



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 Figure 1 ; see Figure 2	-	-	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
Static characteristics						
V_F	forward voltage	$I_F = 15\text{ A}$; $T_j = 150\text{ }^{\circ}\text{C}$; see Figure 4	-	0.78	0.85	V

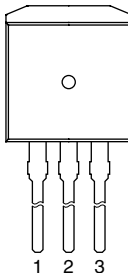
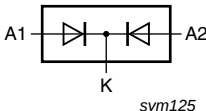


Table 1. Quick reference data ...continued

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Dynamic characteristics						
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 Figure 5	-	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 Figure 6	-	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

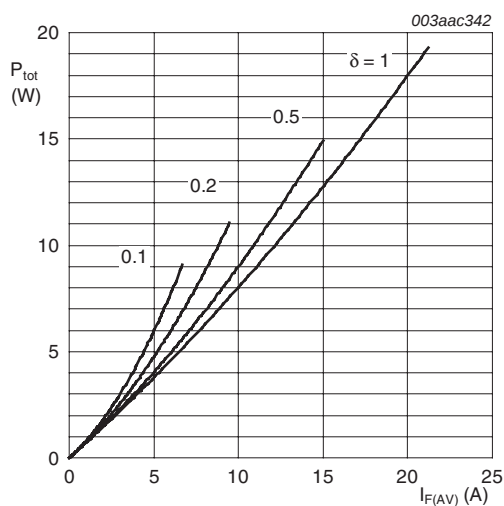
Type number	Package		
	Name	Description	Version
BYV42G-200	I2PAK	plastic single-ended package (I2PAK); TO-262	SOT226A

4. Limiting values

Table 4. Limiting values

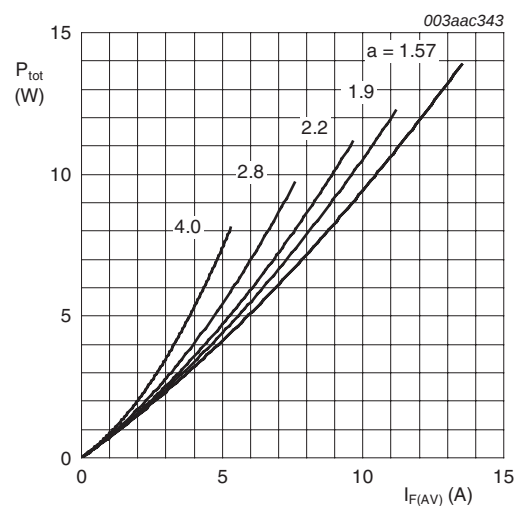
In accordance with the Absolute Maximum Rating System (IEC 60134).

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; $\delta = 0.5$; $T_{mb} \leq 104^\circ\text{C}$; both diodes conducting; see Figure 1 ; see Figure 2	-	30	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\ \mu\text{s}$; $T_{mb} \leq 104^\circ\text{C}$; per diode	-	30	A
I_{FSM}	non-repetitive peak forward current	$t_p = 8.3\ \text{ms}$; sine-wave pulse; $T_{j(\text{init})} = 25^\circ\text{C}$; per diode	-	150	A
		$t_p = 10\ \text{ms}$; sine-wave pulse; $T_{j(\text{init})} = 25^\circ\text{C}$; 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	$^\circ\text{C}$
T_j	junction temperature		-	150	$^\circ\text{C}$
V_{ESD}	electrostatic discharge voltage	HBM; $C = 250\ \text{pF}$; $R = 1.5\ \text{k}\Omega$; 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 Figure 3	-	-	2.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W

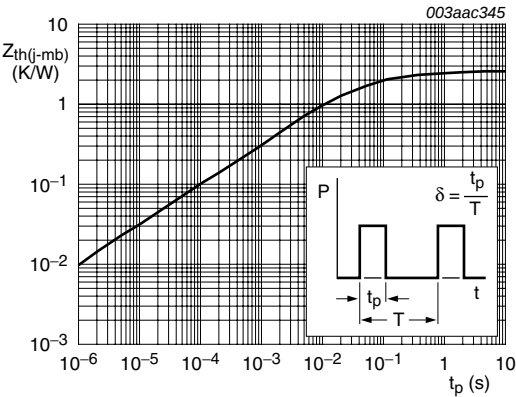


Fig 3. Transient thermal impedance from junction to mounting base as a function of pulse width

6. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V _F	forward voltage	I _F = 15 A; T _j = 150 °C; see Figure 4	-	0.78	0.85	V
		I _F = 15 A; T _j = 25 °C; see Figure 4	-	0.95	1.05	V
		I _F = 30 A; T _j = 25 °C; see Figure 4	-	1	1.2	V
I _R	reverse current	V _R = 200 V; T _j = 100 °C	-	0.5	1	mA
		V _R = 200 V; T _j = 25 °C	-	10	100	μA
Dynamic characteristics						
Q _r	recovered charge	I _F = 2 A; V _R = 30 V; dI _F /dt = 20 A/μs; T _j = 25 °C	-	6	15	nC
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/μs; ramp recovery; T _j = 25 °C; see Figure 5	-	20	28	ns
		I _F = 0.5 A; I _R = 1 A; step recovery; measured at reverse current = 0.25 A; T _j = 25 °C; see Figure 6	-	13	22	ns
V _{FR}	forward recovery voltage	I _F = 1 A; dI _F /dt = 10 A/μs; T _j = 25 °C; see Figure 7	-	-	1	V

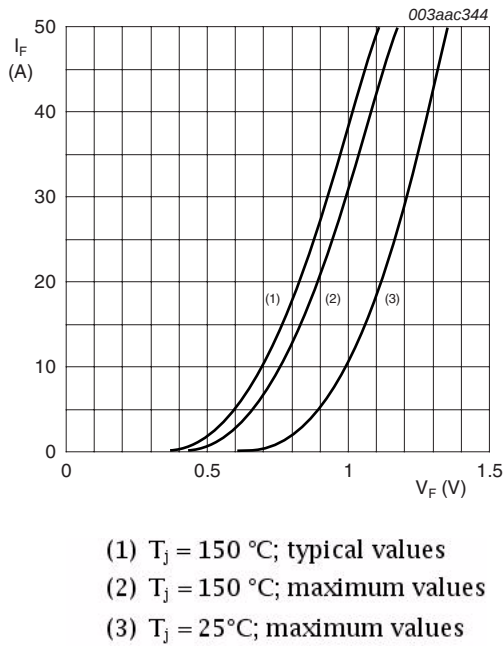


Fig 4. Forward current as a function of forward voltage

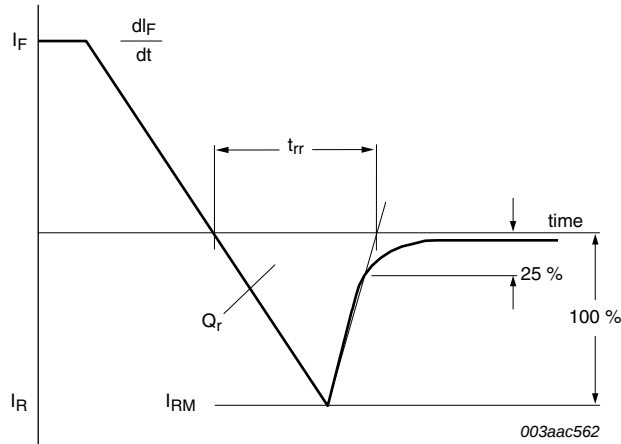


Fig 5. Reverse recovery definitions; ramp recovery

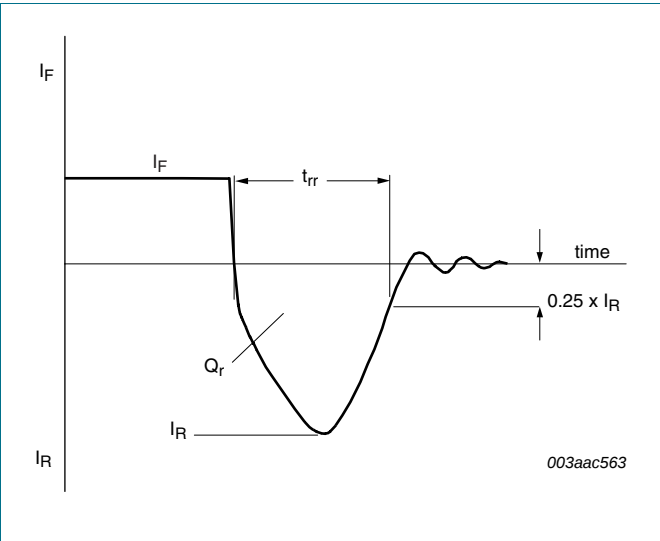


Fig 6. Reverse recovery definitions; step recovery

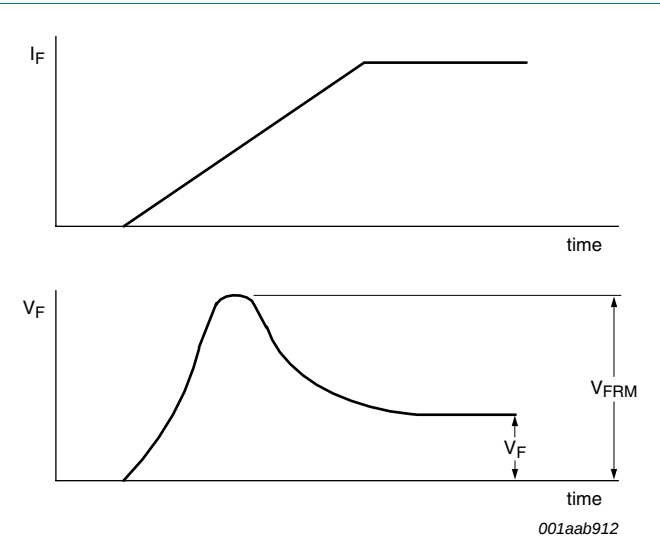


Fig 7. Forward recovery definitions

7. Package outline

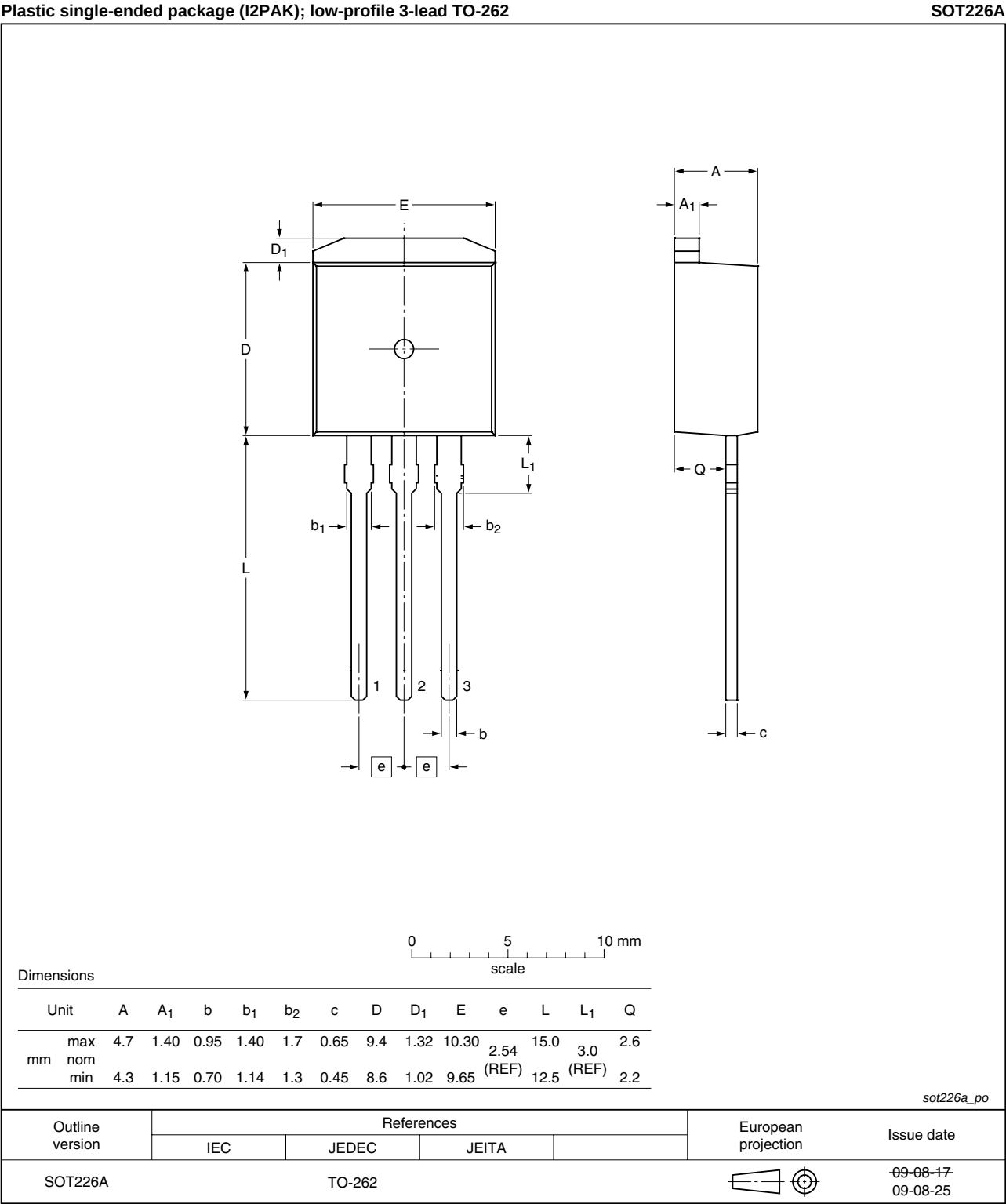


Fig 8. Package outline SOT226A (I2PAK)

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 ^{[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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