

# DATA SHEET

## **BYC5B-600**

Rectifier diode

ultrafast, low switching loss

Product specification

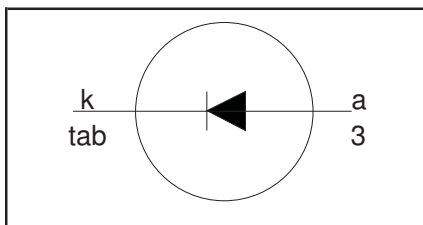
March 2001



## Rectifier diode ultrafast, low switching loss

**BYC5B-600****FEATURES**

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

**SYMBOL****QUICK REFERENCE DATA**

$$V_R = 600 \text{ V}$$

$$V_F \leq 1.75 \text{ V}$$

$$I_{F(AV)} = 5 \text{ A}$$

$$t_{rr} = 19 \text{ ns (typ)}$$

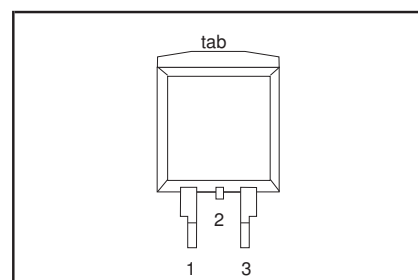
**APPLICATIONS**

- Active power factor correction
- Half-bridge lighting ballasts
- Half-bridge/ full-bridge switched mode power supplies.

The BYC5B-600 is supplied in the SOT404 surface mounting package.

**PINNING**

| PIN | DESCRIPTION          |
|-----|----------------------|
| 1   | no connection        |
| 2   | cathode <sup>1</sup> |
| 3   | anode                |
| tab | cathode              |

**SOT404****LIMITING VALUES**

Limiting values in accordance with the Absolute Maximum System (IEC 134).

| SYMBOL      | PARAMETER                            | CONDITIONS                                                                                                                                                              | MIN. | MAX. | UNIT             |
|-------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------------------|
| $V_{RRM}$   | Peak repetitive reverse voltage      |                                                                                                                                                                         | -    | 600  | V                |
| $V_{RWM}$   | Crest working reverse voltage        |                                                                                                                                                                         | -    | 600  | V                |
| $V_R$       | Continuous reverse voltage           |                                                                                                                                                                         | -    | 500  | V                |
| $I_{F(AV)}$ | Average forward current              | $T_{mb} \leq 110^\circ\text{C}$<br>$\delta = 0.5$ ; with reappplied $V_{RRM(max)}$ ;                                                                                    | -    | 5    | A                |
| $I_{FRM}$   | Repetitive peak forward current      | $T_{mb} \leq 89^\circ\text{C}$<br>$\delta = 0.5$ ; with reappplied $V_{RRM(max)}$ ;                                                                                     | -    | 10   | A                |
| $I_{FSM}$   | Non-repetitive peak forward current. | $T_{mb} \leq 89^\circ\text{C}$<br>$t = 10 \text{ ms}$<br>$t = 8.3 \text{ ms}$<br>sinusoidal; $T_j = 150^\circ\text{C}$ prior to surge<br>with reappplied $V_{RWM(max)}$ | -    | 40   | A                |
| $T_{stg}$   | Storage temperature                  |                                                                                                                                                                         | -40  | 150  | $^\circ\text{C}$ |
| $T_j$       | Operating junction temperature       |                                                                                                                                                                         | -    | 150  | $^\circ\text{C}$ |

**THERMAL RESISTANCES**

| SYMBOL        | PARAMETER                                    | CONDITIONS                   | MIN. | TYP. | MAX. | UNIT |
|---------------|----------------------------------------------|------------------------------|------|------|------|------|
| $R_{th j-mb}$ | Thermal resistance junction to mounting base |                              | -    | -    | 2.5  | K/W  |
| $R_{th j-a}$  | Thermal resistance junction to ambient       | minimum footprint, FR4 board | -    | 50   | -    | K/W  |

<sup>1</sup> it is not possible to make connection to pin 2 of the SOT404 package

