BYV29B-600

Rectifier diode ultrafast

Rev. 3 — 15 June 2018 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

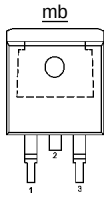
- Switched-mode power supplies
- Low loss rectification.

1.4 Quick reference data

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

SOT404 (D2PAK)

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

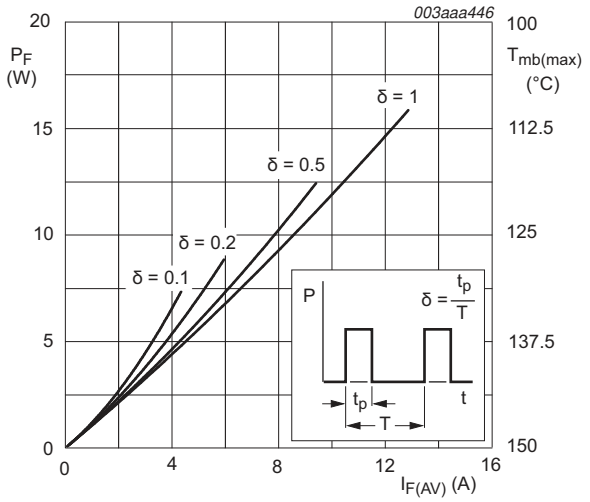
4. Limiting values

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; $\delta = 0.5$; $T_{mb} \leq 120$ °C	[1]	-	9	A
I_{FRM}	repetitive peak forward current	square wave; t = 25 μs; $\delta = 0.5$; $T_{mb} \leq 120$ °C		-	18	A
I_{FSM}	non-repetitive peak forward current	sinusoidal; with reapplied $V_{RRM(max)}$				
		t_p = 10 ms		-	70	A
		t_p = 8.3 ms		-	77	A
T_{stg}	storage temperature			−40	+150	°C
T_j	junction temperature			-	+150	°C

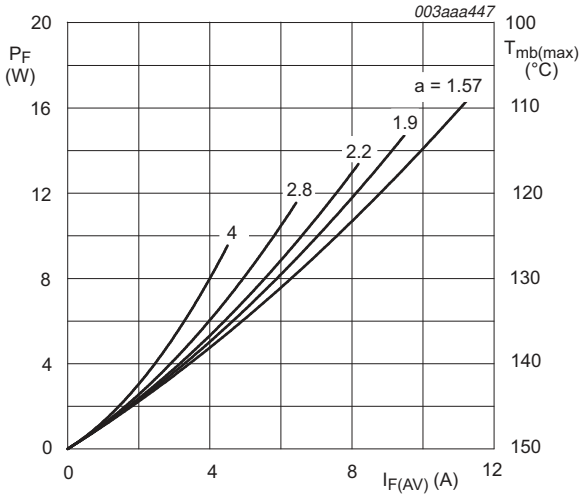
[1] Neglecting switching and reverse current losses.



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

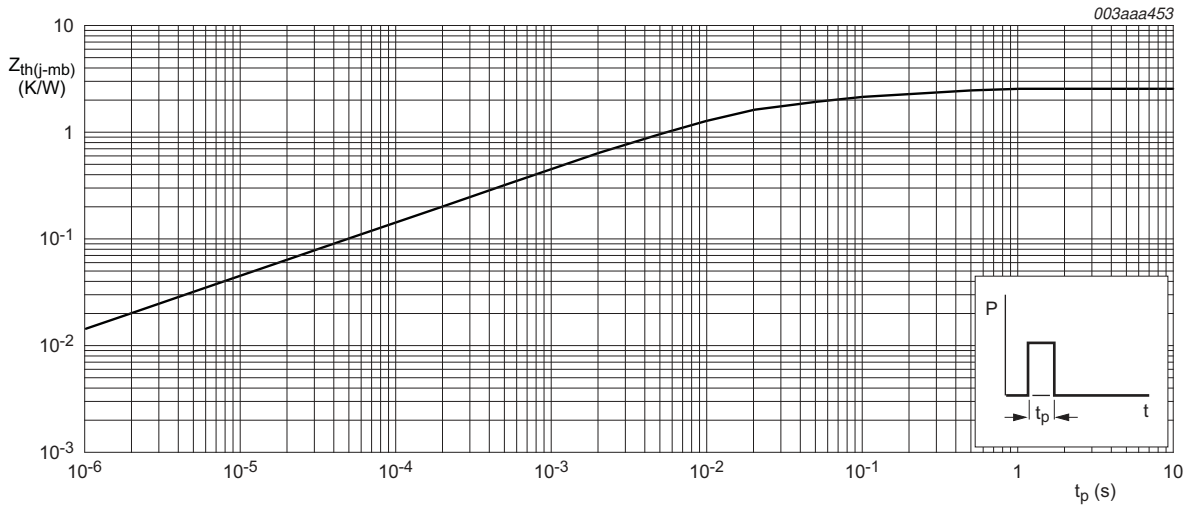


Fig 3. Transient thermal impedance from junction to mounting base as a function of pulse duration.

