



BYV29B-600

Rectifier diode ultrafast

Rev. 2 — 14 September 2011

Product data sheet

1. Product profile

1.1 General description

Ultra-fast, epitaxial rectifier diode in a surface mount plastic package.

Product availability:

BYV29B-600 in SOT404 (D2PAK).

1.2 Features and benefits

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

1.3 Applications

- Switched-mode power supplies
- Low loss rectification.

1.4 Quick reference data

- $V_R \leq 600 \text{ V}$
- $I_{F(AV)} \leq 9 \text{ A}$
- $V_F \leq 1.03 \text{ V}$
- $t_{rr} \leq 60 \text{ ns}$

2. Pinning information

Table 1. Pinning - SOT404 (D2PAK), simplified outline and symbol

Pin	Description	Simplified outline	Symbol
1	no connection		
2	cathode (k)	[1]	
3	anode (a)		
mb	mounting base; connected to cathode (k)		

[1] It is not possible to make connection to pin 2 of the SOT404 package.



3. Ordering information

Table 2. Ordering information

Type number	Package		Version
	Name	Description	
BYV29B-600	D2PAK	plastic single-ended surface mounted package; 3 leads (one lead cropped)	SOT404

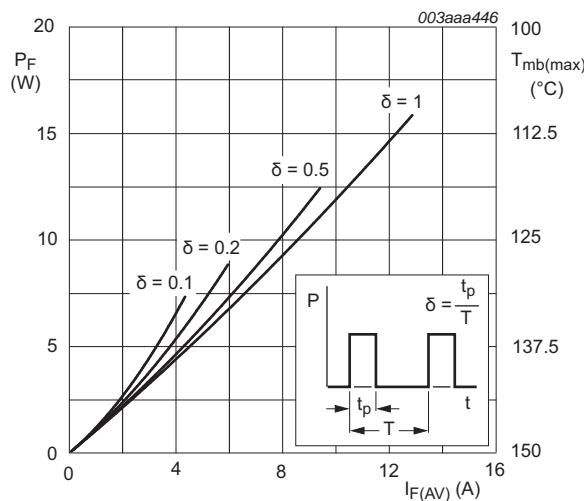
4. Limiting values

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		-	600	V
$I_{F(AV)}$	average forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 120^\circ\text{C}$	[1]	-	A
I_{FRM}	repetitive peak forward current	square wave; $t = 25\ \mu\text{s}$; $\delta = 0.5$; $T_{mb} \leq 120^\circ\text{C}$	-	18	A
I_{FSM}	non-repetitive peak forward current	sinusoidal; with reapplied $V_{RRM(\text{max})}$			
		$t_p = 10\ \text{ms}$	-	70	A
		$t_p = 8.3\ \text{ms}$	-	77	A
T_{stg}	storage temperature		-40	+150	°C
T_j	junction temperature		-	+150	°C

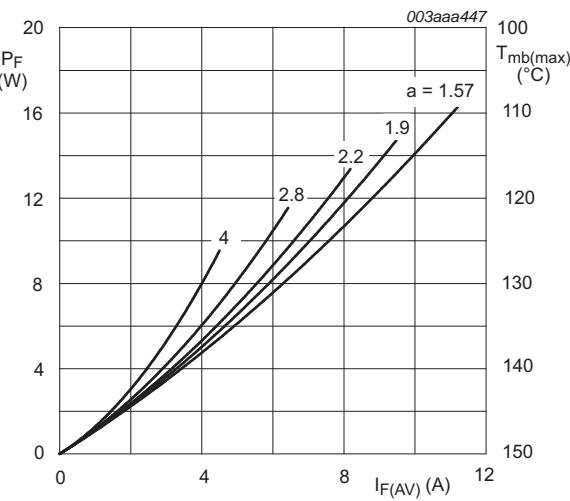
[1] Neglecting switching and reverse current losses.



Square current waveform

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

Fig 1. Maximum forward power dissipation (square current waveform) as a function of average forward current.



