



# SMBYW04-200 BYW4200B

## HIGH EFFICIENCY FAST RECOVERY DIODE

### MAIN PRODUCT CHARACTERISTICS

|             |        |
|-------------|--------|
| $I_{F(AV)}$ | 4 A    |
| $V_{RRM}$   | 200 V  |
| $V_F (max)$ | 0.85 V |
| $T_j (max)$ | 150 °C |

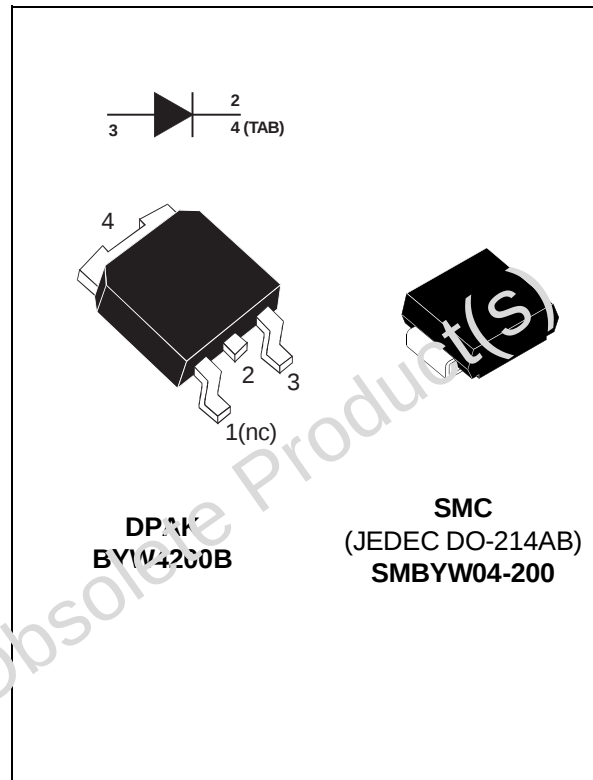
### FEATURES AND BENEFITS

- SUITED TO SMPS AND DRIVES
- SURFACE MOUNT PACKAGE
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY

### DESCRIPTION

Single chip rectifier suited to Switch Mode Power Supplies and high frequency converters.

Packaged in DPAK and SMC, this surface mount device is intended for use in low voltage, high frequency inverters, free wheeling and rectification applications.



### ABSOLUTE RATINGS (limiting values)

| Symbol       | Parameter                                 |             |                                                       | Value         | Unit |
|--------------|-------------------------------------------|-------------|-------------------------------------------------------|---------------|------|
| $V_{RRM}$    | Repetitive peak reverse voltage           |             |                                                       | 200           | V    |
| $I_{F(RMS)}$ | RMS forward current                       |             |                                                       | 10            | A    |
| $I_{F(AV)}$  | Average forward current<br>$\delta = 0.5$ | DPAK<br>SMC | $T_{case} = 130^{\circ}C$<br>$T_{lead} = 70^{\circ}C$ | 4             | A    |
| $I_{FSM}$    | Surge non repetitive forward current      |             | $t_p = 10\text{ ms}$<br>sinusoidal                    | 70            | A    |
| $T_{stg}$    | Storage temperature range                 |             |                                                       | - 65 to + 150 | °C   |
| $T_j$        | Maximum operating junction temperature    |             |                                                       | 150           | °C   |

# THERMAL RESISTANCE

| Symbol        | Parameter         | Package | Value | Unit |
|---------------|-------------------|---------|-------|------|
| $R_{th(j-c)}$ | Junction to case  | DPAK    | 5     | °C/W |
| $R_{th(j-l)}$ | Junction to leads | SMC     | 20    | °C/W |

