

## 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

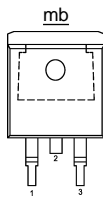
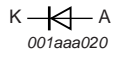
- Switched-mode power supplies
- Low loss rectification.

### 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) <a href="#">[1]</a>		
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		Version
	Name	Description	
BYV29B-600	D2PAK	plastic single-ended surface mounted package; 3 leads (one lead cropped)	SOT404

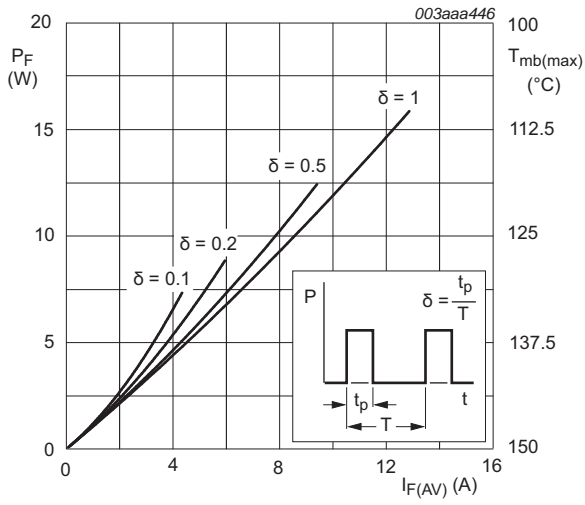
### 4. Limiting values

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

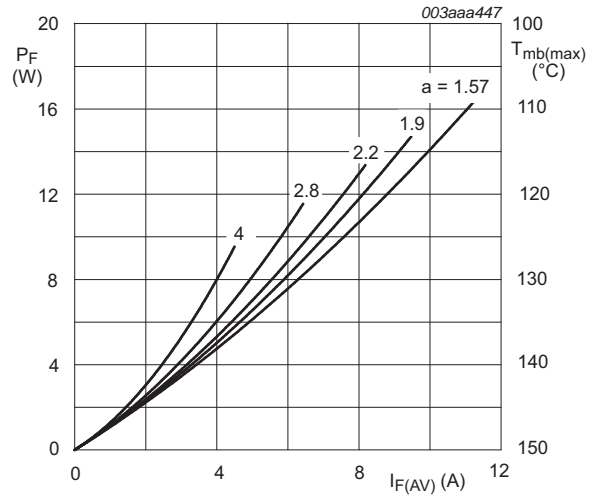
[1] Neglecting switching and reverse current losses.



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

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

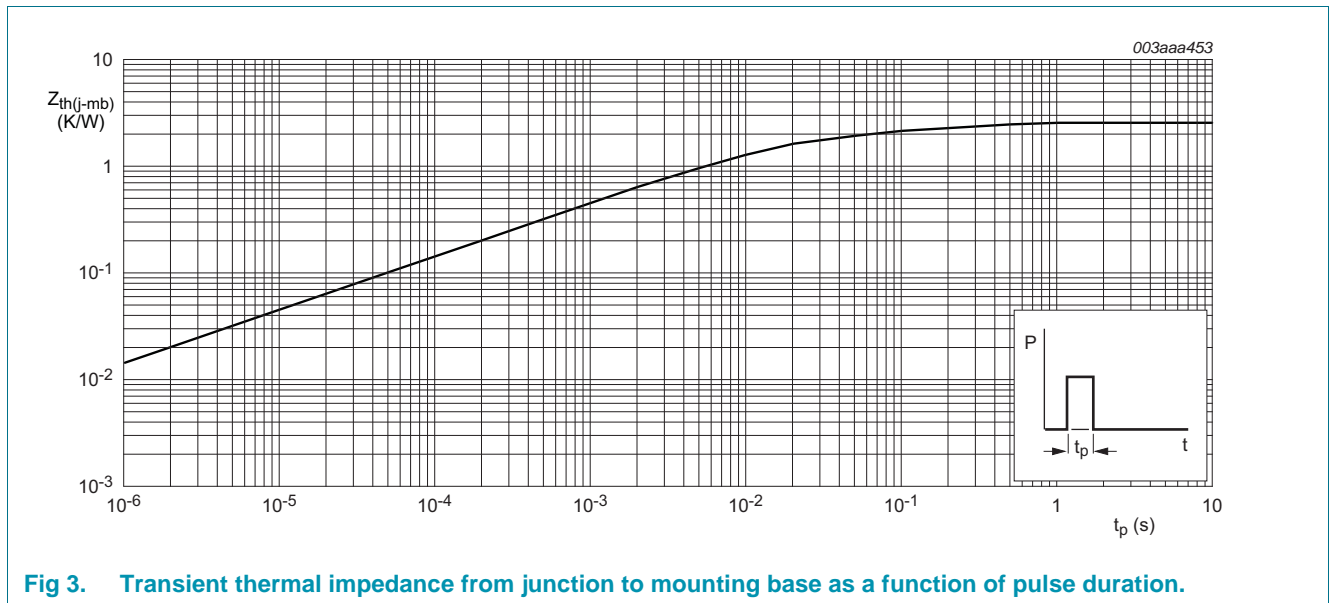
**Fig 2. Maximum forward power dissipation (sinusoidal current waveform) as a function of average forward current.**