Sinusoidal current waveform

$$a = \frac{I_{F(RMS)}}{I_{F(AV)}}$$

Fig 2. Maximum forward power dissipation (sinusoidal current waveform) as a function of average forward current.

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	Figure 3	-	-	2.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	50	-	K/W

5.1 Transient thermal impedance

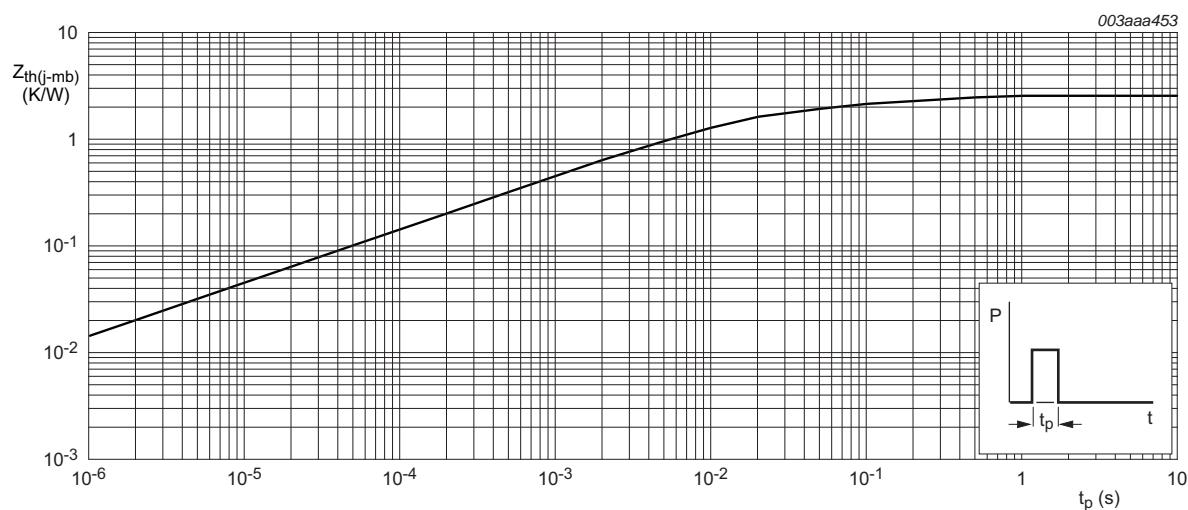


Fig 3. Transient thermal impedance from junction to mounting base as a function of pulse duration.

6. Characteristics

Table 5. Characteristics $T_j = 25^\circ\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 8 \text{ A}$ $T_j = 150^\circ\text{C}$; Figure 4 $T_j = 25^\circ\text{C}$; Figure 4 $I_F = 20 \text{ A}$	-	0.9	1.03	V
I_R	reverse current	$V_R = V_{RRM}$ $T_j = 100^\circ\text{C}$ $T_j = 25^\circ\text{C}$	-	0.1	0.35	mA
Dynamic characteristics						
C_d	diode capacitance	$f = 1 \text{ MHz}$; $V_R = 100 \text{ V}$; Figure 8	-	7	-	pF
Q_{rr}	reverse recovery charge	$I_F = 2 \text{ A}$; $V_R \geq 30 \text{ V}$; $dI_F/dt = 20 \text{ A}/\mu\text{s}$; Figure 7	-	40	70	nC
t_{rr}	reverse recovery time	$I_F = 1 \text{ A}$; $V_R \geq 30 \text{ V}$; $dI_F/dt = 100 \text{ A}/\mu\text{s}$; Figure 5	-	50	60	ns
I_{rrm}	peak reverse recovery current	$I_F = 10 \text{ A}$; $V_R \geq 30 \text{ V}$; $dI_F/dt = 50 \text{ A}/\mu\text{s}$ $T_j = 100^\circ\text{C}$; Figure 6	-	3	5.5	A
V_{fr}	forward recovery voltage	$I_F = 10 \text{ A}$; $dI_F/dt = 10 \text{ A}/\mu\text{s}$	-	3.2	-	V

