

# 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

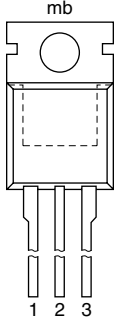
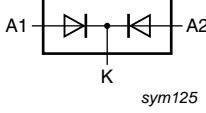
Table 1. Quick reference data

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

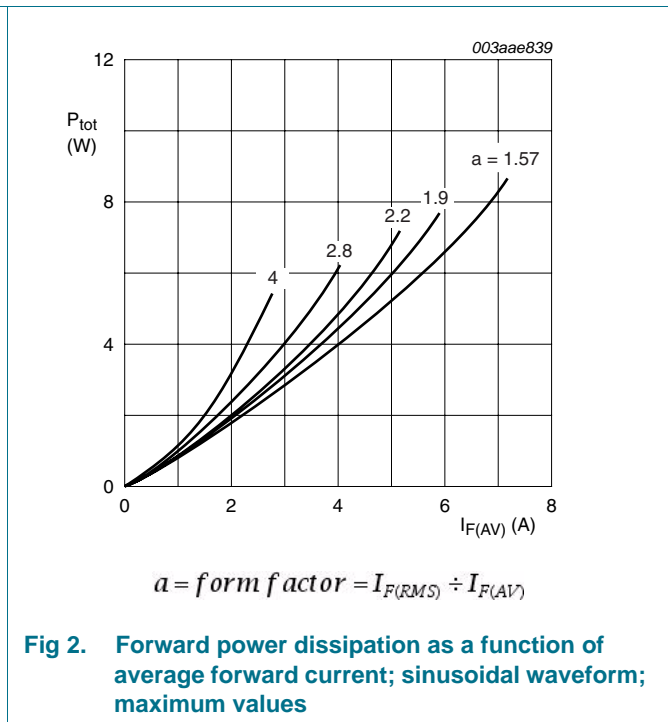
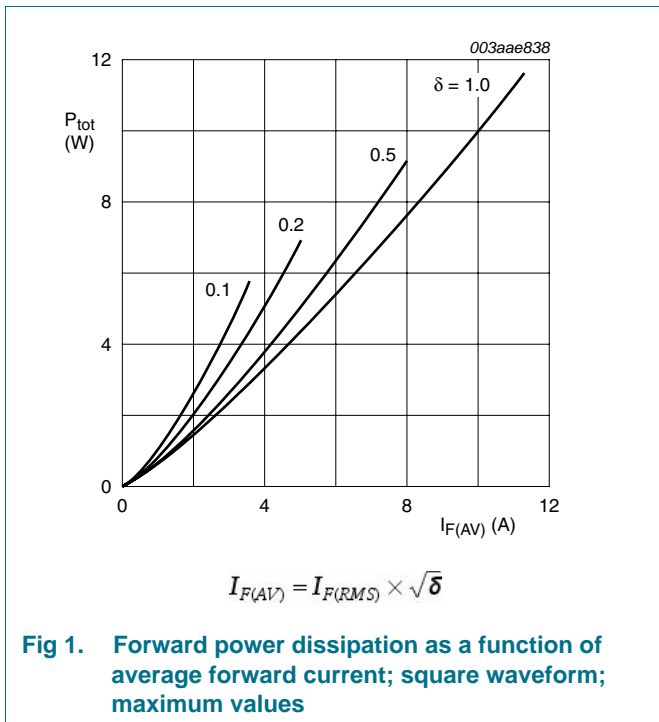
Type number	Package		
	Name	Description	Version
BYQ30E-200	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78
BYQ30E-200/H	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78

