Rectifier diodes ultrafast, rugged

BYQ28E series

GENERAL DESCRIPTION

Glass passivated dual epitaxial rectifier diodes in a 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.

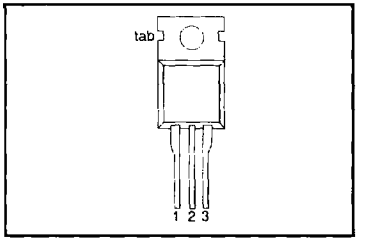
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYQ28E-	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

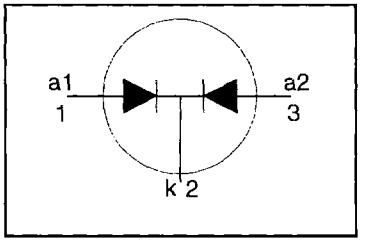
PINNING - TO220AB

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

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		-	100	150	200	V
$I_{O(AV)}$	Output current (both diodes conducting)[1]	square wave $\delta = 0.5$; $T_{mb} \leq 119$ °C	-	10			A
		sinusoidal $a = 1.57$; $T_{mb} \leq 121$ °C	-	9			A
$I_{O(RMS)}$	RMS forward current		-	14			A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 119$ °C	-	10			A
I_{FSM}	Non-repetitive peak forward current per diode	$t = 10$ ms	-	50			A
		$t = 8.3$ ms sinusoidal; with reapplied $V_{RWM(max)}$	-	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 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

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	4.5	K/W
		both diodes conducting	-	-	3.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	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

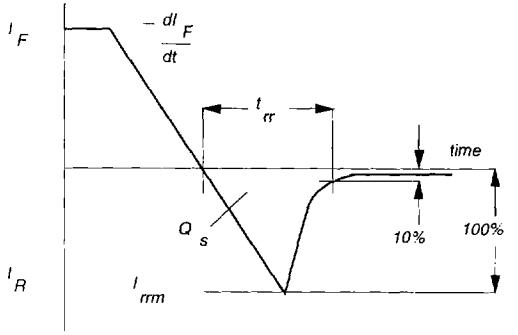


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}.

