Silicon Dual Diode

BYQ28ED-150

150V/10A

DATASHEET
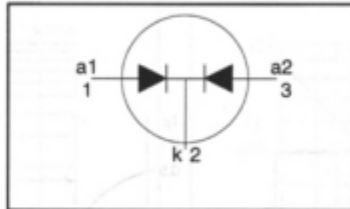
OEM – Philips

Source: Philips Databook 1999

Rectifier diodes ultrafast, rugged

BYQ28E, BYQ28EB, BYQ28ED series

FEATURES

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

SYMBOL

a1
1

a2
3

k 2

QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq 0.895$ V

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

I_{RRM} = 0.2 A

$t_{rr} \leq 25$ ns

GENERAL DESCRIPTION

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

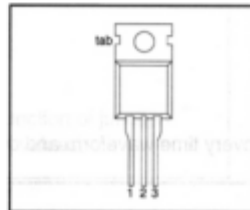The BYQ28E series is supplied in the SOT78 conventional leaded package.
The BYQ28EB series is supplied in the SOT404 surface mounting package.
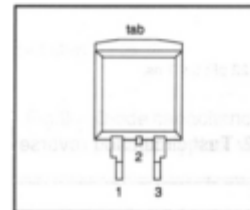The BYQ28ED series is supplied in the SOT428 surface mounting package.

PINNING

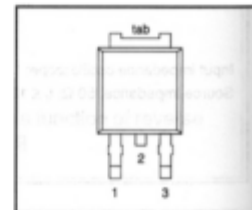| PIN	DESCRIPTION
1	anode 1
2	cathode [1]
3	anode 2
tab	cathode

SOT78 (TO220AB)

SOT404

SOT428

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYQ28E/ BYQ28EB/ BYQ28ED		-150	-200	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Working peak reverse voltage		-	150	200	V
V_R	Continuous reverse voltage		-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; δ = 0.5; $T_{mb} \leq 119$ °C	-	10		A
I_{FRM}	Repetitive peak forward current per diode	square wave; δ = 0.5; $T_{mb} \leq 119$ °C	-	10		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	50		A
		t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$	-	55		A
I_{RRM}	Peak repetitive reverse surge current per diode	t_p = 2 µs; δ = 0.001	-	0.2		A
I_{RSM}	Peak non-repetitive reverse surge current per diode	t_p = 100 µs	-	0.2		A
T_j	Operating junction temperature		-	150		°C
T_{stg}	Storage temperature		- 40	150		°C