# STATIC ELECTRICAL CHARACTERISTICS

| Symbol   | Tests Conditions        | Tests Conditions          | Min.                | Typ. | Max. | Unit          |
|----------|-------------------------|---------------------------|---------------------|------|------|---------------|
| $I_R$ *  | Reverse leakage current | $T_j = 25^\circ\text{C}$  | $V_R = V_{RRM}$     |      | 10   | $\mu\text{A}$ |
|          |                         | $T_j = 100^\circ\text{C}$ |                     | 0.15 | 0.5  | mA            |
| $V_F$ ** | Forward voltage drop    | $T_j = 25^\circ\text{C}$  | $I_F = 12\text{ A}$ |      | 1.25 | V             |
|          |                         | $T_j = 100^\circ\text{C}$ | $I_F = 4\text{ A}$  | 0.8  | 0.85 | V             |

Pulse test : \*  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$   
 \*\*  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

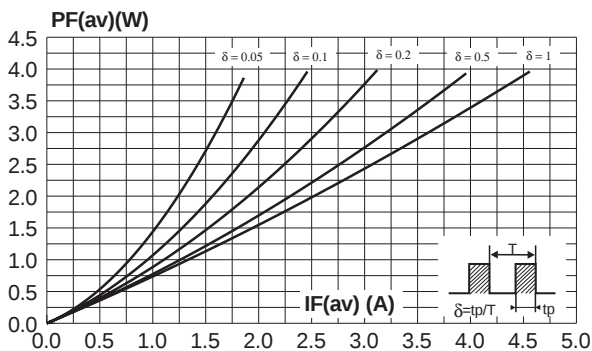
To evaluate the maximum conduction losses use the following equation :

$$P = 0.7 \times I_{F(AV)} + 0.037 I_{F(RMS)}^2$$

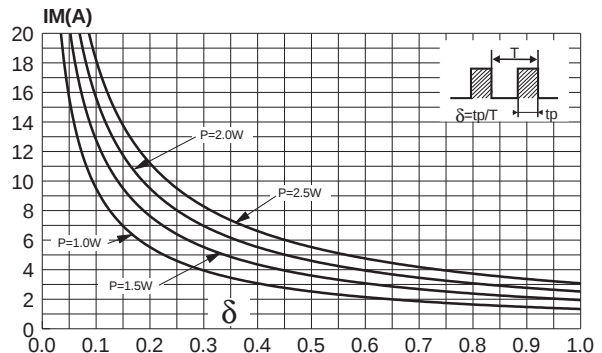
# RECOVERY CHARACTERISTICS

| Symbol   | Test Conditions          |                                                             |                                      | Min. | Typ. | Max. | Unit |
|----------|--------------------------|-------------------------------------------------------------|--------------------------------------|------|------|------|------|
| $t_{rr}$ | $T_j = 25^\circ\text{C}$ | $I_F = 1\text{ A}$<br>$V_F = 30\text{ V}$                   | $dI_F/dt = -50\text{ A}/\mu\text{s}$ |      | 26   | 35   | ns   |
| $t_{fr}$ | $T_j = 25^\circ\text{C}$ | $I_F = 4\text{ A}$<br>$V_{FR} = 1.1 \times V_F \text{ max}$ | $dI_F/dt = -50\text{ A}/\mu\text{s}$ |      | 20   |      | ns   |
| $V_{FP}$ | $T_j = 25^\circ\text{C}$ | $I_F = 4\text{ A}$                                          | $dI_F/dt = -50\text{ A}/\mu\text{s}$ |      | 5    |      | V    |

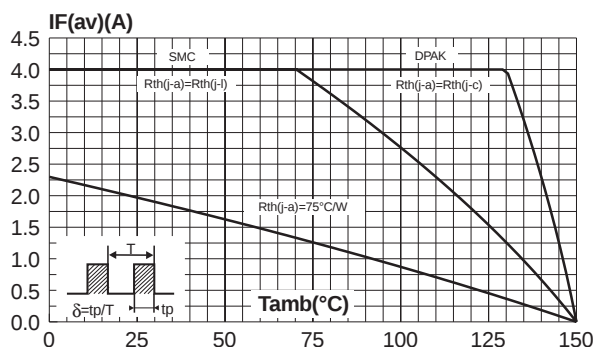
**Fig. 1:** Average forward power dissipation versus average forward current.