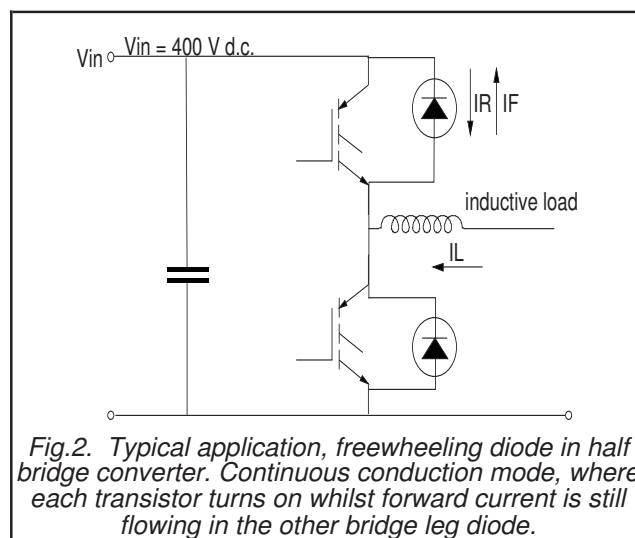
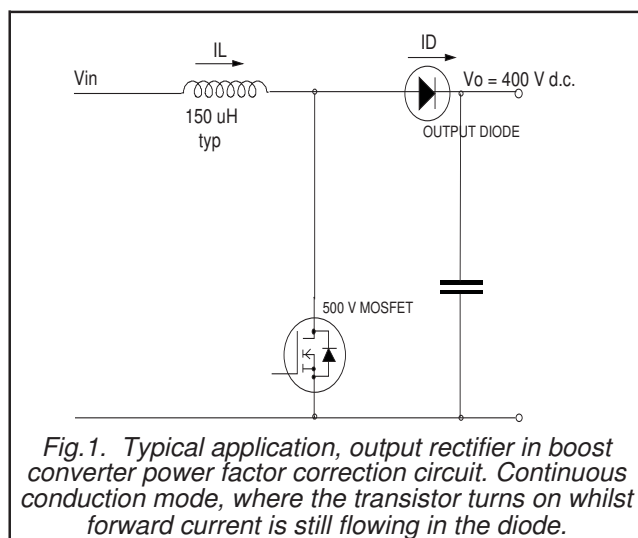
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## ELECTRICAL CHARACTERISTICS

