

# Silicon Dual Diode

## **BYV42E-150**

150V/30A

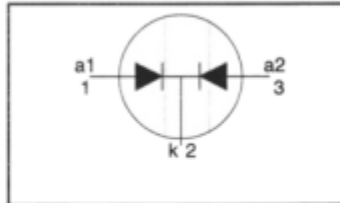
# DATASHEET

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**

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

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

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

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

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

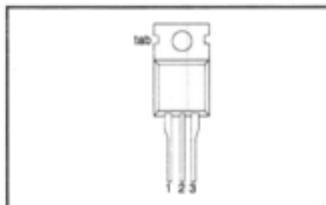
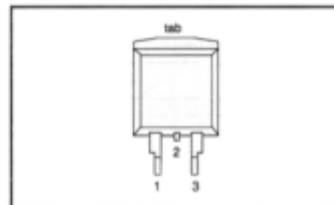
**GENERAL DESCRIPTION**

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 $\delta = 0.5$ ; $T_{mb} \leq 108^\circ\text{C}$	-	30		A
$I_{FRM}$	Repetitive peak forward current per diode	$t = 25 \mu\text{s}$ ; $\delta = 0.5$ ; $T_{mb} \leq 108^\circ\text{C}$	-	30		A
$I_{FSM}$	Non-repetitive peak forward current per diode	$t = 10 \text{ ms}$	-	150		A
		$t = 8.3 \text{ ms}$ sinusoidal; with reapplied	-	160		A
$I_{RRM}$	Repetitive peak reverse current per diode	$V_{RWM(max)}$ $t_p = 2 \mu\text{s}$ ; $\delta = 0.001$	-	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; $C = 250 \text{ pF}$ ; $R = 1.5 \text{ k}\Omega$	-	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 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, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

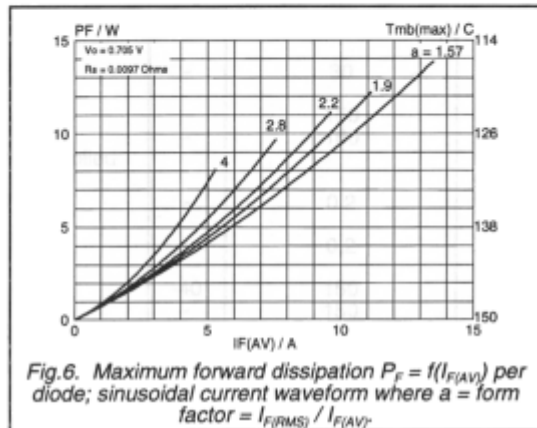
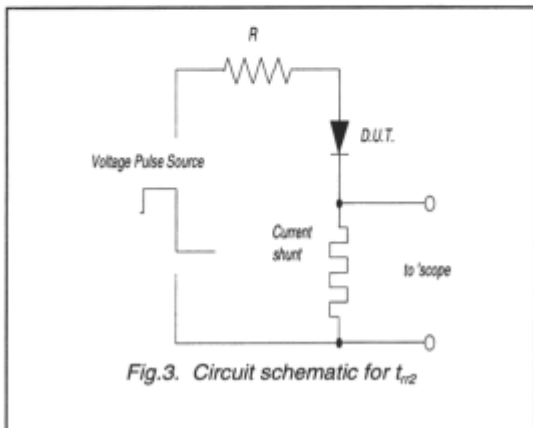
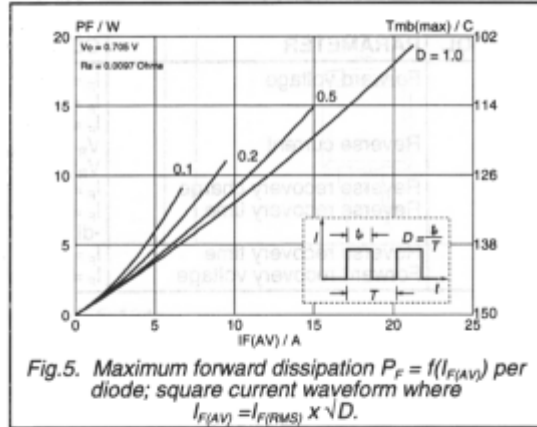
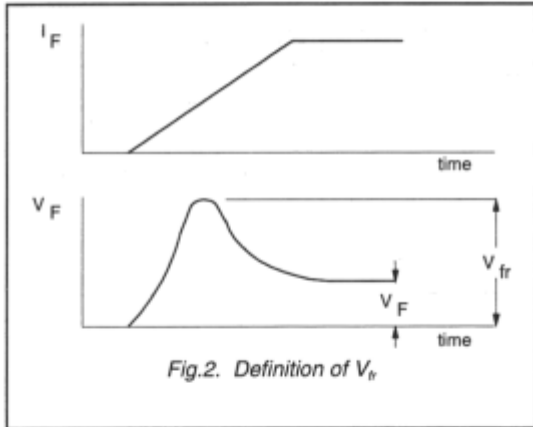
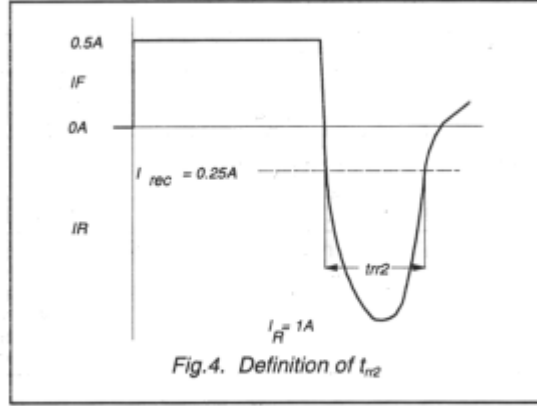
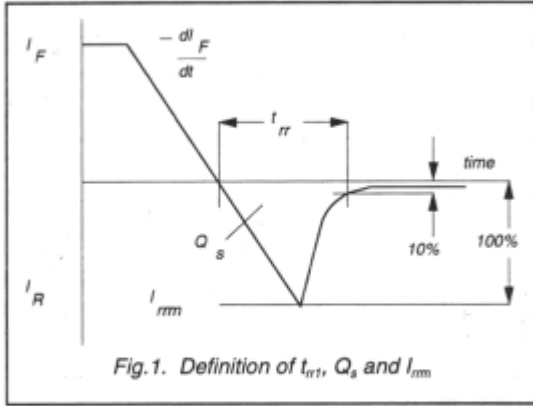
#### ELECTRICAL CHARACTERISTICS