### 4. Limiting values

**Table 4. Limiting values**

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

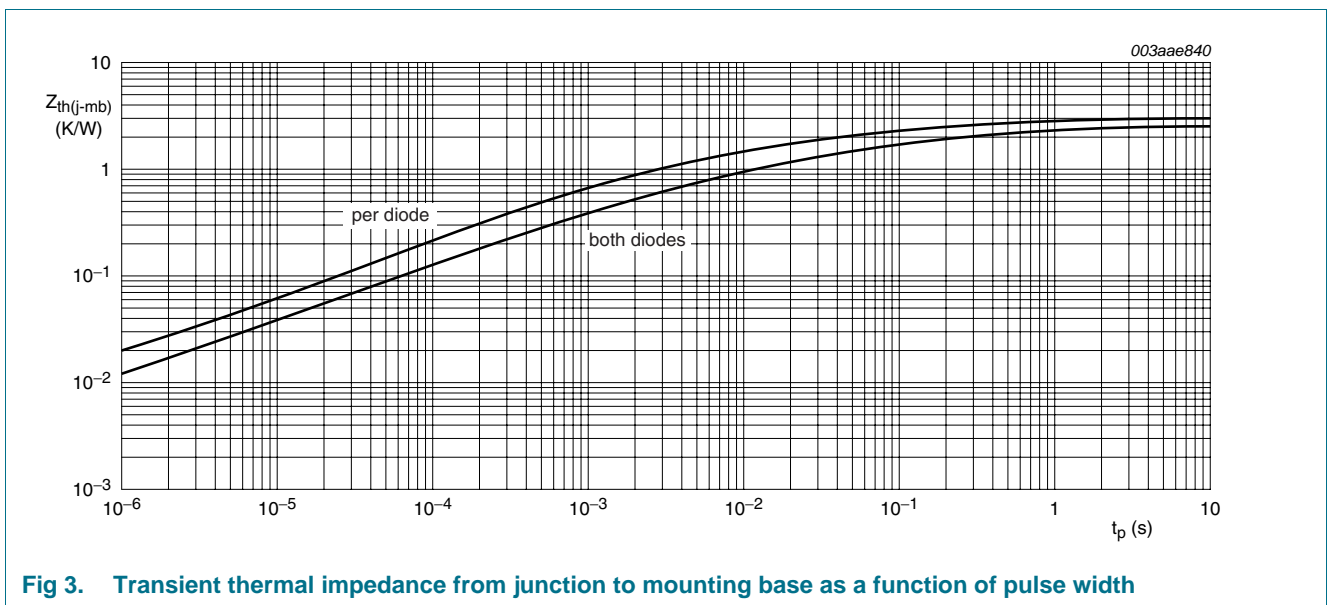
Symbol	Parameter	Conditions	Min	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	200	V
$V_{RWM}$	crest working reverse voltage		-	200	V
$V_R$	reverse voltage	DC	-	200	V
$I_{O(AV)}$	average output current	squire-wave pulse; $\delta = 0.5$ ; $T_{mb} \leq 104\text{ }^\circ\text{C}$ ; both diodes conducting; see <a href="#">Figure 1</a> ; see <a href="#">Figure 2</a>	-	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 $\Omega$	-	8	kV



## 5. Thermal characteristics

**Table 5. Thermal characteristics**

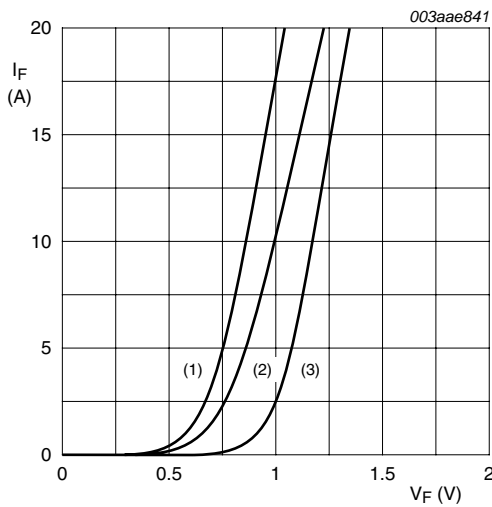
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound; both diodes conducting; see <a href="#">Figure 3</a>	-	-	2.5	K/W
		with heatsink compound; per diode; see <a href="#">Figure 3</a>	-	-	3	K/W
$R_{th(j-a)}$	thermal resistance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



