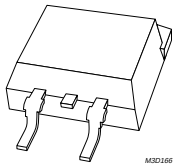


BYV29B-600

Rectifier diode ultrafast

Rev. 01 — 11 August 2003 **Product data**

1. Product profile

1.1 Description

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

Product availability:

BYV29B-600 in SOT404 (D^2-PAK).

1.2 Features

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

1.3 Applications

- Switched-mode power supplies
- Low loss rectification.

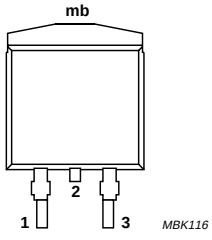
1.4 Quick reference data

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

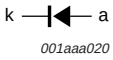
2. Pinning information

Table 1: Pinning - SOT404 (D^2-PAK), 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 (D^2-PAK)



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

PHILIPS

3. Ordering information

Table 2: Ordering information

Type number	Package		
	Name	Description	Version
BYV29B-600	D^2-PAK	Plastic single-ended surface mounted package; 3 leads (one lead cropped)	SOT404

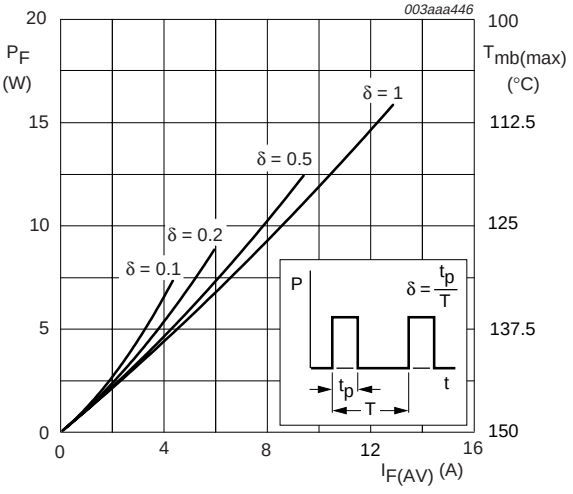
4. Limiting values

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

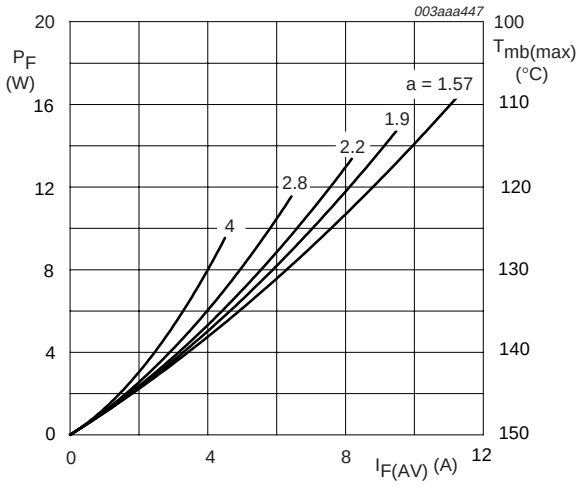
[1] Neglecting switching and reverse current losses.