6. Characteristics

Table 5. Characteristics

T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	I_F = 8 A				
		T_j = 150 °C; Figure 4	-	0.9	1.03	V
		T_j = 25 °C; Figure 4	-	1.05	1.25	V
		I_F = 20 A	-	1.3	1.45	V
I_R	reverse current	$V_R = V_{RRM}$				
		T_j = 100 °C	-	0.1	0.35	mA
		T_j = 25 °C	-	2	50	µA
Dynamic characteristics						
C_d	diode capacitance	f = 1 MHz; V_R = 100 V; Figure 8	-	7	-	pF
Q_{rr}	reverse recovery charge	I_F = 2 A; $V_R \geq$ 30 V; dI_F/dt = 20 A/µs; Figure 7	-	40	70	nC
t_{rr}	reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; dI_F/dt = 100 A/µs; Figure 5	-	50	60	ns
I_{rrm}	peak reverse recovery current	I_F = 10 A; $V_R \geq$ 30 V; dI_F/dt = 50 A/µs T_j = 100 °C; Figure 6	-	3	5.5	A
V_{fr}	forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs	-	3.2	-	V

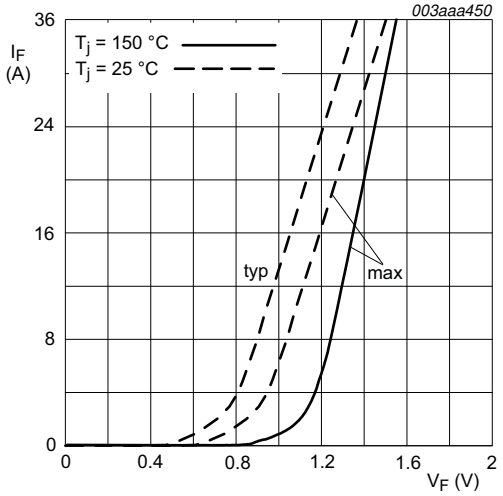


Fig 4. Forward current as a function of forward voltage; typical values.

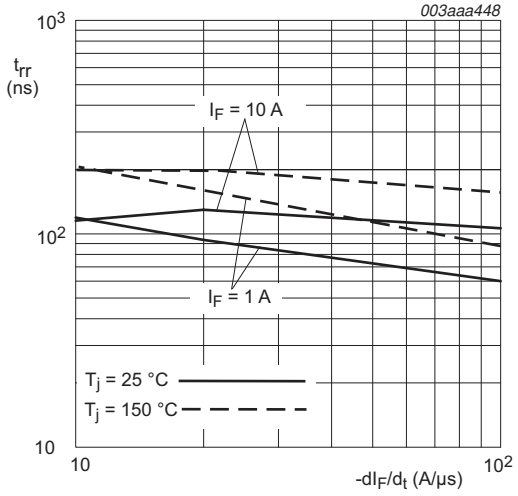


Fig 5. Maximum reverse recovery time as a function of rate of change of forward current.

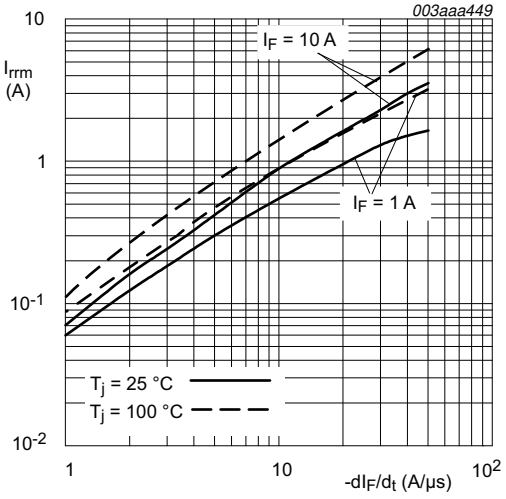


Fig 6. Reverse current as a function of rate of change of forward current; typical values.

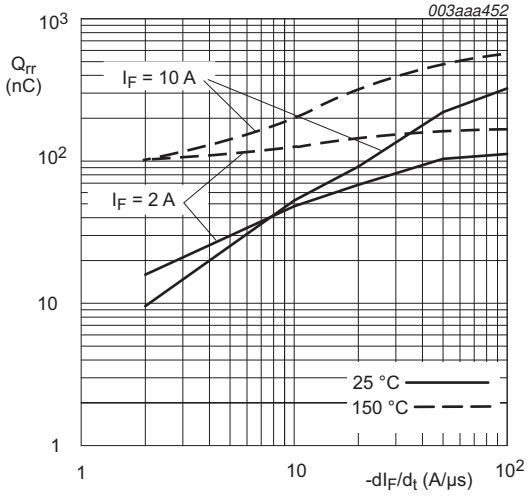
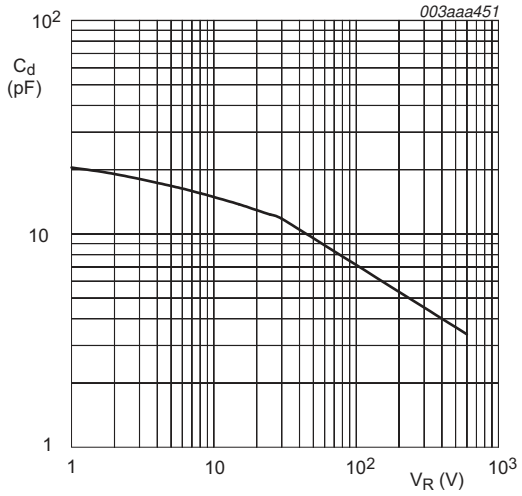


Fig 7. Maximum reverse recovery charge as a function of rate of change of forward current.