## 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	<a href="#">Figure 3</a>	-	-	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**

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

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

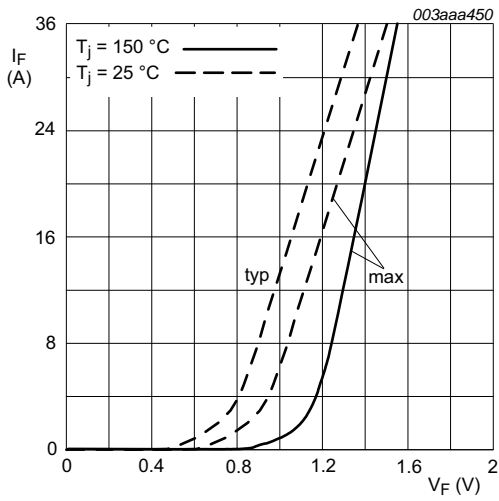


Fig 4. Forward current as a function of forward voltage; typical values.

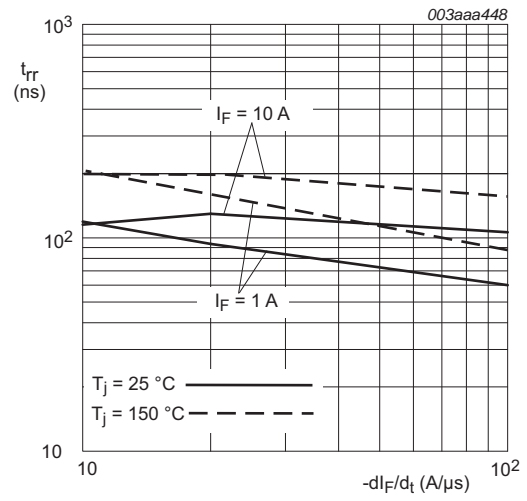


Fig 5. Maximum reverse recovery time as a function of rate of change of forward current.

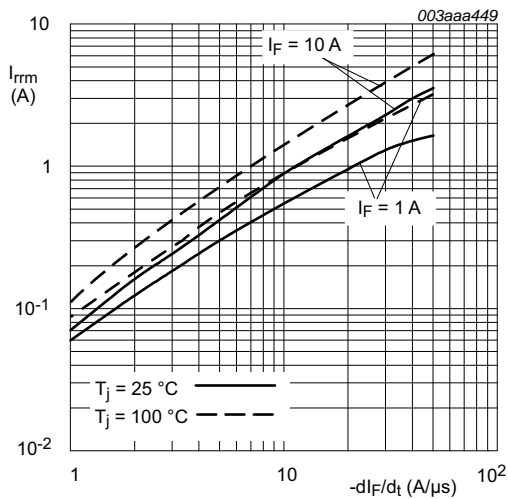


Fig 6. Reverse current as a function of rate of change of forward current; typical values.