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

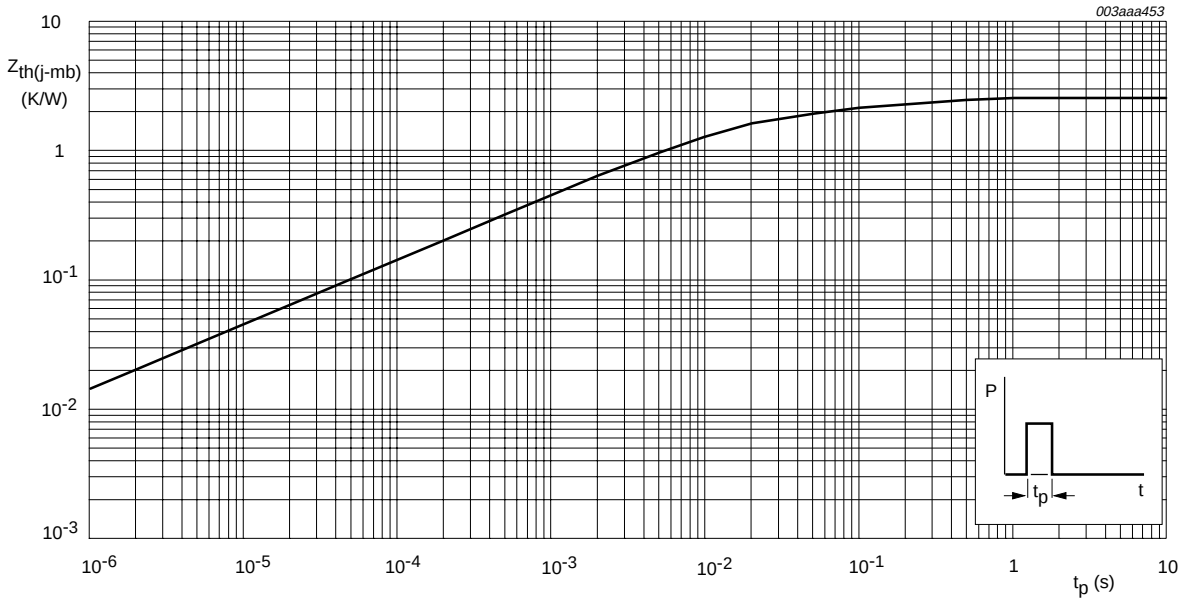


Fig 3. Transient thermal impedance from junction to mounting base as a function of pulse duration.

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

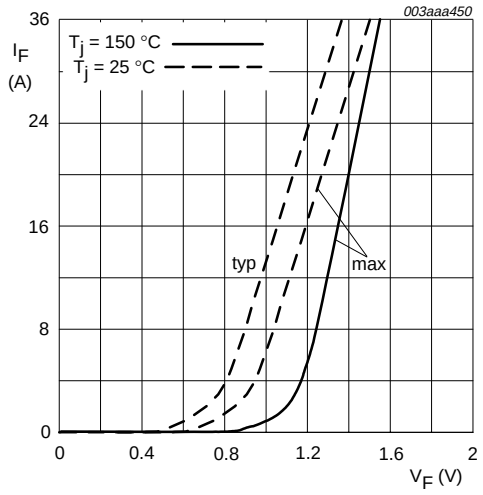


Fig 4. Forward current as a function of forward voltage; typical values.

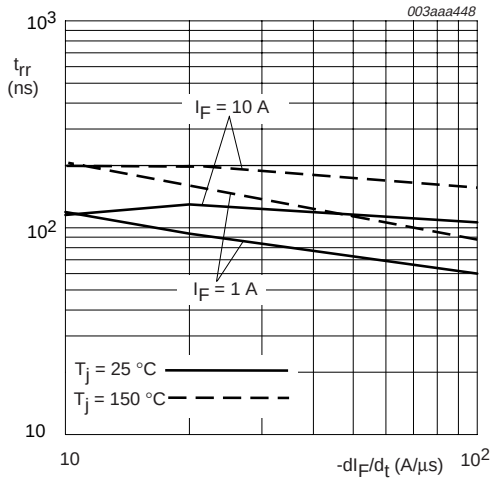


Fig 5. Maximum reverse recovery time as a function of rate of change of forward current.

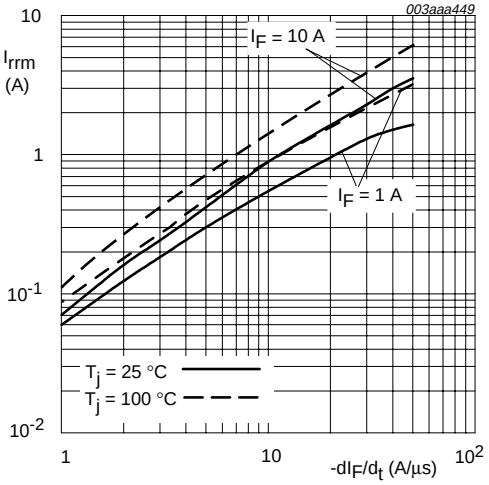


Fig 6. Reverse current as a function of rate of change of forward current; typical values.

