Rectifier diodes ultrafast, rugged

BYQ28EX series

GENERAL DESCRIPTION

Glass passivated dual epitaxial rectifier diodes in a full pack plastic envelope, featuring low forward voltage drop, ultra-fast recovery times, soft recovery characteristic and guaranteed reverse surge and ESD capability. They are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and switching losses are essential.

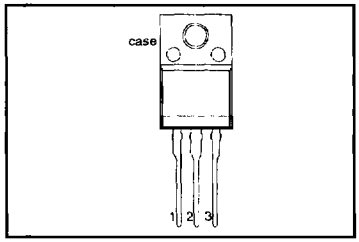
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYQ28EX-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.895	0.895	0.895	V
$I_{O(AV)}$	Output current (both diodes conducting)	10	10	10	A
t_{rr}	Reverse recovery time	25	25	25	ns
I_{RRM}	Repetitive peak reverse current per diode	0.2	0.2	0.2	A

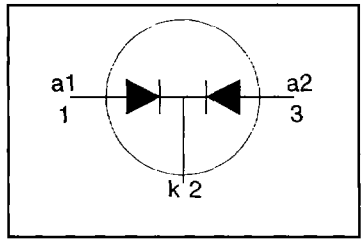
PINNING - SOT186A

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

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-100	**-150**	**-200**	
V_{RRM}	Repetitive peak reverse voltage		-	100	150	200	V
V_{RWM}	Crest working reverse voltage		-	100	150	200	V
V_R	Continuous reverse voltage[1]		-	100	150	200	V
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave $\delta = 0.5$; $T_{hs} \leq 92$ °C	-	10			A
		sinusoidal a = 1.57; $T_{hs} \leq 95$ °C	-	9			A
$I_{O(RMS)}$	RMS forward current		-	14			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 92$ °C	-	10			A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	50			A
		t = 8.3 ms sinusoidal; with reapplied $V_{RWM(max)}$	-	55			A
I^2t	I^2t for fusing	t = 10 ms	-	12.5			A^2s
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

1 $T_{hs} \leq 148$°C for thermal stability.

2 Neglecting switching and reverse current losses

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

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	-	-	5.7	K/W
		without heatsink compound	-	-	6.7	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

STATIC CHARACTERISTICS

T_j = 25 °C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage (per diode)	I_F = 5 A; T_j = 150°C	-	0.80	0.895	V
		I_F = 5 A	-	0.95	1.10	V
		I_F = 10 A	-	1.10	1.25	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$; T_j = 100 °C	-	0.1	0.2	mA
		$V_R = V_{RWM}$	-	2	10	µA

DYNAMIC CHARACTERISTICS

T_j = 25 °C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge (per diode)	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	4	9	nC
t_{rr1}	Reverse recovery time (per diode)	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs	-	15	25	ns
t_{rr2}	Reverse recovery time (per diode)	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	10	20	ns
V_{fr}	Forward recovery voltage (per diode)	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

