

BYV25G-600

Ultrafast rectifier diode

Rev. 01 — 4 February 2010

Product data sheet

1. Product profile

1.1 General description

Ultrafast epitaxial rectifier diode in a SOT226 (I2PAK) plastic package.

1.2 Features and benefits

- Fast switching
- High thermal cycling performance
- Low forward voltage drop
- Low profile package facilitates compact/slim designs
- Low switching losses
- Low thermal resistance
- Soft recovery minimizes power-consuming oscillations

1.3 Applications

- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)
- High frequency switched-mode power supplies

1.4 Quick reference data

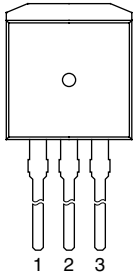
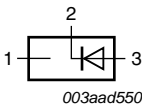
Table 1. Quick reference

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$; $T_{mb} \leq 135\text{ °C}$; see Figure 1 and 2	-	-	5	A
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1\text{ A}$; $V_R \geq 30\text{ V}$; $dI_F/dt = 100\text{ A}/\mu\text{s}$; $T_j = 25\text{ °C}$; see Figure 5	-	50	60	ns



2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	n.c.	not connected		
2	K	cathode		
3	A	anode		
mb	K	mounting base; cathode		

SOT226A (I2PAK)

3. Ordering information

Table 3. Ordering information

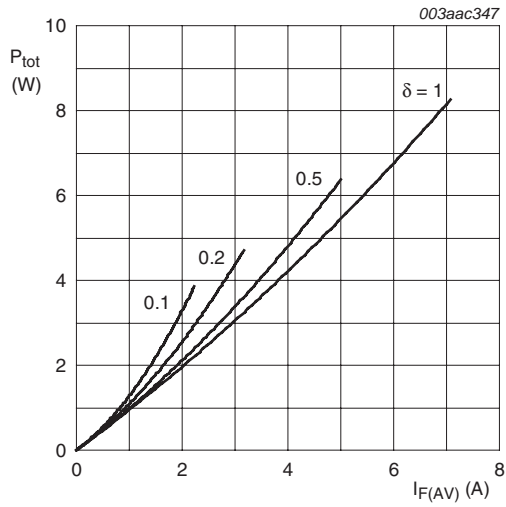
Type number	Package		Version
	Name	Description	
BYV25G-600	I2PAK	plastic single-ended package (I2PAK); TO-262	SOT226A

4. Limiting values

Table 4. Limiting values

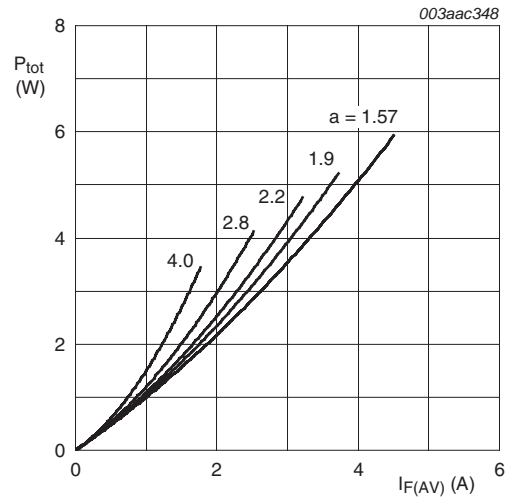
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	600	V
V_{RWM}	crest working reverse voltage		-	600	V
V_R	reverse voltage	$T_{mb} \leq 100\text{ °C}$; DC	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$; $T_{mb} \leq 135\text{ °C}$; see Figure 1 and 2	-	5	A
I_{FRM}	repetitive peak forward current	square-wave pulse; $\delta = 0.5$; $T_{mb} \leq 135\text{ °C}$	-	10	A
I_{FSM}	non-repetitive peak forward current	$t_p = 8.3\text{ ms}$; sine-wave pulse; $T_{j(\text{init})} = 25\text{ °C}$	-	66	A
		$t_p = 10\text{ ms}$; sine-wave pulse; $T_{j(\text{init})} = 25\text{ °C}$	-	60	A
T_{stg}	storage temperature		-40	150	°C
T_j	junction temperature		-	150	°C



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

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; see Figure 3	-	-	2.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air		-	60	-	K/W

