

1. General description

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

2. Features and benefits

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

3. Applications

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

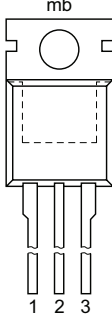
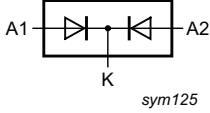
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
Absolute maximum rating						
V_{RRM}	repetitive peak reverse voltage		200			V
$I_{O(AV)}$	average output current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 104\text{ °C}$; both diodes conducting; Fig. 1 ; Fig. 2	16			A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\ \mu\text{s}$; $T_{mb} \leq 104\text{ °C}$; square-wave pulse; per diode	16			A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; sine-wave pulse; per diode $T_{j(\text{init})} = 25\text{ °C}$	80			A
		$t_p = 8.3\text{ ms}$; sine-wave pulse; per diode $T_{j(\text{init})} = 25\text{ °C}$	88			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 8\text{ A}$; $T_j = 150\text{ °C}$; Fig. 4	-	0.84	0.95	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_R = 1\text{ A}$; $I_F = 0.5\text{ A}$; $I_{R(\text{meas})} = 0.25\text{ A}$; $T_j = 25\text{ °C}$; step recovery; Fig. 6	-	12	22	ns

5. 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		

6. 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

7. Marking

Table 4. Marking codes

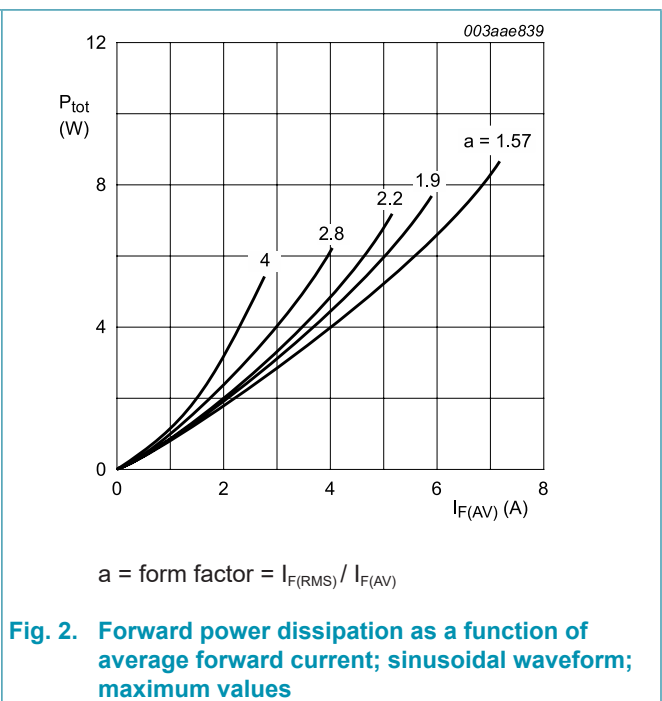
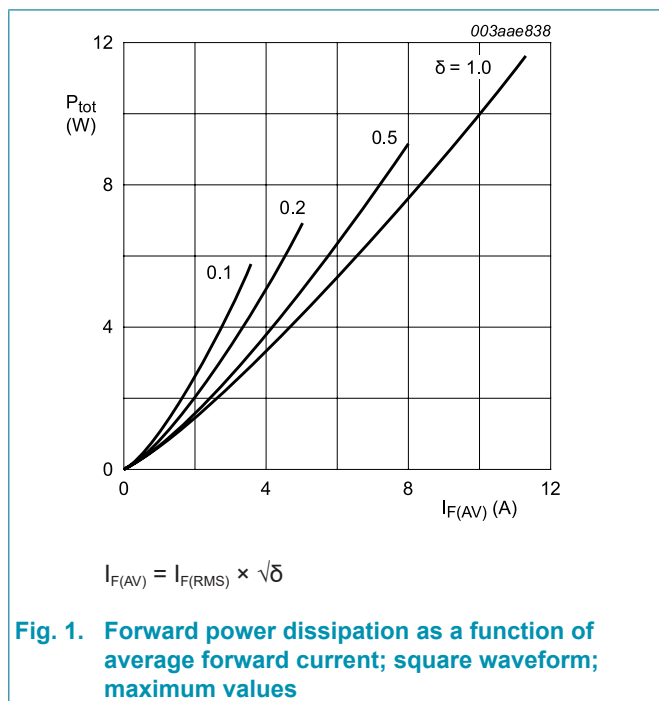
Type number	Marking codes
BYQ30E-200	BYQ30E-200

