



# BYV410-600

## Dual enhanced ultrafast power diode

Rev. 2 — 5 August 2011

Product data sheet

## 1. Product profile

### 1.1 General description

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

### 1.2 Features and benefits

- High thermal cycling performance
- Low on state losses
- Low thermal resistance
- Soft recovery characteristic minimizes power consuming oscillations

### 1.3 Applications

- Dual mode (DCM and CCM) PFC
- Power Factor Correction (PFC) for Interleaved Topology

### 1.4 Quick reference data

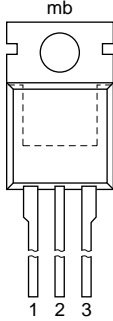
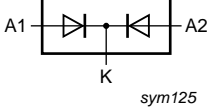
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>RRM</sub>	repetitive peak reverse voltage		-	-	600	V
I <sub>O(AV)</sub>	average output current	square-wave pulse; δ = 0.5 ; T <sub>mb</sub> ≤ 92 °C; both diodes conducting; see <a href="#">Figure 1</a> ; see <a href="#">Figure 2</a>	-	-	20	A
Static characteristics						
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 10 A; T <sub>j</sub> = 150 °C	-	1.3	1.9	V
		I <sub>F</sub> = 10 A; T <sub>j</sub> = 25 °C; see <a href="#">Figure 4</a>	-	1.4	2.1	V
Dynamic characteristics						
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs; T <sub>j</sub> = 25 °C; see <a href="#">Figure 5</a>	-	20	35	ns
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs	-	15	28	nC



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

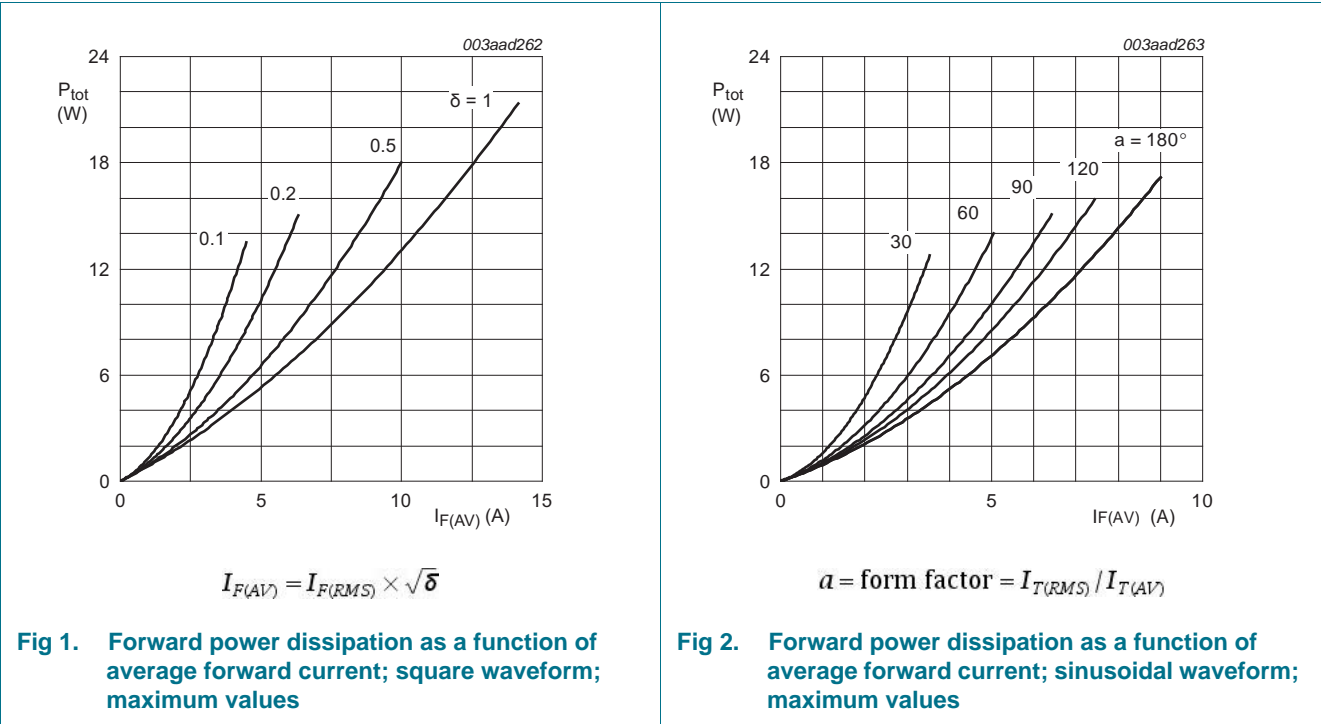
Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYV410-600	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).

