

BYQ30E-200

Dual ultrafast power diode

Rev. 4 — 1 September 2010

Product data sheet

1. Product profile

1.1 General description

Dual ultrafast power diode in a SOT78 (TO-220AB) plastic package

1.2 Features and benefits

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

1.3 Applications

- Output rectifiers in high-frequency switched-mode power supplies

1.4 Quick reference data

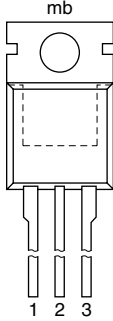
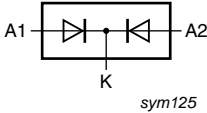
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	-	200	V
$I_{O(AV)}$	average output current	squire-wave pulse; $\delta = 0.5$; $T_{mb} \leq 104\text{ }^{\circ}\text{C}$; both diodes conducting; see Figure 1 ; see Figure 2	-	-	16	A
Static characteristics						
V_F	forward voltage	$I_F = 8\text{ A}$; $T_j = 150\text{ }^{\circ}\text{C}$; see Figure 4	-	0.84	0.95	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_R = 1\text{ A}$; $I_F = 0.5\text{ A}$; $I_{R(meas)} = 0.25\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$; step recovery; see Figure 6	-	12	22	ns



2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1		
2	K	cathode		
3	A2	anode 2		
mb	K	mounting base; cathode		

SOT78 (TO-220AB)

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYQ30E-200	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78
BYQ30E-200/H	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78

4. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	200	V
V_{RWM}	crest working reverse voltage		-	200	V
V_R	reverse voltage	DC	-	200	V
$I_{O(AV)}$	average output current	squire-wave pulse; $\delta = 0.5$; $T_{mb} \leq 104\text{ }^{\circ}\text{C}$; both diodes conducting; see Figure 1 ; see Figure 2	-	16	A
I_{FRM}	repetitive peak forward current	squire-wave pulse; $\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 104\text{ }^{\circ}\text{C}$; per diode	-	16	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; sine-wave pulse; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; per diode	-	80	A
		$t_p = 8.3\text{ ms}$; sine-wave pulse; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; per diode	-	88	A
I_{RRM}	repetitive peak reverse current	$\delta = 0.001$; $t_p = 2\text{ }\mu\text{s}$	-	0.2	A
I_{RSM}	non-repetitive peak reverse current	$t_p = 100\text{ }\mu\text{s}$	-	0.2	A
T_{stg}	storage temperature		-40	150	$^{\circ}\text{C}$
T_j	junction temperature		-	150	$^{\circ}\text{C}$
V_{ESD}	electrostatic discharge voltage	HBM; all pins; C = 250 pF; R = 1.5 k Ω	-	8	kV

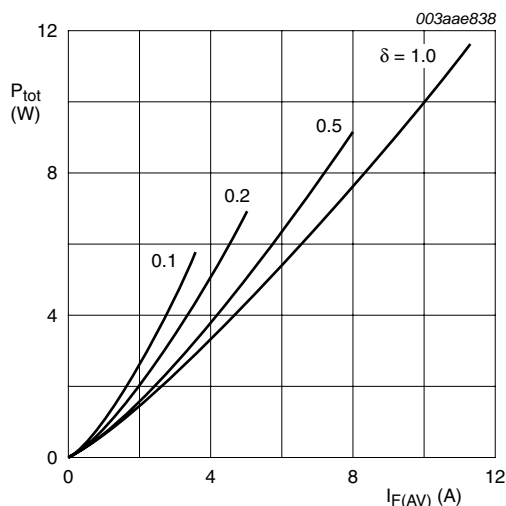


Fig 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

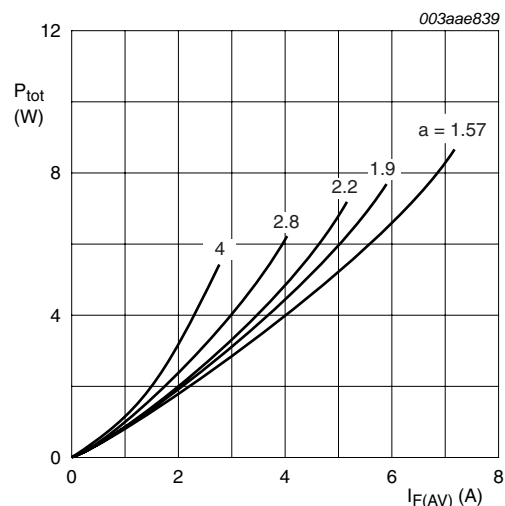


Fig 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound; both diodes conducting; see Figure 3	-	-	2.5	K/W
		with heatsink compound; per diode; see Figure 3	-	-	3	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient		-	60	-	K/W