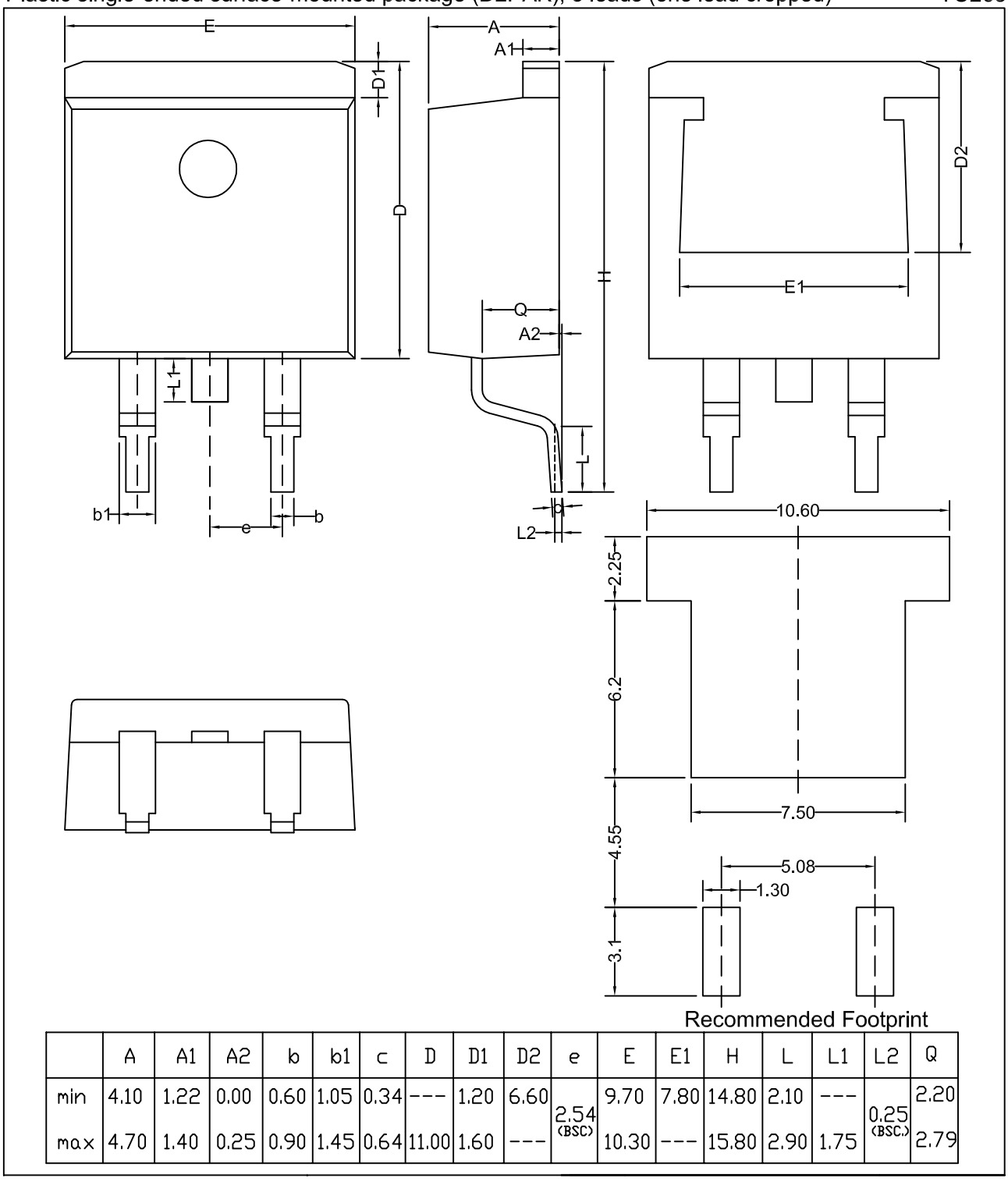


f = 1 MHz

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) TO263



	A	A1	A2	b	b1	c	D	D1	D2	e	E	E1	H	L	L1	L2	Q
min	4.10	1.22	0.00	0.60	1.05	0.34	---	1.20	6.60	2.54 (BSC)	9.70	7.80	14.80	2.10	---	0.25 (BSC)	2.20
max	4.70	1.40	0.25	0.90	1.45	0.64	11.00	1.60	---		10.30	---	15.80	2.90	1.75		2.79

Fig 9. SOT404 (D2PAK).

8. 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:	• 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	-	-

9. Legal information

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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