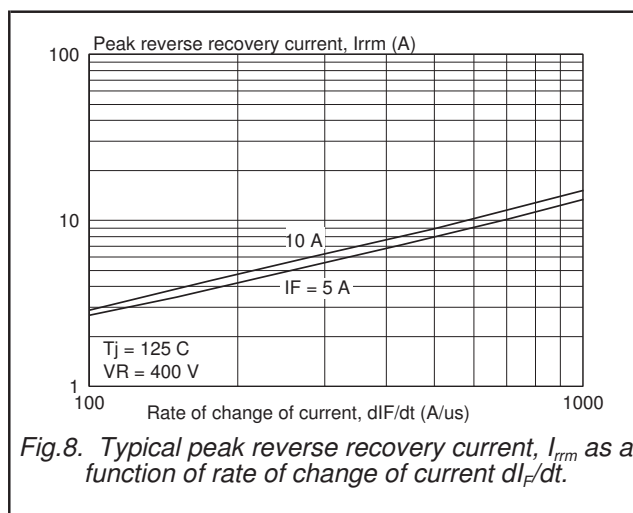
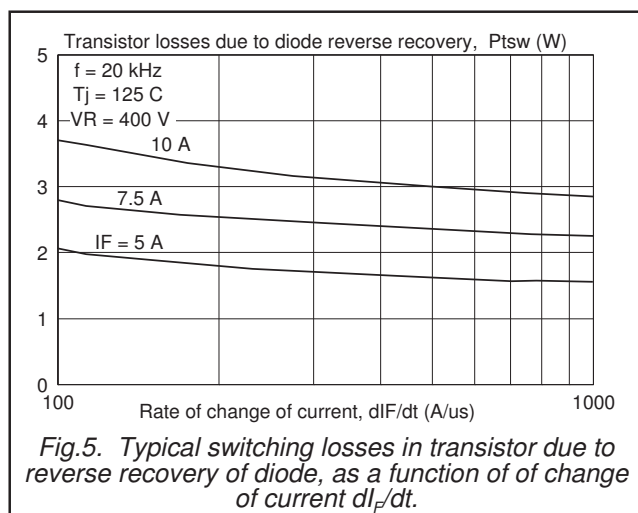
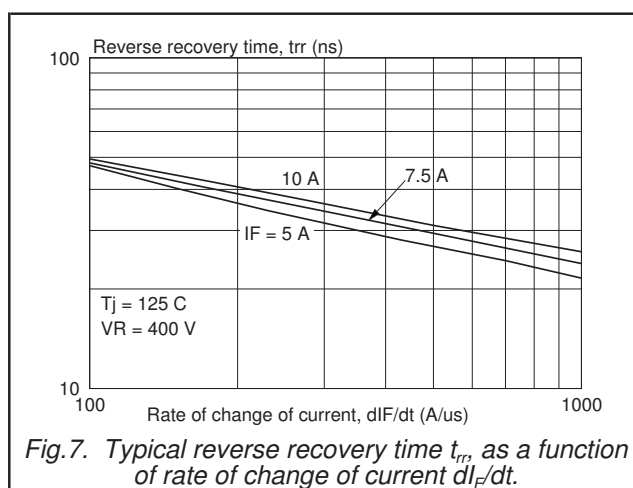
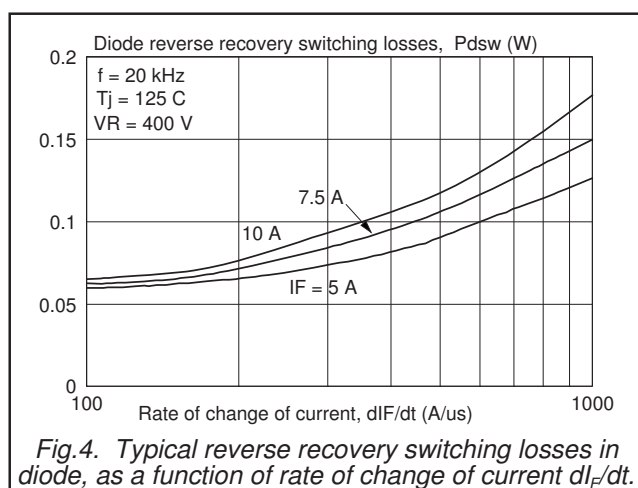
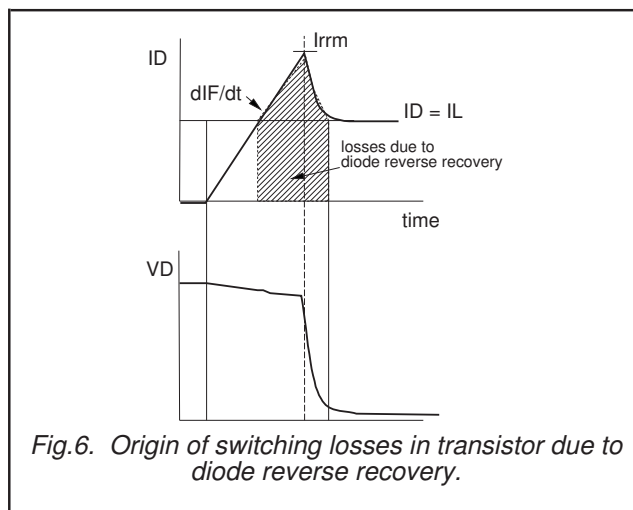
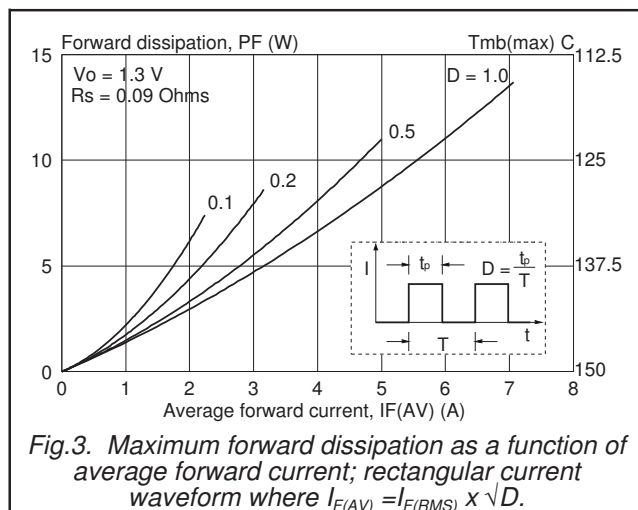
 $T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise stated