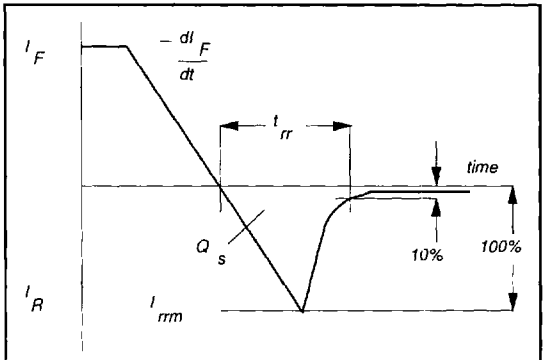


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

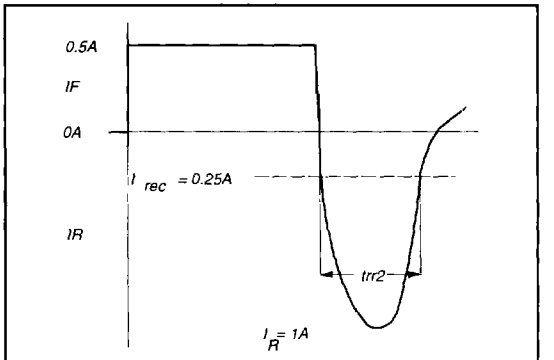


Fig.4. Definition of t_{rr2}

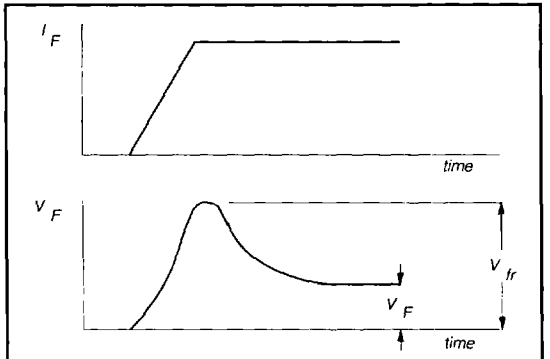


Fig.2. Definition of V_{fr}

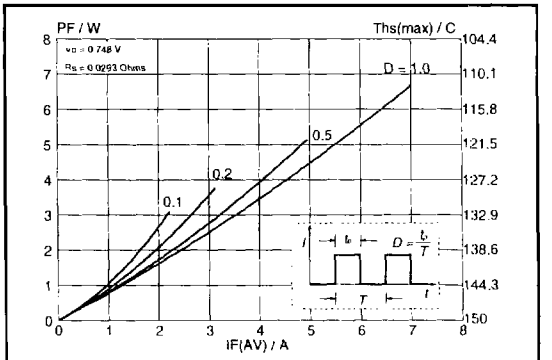


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

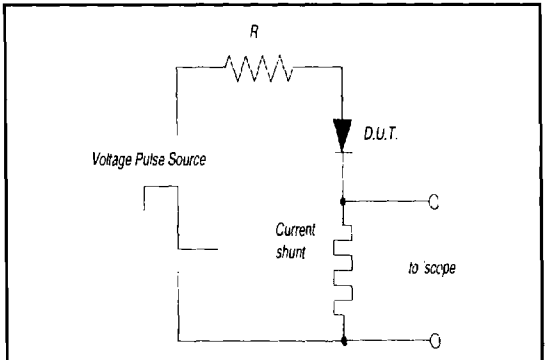


Fig.3. Circuit schematic for t_{rr2}

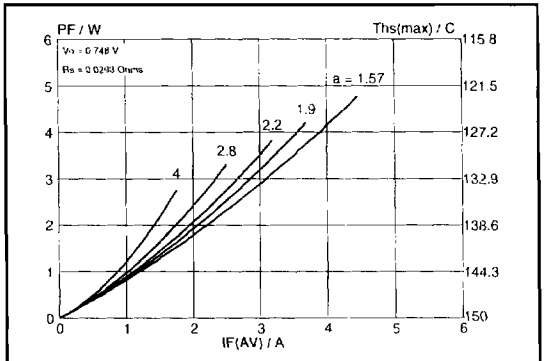


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

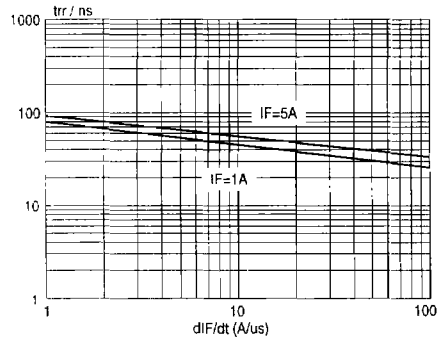


Fig.7. Maximum t_{rr} at T_j = 25 ˚C; per diode

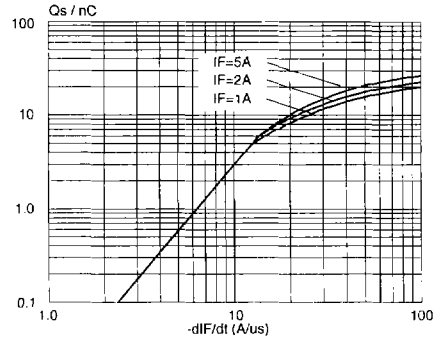


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

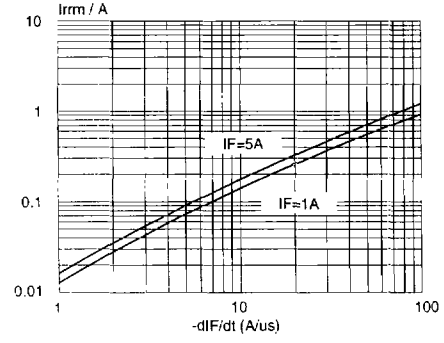


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C; per diode

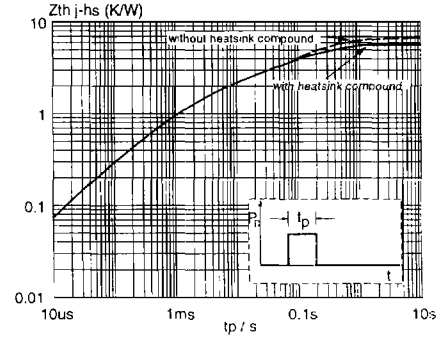


Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}hs} = f(t_p)$.

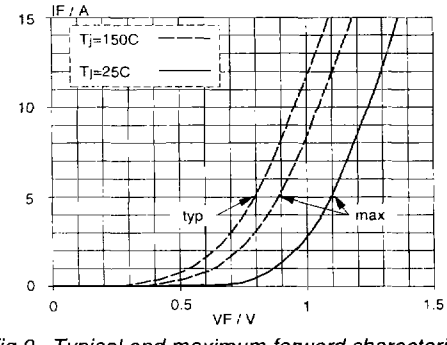


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j