

# Silicon Dual Diode

## **BYQ28F-150**

150V/10A

# DATASHEET

OEM – Philips

Source: Philips Databook 1999

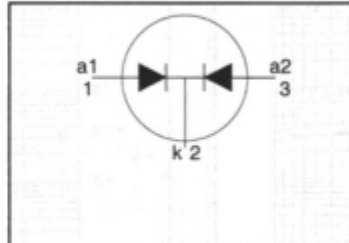
## Rectifier diodes ultrafast, rugged

## BYQ28F, BYQ28EX series

### FEATURES

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

### SYMBOL



### QUICK REFERENCE DATA

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

$$V_F \leq 0.895 \text{ V}$$

$$I_{O(AV)} = 10 \text{ A}$$

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

$$t_{tr} \leq 25 \text{ ns}$$

### GENERAL DESCRIPTION

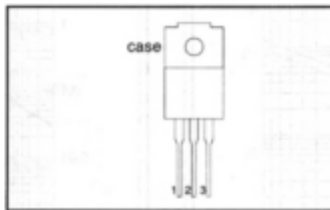
Dual, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYQ28F series is supplied in the SOT186 package.  
The BYQ28EX series is supplied in the SOT186A package.

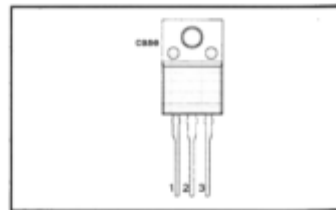
### PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	isolated

### SOT186



### SOT186A



### LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
				BYQ28F / BYQ28EX		
$V_{RRM}$	Peak repetitive reverse voltage	$T_{hs} \leq 148^\circ\text{C}$	-	-150	-200	V
$V_{RWM}$	Crest working reverse voltage		-	150	200	V
$V_R$	Continuous reverse voltage		-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting) <sup>1</sup>	square wave $\delta = 0.5$ ; $T_{hs} \leq 92^\circ\text{C}$	-	10		A
$I_{FRM}$	Repetitive peak forward current per diode	$t = 25 \mu\text{s}$ ; $\delta = 0.5$ ; $T_{hs} \leq 92^\circ\text{C}$	-	10		A
$I_{FSM}$	Non-repetitive peak forward current per diode	$t = 10 \text{ ms}$	-	50		A
		$t = 8.3 \text{ ms}$ sinusoidal; with reapplied	-	55		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
$T_{sig}$	Storage temperature		-40	150		$^\circ\text{C}$
$T_j$	Operating junction temperature		-	150		$^\circ\text{C}$

<sup>1</sup> Neglecting switching and reverse current losses

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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

#### ISOLATION LIMITING VALUE & CHARACTERISTIC

$T_{ns} = 25 \text{ }^\circ\text{C}$  unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{isol}$	Peak isolation voltage from all terminals to external heatsink	SOT186 package; R.H. $\leq 65\%$ ; clean and dustfree	-	-	1500	V
$V_{isol}$	R.M.S. isolation voltage from all terminals to external heatsink	SOT186A package; $f = 50\text{-}60 \text{ Hz}$ ; sinusoidal waveform; R.H. $\leq 65\%$ ; clean and dustfree	-	-	2500	V
$C_{isol}$	Capacitance from pin 2 to external heatsink	$f = 1 \text{ MHz}$	-	10	-	pF

#### THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{thj-hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	5.7	K/W
$R_{thj-a}$	Thermal resistance junction to ambient	without heatsink compound in free air	-	55	6.7	K/W