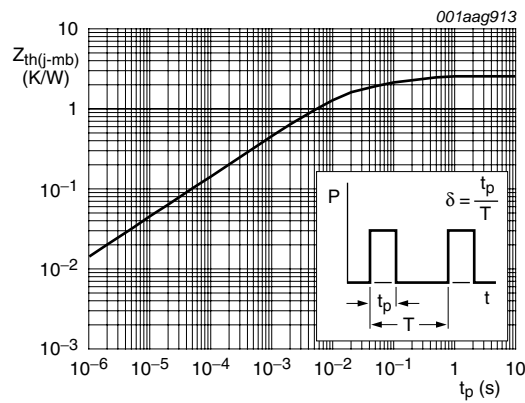
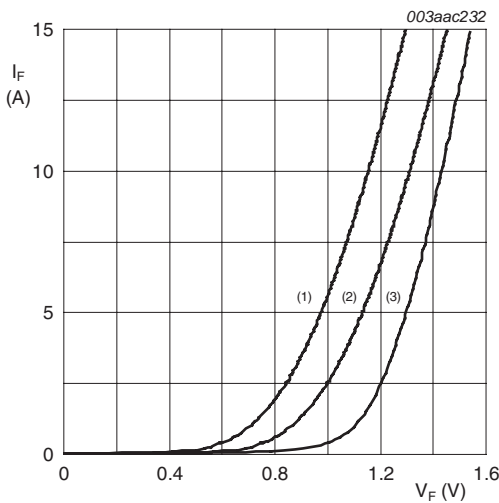


Fig 3. Transient thermal impedance from junction to mounting base as a function of pulse width

6. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 5\text{ A}$; see Figure 4	-	1.12	1.3	V
		$I_F = 5\text{ A}$; $T_{mb} \leq 150\text{ °C}$; see Figure 4	-	0.97	1.11	V
I_R	reverse current	$V_R = 600\text{ V}$; $T_j = 100\text{ °C}$	-	0.1	0.35	mA
		$V_R = 600\text{ V}$	-	2	50	μA
Dynamic characteristics						
Q_r	recovered charge	$I_F = 2\text{ A}$; $V_R \geq 30\text{ V}$; $dI_F/dt = 20\text{ A}/\mu\text{s}$; see Figure 5	-	40	70	nC
t_{rr}	reverse recovery time	$I_F = 1\text{ A}$; $V_R \geq 30\text{ V}$; $dI_F/dt = 100\text{ A}/\mu\text{s}$; $T_j = 25\text{ °C}$; see Figure 5	-	50	60	ns
V_{FR}	forward recovery voltage	$I_F = 10\text{ A}$; $dI_F/dt = 10\text{ A}/\mu\text{s}$; see Figure 6	-	3.2	-	V
I_{RM}	peak reverse recovery current	$I_F = 10\text{ A}$; $V_R \leq 30\text{ V}$; $dI_F/dt = 50\text{ A}/\mu\text{s}$; $T_j = 100\text{ °C}$; see Figure 5	-	3	5.5	A