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Values	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	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 104\text{ °C}$; both diodes conducting; Fig. 1 ; Fig. 2	16	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\ \mu\text{s}$; $T_{mb} \leq 104\text{ °C}$; square-wave pulse; per diode	16	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; sine-wave pulse; per diode $T_{j(\text{init})} = 25\text{ °C}$	80	A
		$t_p = 8.3\text{ ms}$; sine-wave pulse; per diode $T_{j(\text{init})} = 25\text{ °C}$	88	A
I_{RRM}	repetitive peak reverse current	$\delta = 0.001$; $t_p = 2\ \mu\text{s}$	0.2	A
I_{RSM}	non-repetitive peak reverse current	$t_p = 100\ \mu\text{s}$	0.2	A
T_{stg}	storage temperature		-40 to 150	°C
T_j	junction temperature		150	°C
Electrostatic discharge				
V_{ESD}	electrostatic discharge voltage	HBM; all pins; C = 250 pF; R = 1.5 kΩ	8	kV



9. Thermal characteristics

Table 6. 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; Fig. 3	-	-	2.5	K/W
		with heatsink compound; per diode; Fig. 3	-	-	3	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient		-	60	-	K/W

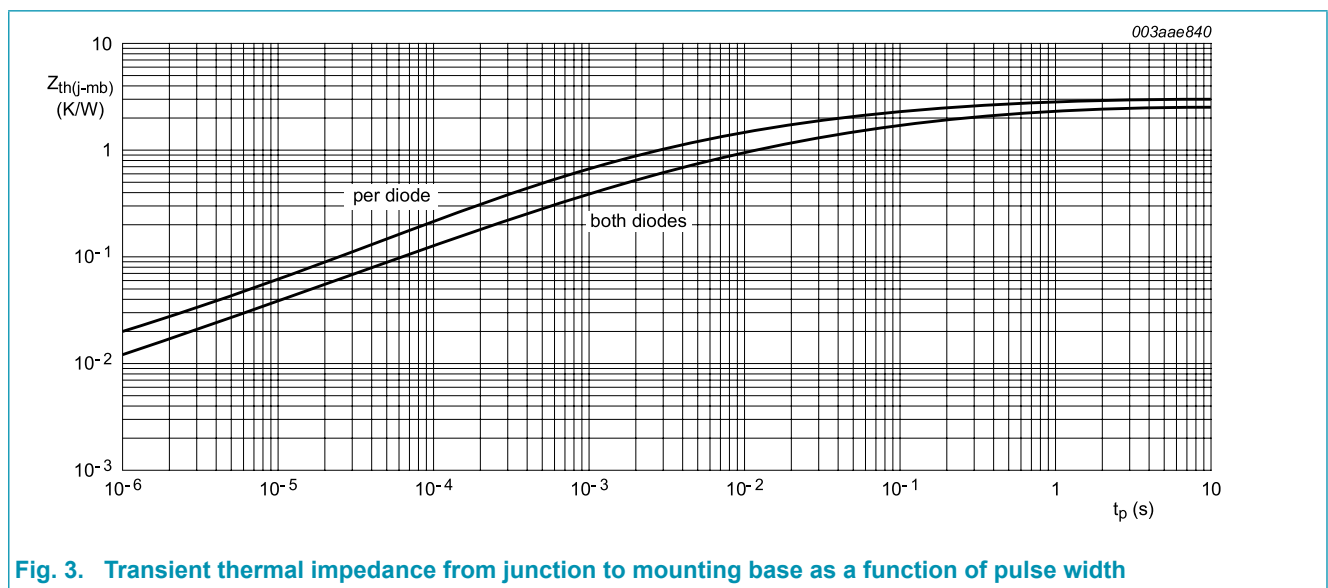


Fig. 3. Transient thermal impedance from junction to mounting base as a function of pulse width

