



# BYV42G-200

## Dual ultrafast power diode

Rev. 01 — 11 January 2011

Product data sheet

## 1. Product profile

### 1.1 General description

Dual ultrafast power diode in a SOT226A (I2PAK) low-profile plastic package.

### 1.2 Features and benefits

- High reverse voltage surge capability
- High thermal cycling performance
- Low thermal resistance
- Soft recovery characteristic minimizes power consuming oscillations
- Very low on-state loss

### 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	square-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>	-	-	30	A
$I_{FSM}$	non-repetitive peak forward current	$T_{j(init)} = 25\text{ }^{\circ}\text{C}$ ; $t_p = 10\text{ ms}$ ; sine-wave pulse; per diode	-	-	160	A
$I_{RRM}$	repetitive peak reverse current	$t_p = 2\text{ }\mu\text{s}$ ; $\delta = 0.001$	-	-	0.2	A
$V_{ESD}$	electrostatic discharge voltage	HBM; $C = 250\text{ pF}$ ; $R = 1.5\text{ k}\Omega$ ; all pins	-	-	8	kV
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 15\text{ A}$ ; $T_j = 150\text{ }^{\circ}\text{C}$ ; see <a href="#">Figure 4</a>	-	0.78	0.85	V

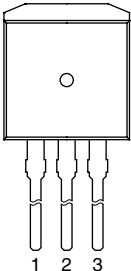
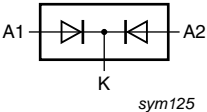


Table 1. Quick reference data ...continued

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}$ ; $V_R = 30\text{ V}$ ; $di_F/dt = 100\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; ramp recovery; see <a href="#">Figure 5</a>	-	20	28	ns
		$I_R = 1\text{ A}$ ; $I_F = 0.5\text{ A}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; step recovery; measured at reverse current = 0.25 A; see <a href="#">Figure 6</a>	-	13	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; connected to cathode		

SOT226A (I2PAK)

## 3. Ordering information

Table 3. Ordering information

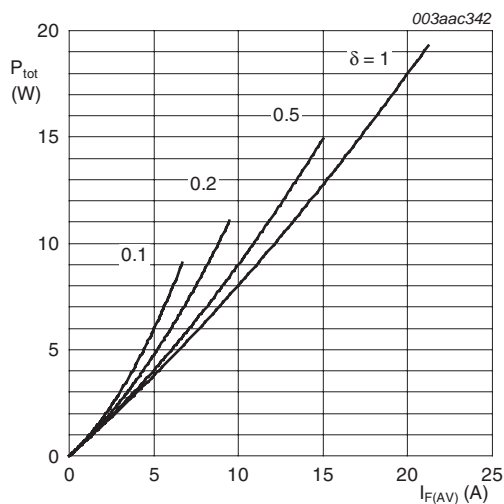
Type number	Package		
	Name	Description	Version
BYV42G-200	I2PAK	plastic single-ended package (I2PAK); TO-262	SOT226A

## 4. Limiting values

**Table 4. Limiting values**

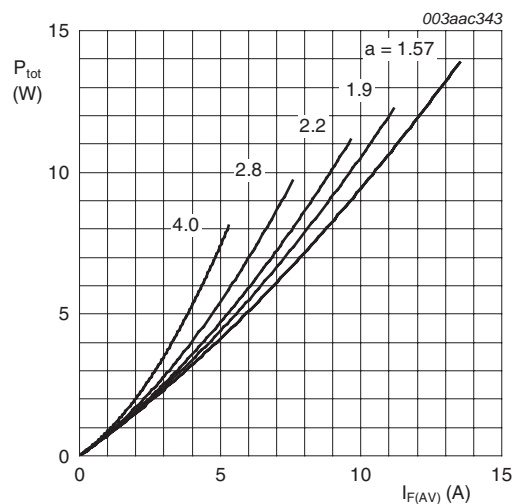
In accordance with the Absolute Maximum Rating System (IEC 60134).

