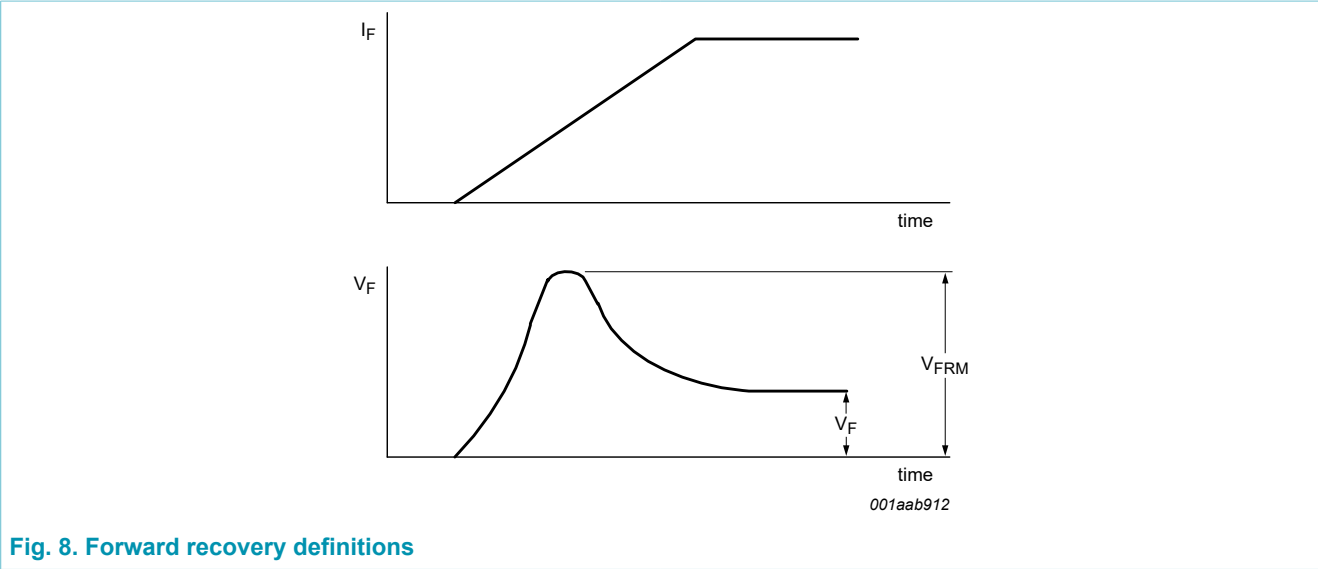
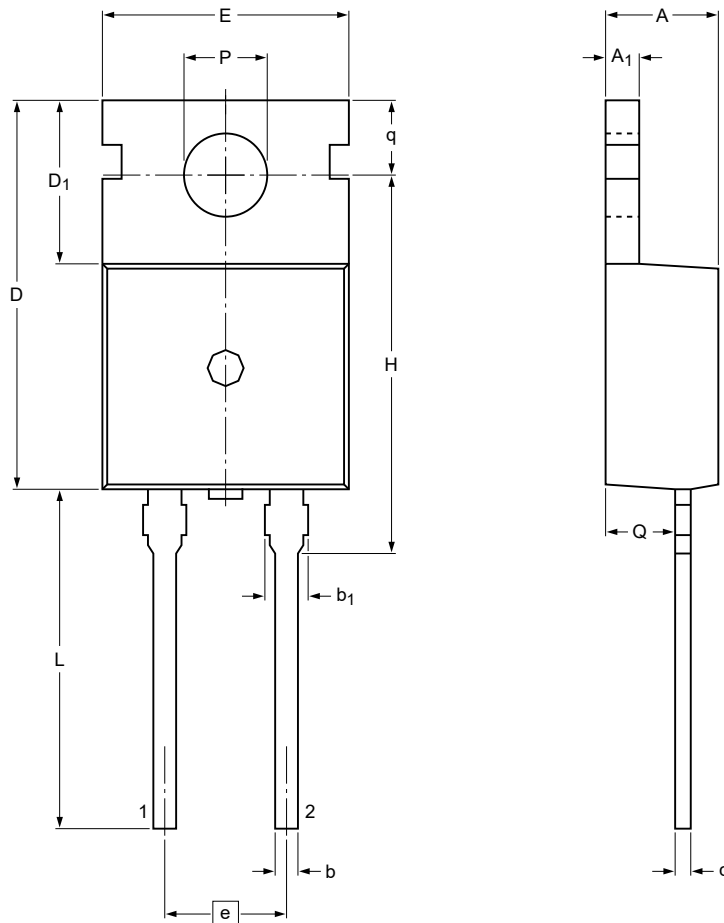


Fig. 8. Forward recovery definitions

10. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC

SOD59



Dimensions

| Unit | A | A ₁ | b | b ₁ ⁽¹⁾ | c | D | D ₁ | E | e | H | L | P | Q | q |
|------|-----|----------------|------|-------------------------------|------|------|----------------|-------|-------|-------|------|------|-----|-----|
| max | 4.7 | 1.40 | 0.95 | 1.7 | 0.65 | 15.8 | 6.8 | 10.30 | 5.08 | 16.25 | 15.0 | 3.80 | 2.6 | 2.9 |
| nom | | | | | | | | | (REF) | | | | | |
| min | 4.3 | 1.15 | 0.70 | 1.3 | 0.45 | 15.6 | 6.4 | 9.65 | | 15.70 | 12.5 | 3.65 | 2.2 | 2.7 |

Note

1. Protruded dambar are included in the dimension.

sod059_po

| Outline version | References | | | European projection | Issue date |
|-----------------|-----------------|-------|-------|---------------------|------------------------|
| | IEC | JEDEC | JEITA | | |
| SOD59 | 2-lead TO-220AC | | | | -09-08-25- 12-11-27 |

Fig. 9. Package outline TO-220AC (SOD59)

11. 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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