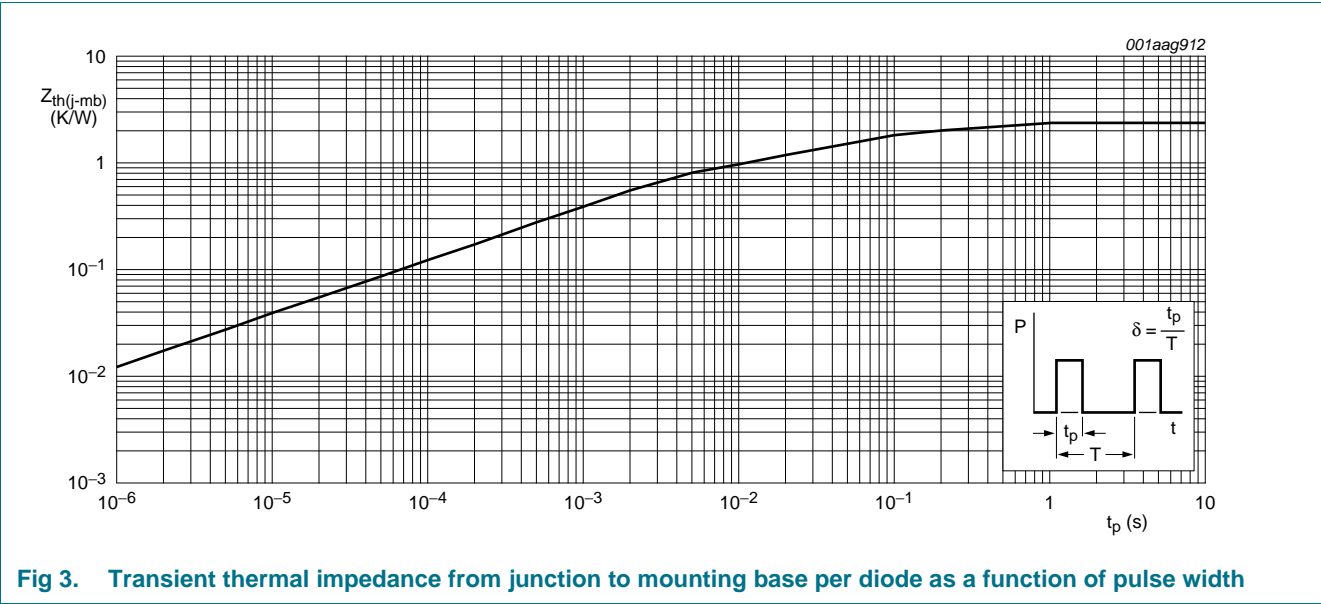
Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>RRM</sub>	repetitive peak reverse voltage		-	600	V
V <sub>RWM</sub>	crest working reverse voltage		-	600	V
V <sub>R</sub>	reverse voltage	DC	-	600	V
I <sub>O(AV)</sub>	average output current	square-wave pulse; δ = 0.5 ; T <sub>mb</sub> ≤ 92 °C; both diodes conducting; see <a href="#">Figure 1</a> ; see <a href="#">Figure 2</a>	-	20	A
I <sub>FRM</sub>	repetitive peak forward current	δ = 0.5 ; t <sub>p</sub> = 25 μs; T <sub>mb</sub> ≤ 108 °C; per diode	-	20	A
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 8.3 ms; sine-wave pulse; T <sub>j(init)</sub> = 25 °C; per diode	-	132	A
		t <sub>p</sub> = 10 ms; sine-wave pulse; T <sub>j(init)</sub> = 25 °C; per diode	-	120	A
T <sub>stg</sub>	storage temperature		-40	150	°C
T <sub>j</sub>	junction temperature		-	150	°C