| SYMBOL    | PARAMETER                     | CONDITIONS                                                                                                                | MIN. | TYP. | MAX. | UNIT          |
|-----------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------|------|------|------|---------------|
| $V_F$     | Forward voltage               | $I_F = 5\text{ A}$ ; $T_j = 150\text{ }^{\circ}\text{C}$                                                                  | -    | 1.4  | 1.75 | V             |
|           |                               | $I_F = 10\text{ A}$ ; $T_j = 150\text{ }^{\circ}\text{C}$                                                                 | -    | 1.75 | 2.2  | V             |
| $I_R$     | Reverse current               | $I_F = 5\text{ A}$ ;<br>$V_R = 600\text{ V}$                                                                              | -    | 2.0  | 2.9  | V             |
|           |                               | $V_R = 500\text{ V}$ ; $T_j = 100\text{ }^{\circ}\text{C}$                                                                | -    | 9    | 100  | $\mu\text{A}$ |
|           |                               |                                                                                                                           | -    | 0.9  | 3.0  | mA            |
| $t_{rr}$  | Reverse recovery time         | $I_F = 1\text{ A}$ ; $V_R = 30\text{ V}$ ; $di_F/dt = 50\text{ A}/\mu\text{s}$                                            | -    | 30   | 50   | ns            |
| $t_{rr}$  | Reverse recovery time         | $I_F = 5\text{ A}$ ; $V_R = 400\text{ V}$ ;<br>$di_F/dt = 500\text{ A}/\mu\text{s}$                                       | -    | 19   | -    | ns            |
| $t_{rr}$  | Reverse recovery time         | $I_F = 5\text{ A}$ ; $V_R = 400\text{ V}$ ;<br>$di_F/dt = 500\text{ A}/\mu\text{s}$ ; $T_j = 100\text{ }^{\circ}\text{C}$ | -    | 25   | 30   | ns            |
| $I_{rrm}$ | Peak reverse recovery current | $I_F = 5\text{ A}$ ; $V_R = 400\text{ V}$ ;<br>$di_F/dt = 50\text{ A}/\mu\text{s}$ ; $T_j = 125\text{ }^{\circ}\text{C}$  | -    | 0.7  | 3    | A             |
| $I_{rrm}$ | Peak reverse recovery current | $I_F = 5\text{ A}$ ; $V_R = 400\text{ V}$ ;<br>$di_F/dt = 500\text{ A}/\mu\text{s}$ ; $T_j = 125\text{ }^{\circ}\text{C}$ | -    | 8    | 11   | A             |
| $V_{fr}$  | Forward recovery voltage      | $I_F = 10\text{ A}$ ; $di_F/dt = 100\text{ A}/\mu\text{s}$                                                                | -    | 9    | 11   | V             |