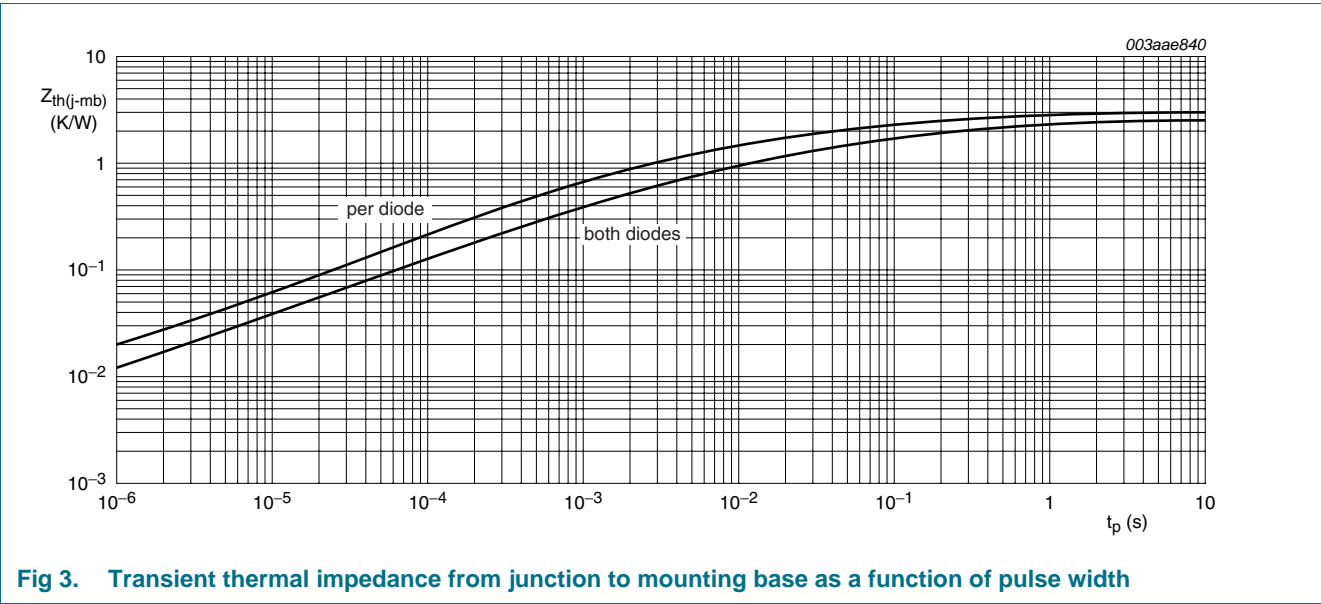
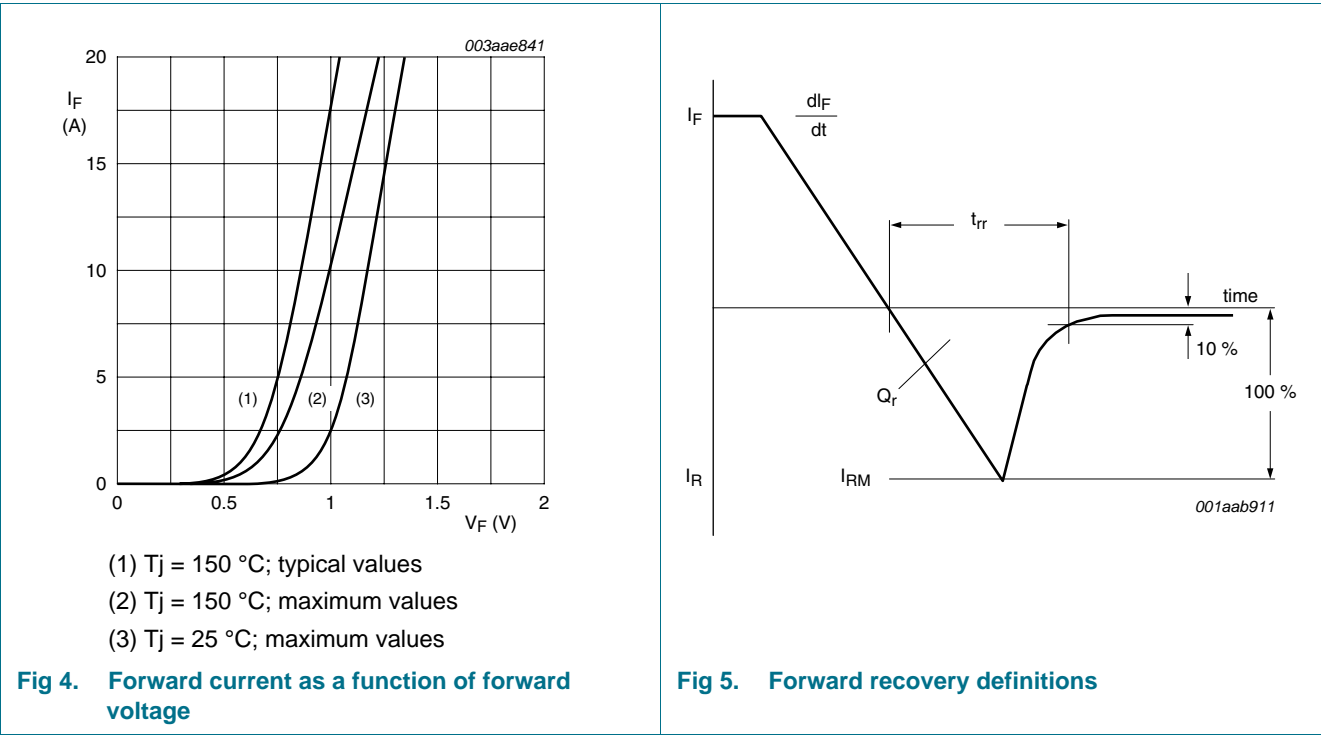


