Silicon Dual Diode

BYQ30EX-200

200V/16A

DATASHEET

OEM – Philips

Source: Philips Databook 1999

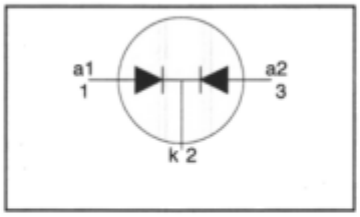
Datasheet Rev. 1.3 – 04/19 – data without warranty / liability

Rectifier diodes ultrafast, rugged — BYQ30EX 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 V/ 200 V

$V_F \leq 0.95$ V

$I_{O(AV)}$ = 16 A

$I_{RRM} \leq 0.2$ A

$t_{rr} \leq 25$ ns

GENERAL DESCRIPTION

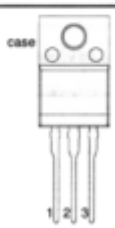
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYQ30EX series is supplied in the conventional leaded SOT186A package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
tab	isolated

SOT186A



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYQ30EX		-150	-200	
V_{RRM}	Peak repetitive reverse voltage		-	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)[1]	square wave $\delta = 0.5$; $T_{hs} \leq 59$ °C	-	16		A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 59$ °C	-	16		A
I_{FSM}	Non-repetitive peak forward current per diode	$t = 10$ ms	-	100		A
		$t = 8.3$ ms sinusoidal; with reapplied $V_{RWM(max)}$	-	110		A
I_{RRM}	Repetitive peak reverse current per diode	$t_p = 2$ µs; $\delta = 0.001$	-	0.2		A
I_{RSM}	Non-repetitive peak reverse current per diode	$t_p = 100$ µs	-	0.2		A
T_{stg}	Storage temperature		-40	150		°C
T_j	Operating junction temperature		-	150		°C

ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

1 Neglecting switching and reverse current losses.

Rectifier diodes
ultrafast, rugged

BYQ30EX series

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from all three terminals to external heatsink	f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree	-		2500	V
C_{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	5.0	K/W
		without heatsink compound	-	-	7.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

ELECTRICAL CHARACTERISTICS

characteristics are per diode at T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C	-	0.83	0.95	V
		I_F = 16 A; T_j = 150˚C	-	1.0	1.15	V
		I_F = 16 A;	-	0.98	1.25	
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.3	0.6	mA
		$V_R = V_{RWM}$	-	2	30	µA
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	4	11	nC
t_{rr}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs	-	20	25	ns
I_{rrm}	Peak reverse recovery current	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 50 A/µs; T_j = 100 ˚C	-	1.0	2	A
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

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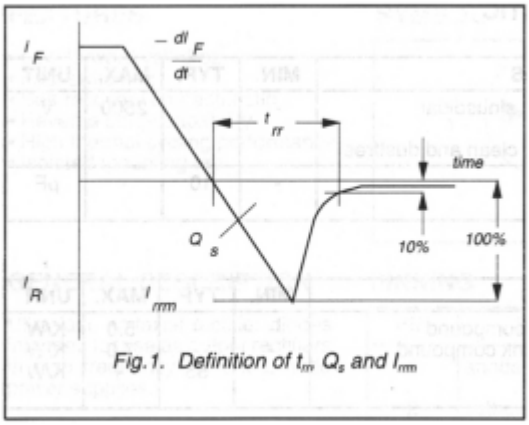

Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

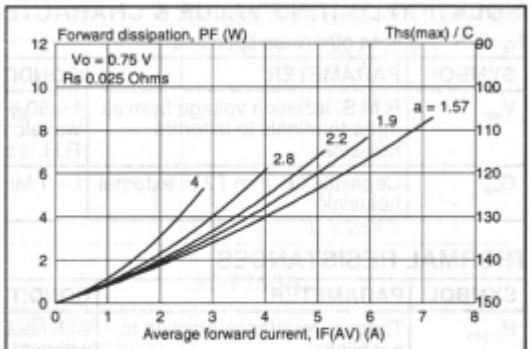

Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$

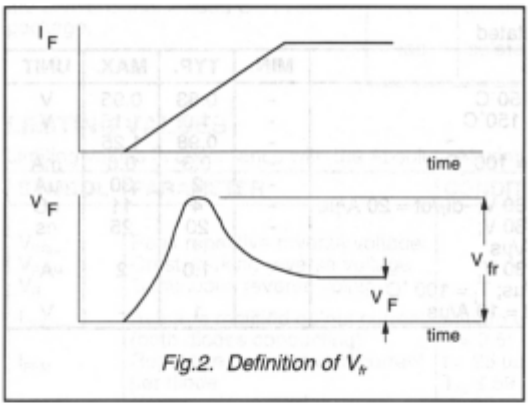

Fig.2. Definition of V_{fr}

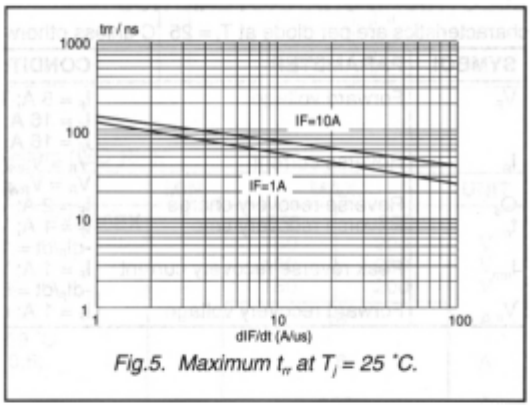

Fig.5. Maximum t_{rr} at T_j = 25 °C.