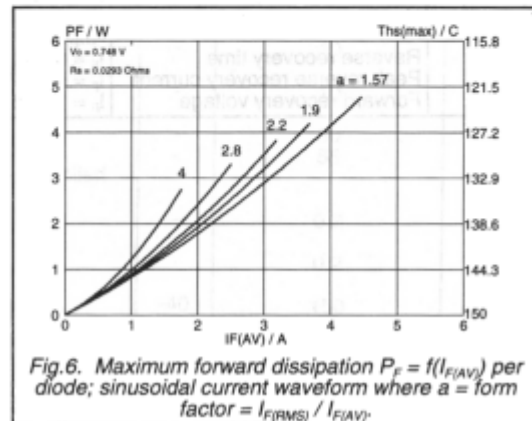
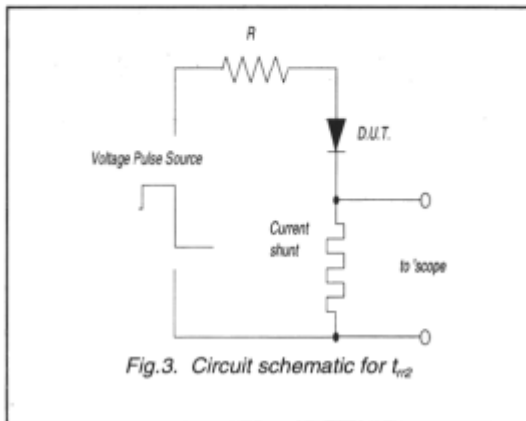
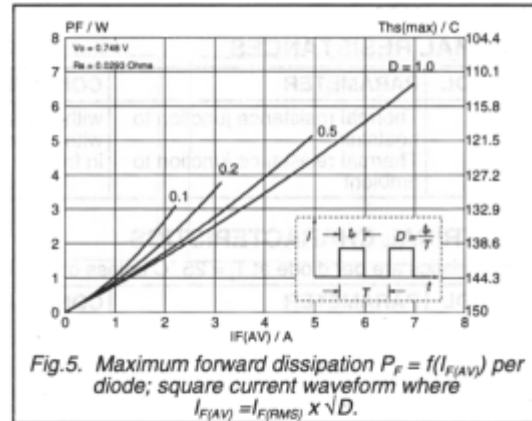
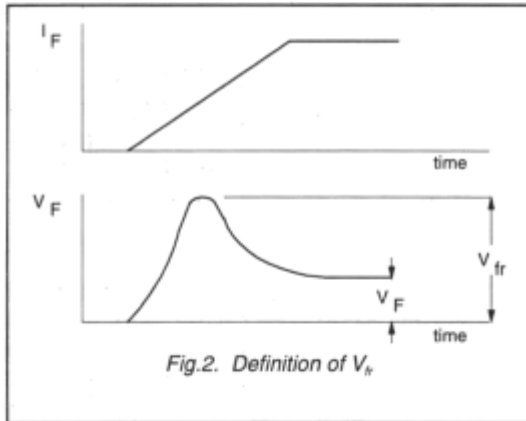
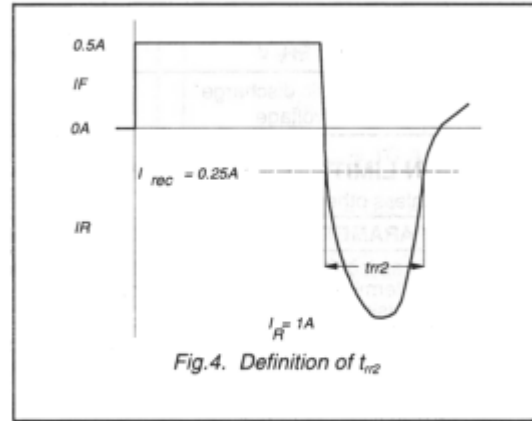
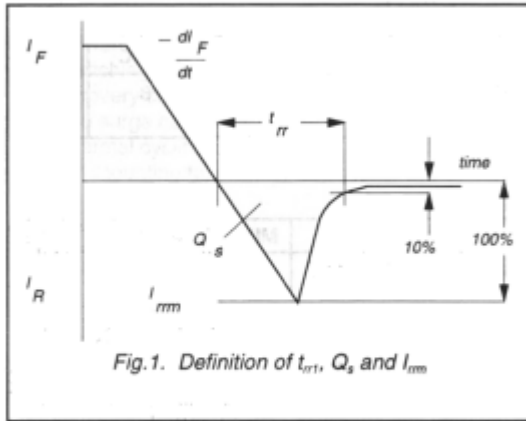
#### ELECTRICAL CHARACTERISTICS

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	$I_F = 5 \text{ A}$ ; $T_j = 150 \text{ }^\circ\text{C}$	-	0.80	0.895	V
		$I_F = 5 \text{ A}$	-	0.95	1.10	V
		$I_F = 10 \text{ A}$	-	1.10	1.25	V
$I_R$	Reverse current	$V_R = V_{RWM}$ ; $T_j = 100 \text{ }^\circ\text{C}$	-	0.1	0.2	mA
		$V_R = V_{RWM}$	-	2	10	$\mu\text{A}$
$Q_s$	Reverse recovery charge	$I_F = 2 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ; $-di_F/dt = 20 \text{ A}/\mu\text{s}$	-	4	9	nC
$t_{rr1}$	Reverse recovery time	$I_F = 1 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ; $-di_F/dt = 100 \text{ A}/\mu\text{s}$	-	15	25	ns
$t_{rr2}$	Reverse recovery time	$I_F = 0.5 \text{ A}$ to $I_R = 1 \text{ A}$ ; $I_{rec} = 0.25 \text{ A}$	-	10	20	ns
$I_{rrm}$	Peak reverse recovery current	$I_F = 5 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ; $-di_F/dt = 50 \text{ A}/\mu\text{s}$	-	0.5	0.7	A
$V_{fr}$	Forward recovery voltage	$I_F = 1 \text{ A}$ ; $di_F/dt = 10 \text{ A}/\mu\text{s}$	-	1	-	V

