

# Silicon Dual Diode

## **BYV42E-200**

200V/30A

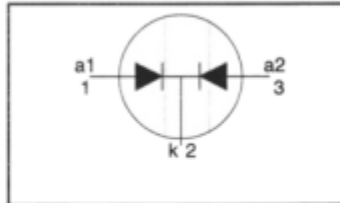
# DATASHEET

OEM – Philips

Source: Philips Databook 1999

**Rectifier diodes  
ultrafast, rugged**
**BYV42E, BYV42EB series**
**FEATURES**

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

**SYMBOL**

**QUICK REFERENCE DATA**

$$V_R = 150 \text{ V} / 200 \text{ V}$$

$$V_F \leq 0.85 \text{ V}$$

$$I_{O(AV)} = 30 \text{ A}$$

$$I_{RRM} = 0.2 \text{ A}$$

$$t_r \leq 28 \text{ ns}$$

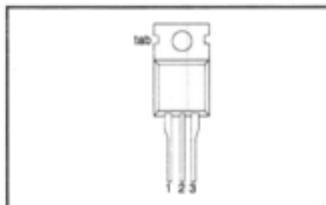
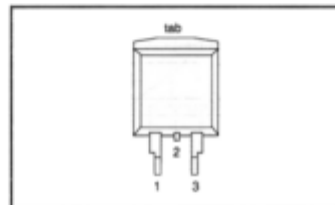
**GENERAL DESCRIPTION**

Dual, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV42E series is supplied in the SOT78 conventional leaded package.  
The BYV42EB series is supplied in the SOT404 surface mounting package.

**PINNING**

| PIN | DESCRIPTION              |
|-----|--------------------------|
| 1   | anode 1 (a)              |
| 2   | cathode (k) <sup>1</sup> |
| 3   | anode 2 (a)              |
| tab | cathode (k)              |

**SOT78 (TO220AB)**

**SOT404**

**LIMITING VALUES**

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

| SYMBOL      | PARAMETER   | CONDITIONS   | MIN. | MAX.             |      | UNIT             |
|-------------|---|--|------|------------------|------|------------------|
|             |   |  |      | BYV42E / BYV42EB |      |                  |
| $V_{RRM}$   | Peak repetitive reverse voltage                           |  | -    | -150             | -200 | V                |
| $V_{RWM}$   | Crest working reverse voltage                             |  | -    | 150              | 200  | V                |
| $V_R$       | Continuous reverse voltage                                | $T_{mb} \leq 144^\circ\text{C}$  | -    | 150              | 200  | V                |
| $I_{O(AV)}$ | Average rectified output current (both diodes conducting) | square wave<br>$\delta = 0.5$ ; $T_{mb} \leq 108^\circ\text{C}$            | -    | 30               |      | A                |
| $I_{FRM}$   | Repetitive peak forward current per diode                 | $t = 25 \mu\text{s}$ ; $\delta = 0.5$ ;<br>$T_{mb} \leq 108^\circ\text{C}$ | -    | 30               |      | A                |
| $I_{FSM}$   | Non-repetitive peak forward current per diode             | $t = 10 \text{ ms}$  | -    | 150              |      | A                |
|             |   | $t = 8.3 \text{ ms}$<br>sinusoidal; with reapplied                         | -    | 160              |      | A                |
| $I_{RRM}$   | Repetitive peak reverse current per diode                 | $V_{RWM(max)}$<br>$t_p = 2 \mu\text{s}$ ; $\delta = 0.001$                 | -    | 0.2              |      | A                |
| $I_{RSM}$   | Non-repetitive peak reverse current per diode             | $t_p = 100 \mu\text{s}$  | -    | 0.2              |      | A                |
| $T_{stg}$   | Storage temperature                                       |  | -40  | 150              |      | $^\circ\text{C}$ |
| $T_j$       | Operating junction temperature                            |  | -    | 150              |      | $^\circ\text{C}$ |