1. It is not possible to make connection to pin 2 of the SOT428 or SOT404 packages.

Rectifier diodes
ultrafast, rugged   BYQ28E, BYQ28EB, BYQ28ED series

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

THERMAL RESISTANCES

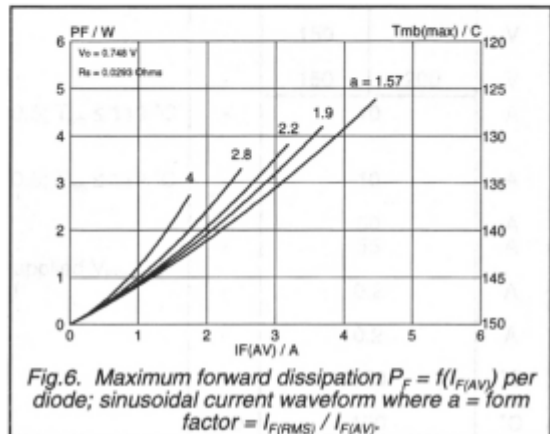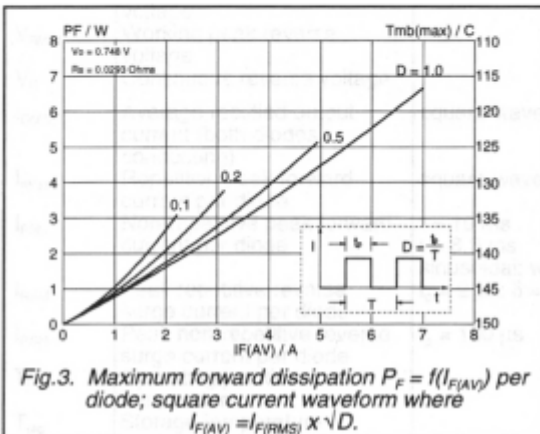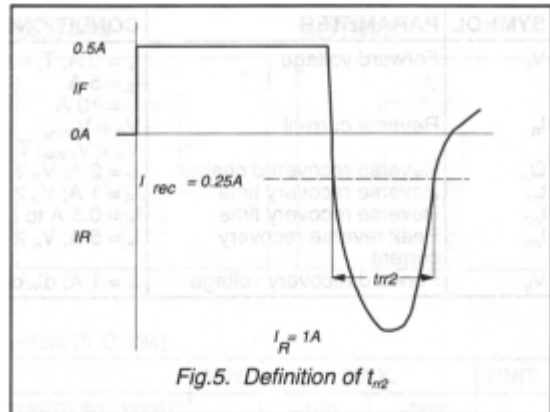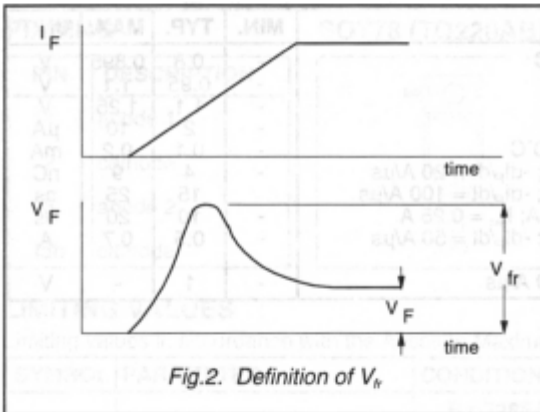| SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base	per diode	-	-	4.5	K/W
		both diodes	-	-	3	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	SOT78 package, in free air	-	60	-	K/W
		SOT404 and SOT428 packages, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

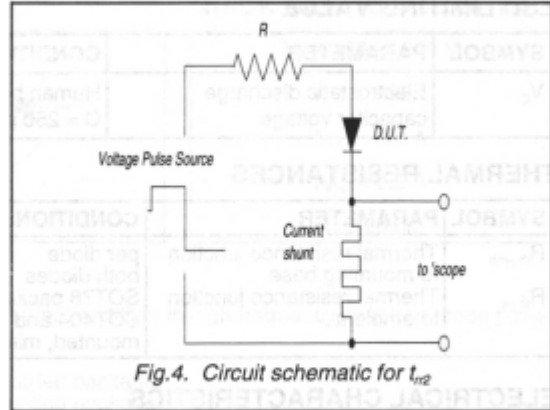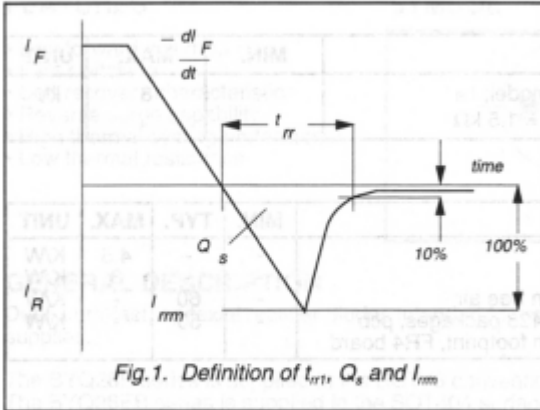## ELECTRICAL CHARACTERISTICS

All characteristics are per diode at $T_j = 25$ °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	$I_F = 5$ A; $T_j = 150$°C	-	0.8	0.895	V
		$I_F = 5$ A	-	0.95	1.1	V
		$I_F = 10$ A	-	1.1	1.25	V
I_R	Reverse current	$V_R = V_{RWM}$	-	2	10	µA
		$V_R = V_{RWM}$; $T_j = 100$°C	-	0.1	0.2	mA
Q_{rr}	Reverse recovered charge	$I_F = 2$ A; $V_R \geq 30$ V; $-dI_F/dt = 20$ A/µs	-	4	9	nC
t_{rr1}	Reverse recovery time	$I_F = 1$ A; $V_R \geq 30$ V; $-dI_F/dt = 100$ A/µs		15	25	ns
t_{rr2}	Reverse recovery time	$I_F = 0.5$ A to $I_R = 1$ A; $I_{rec} = 0.25$ A	-	10	20	ns
I_{rrm}	Peak reverse recovery current	$I_F = 5$ A; $V_R \geq 30$ V; $-dI_F/dt = 50$ A/µs	-	0.5	0.7	A
V_{fr}	Forward recovery voltage	$I_F = 1$ A; $dI_F/dt = 10$ A/µs	-	1	-	V

