



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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Thank you for your cooperation and understanding,

WeEn Semiconductors



BYC15-600

Hyperfast power diode

Rev. 02 — 29 July 2010

Product data sheet

1. Product profile

1.1 General description

Hyperfast power diode in a SOD59 (2-lead TO-220AC) plastic package

1.2 Features and benefits

- Extremely fast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching loss in associated MOSFET

1.3 Applications

- Continuous Current Mode (CCM) Power
- Half-bridge lighting ballasts
- Half-bridge or full-bridge switched-mode

1.4 Quick reference data

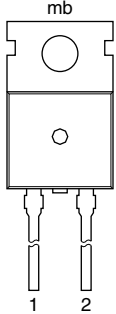
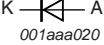
Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------|
| Specify Name | | | | | | |
| V_{RRM} | repetitive peak reverse voltage | | - | - | 600 | V |
| $I_{F(AV)}$ | average forward current | square-wave pulse; $\delta = 0.5$; $T_{mb} \leq 98$ °C; see Figure 1 ; see Figure 2 | - | - | 15 | A |
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 15$ A; $T_j = 150$ °C; see Figure 3 | - | 1.4 | 2 | V |
| Dynamic characteristics | | | | | | |
| t_{rr} | reverse recovery time | $I_F = 15$ A; $V_R = 400$ V; $dI_F/dt = 500$ A/ μ s; $T_j = 25$ °C; see Figure 4 | - | 19 | - | ns |



2. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 1 | K | cathode |  |  001aaa020 |
| 2 | A | anode | | |
| mb | mb | mounting base; cathode | | |

SOD59 (TO-220AC)

3. Ordering information

Table 3. Ordering information

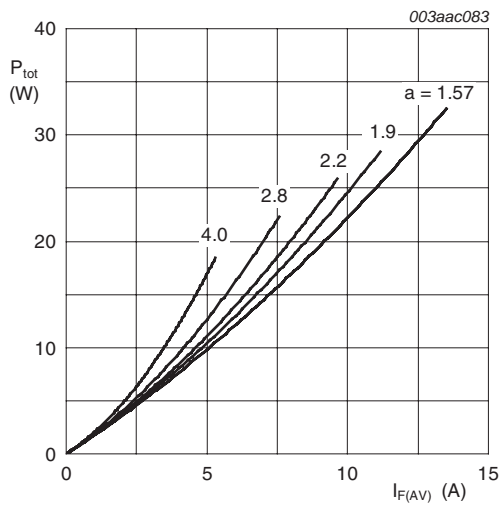
| Type number | Package | | |
|-------------|----------|----------------------------------------------------------------------------------|---------|
| | Name | Description | Version |
| BYC15-600 | TO-220AC | plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC | SOD59 |

4. Limiting values

Table 4. Limiting values

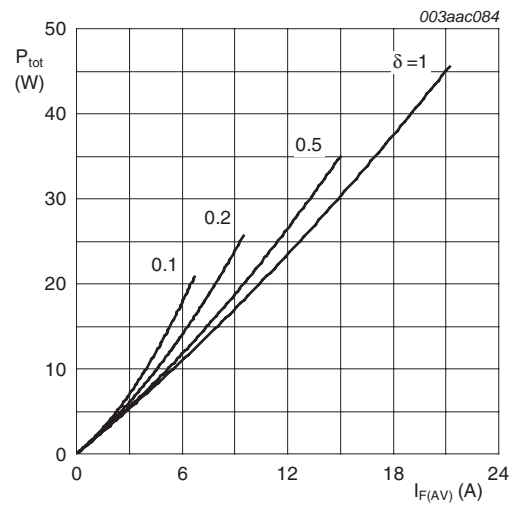
In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|---------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-----|-----|------|
| Specify Name | | | | | |
| V_{RRM} | repetitive peak reverse voltage | | - | 600 | V |
| V_{RWM} | crest working reverse voltage | | - | 600 | V |
| V_R | reverse voltage | $T_{mb} \leq 100\text{ °C}$; DC | - | 500 | V |
| $I_{F(AV)}$ | average forward current | square-wave pulse; $\delta = 0.5$; $T_{mb} \leq 98\text{ °C}$; see Figure 1 ; see Figure 2 | - | 15 | A |
| I_{FRM} | repetitive peak forward current | square-wave pulse; $\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 98\text{ °C}$ | - | 30 | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 10\text{ ms}$; sine-wave pulse; $T_{j(\text{init})} = 25\text{ °C}$ | - | 200 | A |
| | | $t_p = 8.3\text{ ms}$; sine-wave pulse; $T_{j(\text{init})} = 25\text{ °C}$ | - | 220 | A |
| T_{stg} | storage temperature | | -40 | 150 | °C |
| T_j | junction temperature | | - | 150 | °C |



