

# BYV29G-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 on-state losses
- Low profile package facilitating compact designs
- Low thermal resistance
- Soft recovery minimizes power-consuming oscillations

### 1.3 Applications

- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)
- Output rectifiers in high-frequency switched-mode power supplies

### 1.4 Quick reference data

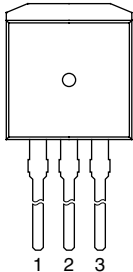
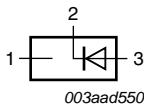
Table 1. Quick reference

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$ ; $T_{mb} \leq 123\text{ }^{\circ}\text{C}$ ; see <a href="#">Figure 1</a> and <a href="#">2</a>	-	-	9	A
$I_{FRM}$	repetitive peak forward current	$t_p = 25\text{ }\mu\text{s}$ ; $\delta = 0.5$	-	-	18	A
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}$ ; $V_R = 30\text{ V}$ ; $dI_F/dt = 100\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; see <a href="#">Figure 5</a>	-	50	60	ns
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 8\text{ A}$ ; $T_j = 150\text{ }^{\circ}\text{C}$ ; see <a href="#">Figure 4</a>	-	0.97	1.11	V



## 2. Pinning information

**Table 2. Pinning information**

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	n.c.	no connection		
2	K	cathode		
3	A	anode		
mb	K	mounting base; cathode		

**SOT226A (I2PAK)**

## 3. Ordering information

**Table 3. Ordering information**

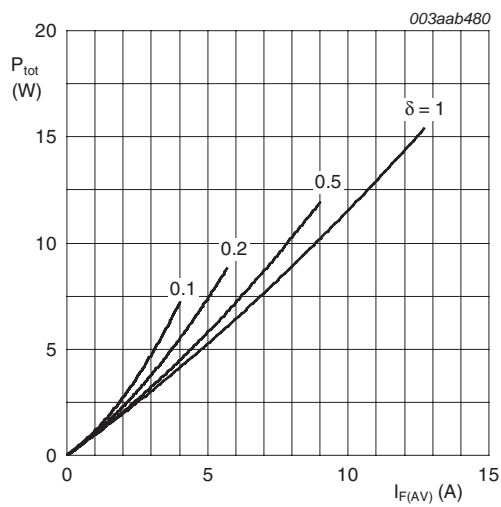
Type number	Package		Version
	Name	Description	
BYV29G-600	I2PAK	plastic single-ended package (I2PAK); TO-262	SOT226A

## 4. Limiting values

**Table 4. Limiting values**

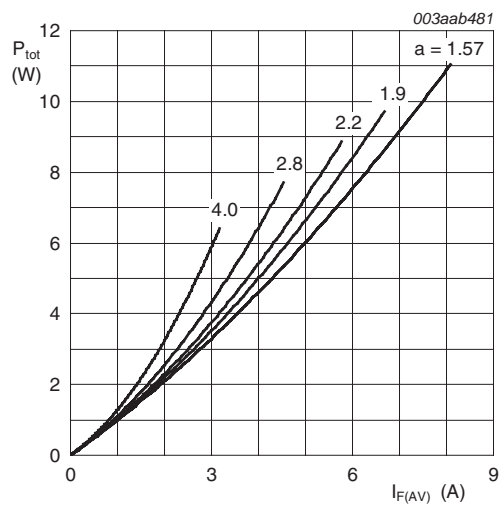
*In accordance with the Absolute Maximum Rating System (IEC 60134).*

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	DC	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$ ; $T_{mb} \leq 123\text{ °C}$ ; see <a href="#">Figure 1</a> and <a href="#">2</a>	-	9	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 8.3\text{ ms}$ ; sine-wave pulse; $T_{j(\text{init})} = 25\text{ °C}$	-	77	A
		$t_p = 10\text{ ms}$ ; sine-wave pulse; $T_{j(\text{init})} = 25\text{ °C}$	-	70	A
$T_{stg}$	storage temperature		-40	150	°C
$T_j$	junction temperature		-	150	°C
$I_{FRM}$	repetitive peak forward current	$t_p = 25\text{ }\mu\text{s}$ ; $\delta = 0.5$	-	18	A



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

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



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

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 <a href="#">Figure 3</a>	-	-	2.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air		-	60	-	K/W

