



# 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; $\delta = 0.5$ ; $T_{mb} \leq 104$ °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	$T_{j(init)} = 25$ °C; $t_p = 10$ ms; sine-wave pulse; per diode	-	-	160	A
$I_{RRM}$	repetitive peak reverse current	$t_p = 2$ $\mu$ s; $\delta = 0.001$	-	-	0.2	A
$V_{ESD}$	electrostatic discharge voltage	HBM; C = 250 pF; R = 1.5 k $\Omega$ ; all pins	-	-	8	kV
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 15$ A; $T_j = 150$ °C; see <a href="#">Figure 4</a>	-	0.78	0.85	V

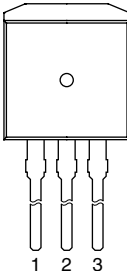
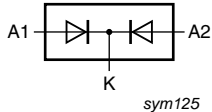


**Table 1. Quick reference data ...continued**

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**

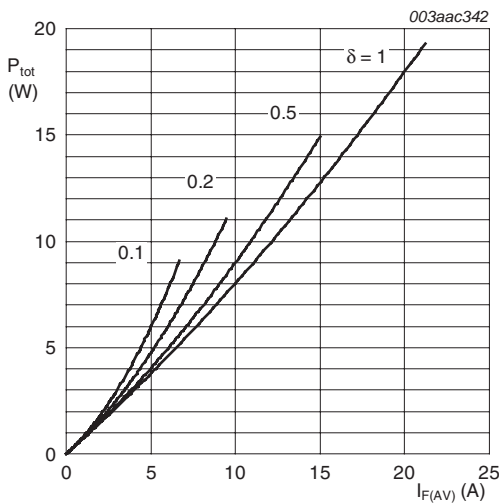
Type number	Package		Version
	Name	Description	
BYV42G-200	I2PAK	plastic single-ended package (I2PAK); TO-262	SOT226A

**4. Limiting values**

**Table 4. Limiting values**

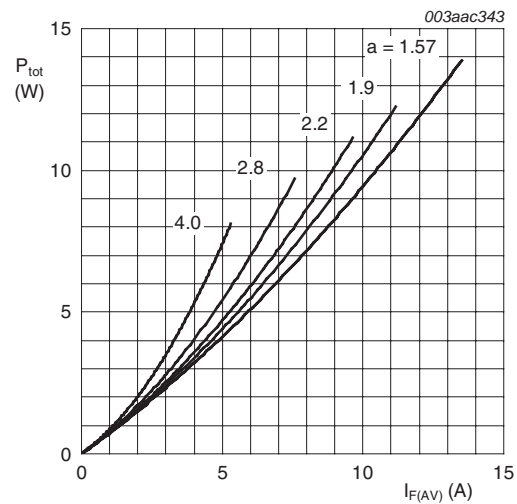
In accordance with the Absolute Maximum Rating System (IEC 60134).

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; $\delta = 0.5$ ; $T_{mb} \leq 104\text{ °C}$ ; both diodes conducting; see <a href="#">Figure 1</a> ; see <a href="#">Figure 2</a>	-	30	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\ \mu\text{s}$ ; $T_{mb} \leq 104\text{ °C}$ ; per diode	-	30	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 8.3\text{ ms}$ ; sine-wave pulse; $T_{j(\text{init})} = 25\text{ °C}$ ; per diode	-	150	A
		$t_p = 10\text{ ms}$ ; sine-wave pulse; $T_{j(\text{init})} = 25\text{ °C}$ ; per diode	-	160	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	150	°C
$T_j$	junction temperature		-	150	°C
$V_{ESD}$	electrostatic discharge voltage	HBM; C = 250 pF; R = 1.5 kΩ; 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**



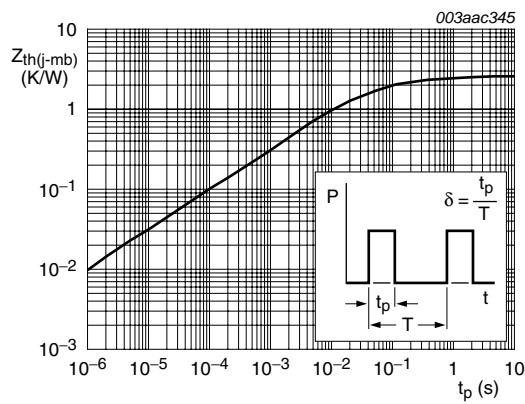
$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$