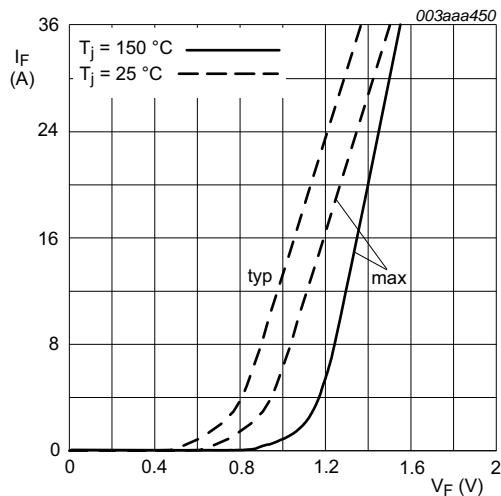


Fig 4. Forward current as a function of forward voltage; typical values.

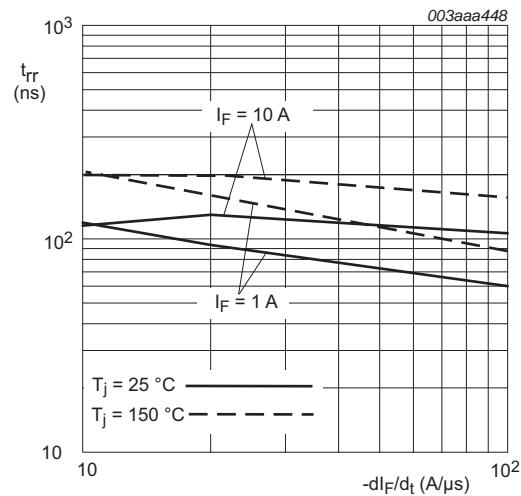


Fig 5. Maximum reverse recovery time as a function of rate of change of forward current.

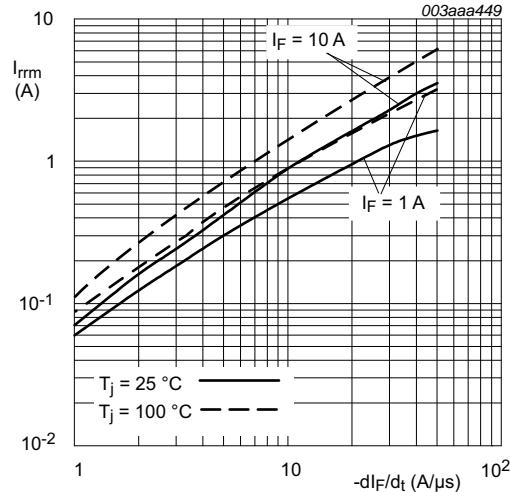


Fig 6. Reverse current as a function of rate of change of forward current; typical values.

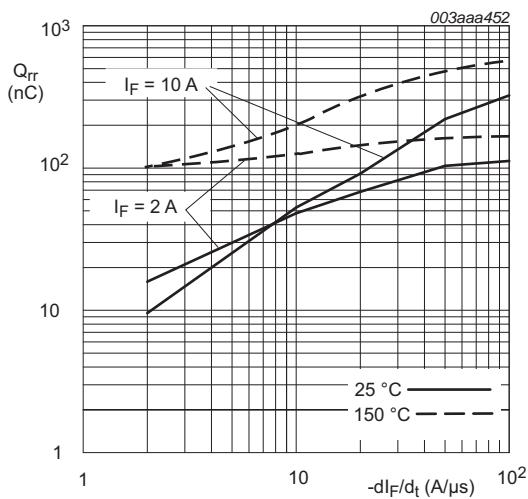
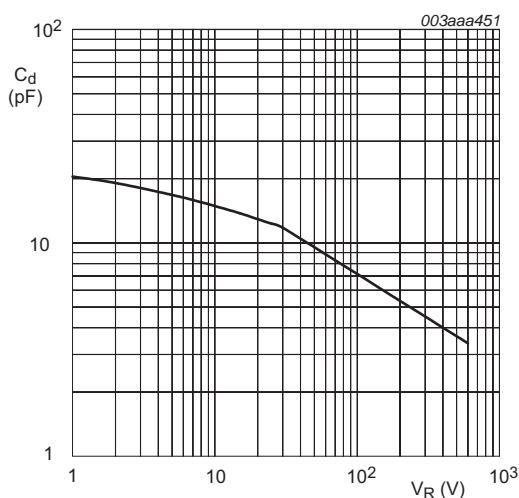