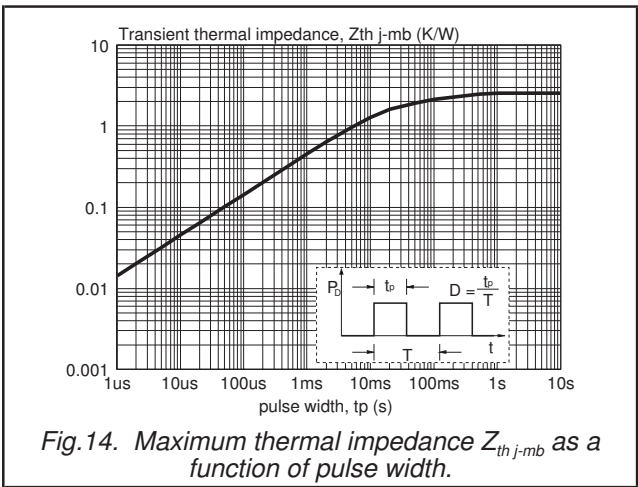
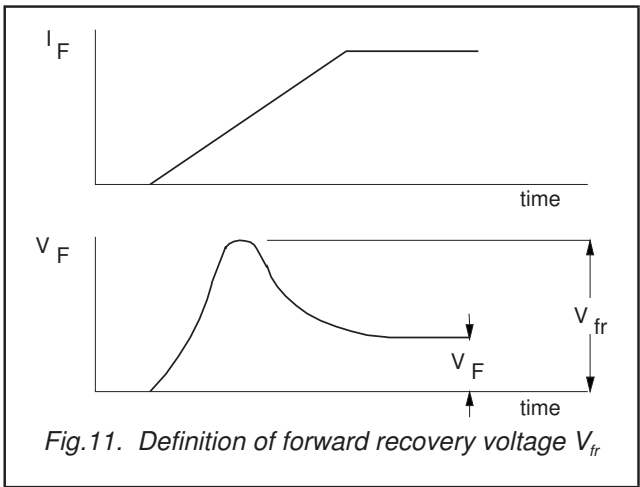
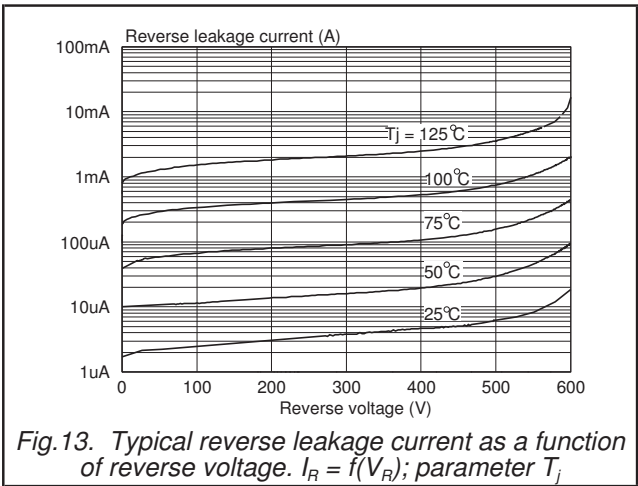
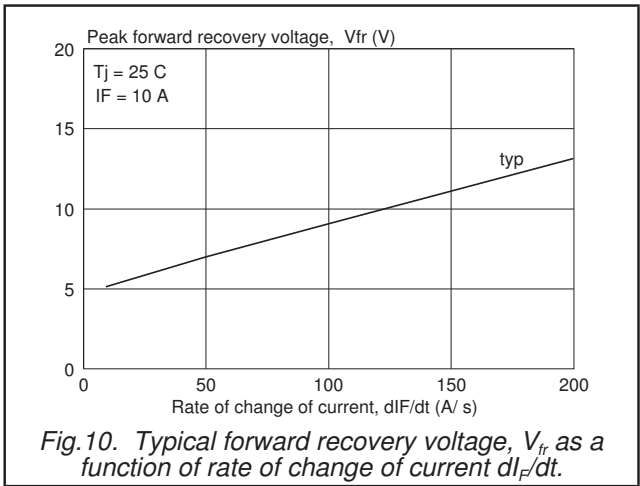
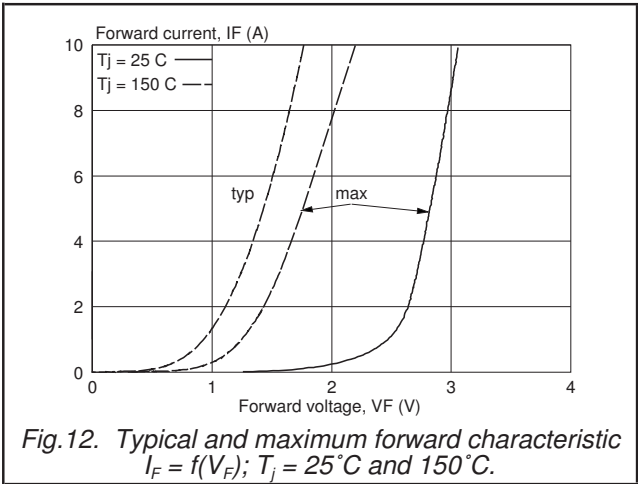
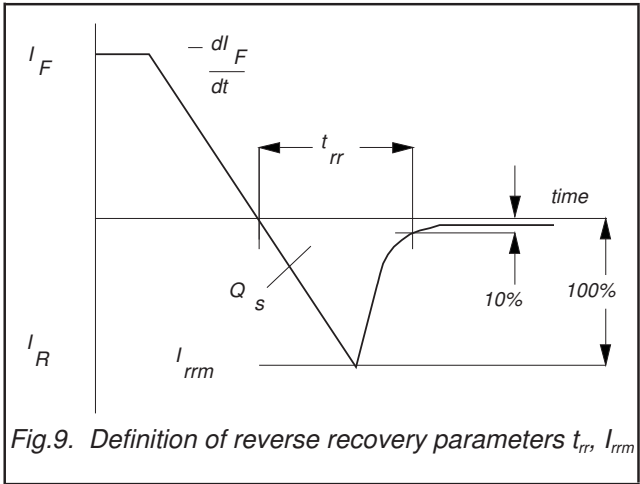
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## MECHANICAL DATA