**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

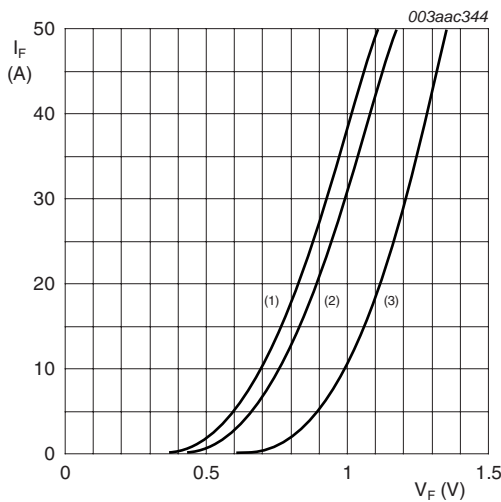


**Fig 3. Transient thermal impedance from junction to mounting base as a function of pulse width**

## 6. Characteristics

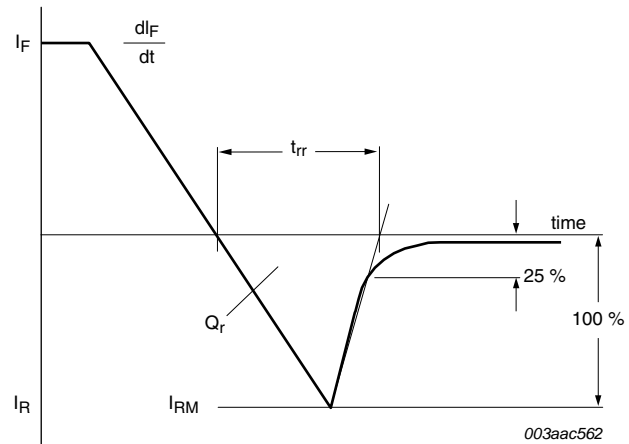
**Table 6. Characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 15\text{ A}; T_j = 150\text{ °C};$ see <a href="#">Figure 4</a>	-	0.78	0.85	V
		$I_F = 15\text{ A}; T_j = 25\text{ °C};$ see <a href="#">Figure 4</a>	-	0.95	1.05	V
		$I_F = 30\text{ A}; T_j = 25\text{ °C};$ see <a href="#">Figure 4</a>	-	1	1.2	V
$I_R$	reverse current	$V_R = 200\text{ V}; T_j = 100\text{ °C}$	-	0.5	1	mA
		$V_R = 200\text{ V}; T_j = 25\text{ °C}$	-	10	100	$\mu\text{A}$
<b>Dynamic characteristics</b>						
$Q_r$	recovered charge	$I_F = 2\text{ A}; V_R = 30\text{ V}; dI_F/dt = 20\text{ A}/\mu\text{s}; T_j = 25\text{ °C}$	-	6	15	nC
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s};$ ramp recovery; $T_j = 25\text{ °C};$ see <a href="#">Figure 5</a>	-	20	28	ns
		$I_F = 0.5\text{ A}; I_R = 1\text{ A};$ step recovery; measured at reverse current = 0.25 A; $T_j = 25\text{ °C};$ see <a href="#">Figure 6</a>	-	13	22	ns
$V_{FR}$	forward recovery voltage	$I_F = 1\text{ A}; dI_F/dt = 10\text{ A}/\mu\text{s}; T_j = 25\text{ °C};$ see <a href="#">Figure 7</a>	-	-	1	V

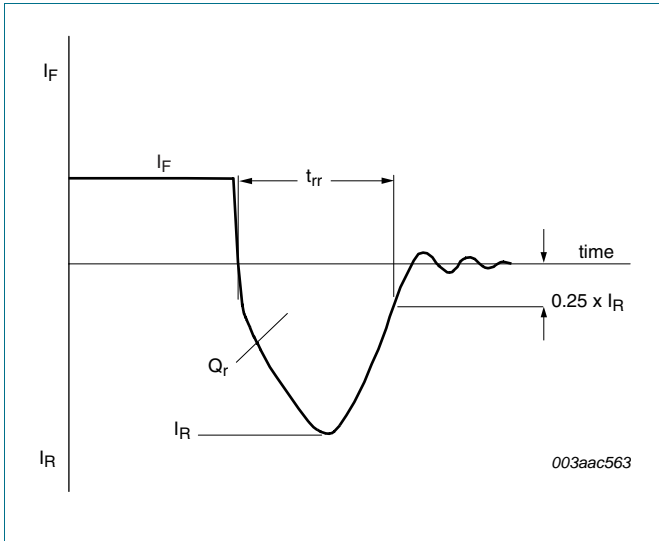


- (1)  $T_j = 150\text{ °C};$  typical values
- (2)  $T_j = 150\text{ °C};$  maximum values
- (3)  $T_j = 25\text{ °C};$  maximum values

