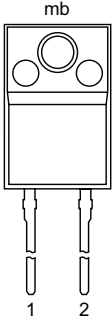
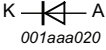


5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description             | Simplified outline                                                                | Graphic symbol                                                                      |
|-----|--------|-------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | K      | cathode                 |  |  |
| 2   | A      | anode                   |                                                                                   |                                                                                     |
| mb  | n.c.   | mounting base; isolated |                                                                                   |                                                                                     |

6. Ordering information

Table 3. Ordering information

| Type number | Package |                                                                                                      |         |
|-------------|---------|------------------------------------------------------------------------------------------------------|---------|
|             | Name    | Description                                                                                          | Version |
| BYC5X-600P  | TO-220F | plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220F "full pack" | SOD113A |

7. Marking

Table 4. Marking codes

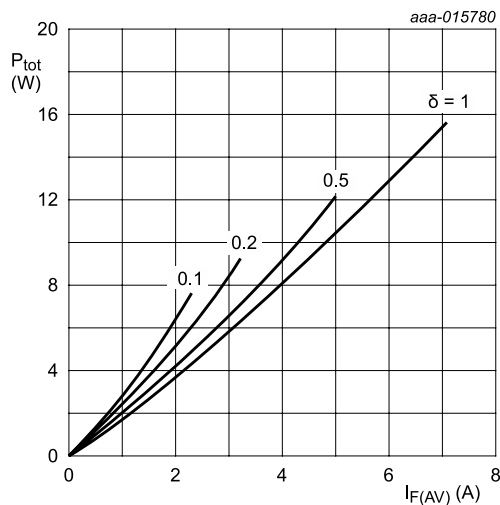
| Type number | Marking codes |
|-------------|---------------|
| BYC5X-600P  | BYC5X-600P    |

## 8. Limiting values

**Table 5. Limiting values**

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

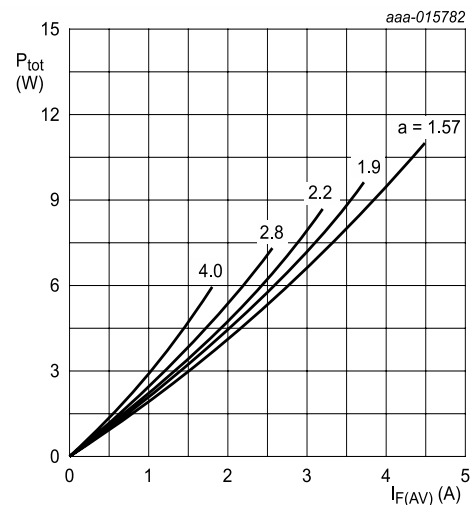
| Symbol      | Parameter                           | Conditions                                                                                                                                              | Values     | Unit               |
|-------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------|
| $V_{RRM}$   | repetitive peak reverse voltage     |                                                                                                                                                         | 600        | V                  |
| $V_{RWM}$   | crest working reverse voltage       |                                                                                                                                                         | 600        | V                  |
| $V_R$       | reverse voltage                     | DC                                                                                                                                                      | 600        | V                  |
| $I_{F(AV)}$ | average forward current             | $\delta = 0.5$ ; square-wave pulse; $T_h \leq 97\text{ }^{\circ}\text{C}$ ;<br><a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> | 5          | A                  |
| $I_{FRM}$   | repetitive peak forward current     | $\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_h \leq 97\text{ }^{\circ}\text{C}$ ;<br>square-wave pulse                                           | 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;<br><a href="#">Fig. 4</a>                                   | 60         | A                  |
|             |                                     | $t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$ ; sine-wave pulse                                                             | 65         | A                  |
| $T_{stg}$   | storage temperature                 |                                                                                                                                                         | -65 to 175 | $^{\circ}\text{C}$ |
| $T_j$       | junction temperature                |                                                                                                                                                         | 175        | $^{\circ}\text{C}$ |