5. Thermal characteristics

Table 5. Thermal characteristics

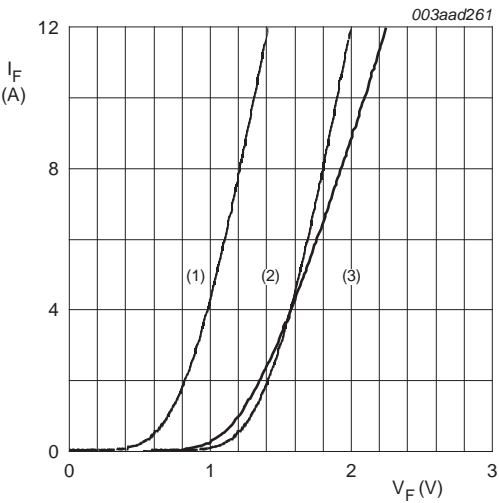
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound; per diode; see <a href="#">Figure 3</a>	-	-	2.4	K/W
		with heatsink compound; both diodes conducting	-	-	1.6	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient		-	60	-	K/W



6. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 10 A; T <sub>j</sub> = 150 °C	-	1.3	1.9	V
		I <sub>F</sub> = 10 A; T <sub>j</sub> = 25 °C; see <a href="#">Figure 4</a>	-	1.4	2.1	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 600 V	-	13	50	μA
		V <sub>R</sub> = 600 V; T <sub>j</sub> = 100 °C	-	1	1.5	mA
Dynamic characteristics						
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs	-	15	28	nC
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs; T <sub>j</sub> = 25 °C; see <a href="#">Figure 5</a>	-	20	35	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs; see <a href="#">Figure 5</a>	-	1.4	1.9	A
V <sub>FR</sub>	forward recovery voltage	I <sub>F</sub> = 1 A; dI <sub>F</sub> /dt = 100 A/μs; see <a href="#">Figure 6</a>	-	3.2	-	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