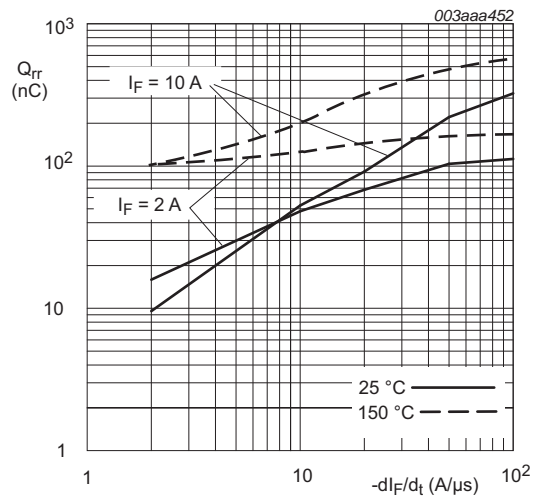
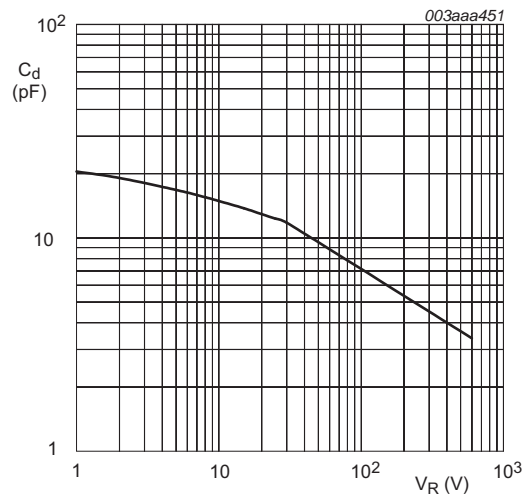


Fig 7. Maximum reverse recovery charge as a function of rate of change of forward current.