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

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



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

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

5. Thermal characteristics

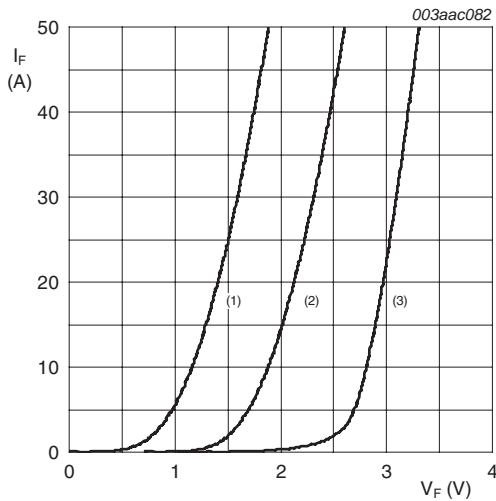
Table 5. Thermal characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---------------------|---------------------------------------------------|------------------------|-----|-----|-----|------|
| Specify Name | | | | | | |
| $R_{th(j-mb)}$ | thermal resistance from junction to mounting base | with heatsink compound | - | - | 1.5 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | - | 60 | - | K/W |

6. Characteristics

Table 6. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|---------------|
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 30\text{ A}; T_j = 150\text{ °C};$ see Figure 3 | - | 1.7 | 2.3 | V |
| | | $I_F = 15\text{ A}; T_j = 25\text{ °C};$ see Figure 3 | - | 1.9 | 2.9 | V |
| | | $I_F = 15\text{ A}; T_j = 150\text{ °C};$ see Figure 3 | - | 1.4 | 2 | V |
| I_R | reverse current | $V_R = 500\text{ V}; T_j = 100\text{ °C}$ | - | 1.1 | 3 | mA |
| | | $V_R = 600\text{ V}; T_j = 25\text{ °C}$ | - | 12 | 200 | μA |
| Dynamic characteristics | | | | | | |
| t_{rr} | reverse recovery time | $I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 100\text{ °C};$ see Figure 4 | - | 32 | 40 | ns |
| | | $I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 50\text{ A}/\mu\text{s}; T_j = 25\text{ °C};$ see Figure 4 | - | 35 | 55 | ns |
| | | $I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 25\text{ °C};$ see Figure 4 | - | 19 | - | ns |
| I_{RM} | peak reverse recovery current | $I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 125\text{ °C};$ see Figure 4 | - | 9.5 | 12 | A |
| | | $I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 50\text{ A}/\mu\text{s}; T_j = 125\text{ °C};$ see Figure 4 | - | 3 | 7.5 | A |
| V_{FR} | forward recovery voltage | $I_F = 15\text{ A}; dI_F/dt = 100\text{ A}/\mu\text{s}; T_j = 25\text{ °C};$ see Figure 5 | - | 8 | 11 | 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 3. Forward current as a function of forward voltage