1. It is not possible to make connection to pin 2 of the SOT404 package

2. SOT78 package, For output currents in excess of 20 A, the cathode connection should be made to the mounting tab.

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#### ESD LIMITING VALUE

| SYMBOL | PARAMETER                                 | CONDITIONS  | MIN. | MAX. | UNIT |
|--------|---|---|------|------|------|
| $V_C$  | Electrostatic discharge capacitor voltage | Human body model;<br>$C = 250 \text{ pF}$ ; $R = 1.5 \text{ k}\Omega$ | -    | 8    | kV   |

#### THERMAL RESISTANCES

| SYMBOL                      | PARAMETER                                    | CONDITIONS  | MIN. | TYP. | MAX. | UNIT |
|-----------------------------|--|---|------|------|------|------|
| $R_{th\text{-}j\text{-}mb}$ | Thermal resistance junction to mounting base | per diode<br>both diodes  | -    | -    | 2.4  | K/W  |
| $R_{th\text{-}j\text{-}a}$  | Thermal resistance junction to ambient       | SOT78 package, in free air  | -    | 60   | -    | K/W  |
|                             |  | SOT404 and SOT428 packages,<br>pcb mounted, minimum footprint,<br>FR4 board | -    | 50   | -    | K/W  |

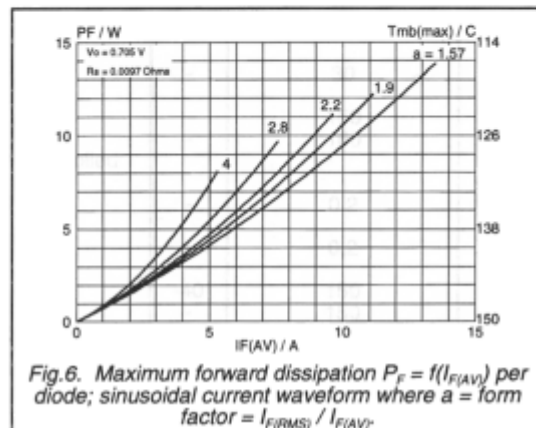
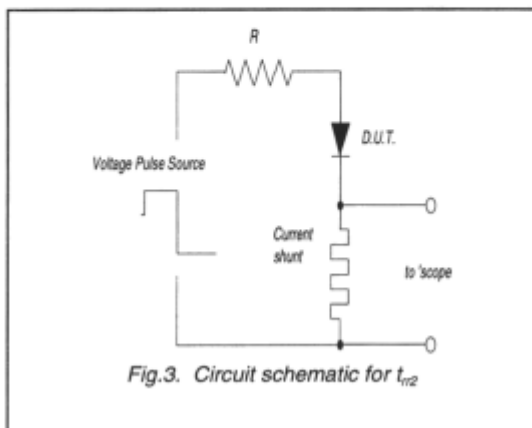
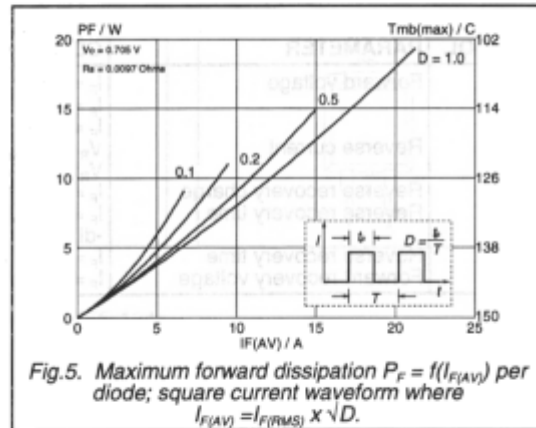
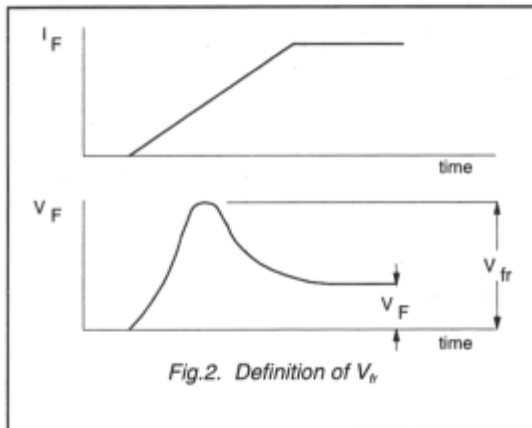
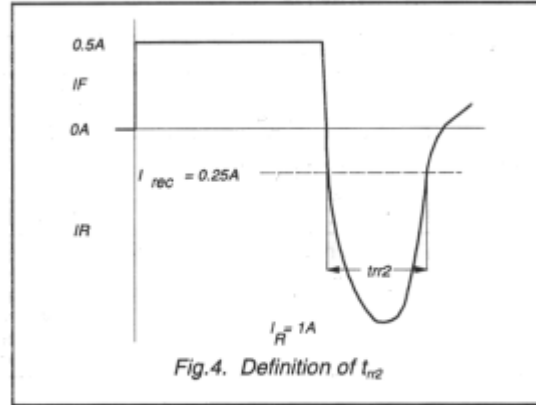
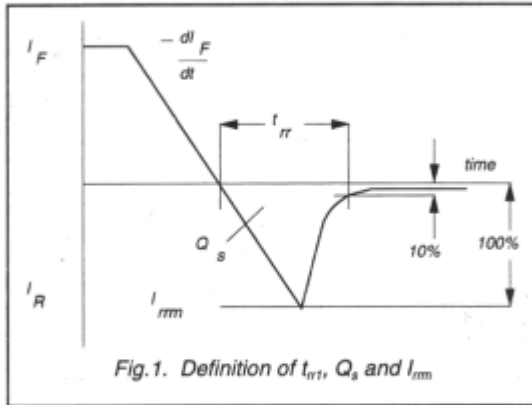
#### ELECTRICAL CHARACTERISTICS