Rectifier diodes
ultrafast, rugged

BYQ28E, BYQ28EB, BYQ28ED series

Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

Fig.4. Circuit schematic for t_{rr2}

Fig.2. Definition of V_{fr}

Fig.5. Definition of t_{rr2}

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

Rectifier diodes
ultrafast, rugged

BYQ28E, BYQ28EB, BYQ28ED series
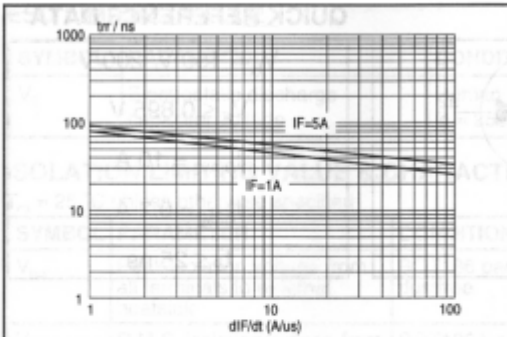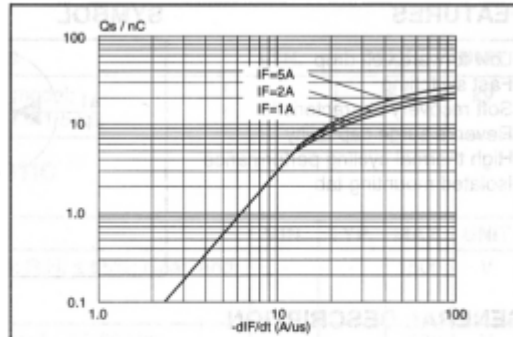

Fig.7. Maximum t_{rr} at $T_j = 25$ °C; per diode

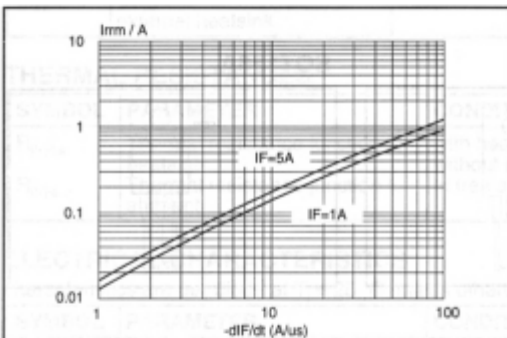Fig.10. Maximum Q_s at $T_j = 25$ °C; per diode

Fig.8. Maximum I_{rrm} at $T_j = 25$ °C; per diode

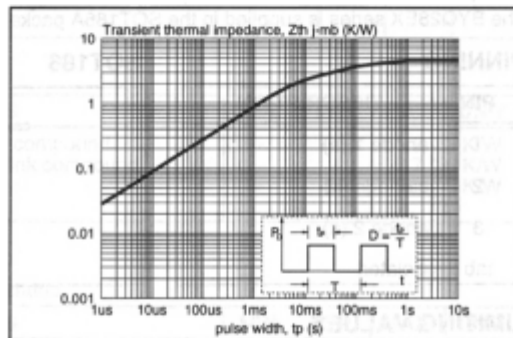Fig.11. Transient thermal impedance; per diode;
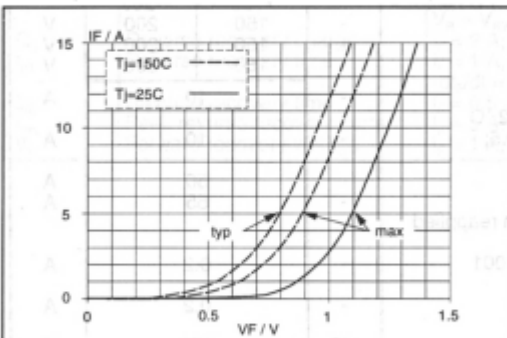$Z_{th\ j\text{-}mb} = f(t_p)$.

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