10. Characteristics

Table 7. Characteristics

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

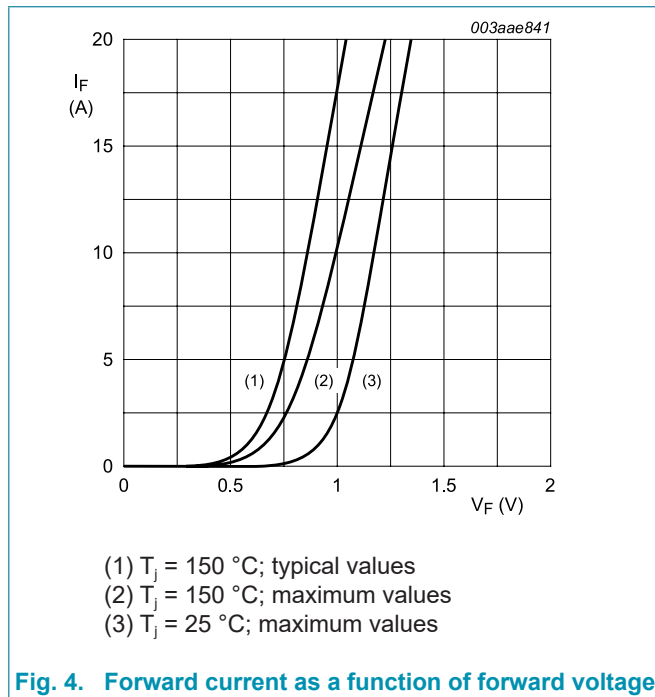


Fig. 4. Forward current as a function of forward voltage

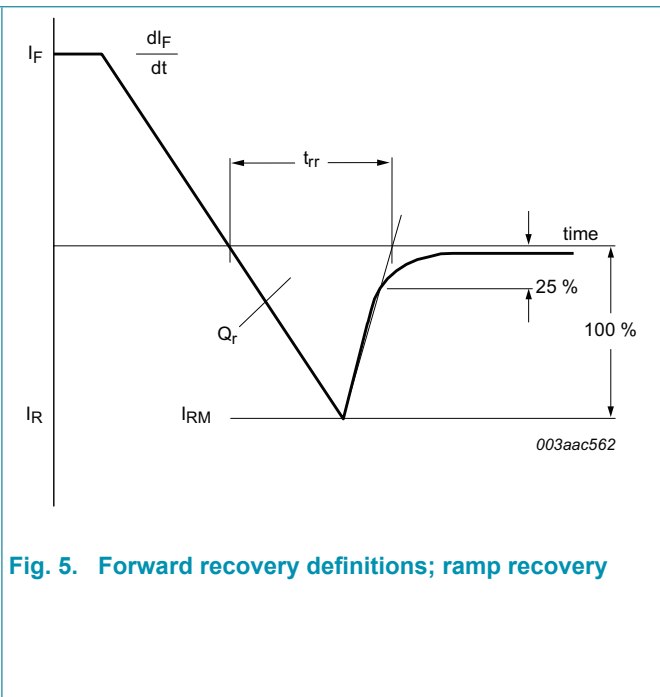


Fig. 5. Forward recovery definitions; ramp recovery

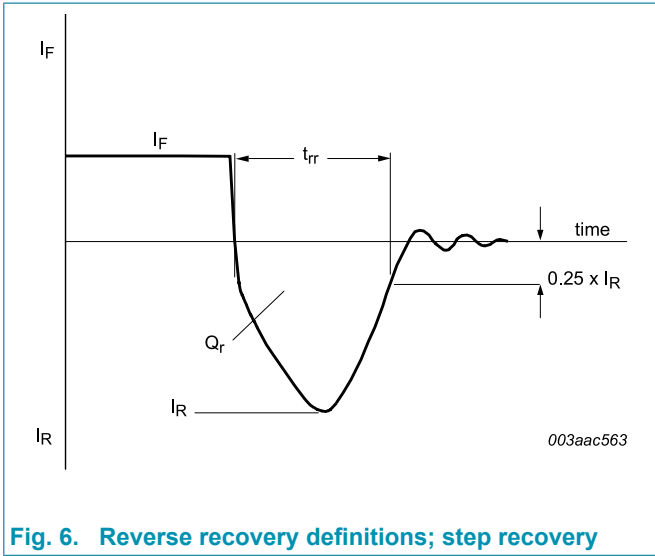


Fig. 6. Reverse recovery definitions; step recovery

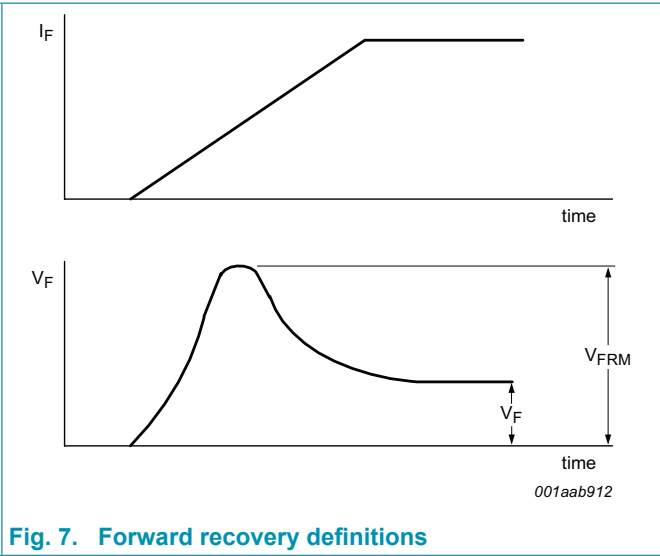
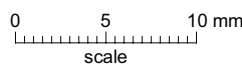
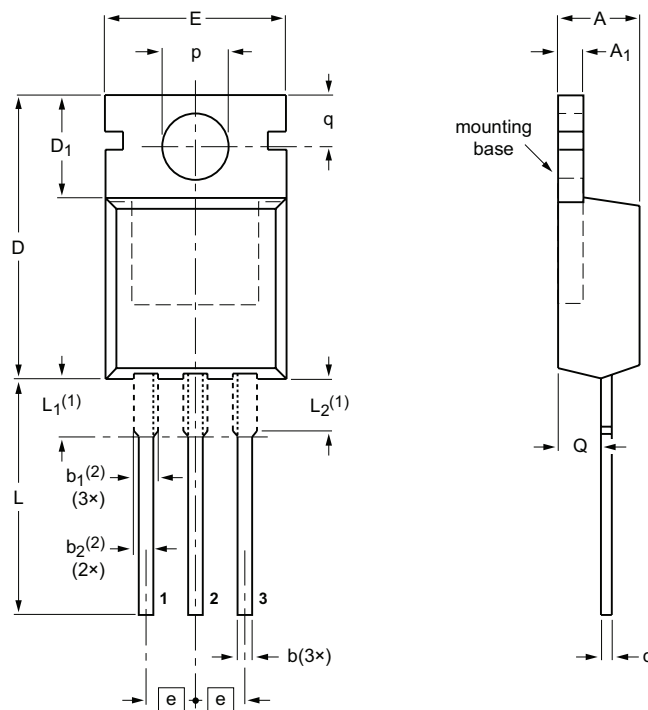


Fig. 7. Forward recovery definitions

11. Package outline

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

SOT78



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁	b	b ₁ (2)	b ₂ (2)	c	D	D ₁	E	e	L	L ₁ (1)	L ₂ (1) max.	p	q	Q
mm	4.7 4.1	1.40 1.25	0.9 0.6	1.6 1.0	1.3 1.0	0.7 0.4	16.0 15.2	6.6 5.9	10.3 9.7	2.54	15.0 12.8	3.30 2.79	3.0	3.8 3.5	3.0 2.7	2.6 2.2

Notes

1. Lead shoulder designs may vary.
2. Dimension includes excess dambar.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT78		3-lead TO-220AB	SC-46		08-04-23 08-06-13

12. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYQ30E-200 v.5	20180605	Product data sheet	-	BYQ30E-200 v.4
Modifications:	Change from NXP version to WeEn version			
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

13. Legal information

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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14. Contents

1. General description.....	1
2. Features and benefits	1
3. Applications	1
4. Quick reference data.....	1
5. Pinning information.....	2
6. Ordering information.....	2
7. Marking.....	2
8. Limiting values	3
9. Thermal characteristics	4
10. Characteristics.....	5
11. Package outline	7
12. Revision history.....	8
13. Legal information	9
14. Contents	11

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