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

$$V_o = 1.801\text{ V}; R_s = 0.062\text{ }\Omega$$

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



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

$$V_o = 1.801\text{ V}; R_s = 0.062\text{ }\Omega$$

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

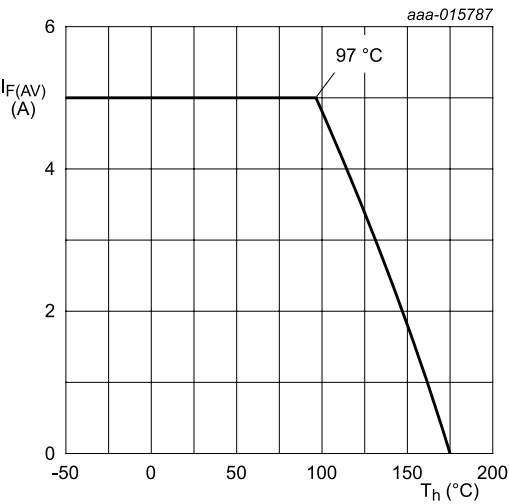


Fig. 3. Forward current as a function of heatsink temperature; maximum values

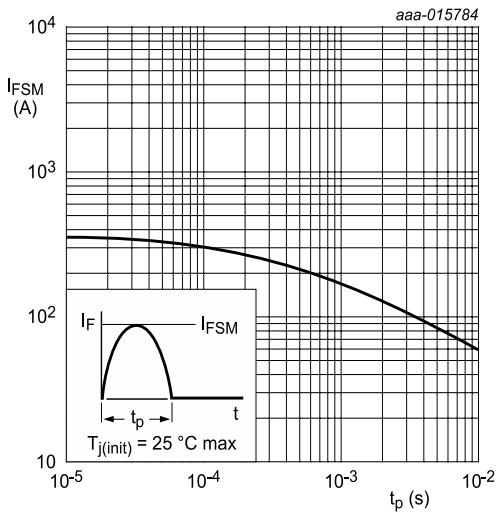
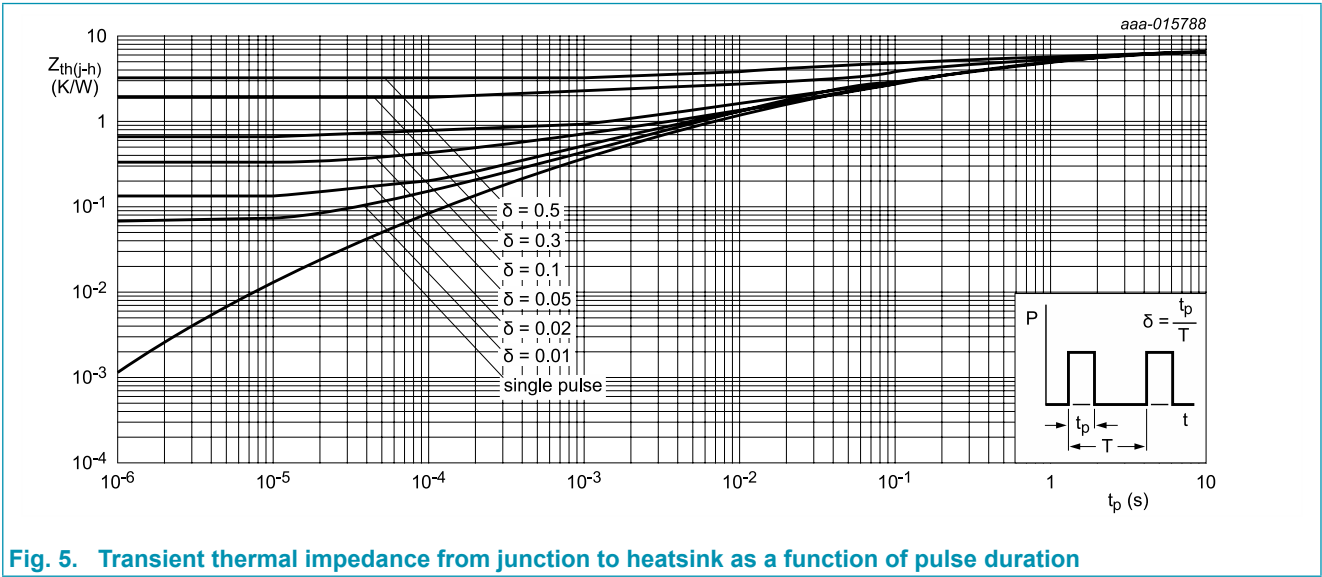


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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.5 | -   | -   | 6.5 | K/W  |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient  | in free air                   | -   | 55  | -   | K/W  |