- (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

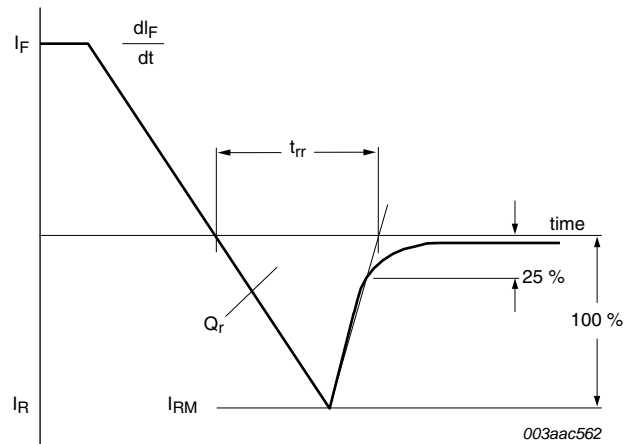


Fig 5. Reverse recovery definitions; ramp recovery

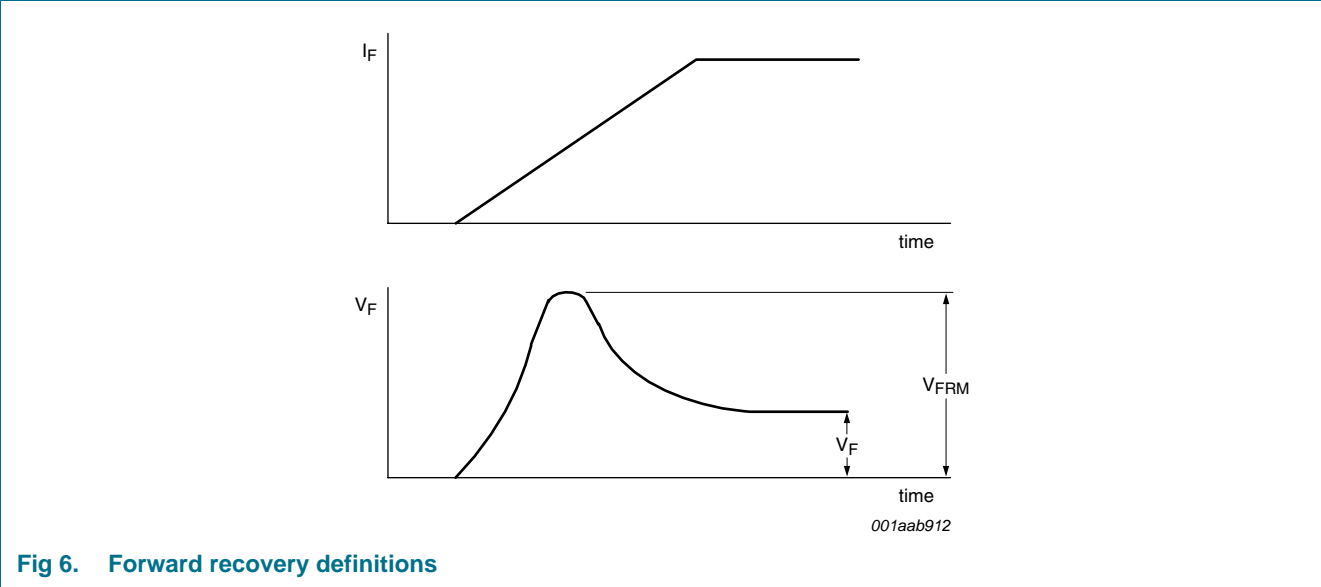


Fig 6. Forward recovery definitions

7. Package outline

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

SOT226A

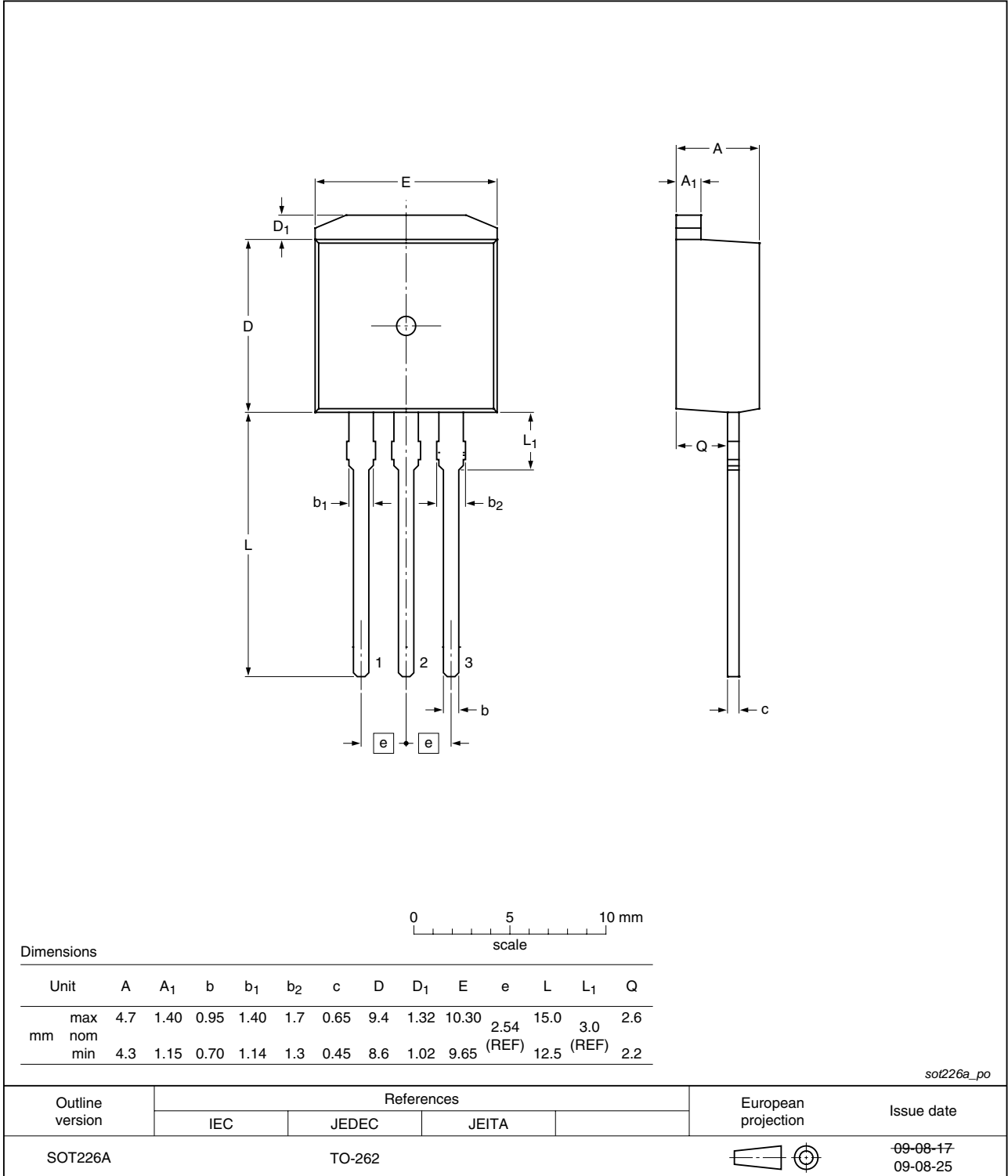


Fig 7. Package outline SOT226A (I2PAK)

8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYV25G-600_1	20100204	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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