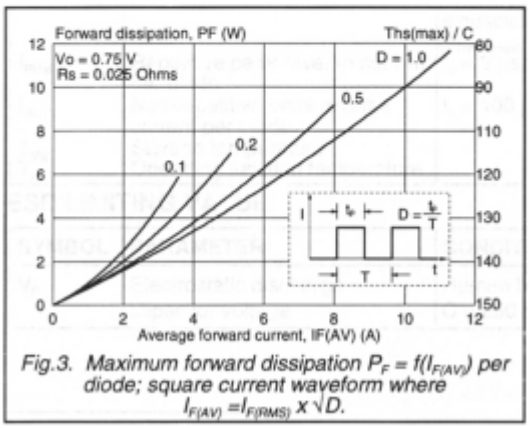

Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

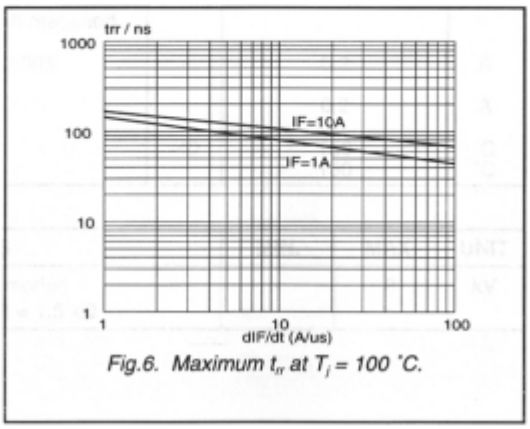

Fig.6. Maximum t_{rr} at T_j = 100 °C.

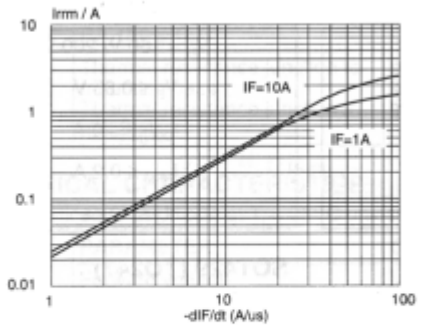

Fig.7. Maximum I_{rrm} at T_j = 25 ˚C.

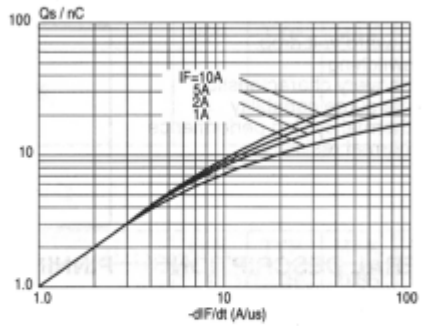

Fig.10. Maximum Q_s at T_j = 25 ˚C.

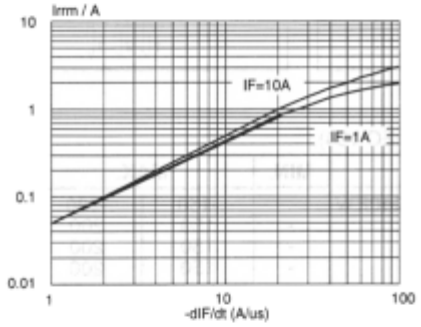

Fig.8. Maximum I_{rrm} at T_j = 100 ˚C.

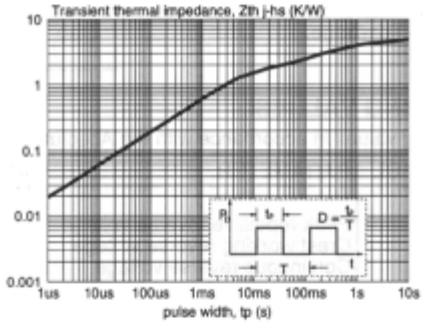

Fig.11. Transient thermal impedance; $Z_{th\ j\text{-}hs} = f(t_p)$.

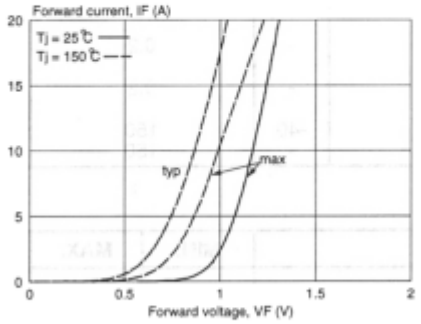

Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j