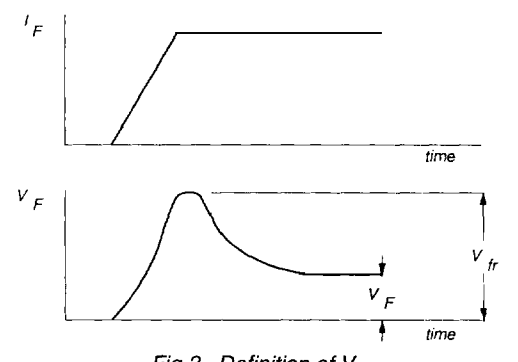


Fig.2. Definition of V_{fr}

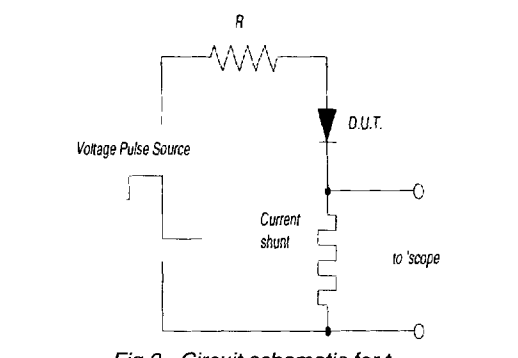


Fig.3. Circuit schematic for t_{rr2}

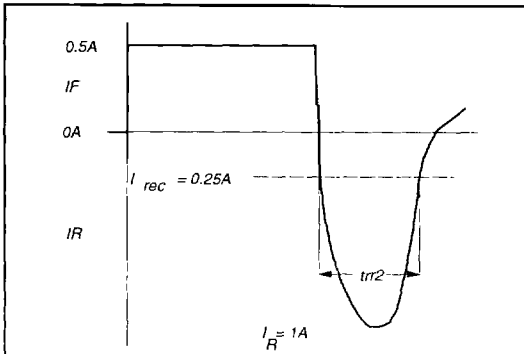


Fig.4. Definition of t_{rr2}

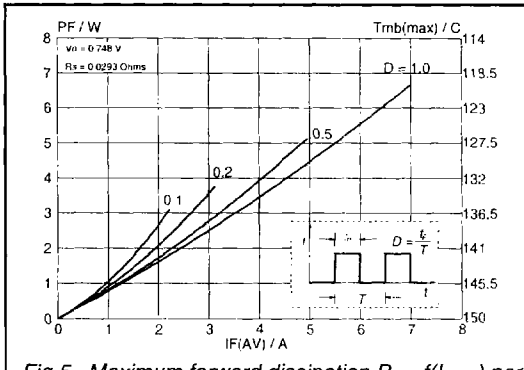


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

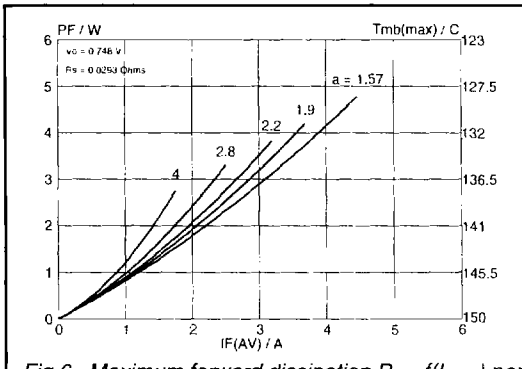


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

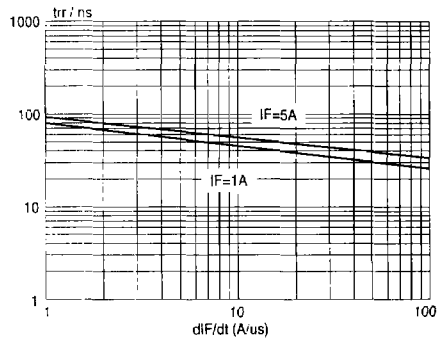


Fig.7. Maximum t_{rr} at T_j = 25 ˚C; per diode

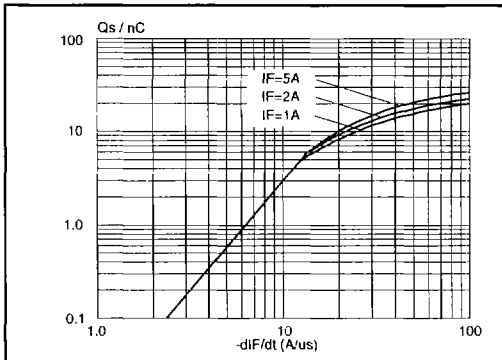


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

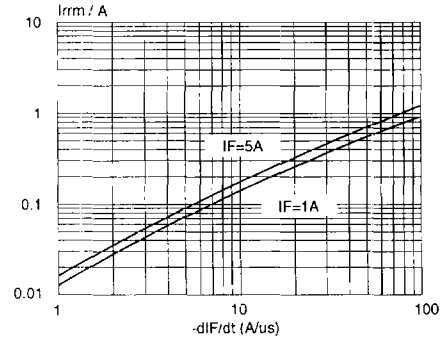


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C; per diode

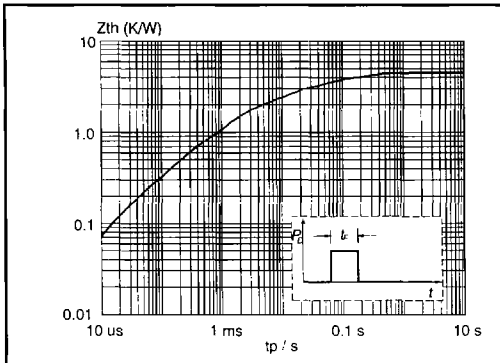


Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

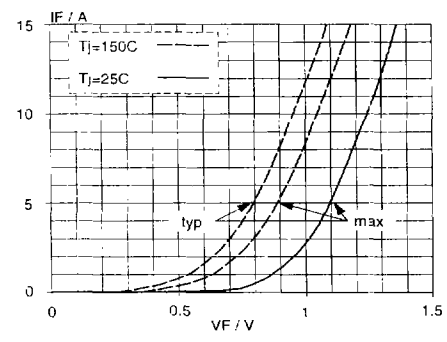


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j