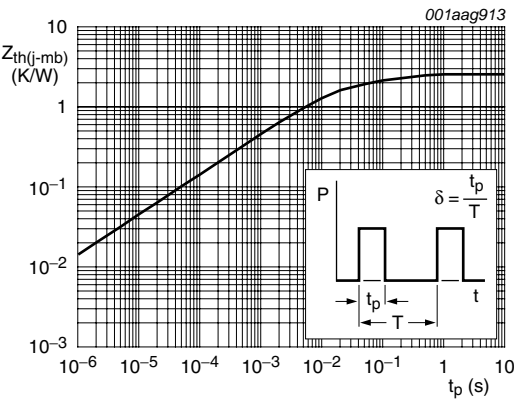
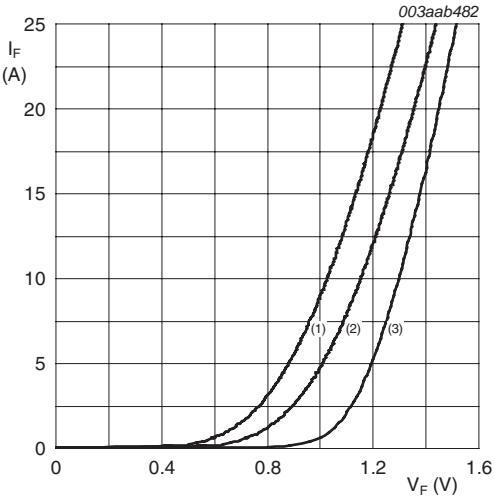


Fig 3. Transient thermal impedance from junction to mounting base as a function of pulse width

6. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 8 A; T <sub>j</sub> = 25 °C; see <a href="#">Figure 4</a>	-	1.12	1.25	V
		I <sub>F</sub> = 20 A; T <sub>j</sub> = 25 °C; see <a href="#">Figure 4</a>	-	1.31	1.45	V
		I <sub>F</sub> = 8 A; T <sub>j</sub> = 150 °C; see <a href="#">Figure 4</a>	-	0.97	1.11	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 600 V	-	2	50	μA
		V <sub>R</sub> = 600 V; T <sub>j</sub> = 100 °C	-	0.1	0.35	mA
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; see <a href="#">Figure 5</a>	-	40	70	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>	-	50	60	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 10 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 50 A/μs; see <a href="#">Figure 5</a>	-	3	5.5	A
V <sub>FR</sub>	forward recovery voltage	I <sub>F</sub> = 10 A; dI <sub>F</sub> /dt = 10 A/μs; see <a href="#">Figure 6</a>	-	3.2	-	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

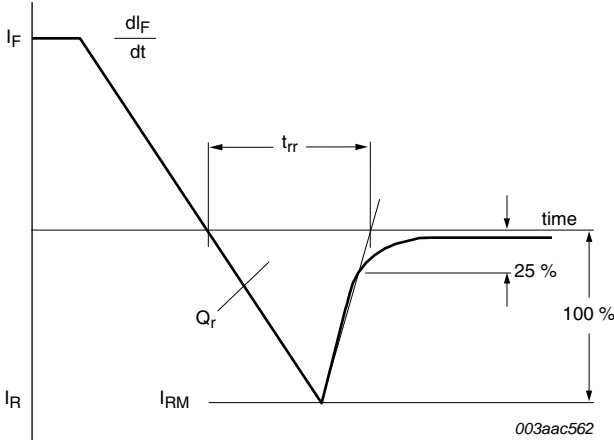
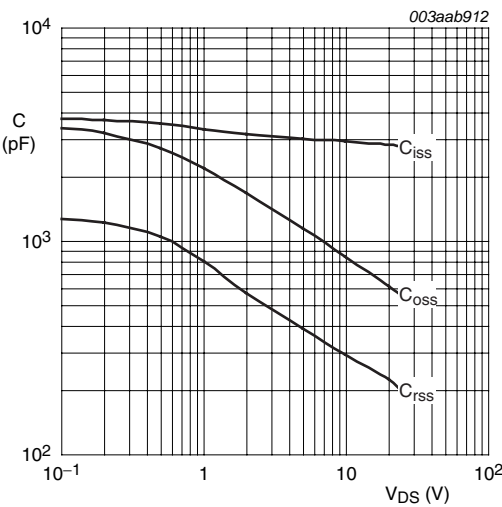