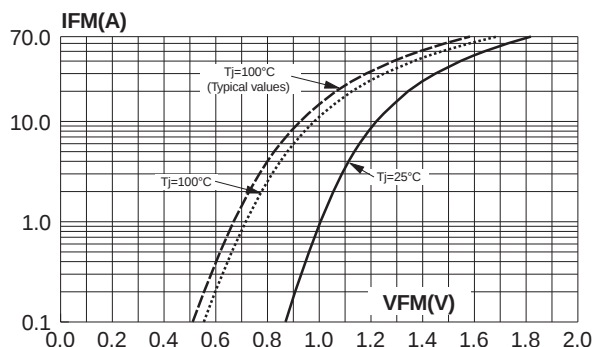
**Fig. 2:** Peak current versus form factor.



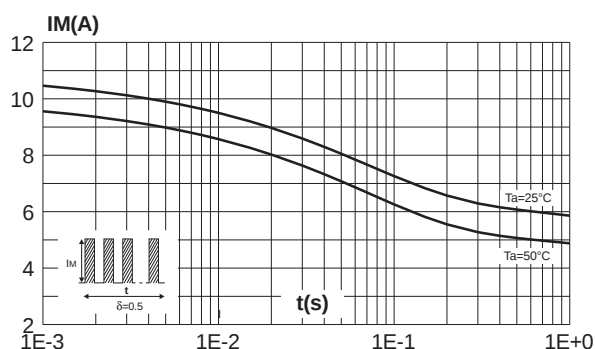
**Fig. 3:** Average forward current versus ambient temperature ( $\delta=0.5$ ).



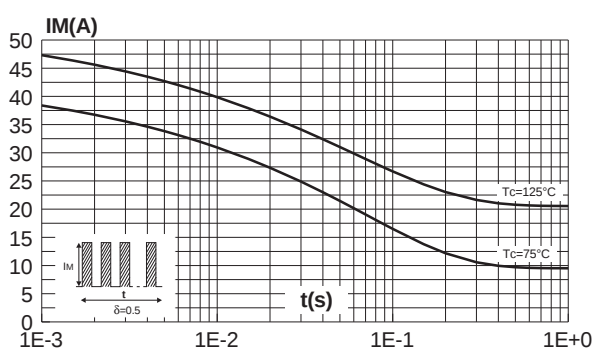
**Fig. 4:** Forward voltage drop versus forward current (maximum values).



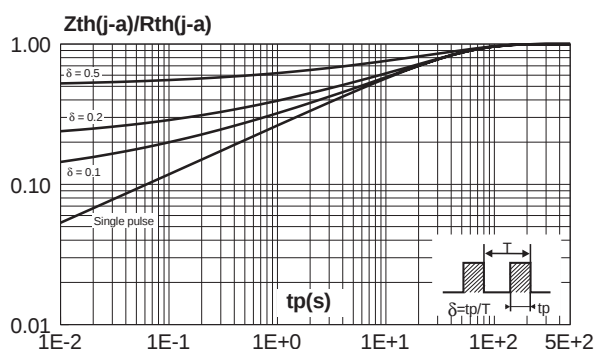
**Fig. 5-1:** Non repetitive surge peak forward current versus overload duration (SMBYW04-200).



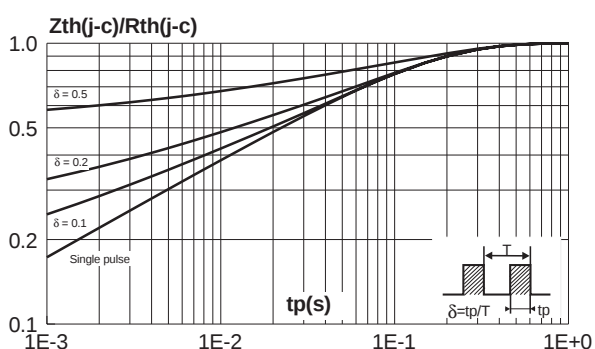
**Fig. 5-2:** Non repetitive surge peak forward current versus overload duration (BYW4200B).