Fig 3. Transient thermal impedance from junction to mounting base as a function of pulse width

6. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V _F	forward voltage	I _F = 16 A; T _j = 25 °C; see Figure 4	-	1.12	1.25	V
		I _F = 16 A; T _j = 150 °C; see Figure 4	-	1	1.15	V
		I _F = 8 A; T _j = 150 °C; see Figure 4	-	0.84	0.95	V
I _R	reverse current	V _R = 200 V; T _j = 100 °C	-	0.3	0.6	mA
		V _R = 200 V; T _j = 25 °C	-	4	30	μA
Dynamic characteristics						
Q _r	recovered charge	I _F = 2 A; V _R ≥ 30 V; dI _F /dt = 20 A/s; T _j = 25 °C; see Figure 5	-	4	11	nC
t _{rr}	reverse recovery time	I _F = 1 A; V _R ≥ 30 V; dI _F /dt = 100 A/μs; ramp recovery; T _j = 25 °C; see Figure 5	-	20	25	ns
		I _F = 0.5 A; I _R = 1 A; step recovery; I _{R(meas)} = 0.25 A; T _j = 25 °C; see Figure 6	-	12	22	ns
V _{FR}	forward recovery voltage	I _F = 1 A; dI _F /dt = 10 A/μs; T _j = 25 °C; see Figure 7	-	1	-	V