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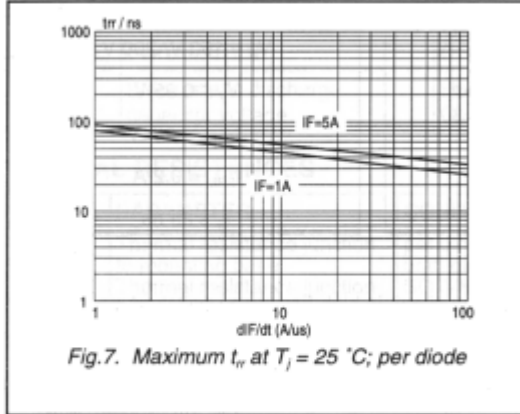


Fig. 7. Maximum  $t_{rr}$  at  $T_j = 25^\circ C$ ; per diode

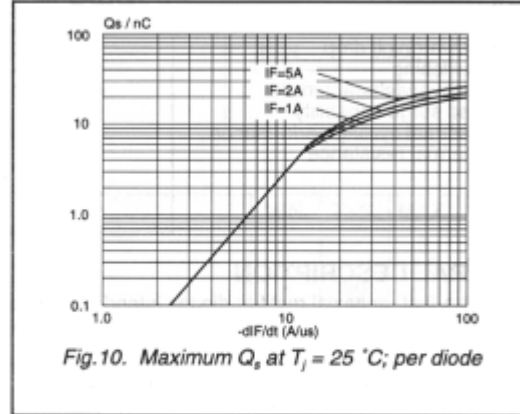


Fig. 10. Maximum  $Q_s$  at  $T_j = 25^\circ C$ ; per diode

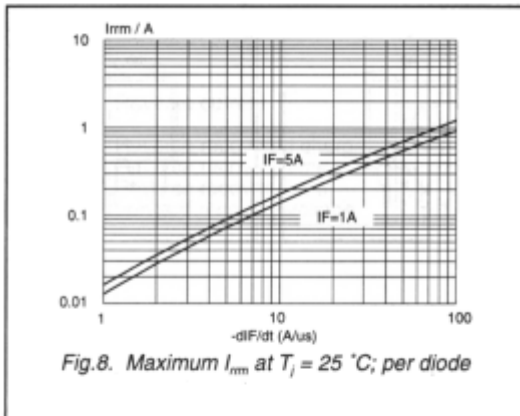


Fig. 8. Maximum  $I_{rms}$  at  $T_j = 25^\circ C$ ; per diode

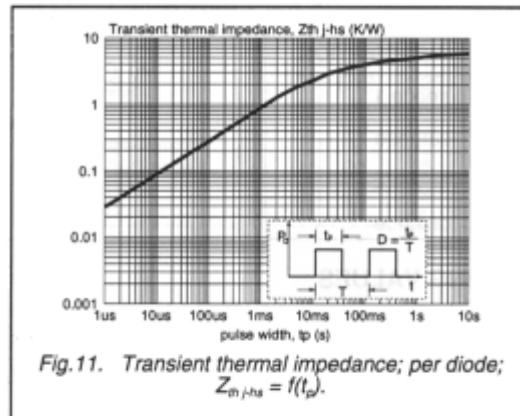


Fig. 11. Transient thermal impedance; per diode;  
 $Z_{th(j-hs)} = f(t_p)$ .

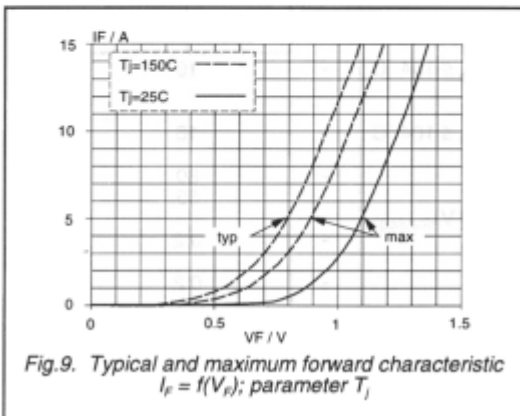


Fig. 9. Typical and maximum forward characteristic  
 $I_F = f(V_F)$ ; parameter  $T_j$