Fig 7. Maximum reverse recovery charge as a function of rate of change of forward current.



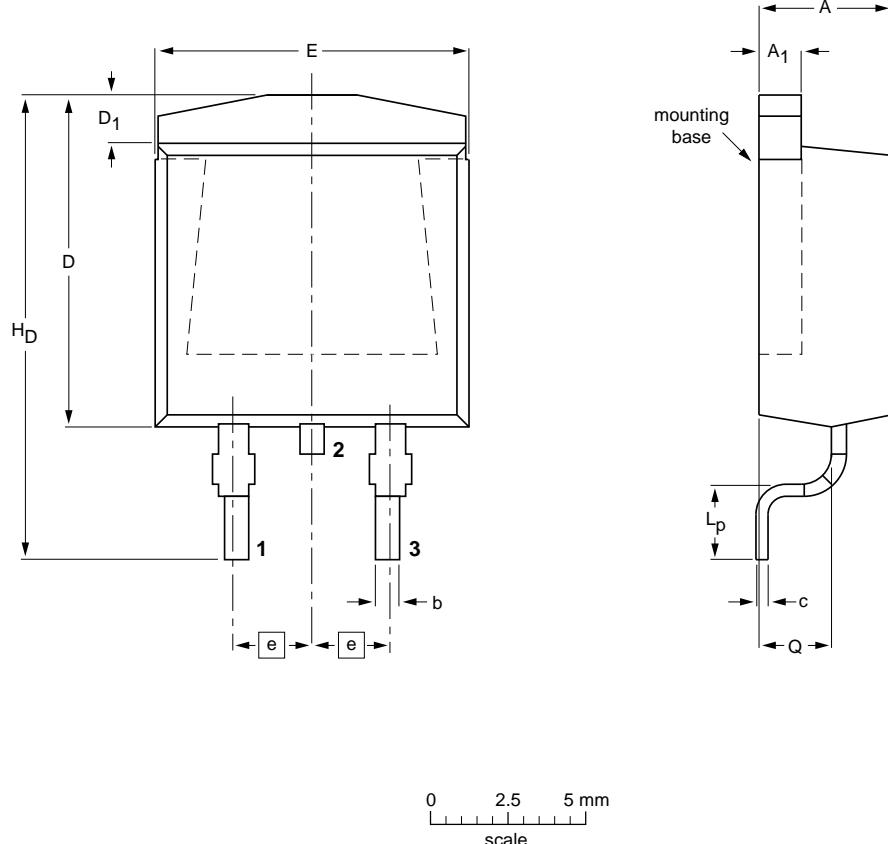
$f = 1$ MHz

Fig 8. Diode capacitance as a function of reverse voltage; typical values.

7. Package outline

Plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped)

SOT404



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁	b	c	D _{max.}	D ₁	E	e	L _p	H _D	Q
mm	4.50 4.10	1.40 1.27	0.85 0.60	0.64 0.46	11	1.60 1.20	10.30 9.70	2.54	2.90 2.10	15.80 14.80	2.60 2.20

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT404						05-02-11 06-03-16

Fig 9. SOT404 (D2PAK).