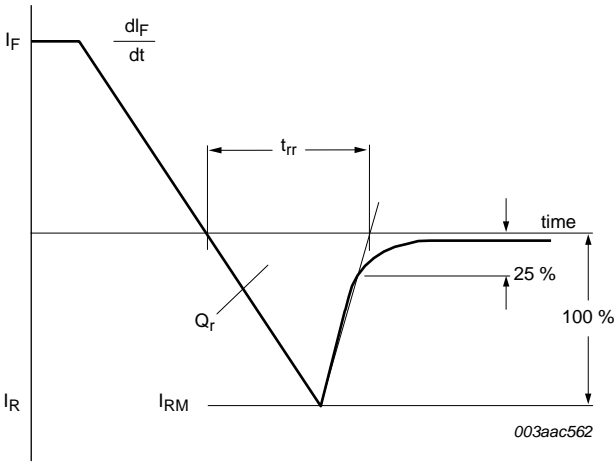


Fig 5. Reverse recovery definitions; ramp recovery

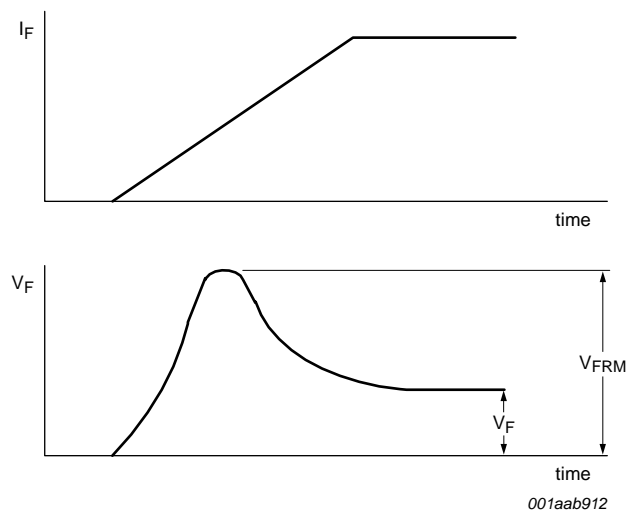


Fig 6. Forward recovery definitions

7. Package outline

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

SOT78

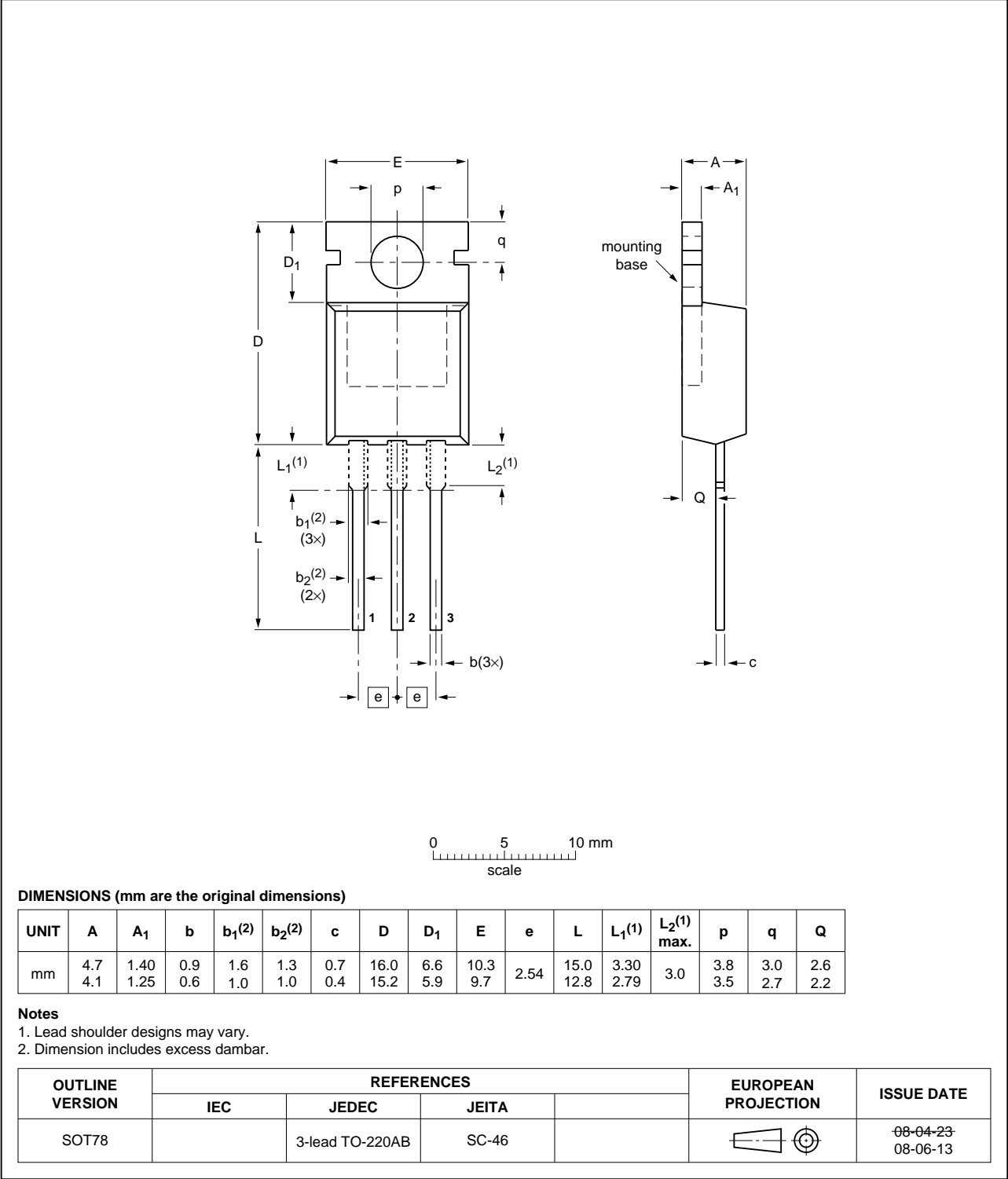


Fig 7. Package outline SOT78 (TO-220AB)

## 8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYV410-600 v.2	20110805	Product data sheet	-	BYV410-600_1
Modifications:	<ul style="list-style-type: none"><li>• Various changes to content.</li></ul>			
BYV410-600_1	20090629	Product data sheet	-	-



## 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.

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Date of release: 5 August 2011

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