10. Isolation characteristics

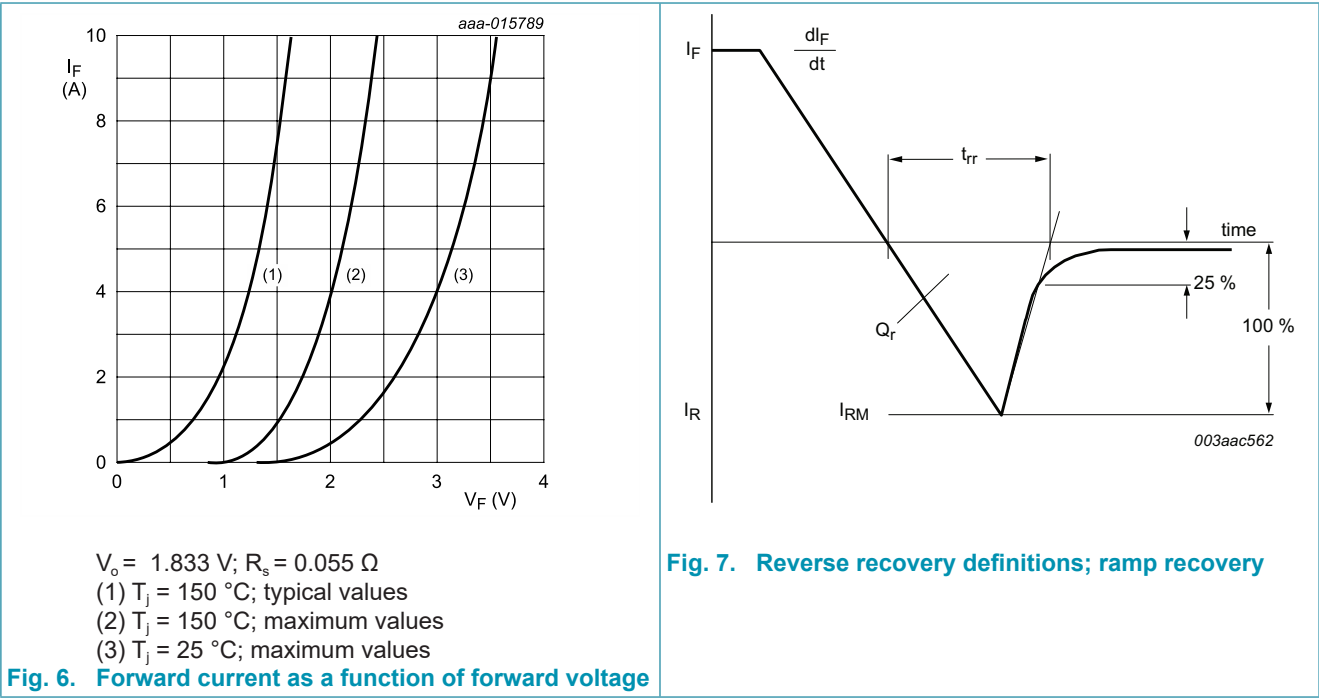
Table 7. Isolation characteristics

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

11. Characteristics

Table 8. Characteristics

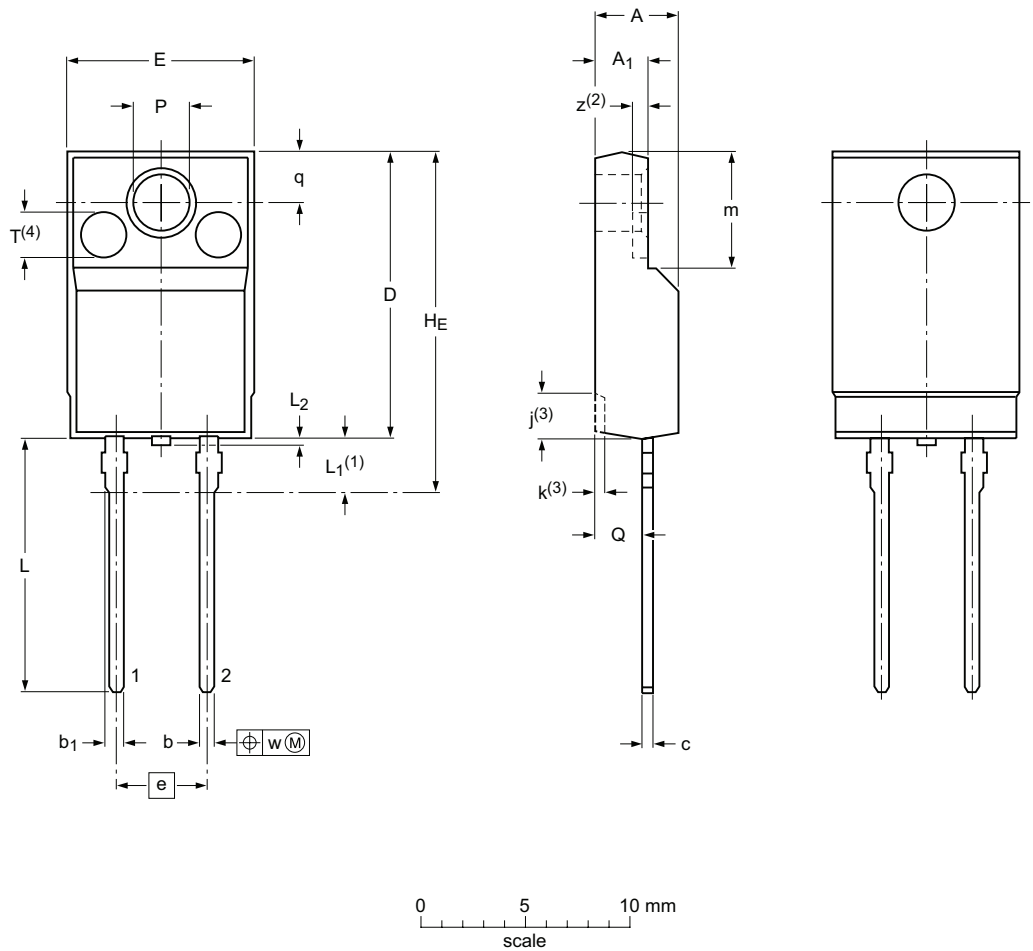
| Symbol                  | Parameter                     | Conditions                                                                                                                    |  | Min | Typ  | Max | Unit |
|-------------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--|-----|------|-----|------|
| Static characteristics  |                               |                                                                                                                               |  |     |      |     |      |
| V <sub>F</sub>          | forward voltage               | I <sub>F</sub> = 5 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>                                                          |  | -   | 2.5  | 3.3 | V    |
|                         |                               | I <sub>F</sub> = 5 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 6</a>                                                         |  | -   | 1.35 | 2.1 | V    |
| I <sub>R</sub>          | reverse current               | V <sub>R</sub> = 600 V; T <sub>j</sub> = 25 °C                                                                                |  | -   | -    | 10  | μA   |
|                         |                               | V <sub>R</sub> = 600 V; T <sub>j</sub> = 150 °C                                                                               |  | -   | -    | 0.6 | mA   |
| Dynamic characteristics |                               |                                                                                                                               |  |     |      |     |      |
| Q <sub>r</sub>          | recovered charge              | I <sub>F</sub> = 5 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>  |  | -   | 19   | -   | nC   |