## 6. Characteristics

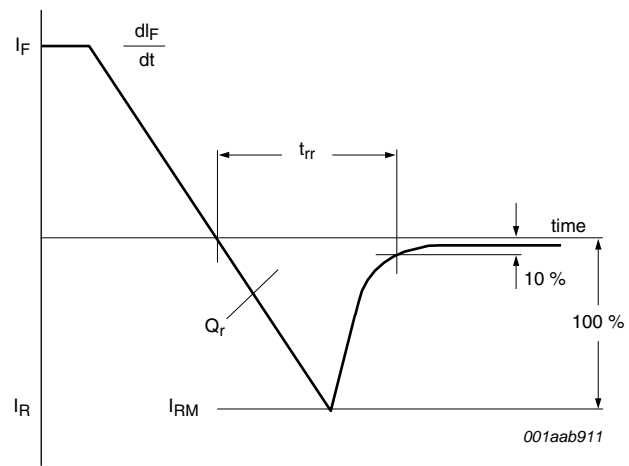
**Table 6. Characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 16 \text{ A}; T_j = 25 \text{ }^\circ\text{C};$ see <a href="#">Figure 4</a>	-	1.12	1.25	V
		$I_F = 16 \text{ A}; T_j = 150 \text{ }^\circ\text{C};$ see <a href="#">Figure 4</a>	-	1	1.15	V
		$I_F = 8 \text{ A}; T_j = 150 \text{ }^\circ\text{C};$ see <a href="#">Figure 4</a>	-	0.84	0.95	V
$I_R$	reverse current	$V_R = 200 \text{ V}; T_j = 100 \text{ }^\circ\text{C}$	-	0.3	0.6	mA
		$V_R = 200 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	4	30	$\mu\text{A}$
<b>Dynamic characteristics</b>						
$Q_r$	recovered charge	$I_F = 2 \text{ A}; V_R \geq 30 \text{ V}; dI_F/dt = 20 \text{ A/s}; T_j = 25 \text{ }^\circ\text{C};$ see <a href="#">Figure 5</a>	-	4	11	nC
$t_{rr}$	reverse recovery time	$I_F = 1 \text{ A}; V_R \geq 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s};$ ramp recovery; $T_j = 25 \text{ }^\circ\text{C};$ see <a href="#">Figure 5</a>	-	20	25	ns
		$I_F = 0.5 \text{ A}; I_R = 1 \text{ A};$ step recovery; $I_{R(\text{meas})} = 0.25 \text{ A}; T_j = 25 \text{ }^\circ\text{C};$ see <a href="#">Figure 6</a>	-	12	22	ns
$V_{FR}$	forward recovery voltage	$I_F = 1 \text{ A}; dI_F/dt = 10 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C};$ see <a href="#">Figure 7</a>	-	1	-	V

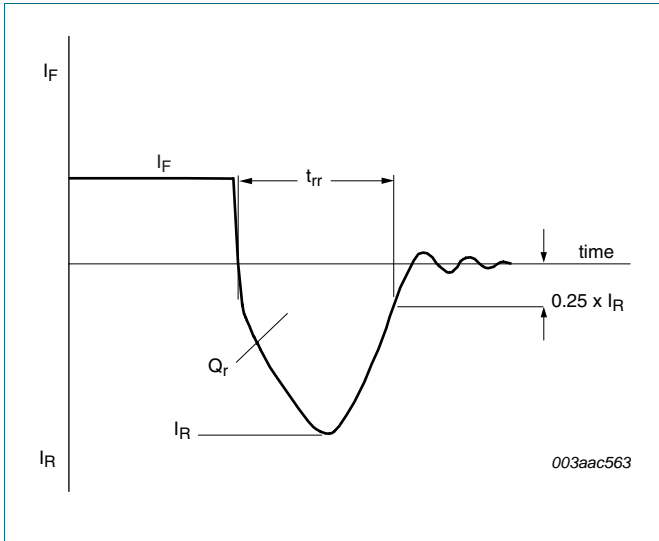


- (1)  $T_j = 150 \text{ }^\circ\text{C};$  typical values
- (2)  $T_j = 150 \text{ }^\circ\text{C};$  maximum values
- (3)  $T_j = 25 \text{ }^\circ\text{C};$  maximum values

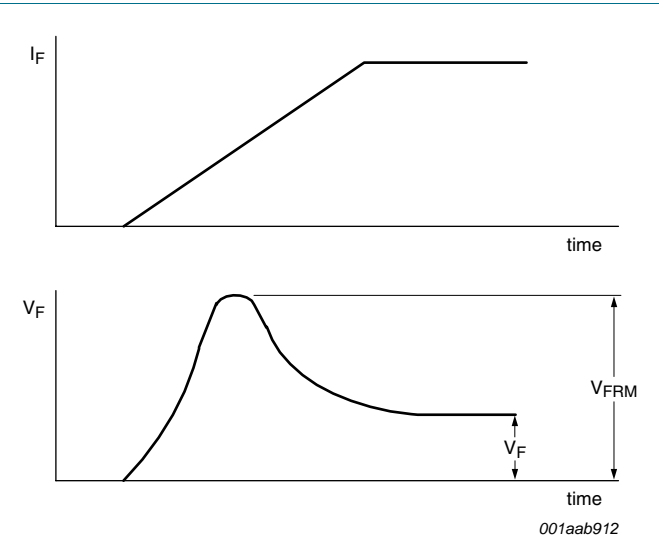
**Fig 4. Forward current as a function of forward voltage**



