

# BYV25D-600

Rectifier diode, ultrafast

Rev. 01 — 29 July 2008

Product data sheet

## 1. Product profile

### 1.1 General description

Ultrafast, epitaxial rectifier diode in a SOT428 (DPAK) surface-mountable plastic package.

### 1.2 Features

- Fast switching
- Soft recovery characteristic
- Low forward voltage drop
- Low thermal resistance
- High thermal cycling performance

### 1.3 Applications

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

### 1.4 Quick reference data

- $V_{RRM} \leq 600$  V
- $V_F \leq 1.11$  V
- $I_{F(AV)} \leq 5$  A
- $t_{rr} \leq 60$  ns

## 2. Pinning information

Table 1. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	no connection	<p>SOT428 (DPAK)</p>	<p>k — &lt;— a 001aaa020</p>
2	cathode (k) <a href="#">[1]</a>		
3	anode (a)		
mb	mounting base; cathode (k)		

[1] It is not possible to connect to pin 2 of the SOT428 package.

### 3. Ordering information

**Table 2. Ordering information**

Type number	Package		Version
	Name	Description	
BYV25D-600	DPAK	plastic single-ended surface-mounted package (DPAK); 3-leads (one lead cropped)	SOT428

### 4. Limiting values

**Table 3. Limiting values**

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

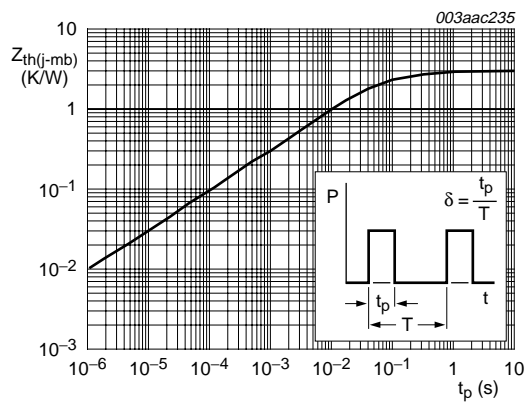
Symbol	Parameter	Conditions	Min	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	600	V
$V_{RWM}$	crest working reverse voltage		-	600	V
$V_R$	reverse voltage	square waveform; $\delta = 1.0$ ; $T_{mb} \leq 100$ °C	-	600	V
$I_{F(AV)}$	average forward current	square waveform; $\delta = 0.5$ ; $T_{mb} \leq 131$ °C	-	5	A
$I_{FRM}$	repetitive peak forward current	square waveform; $\delta = 0.5$ ; $T_{mb} \leq 131$ °C	-	10	A
$I_{FSM}$	non-repetitive peak forward current	$t = 10$ ms; sinusoidal waveform	-	60	A
		$t = 8.3$ ms; sinusoidal waveform	-	66	A
$T_{stg}$	storage temperature		-40	+150	°C
$T_j$	junction temperature		-	150	°C

## 5. Thermal characteristics

**Table 4. 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 1</a>	-	-	3.0	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	50	-	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.



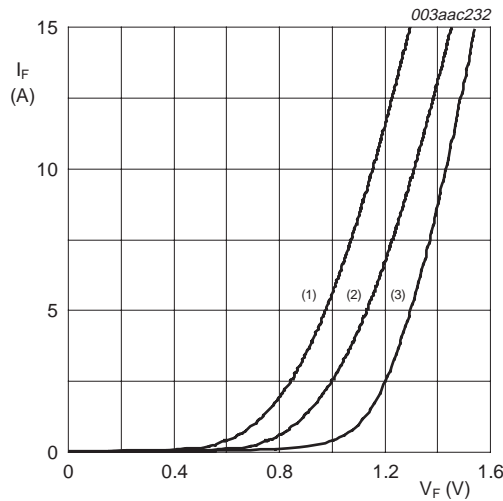
**Fig 1. Transient thermal impedance from junction to mounting base as a function of pulse width**