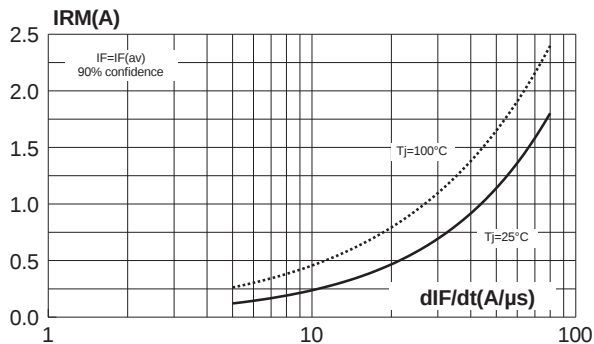
**Fig. 6-1:** Variation of thermal impedance junction to ambient versus pulse duration (recommended pad layout, epoxy FR4, e(Cu)=35μm) (SMBYW04-200).



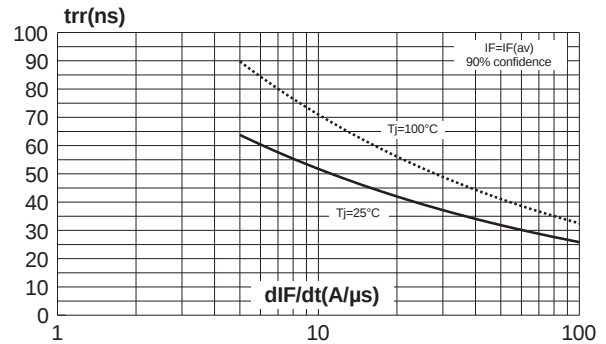
**Fig. 6-2:** Variation of thermal impedance junction to case versus pulse duration (BYW4200B).



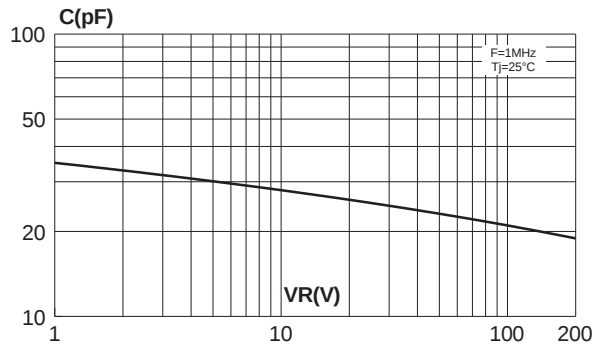
**Fig. 7:** Reverse recovery current versus  $dI_F/dt$ .



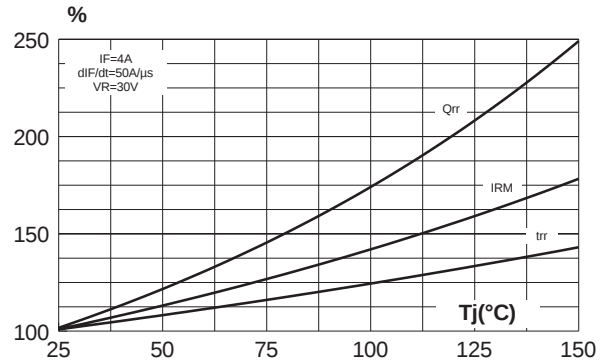
**Fig. 8:** Reverse recovery time versus  $dI_F/dt$ .