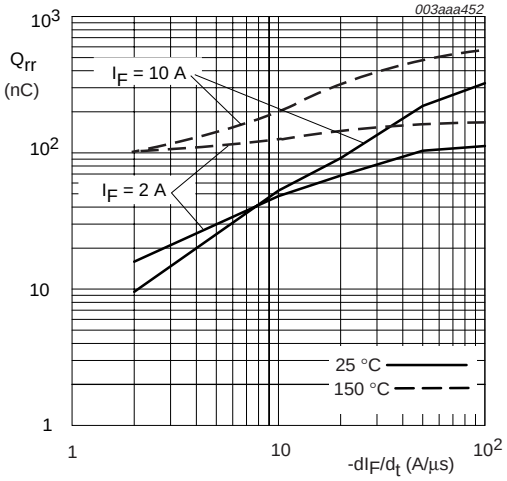
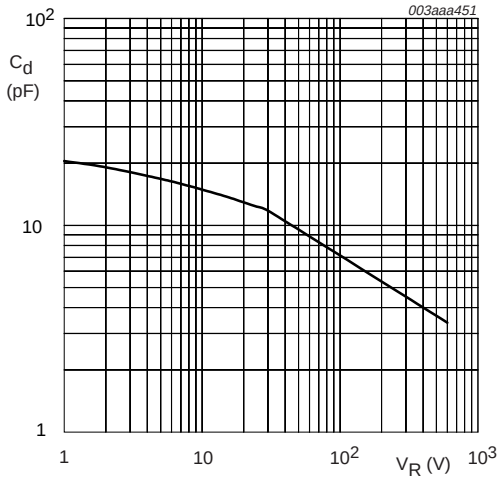


Fig 7. Maximum reverse recovery charge as a function of rate of change of forward current.

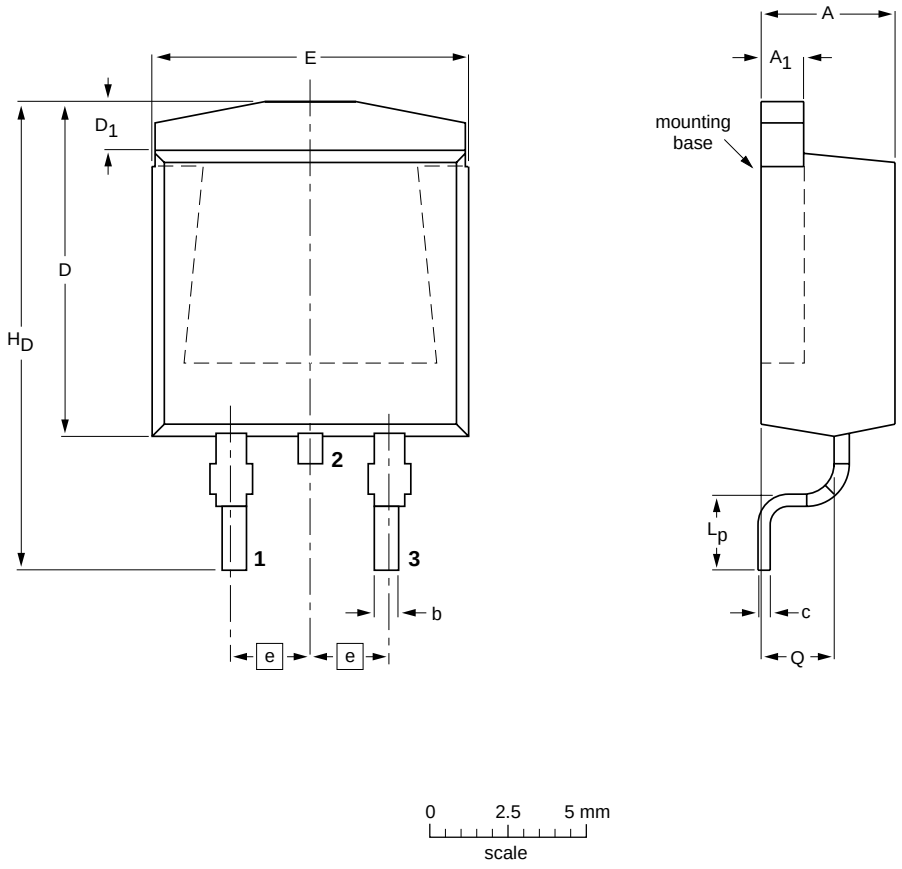


f = 1MHz

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

7. Package outline

Plastic single-ended surface mounted package (Philips version of D²-PAK); 3 leads (one lead cropped) **SOT404**