**Fig 5. Forward recovery definitions**



**Fig 6. Reverse recovery definitions; step recovery**

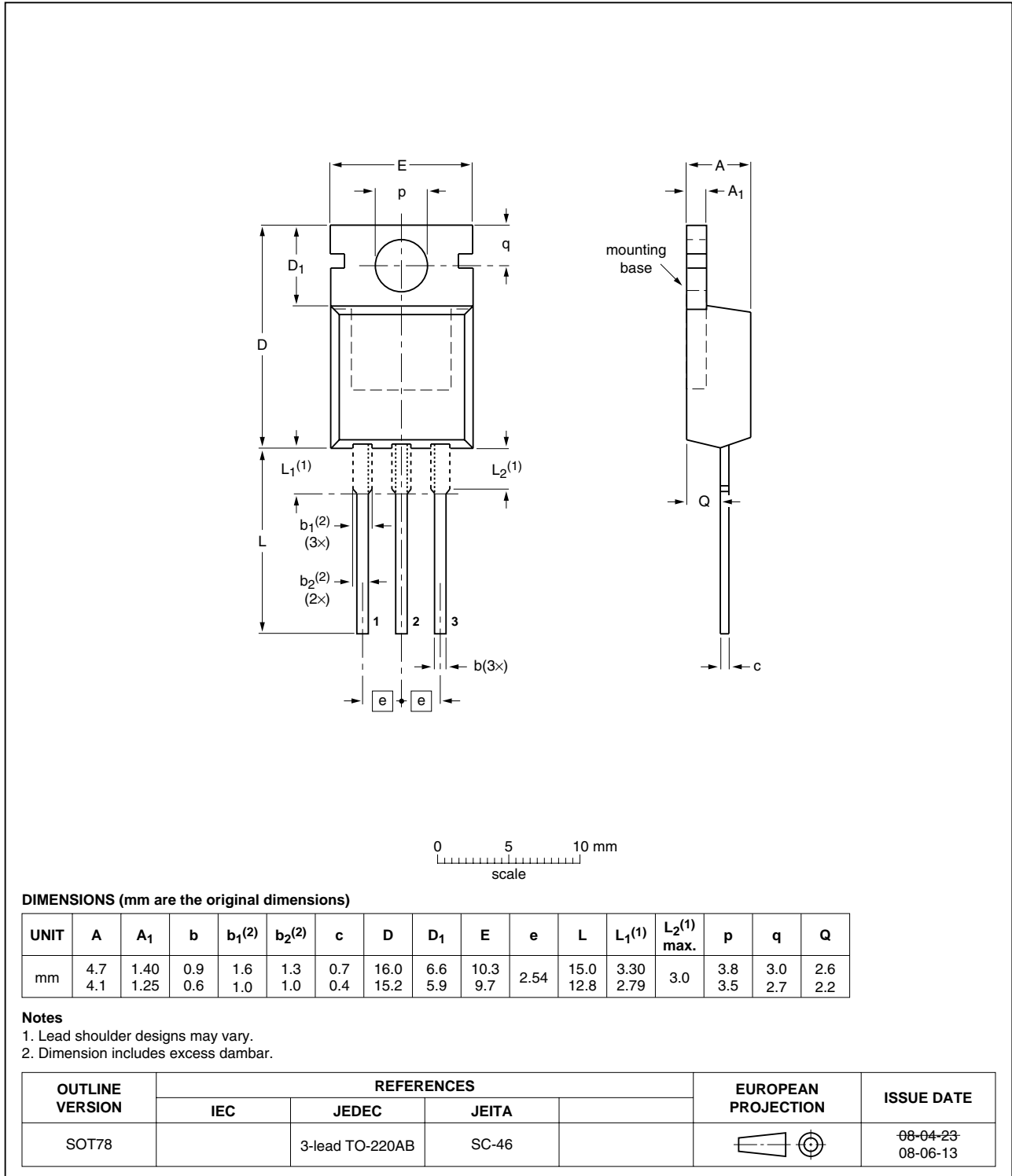


**Fig 7. Forward recovery definitions**

**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"><li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• Type number BYQ30E-200 separated from datasheet BYQ30E_SERIES.</li></ul>			
BYQ30E_SERIES_3	19981001	Product specification	-	BYQ30E_SERIES_2



## 9. Legal information

### 9.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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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Date of release: 1 September 2010

Document identifier: BYQ30E-200