Dimensions in mm

Net Mass: 1.4 g

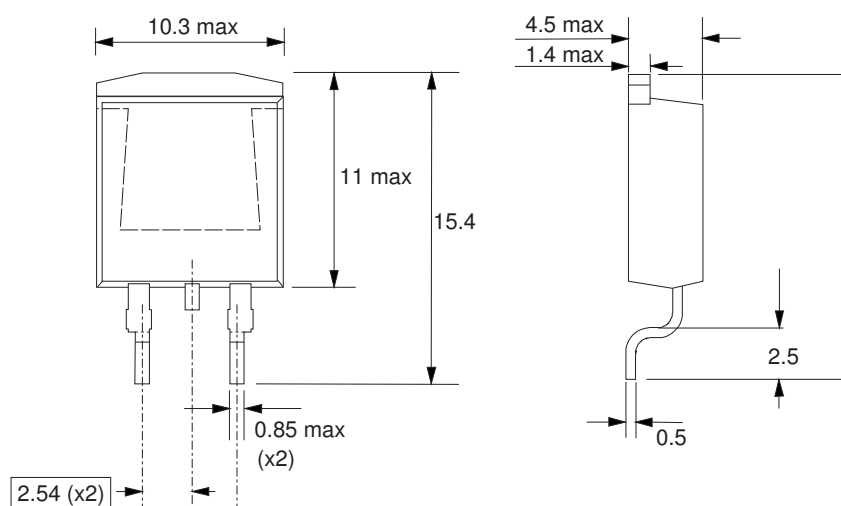


Fig. 15. SOT404 : centre pin connected to mounting base.

## MOUNTING INSTRUCTIONS

Dimensions in mm

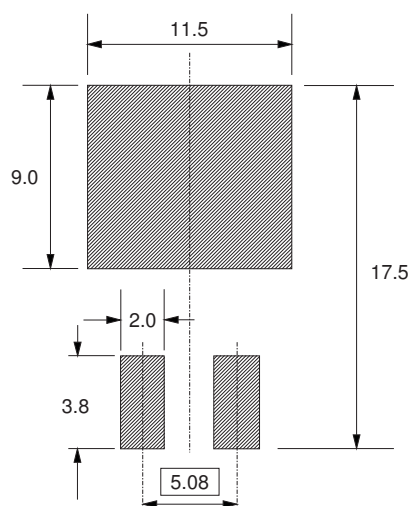


Fig. 16. SOT404 : soldering pattern for surface mounting.

### Notes

1. Epoxy meets UL94 V0 at 1/8".

## Legal information

### DATA SHEET STATUS

| DOCUMENT STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)</sup> | DEFINITION                                                                            |
|--------------------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Objective data sheet           | Development                   | This document contains data from the objective specification for product development. |
| Preliminary data sheet         | Qualification                 | This document contains data from the preliminary specification.                       |
| Product data sheet             | Production                    | This document contains the product specification.                                     |

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