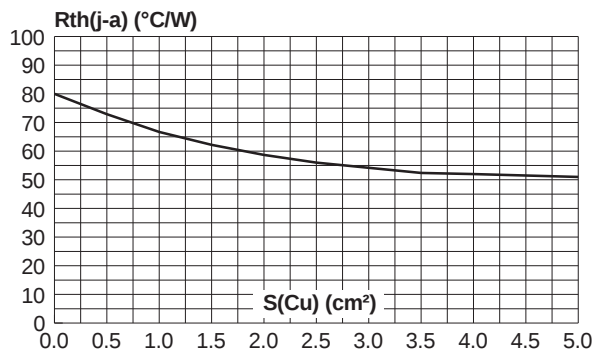
**Fig. 9:** Junction capacitance versus reverse voltage applied (typical values).



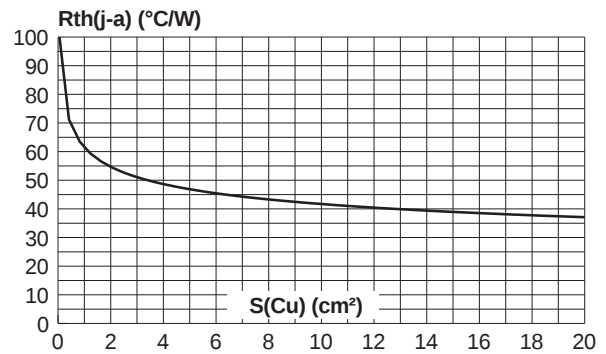
**Fig. 10:** Dynamic parameters versus junction temperature.



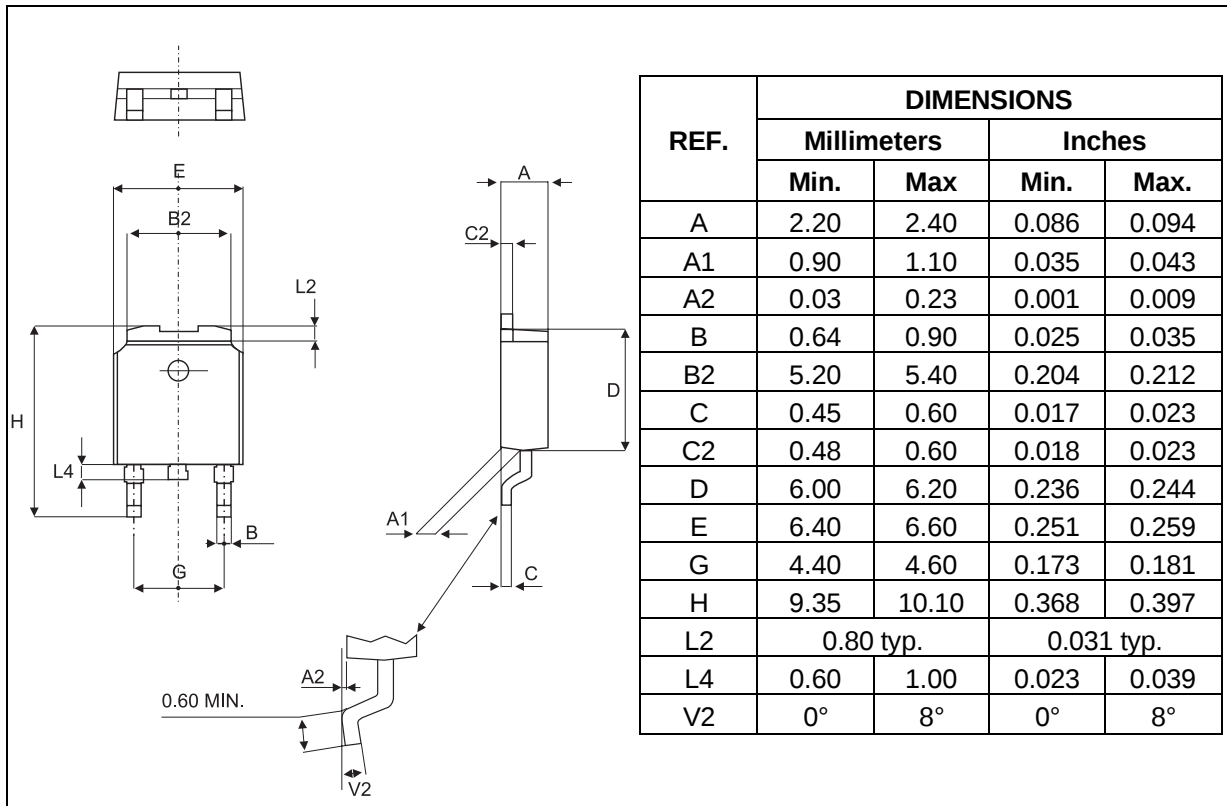
**Fig. 11-1:** Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35mm) (SMBYW04-200).