## 6. Characteristics

**Table 5. Characteristics**

$T_j = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 5\text{ A}$ ; $T_j = 150\text{ °C}$ ; see <a href="#">Figure 2</a>	-	0.97	1.11	V
		$I_F = 5\text{ A}$	-	1.12	1.30	V
$I_R$	reverse current	$V_R = 600\text{ V}$	-	2	50	$\mu\text{A}$
		$V_R = 600\text{ V}$ ; $T_j = 100\text{ °C}$	-	0.1	0.35	mA
<b>Dynamic characteristics</b>						
$Q_r$	recovered charge	$I_F = 2\text{ A}$ to $V_R \geq 30\text{ V}$ ; $di_F/dt = 20\text{ A}/\mu\text{s}$ ; see <a href="#">Figure 3</a>	-	40	70	nC
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}$ to $V_R \geq 30\text{ V}$ ; $di_F/dt = 100\text{ A}/\mu\text{s}$ ; see <a href="#">Figure 3</a>	-	50	60	ns
$I_{RM}$	peak reverse recovery current	$I_F = 10\text{ A}$ to $V_R \geq 30\text{ V}$ ; $di_F/dt = 50\text{ A}/\mu\text{s}$ ; $T_j = 100\text{ °C}$ ; see <a href="#">Figure 3</a>	-	3	5.5	A
$V_{FR}$	forward recovery voltage	$I_F = 10\text{ A}$ ; $di_F/dt = 10\text{ A}/\mu\text{s}$ ; see <a href="#">Figure 4</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 2. Forward current as a function of forward voltage**