|                         |                               | I <sub>F</sub> = 5 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 7</a> |  | -   | 45   | -   | nC   |
| t <sub>rr</sub>         | reverse recovery time         | I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>   |  | -   | 11   | -   | ns   |
|                         |                               | I <sub>F</sub> = 5 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>  |  | -   | 23   | -   | ns   |
|                         |                               | I <sub>F</sub> = 5 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 7</a> |  | -   | 28   | -   | ns   |
|                         |                               | I <sub>F</sub> = 5 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>  |  | -   | 13   | 25  | ns   |
| I <sub>RM</sub>         | peak reverse recovery current | I <sub>F</sub> = 5 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>  |  | -   | 1.7  | -   | A    |
|                         |                               | I <sub>F</sub> = 5 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 7</a> |  | -   | 3.2  | -   | A    |



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 <sub>1</sub> | b   | b <sub>1</sub> | c   | D    | E    | e    | H <sub>E</sub><br>max | j <sup>(3)</sup> | k <sup>(3)</sup> | L    | L <sub>1</sub> <sup>(1)</sup> | L <sub>2</sub><br>max | m   | P   | Q   | q   | T <sup>(4)</sup> | w   | z <sup>(2)</sup> |
|------|-----|----------------|-----|----------------|-----|------|------|------|-----------------------|------------------|------------------|------|-------------------------------|-----------------------|-----|-----|-----|-----|------------------|-----|------------------|
| 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 |       |  |                     | <del>07-06-08</del><br>15-08-28 |

## 13. 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.
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