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	square-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>	-	30	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 104\text{ }^{\circ}\text{C}$ ; per diode	-	30	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 8.3\text{ ms}$ ; sine-wave pulse; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$ ; per diode	-	150	A
		$t_p = 10\text{ ms}$ ; sine-wave pulse; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$ ; per diode	-	160	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; C = 250 pF; R = 1.5 k $\Omega$ ; all pins	-	8	kV



$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$

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



$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$

**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	-	-	1.4	K/W
		with heatsink compound; per diode; see <a href="#">Figure 3</a>	-	-	2.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W

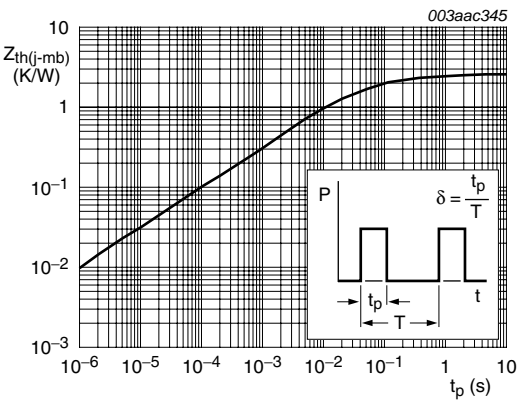


Fig 3. Transient thermal impedance from junction to mounting base as a function of pulse width

6. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 15 A; T <sub>j</sub> = 150 °C; see <a href="#">Figure 4</a>	-	0.78	0.85	V
		I <sub>F</sub> = 15 A; T <sub>j</sub> = 25 °C; see <a href="#">Figure 4</a>	-	0.95	1.05	V
		I <sub>F</sub> = 30 A; T <sub>j</sub> = 25 °C; see <a href="#">Figure 4</a>	-	1	1.2	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 200 V; T <sub>j</sub> = 100 °C	-	0.5	1	mA
		V <sub>R</sub> = 200 V; T <sub>j</sub> = 25 °C	-	10	100	µA
Dynamic characteristics						
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 2 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 20 A/µs; T <sub>j</sub> = 25 °C	-	6	15	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; ramp recovery; T <sub>j</sub> = 25 °C; see <a href="#">Figure 5</a>	-	20	28	ns
		I <sub>F</sub> = 0.5 A; I <sub>R</sub> = 1 A; step recovery; measured at reverse current = 0.25 A; T <sub>j</sub> = 25 °C; see <a href="#">Figure 6</a>	-	13	22	ns
V <sub>FR</sub>	forward recovery voltage	I <sub>F</sub> = 1 A; dI <sub>F</sub> /dt = 10 A/µs; T <sub>j</sub> = 25 °C; see <a href="#">Figure 7</a>	-	-	1	V