characteristics are per diode at  $T_j = 25 \text{ }^\circ\text{C}$  unless otherwise stated

| SYMBOL    | PARAMETER                | CONDITIONS  | MIN. | TYP. | MAX. | UNIT          |
|-----------|--------------------------|---|------|------|------|---------------|
| $V_F$     | Forward voltage          | $I_F = 15 \text{ A}$ ; $T_j = 150 \text{ }^\circ\text{C}$                                 | -    | 0.78 | 0.85 | V             |
|           |                          | $I_F = 15 \text{ A}$  | -    | 0.95 | 1.05 | V             |
|           |                          | $I_F = 30 \text{ A}$  | -    | 1.00 | 1.20 | V             |
| $I_R$     | Reverse current          | $V_R = V_{RWM}$ ; $T_j = 100 \text{ }^\circ\text{C}$                                      | -    | 0.5  | 1    | mA            |
|           |                          | $V_R = V_{RWM}$   | -    | 10   | 100  | $\mu\text{A}$ |
| $Q_s$     | Reverse recovery charge  | $I_F = 2 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ; $-di_F/dt = 20 \text{ A}/\mu\text{s}$     | -    | 6    | 15   | nC            |
| $t_{rr1}$ | Reverse recovery time    | $I_F = 1 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ;<br>$-di_F/dt = 100 \text{ A}/\mu\text{s}$ | -    | 20   | 28   | ns            |
| $t_{rr2}$ | Reverse recovery time    | $I_F = 0.5 \text{ A}$ to $I_R = 1 \text{ A}$ ; $I_{inc} = 0.25 \text{ A}$                 | -    | 13   | 22   | ns            |
| $V_r$     | Forward recovery voltage | $I_F = 1 \text{ A}$ ; $di_F/dt = 10 \text{ A}/\mu\text{s}$                                | -    | 1    | -    | V             |

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