8. Soldering

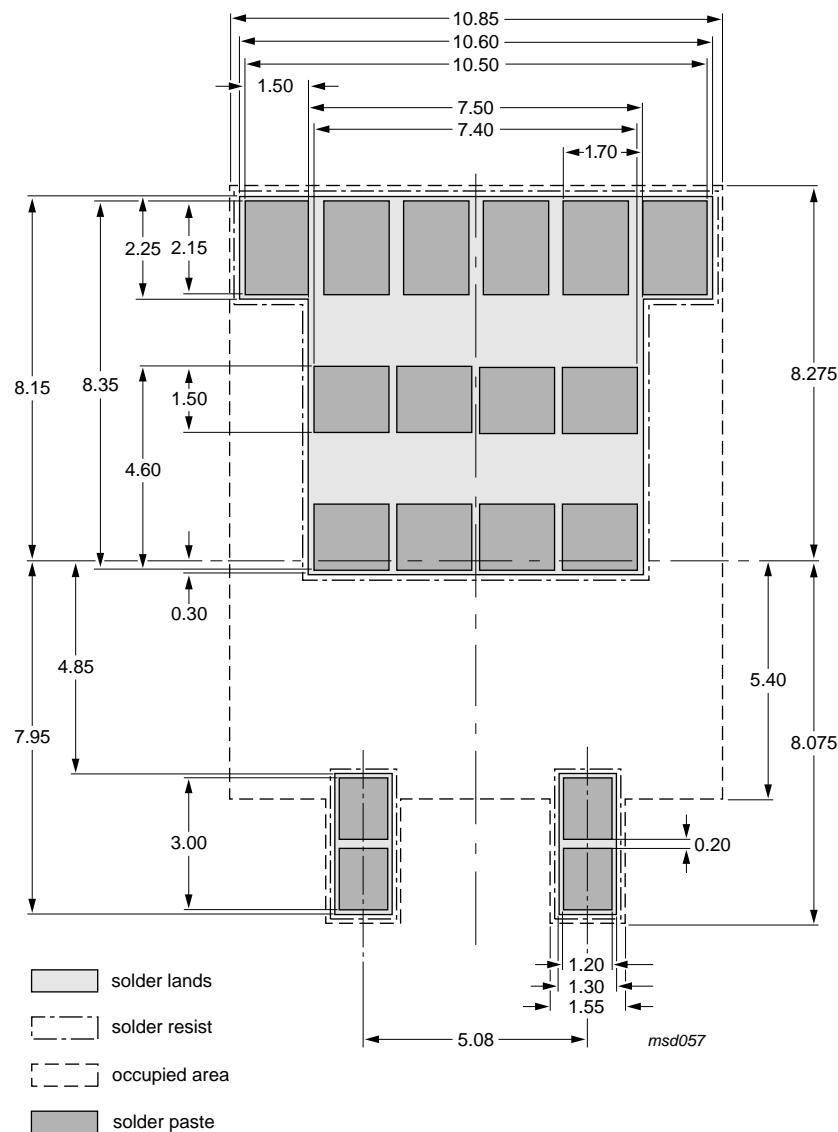


Fig 10. Reflow soldering footprint for SOT404.

9. Revision history

Table 6. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYV29B_600 v.2	20110914	Product data sheet	-	BYV29B_600 v.1 (9397 750 11884)
Modifications:		<ul style="list-style-type: none">• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.• Legal texts have been adapted to the new company name where appropriate.• Package outline drawings have been updated to the latest version.		
BYV29B_600 v.1 (9397 750 11884)	20030811	Product data	-	-

10. Legal information

10.1 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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12. Contents

1	Product profile	1
1.1	General description	1
1.2	Features and benefits	1
1.3	Applications	1
1.4	Quick reference data	1
2	Pinning information	1
3	Ordering information	2
4	Limiting values	2
5	Thermal characteristics	4
5.1	Transient thermal impedance	4
6	Characteristics	5
7	Package outline	8
8	Soldering	9
9	Revision history	10
10	Legal information	11
10.1	Data sheet status	11
10.2	Definitions	11
10.3	Disclaimers	11
10.4	Trademarks	12
11	Contact information	12
12	Contents	13

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