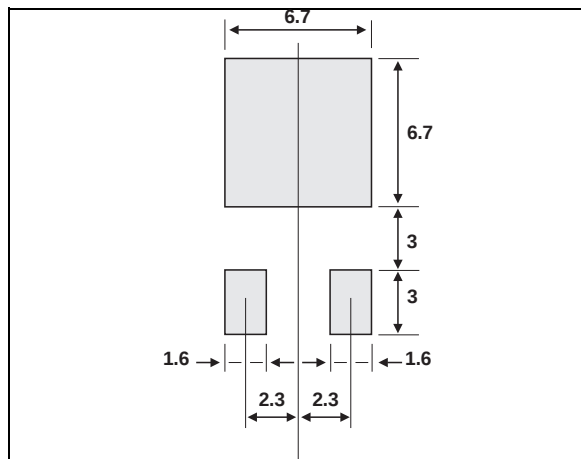
**Fig. 11-2:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35mm) (BYW4200B).



# **PACKAGE MECHANICAL DATA** **DPAK**



## **FOOT PRINT (in millimeters)**

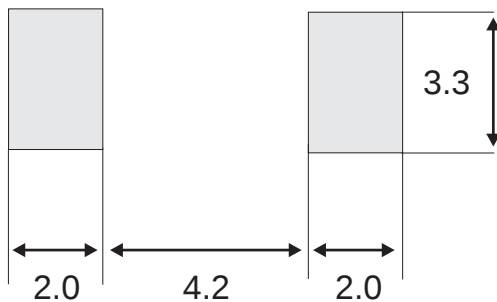


## SMBYW04-200 / BYW4200B

### PACKAGE MECHANICAL DATA SMC

| REF. | DIMENSIONS  |      |        |       |
|------|-------------|------|--------|-------|
|      | Millimeters |      | Inches |       |
|      | Min.        | Max. | Min.   | Max.  |
| A1   | 1.90        | 2.45 | 0.075  | 0.096 |
| A2   | 0.05        | 0.20 | 0.002  | 0.008 |
| b    | 2.90        | 3.2  | 0.114  | 0.126 |
| c    | 0.15        | 0.41 | 0.006  | 0.016 |
| E    | 7.75        | 8.15 | 0.305  | 0.321 |
| E1   | 6.60        | 7.15 | 0.260  | 0.281 |
| E2   | 4.40        | 4.70 | 0.173  | 0.185 |
| D    | 5.55        | 6.25 | 0.218  | 0.246 |
| L    | 0.75        | 1.60 | 0.030  | 0.063 |

### FOOT PRINT (in millimeters)



| Ordering code | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|---------|---------|--------|----------|---------------|
| SMBYW04-200   | D20     | SMC     | 0.243g | 2500     | Tape and reel |
| BYW4200B      | W4200   | DPAK    | 0.30g  | 75       | Tube          |
| BYW4200B-RL   | W4200   | DPAK    | 0.30g  | 2500     | Tape and reel |

- Epoxy meets UL 94,V0
- Band indicates cathode

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