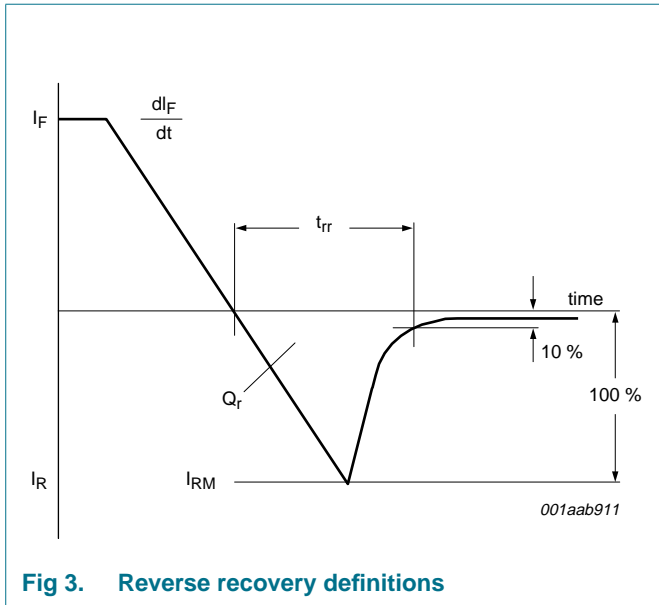


Fig 3. Reverse recovery definitions

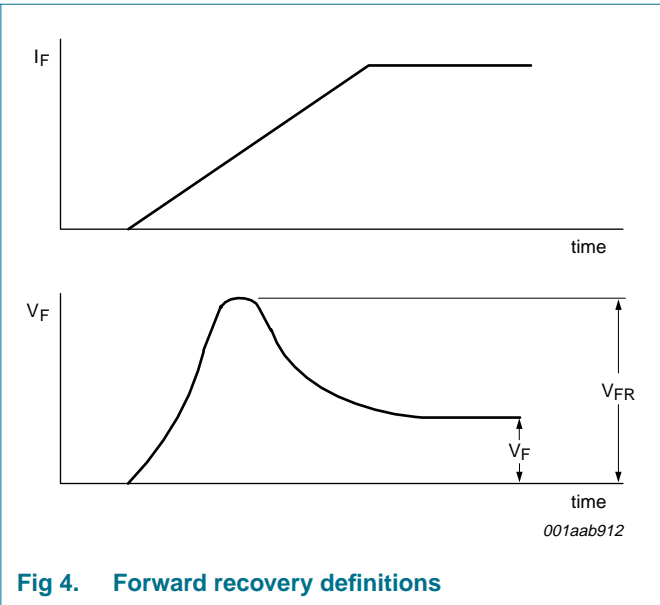


Fig 4. Forward recovery definitions

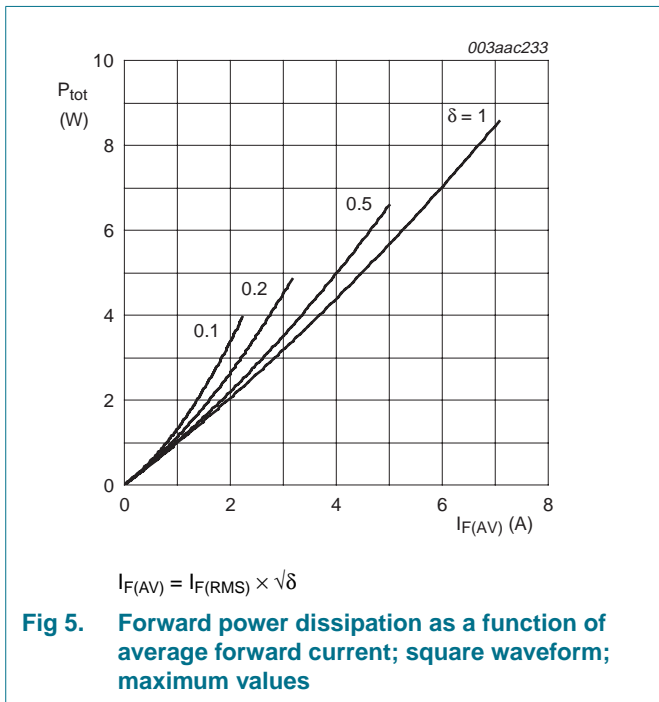


Fig 5. Forward power dissipation as a function of average forward current; square waveform; maximum values