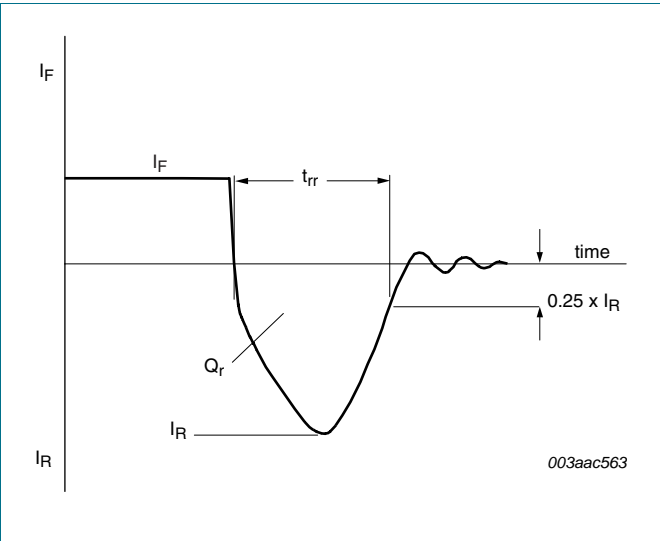


Fig 6. Reverse recovery definitions; step recovery

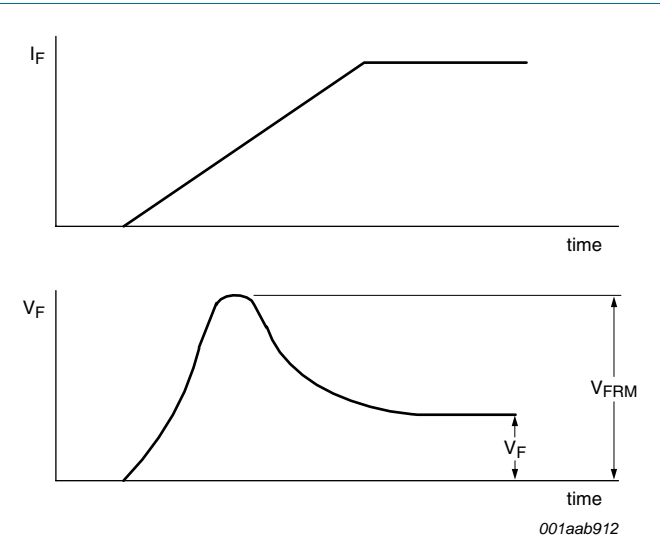


Fig 7. Forward recovery definitions

7. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB SOT78

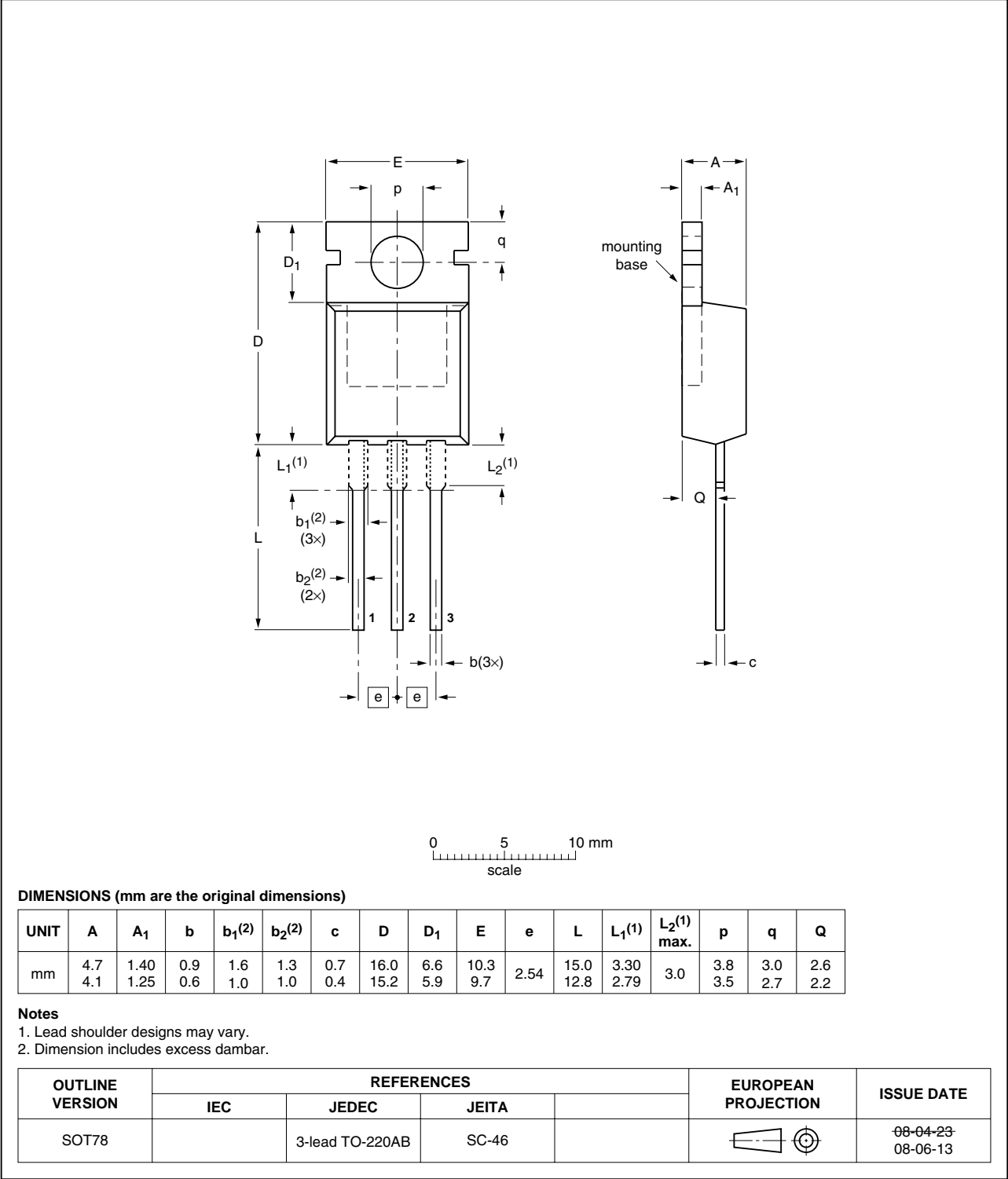


Fig 8. Package outline SOT78 (TO-220AB)

8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYQ30E-200 v.4	20100901	Product data sheet	-	BYQ30E_SERIES_3
Modifications:	<ul style="list-style-type: none">• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.• Legal texts have been adapted to the new company name where appropriate.• Type number BYQ30E-200 separated from datasheet BYQ30E_SERIES.			
BYQ30E_SERIES_3	19981001	Product specification	-	BYQ30E_SERIES_2

9. Legal information

9.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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