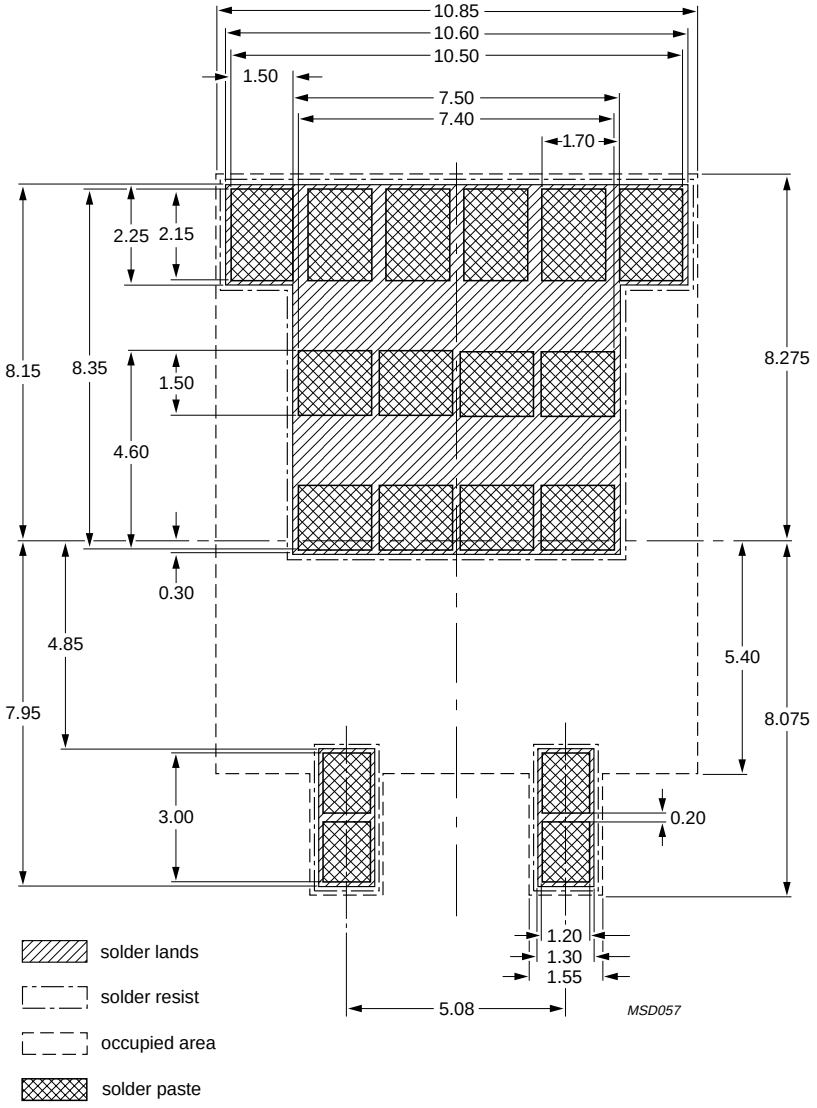
DIMENSIONS (mm are the original dimensions)

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	EIAJ			
SOT404						~~99-06-25~~ 01-02-12

Fig 9. SOT404 (D²-PAK).

8. Soldering



Dimensions in mm.

Fig 10. Reflow soldering footprint for SOT404.

9. Revision history

Table 6: Revision history

Rev	Date	CPCN	Description
01	20030811	-	Product data (9397 750 11884).

10. Data sheet status

Level	Data sheet status[1]	Product status[2][3]	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

11. Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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