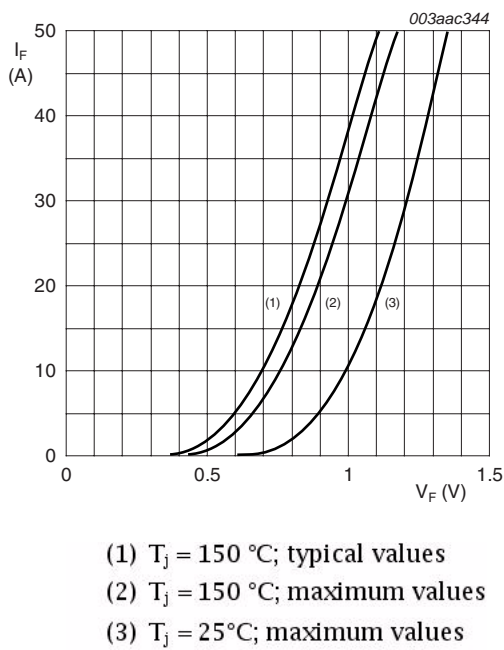


Fig 4. Forward current as a function of forward voltage

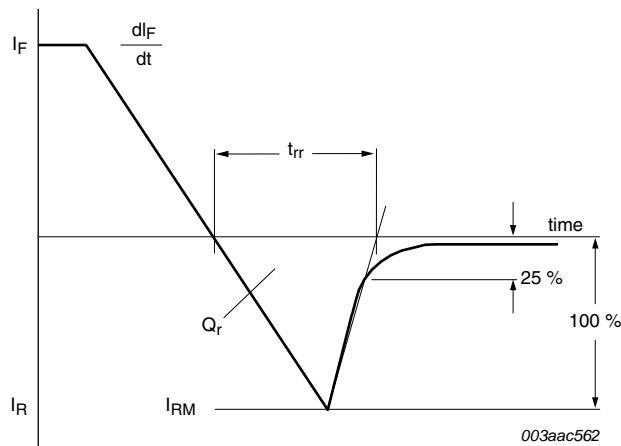


Fig 5. Reverse recovery definitions; ramp recovery

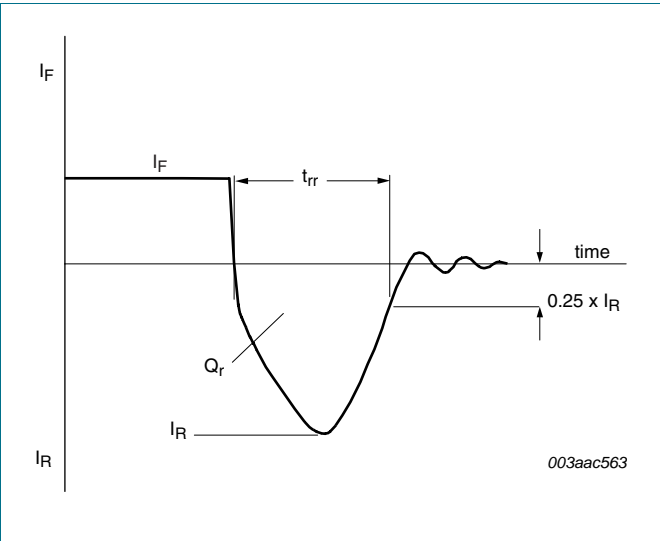


Fig 6. Reverse recovery definitions; step recovery

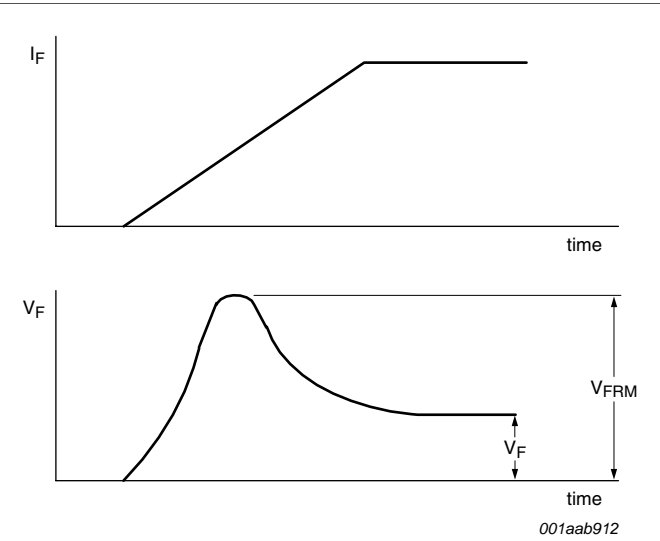


Fig 7. Forward recovery definitions

7. Package outline

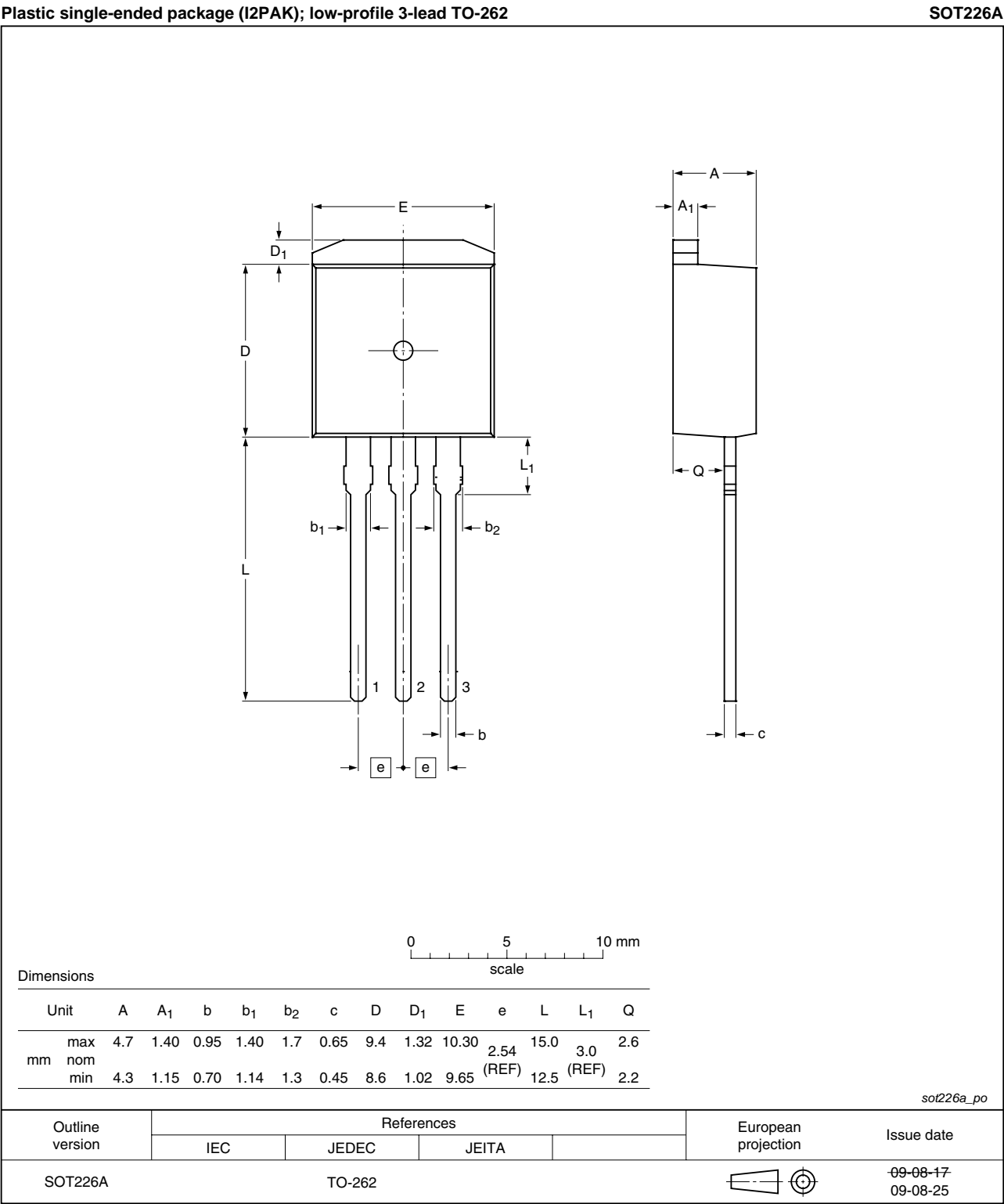


Fig 8. Package outline SOT226A (I2PAK)

## 8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYV42G-200 v.1	20110111	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.
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## 11. Contents

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<b>1</b>	<b>Product profile</b> . . . . .	<b>1</b>
1.1	General description . . . . .	1
1.2	Features and benefits . . . . .	1
1.3	Applications . . . . .	1
1.4	Quick reference data . . . . .	1
<b>2</b>	<b>Pinning information</b> . . . . .	<b>2</b>
<b>3</b>	<b>Ordering information</b> . . . . .	<b>2</b>
<b>4</b>	<b>Limiting values</b> . . . . .	<b>3</b>
<b>5</b>	<b>Thermal characteristics</b> . . . . .	<b>4</b>
<b>6</b>	<b>Characteristics</b> . . . . .	<b>5</b>
<b>7</b>	<b>Package outline</b> . . . . .	<b>7</b>
<b>8</b>	<b>Revision history</b> . . . . .	<b>8</b>
<b>9</b>	<b>Legal information</b> . . . . .	<b>9</b>
9.1	Data sheet status . . . . .	9
9.2	Definitions . . . . .	9
9.3	Disclaimers . . . . .	9
9.4	Trademarks . . . . .	10
<b>10</b>	<b>Contact information</b> . . . . .	<b>10</b>

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