Fig 5. Reverse recovery definitions; ramp recovery



$V_{GS} = 0\text{ V}; f = 1\text{ MHz}$

Fig 6. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

7. Package outline

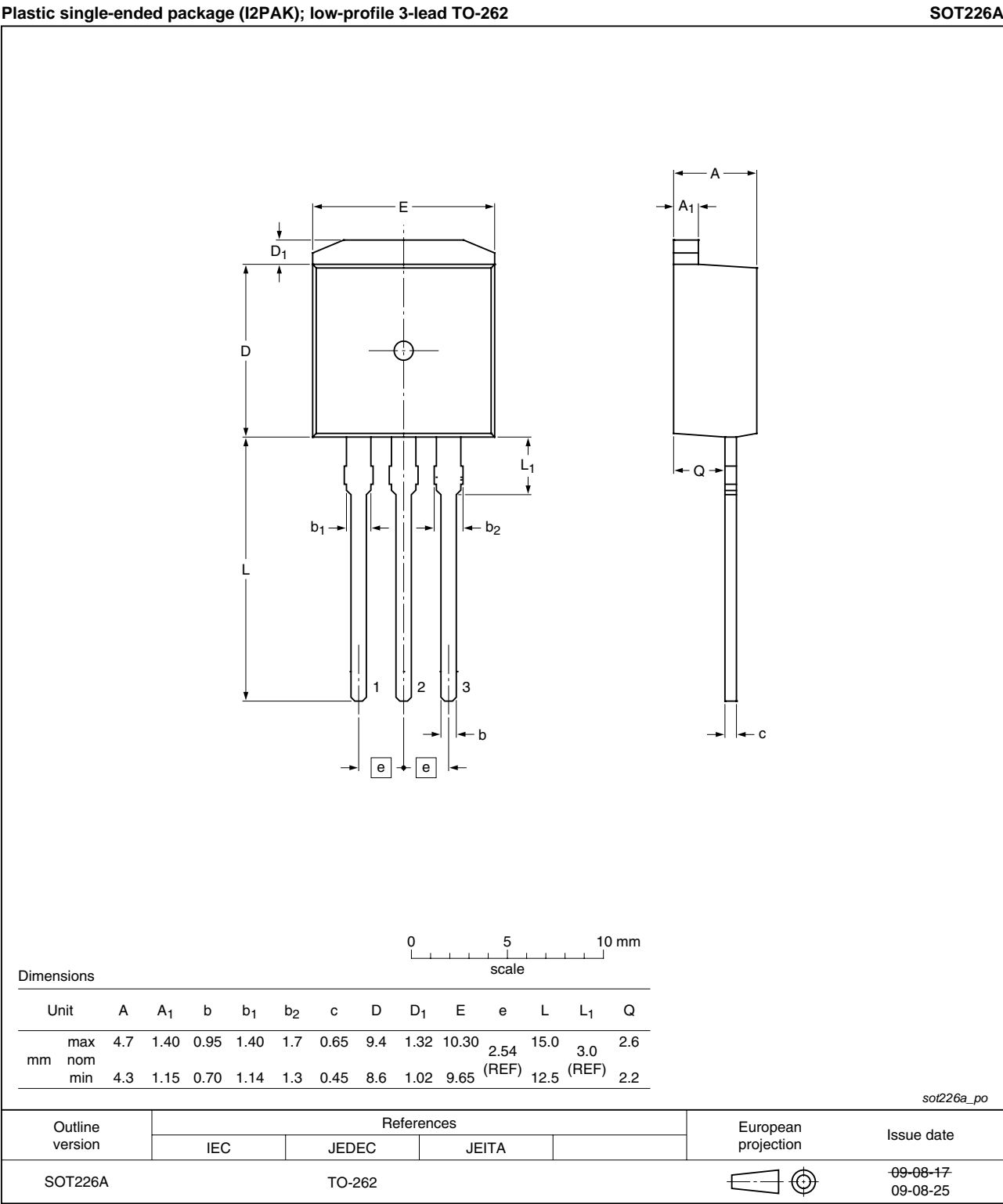


Fig 7. Package outline SOT226A (I2PAK)

## 8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYV29G-600_1	20100204	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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