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	$I_F = 1 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ; $-di_F/dt = 100 \text{ A}/\mu\text{s}$	-	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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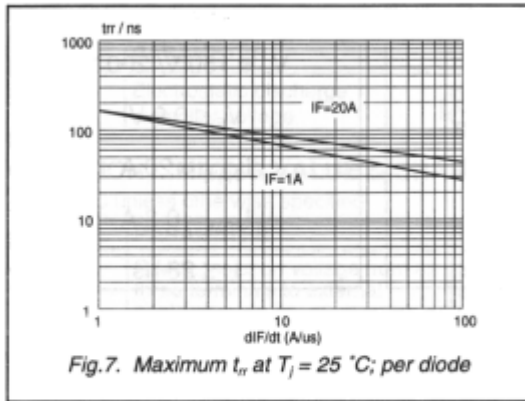


Fig.7. Maximum  $t_r$  at  $T_j = 25^\circ C$ ; per diode

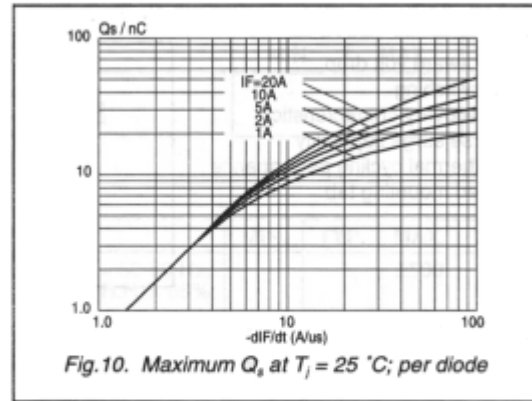


Fig.10. Maximum  $Q_s$  at  $T_j = 25^\circ C$ ; per diode

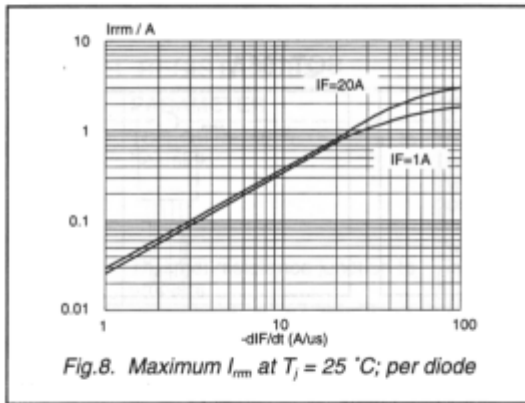


Fig.8. Maximum  $I_{rm}$  at  $T_j = 25^\circ C$ ; per diode

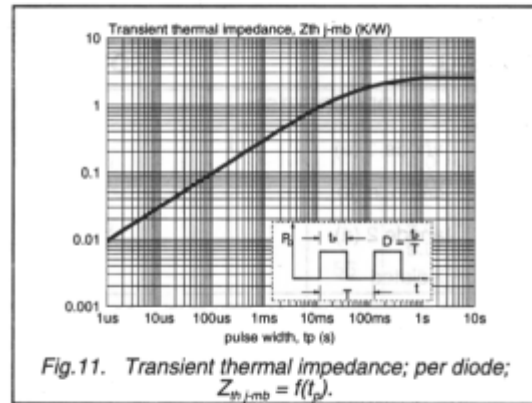


Fig.11. Transient thermal impedance; per diode;  
 $Z_{th, j-mb} = f(t_p)$ .

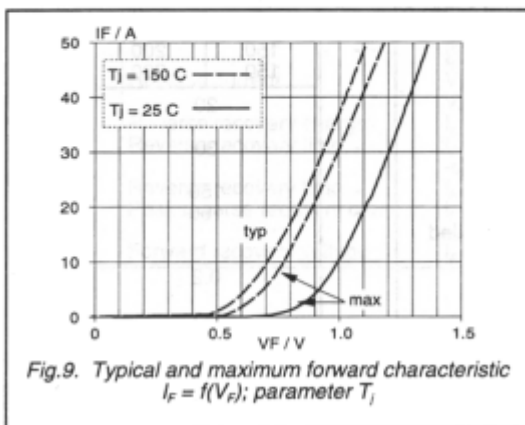


Fig.9. Typical and maximum forward characteristic  
 $I_F = f(V_F)$ ; parameter  $T_j$