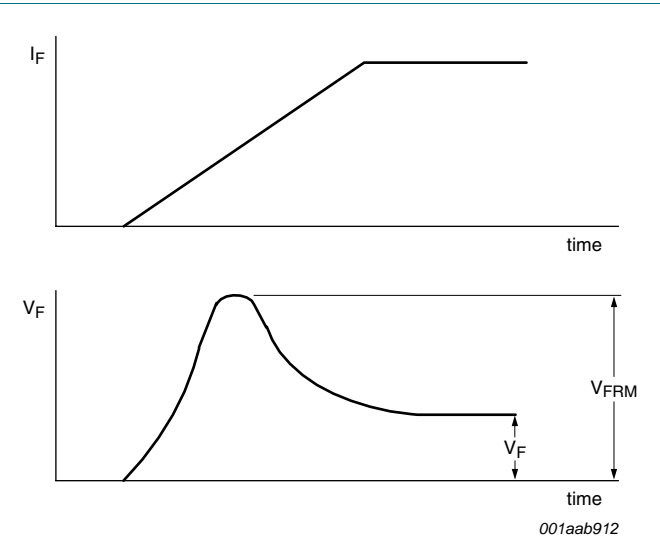
**Fig 4. Forward current as a function of forward voltage**



**Fig 5. Reverse recovery definitions; ramp recovery**



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

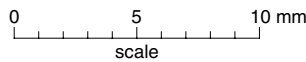
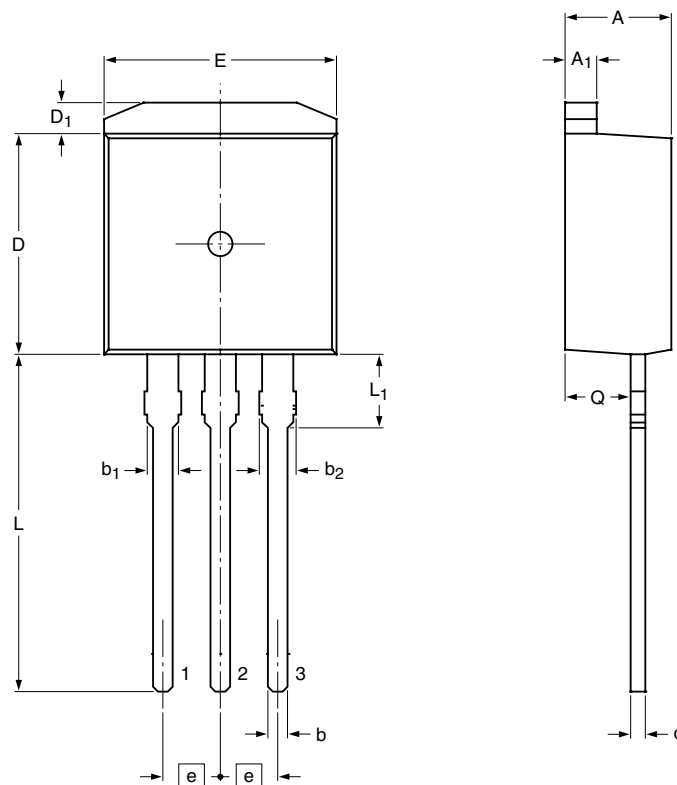


**Fig 7. Forward recovery definitions**

**7. Package outline**

Plastic single-ended package (I2PAK); low-profile 3-lead TO-262

SOT226A



Dimensions

Unit	A	A <sub>1</sub>	b	b <sub>1</sub>	b <sub>2</sub>	c	D	D <sub>1</sub>	E	e	L	L <sub>1</sub>	Q
max	4.7	1.40	0.95	1.40	1.7	0.65	9.4	1.32	10.30	2.54	15.0	3.0	2.6
nom										(REF)		(REF)	
min	4.3	1.15	0.70	1.14	1.3	0.45	8.6	1.02	9.65		12.5		2.2

sot226a\_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT226A		TO-262			09-08-17 09-08-25

**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

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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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