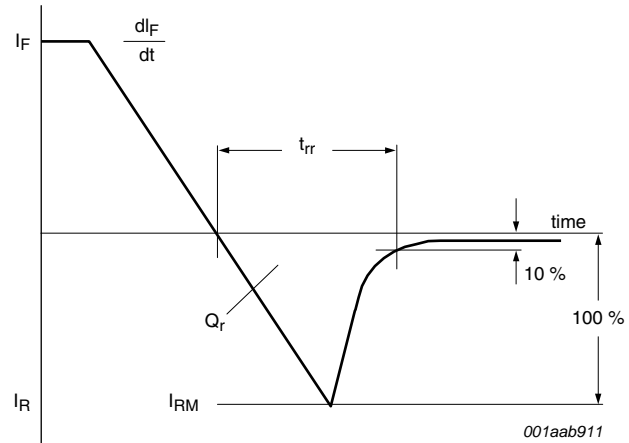


Fig 4. Forward recovery definitions

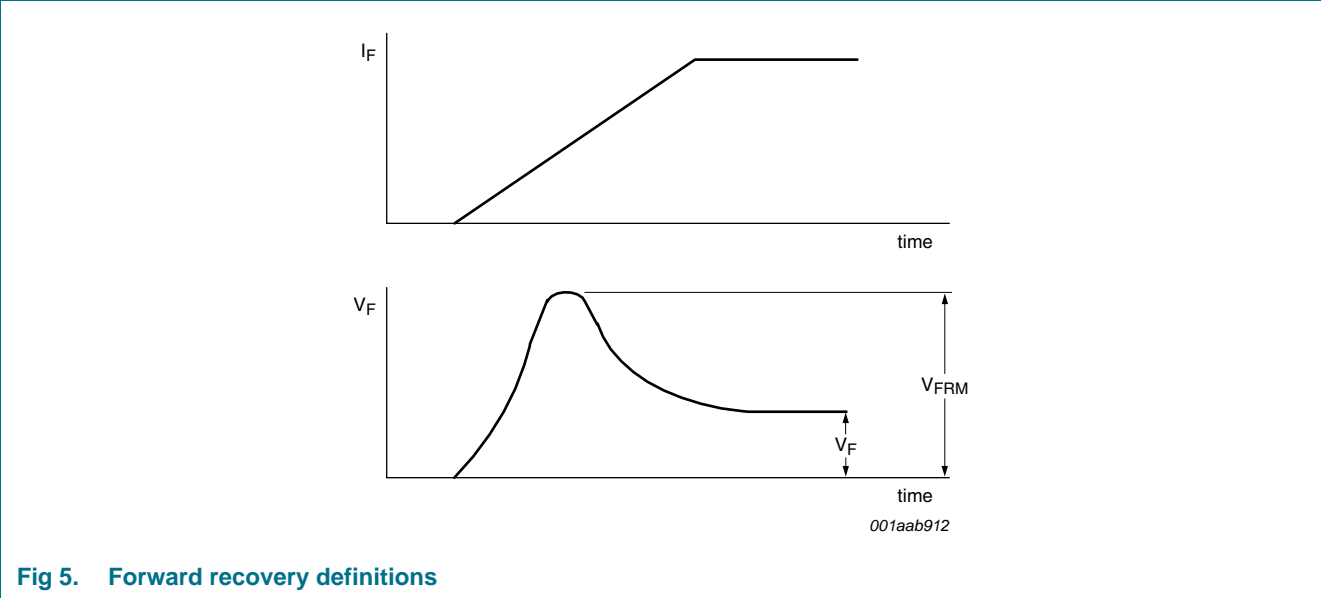


Fig 5. Forward recovery definitions

7. Package outline

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

SOD59

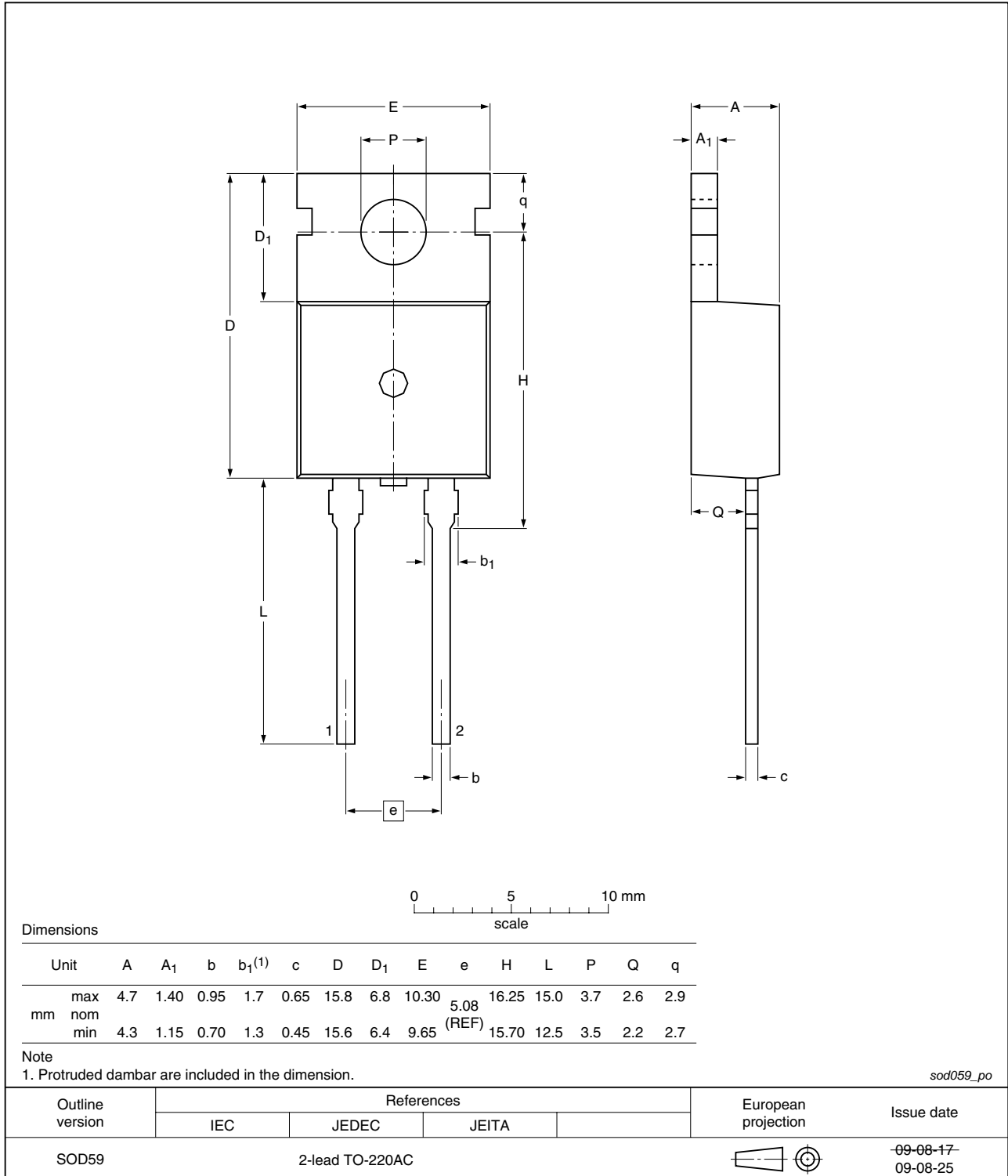


Fig 6. Package outline SOD59 (TO-220AC)

8. Revision history

Table 7. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|-------------------------------|--------------------|---------------|---------------|
| BYC15-600 v.2 | 20100729 | Product data sheet | - | BYC15-600 v.1 |
| Modifications: | • Various changes to content. | | | |
| BYC15-600 v.1 | 20071129 | Product data sheet | - | - |

9. Legal information

9.1 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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