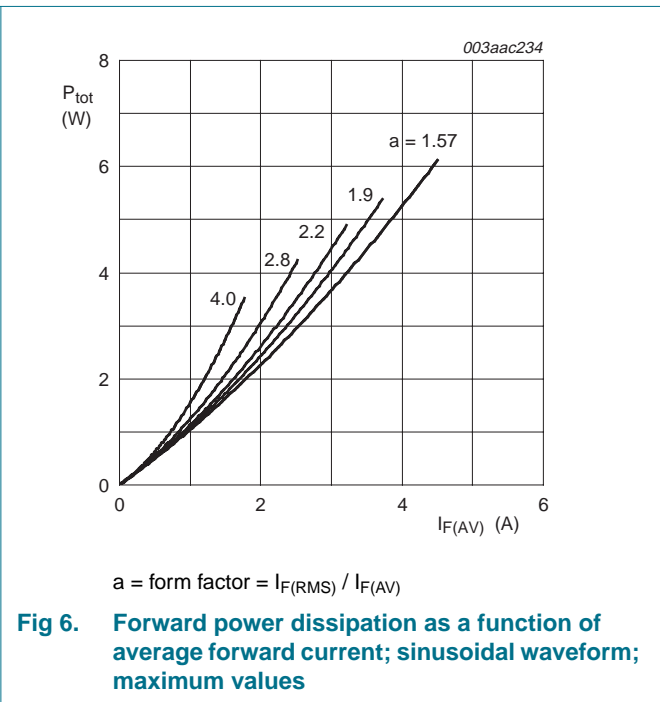
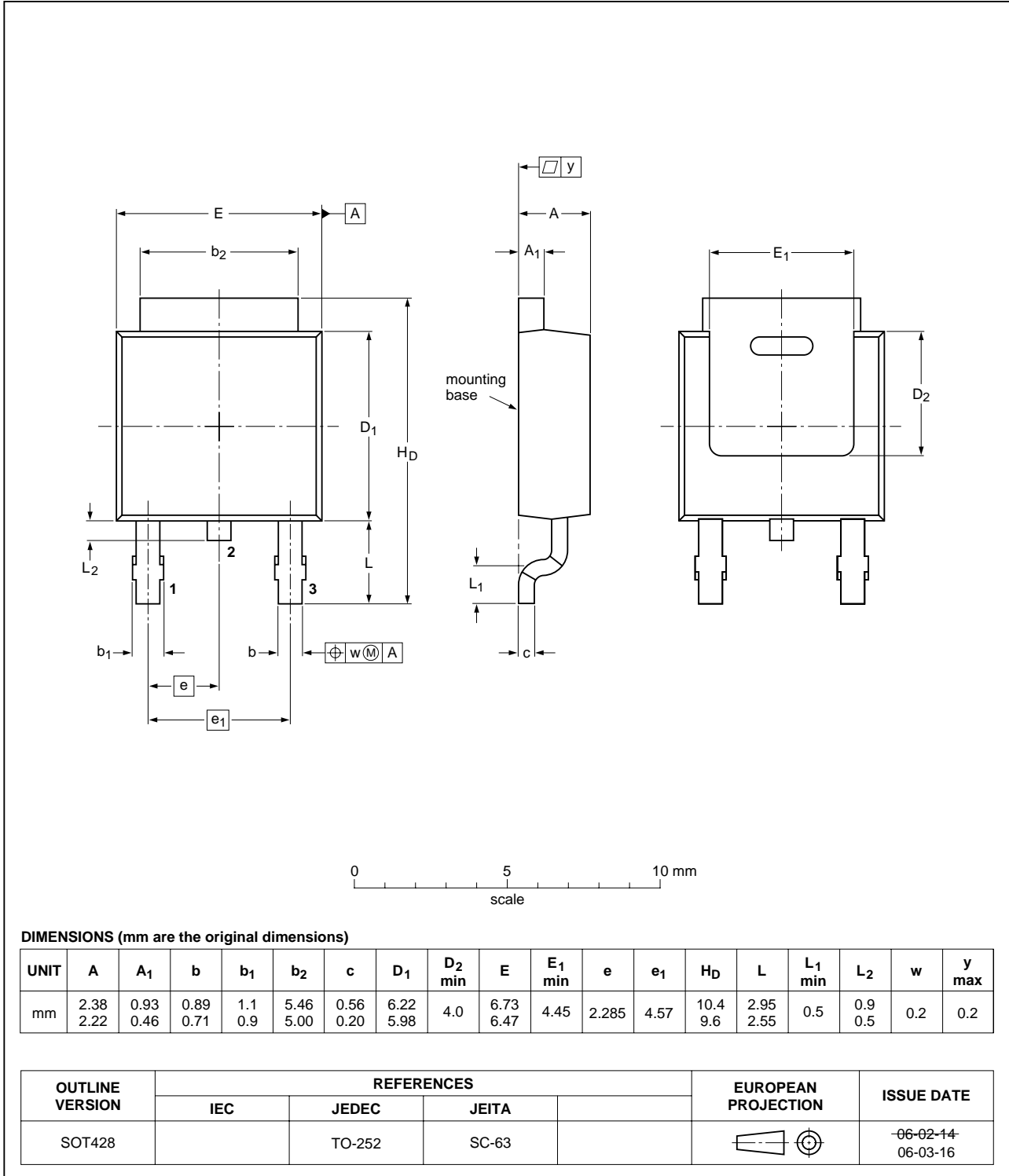


Fig 6. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

**7. Package outline**

Plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)

SOT428



**Fig 7. Package outline SOT428 (TO-252)**

## 8. Revision history

Table 6. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYV25D-600_1	20080729	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.
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[2] The term 'short data sheet' is explained in section "Definitions".

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