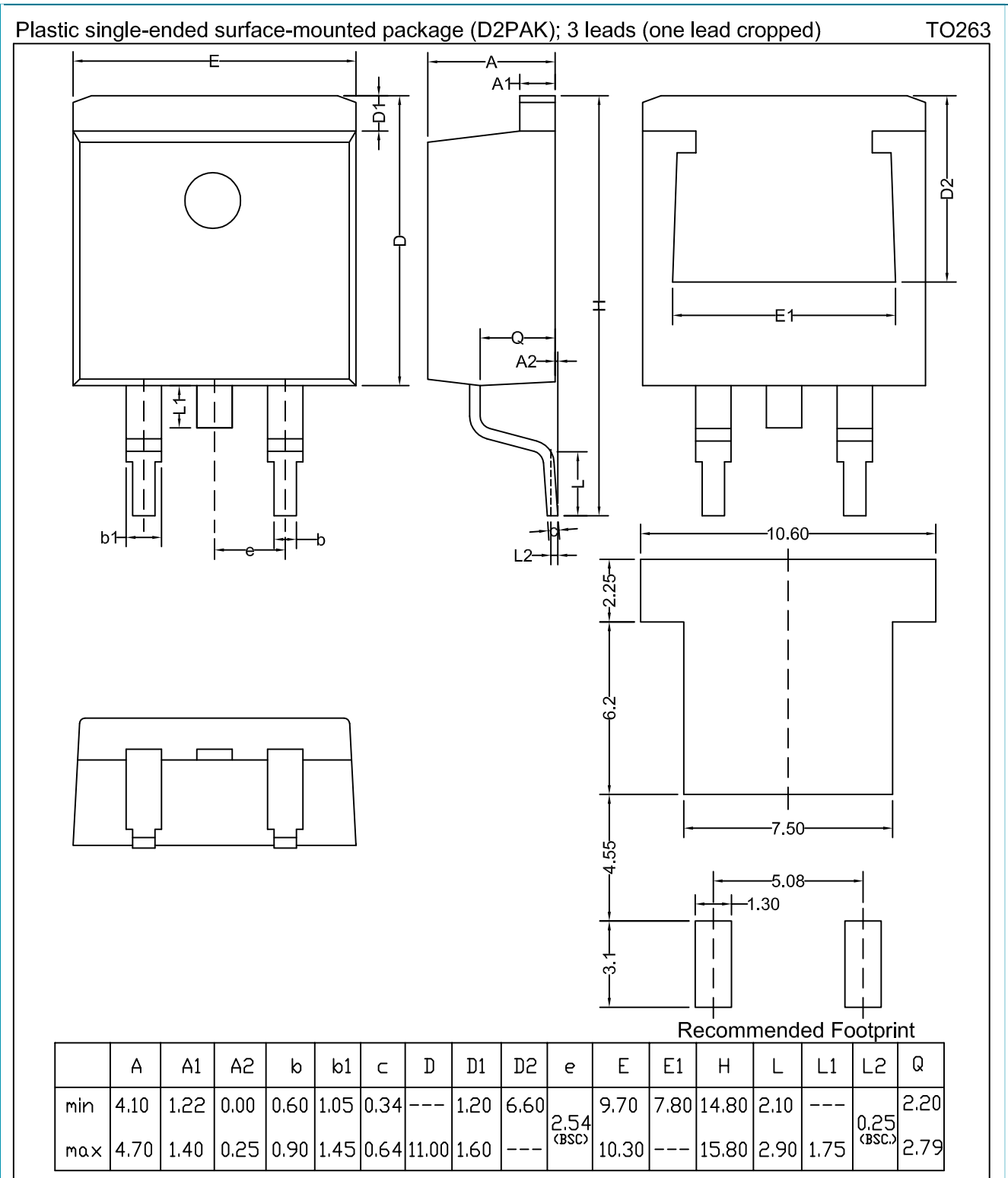


f = 1 MHz

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

**7. Package outline**

Assembly factory: E



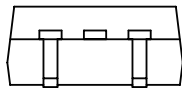
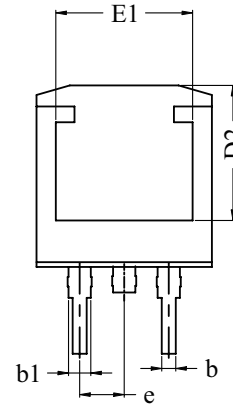
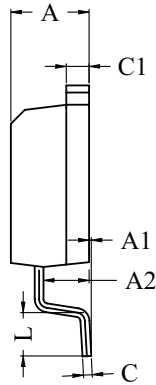
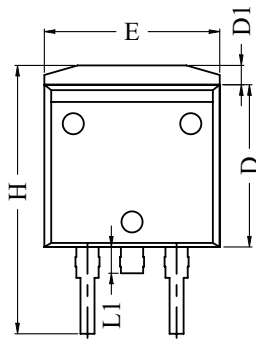
**Fig 9. SOT404 (D2PAK).**



Assembly factory: P

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

TO263



Dim	All Dimensions in Millimeters		
	Min	Typ	Max
A	4.30	4.46	4.60
A1	0	0.13	0.25
A2	2.50	2.60	2.70
b	0.70	0.80	0.90
b1	1.10	1.27	1.45
C	0.40	0.52	0.60
C1	1.17	1.30	1.40
D	9.10	9.25	9.40
D1	1.00	1.10	1.30
D2	7.40	7.70	8.00
E	9.80	10.00	10.20
E1	7.60	7.80	8.00
e	2.54 BSC		
H	14.80	15.30	15.80
L	2.10	2.47	2.80
L1	1.30	1.50	1.70

## 8. 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.

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