

## 1. Product profile

### 1.1 General description

Ultrafast, dual common cathode, epitaxial rectifier diode in a SOT186A (TO-220F)) plastic package.

### 1.2 Features

- Fast switching
- Soft recovery characteristics
- Low forward voltage drop
- Low thermal resistance
- Isolated package
- High thermal cycling performance

### 1.3 Applications

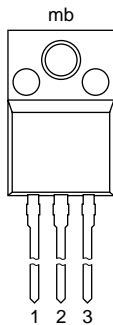
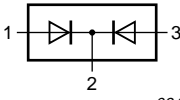
- Output rectifiers in high frequency switched-mode power supplies
- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)

### 1.4 Quick reference data

- $V_{RRM} \leq 600 \text{ V}$
- $V_F \leq 1.16 \text{ V}$
- $I_{O(AV)} \leq 20 \text{ A}$
- $t_{rr} \leq 60 \text{ ns}$

## 2. Pinning information

Table 1. Pinning

Pin	Description	Simplified outline	Symbol
1	anode 1		 <i>sym084</i>
2	cathode		
3	anode 2		
mb	mounting base; isolated		

SOT186A (3-lead TO-220F)

### 3. Ordering information

**Table 2. Ordering information**

Type number	Package		Version
	Name	Description	
BYV34X-600	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 'full pack'	SOT186A

### 4. Limiting values

**Table 3. Limiting values**

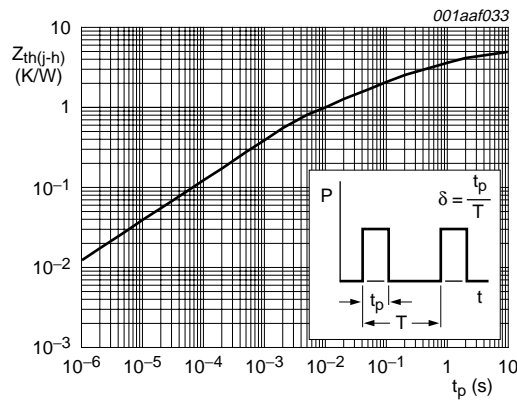
*In accordance with the Absolute Maximum Rating System (IEC 60134).*

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; $\delta = 1.0$ ; $T_h \leq 100$ °C	-	600	V
$I_{O(AV)}$	average output current	square waveform; $\delta = 0.5$ ; $T_h \leq 44$ °C; both diodes conducting	-	20	A
$I_{FRM}$	repetitive peak forward current	$t = 25$ $\mu$ s; square waveform; $\delta = 0.5$ ; $T_h \leq 44$ °C; per diode	-	20	A
$I_{FSM}$	non-repetitive peak forward current	$t = 10$ ms; sinusoidal waveform; per diode	-	120	A
		$t = 8.3$ ms; sinusoidal waveform; per diode	-	132	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
$R_{th(j-h)}$	thermal resistance from junction to heatsink	with heatsink compound; per diode; see <a href="#">Figure 1</a>	-	-	5.0	K/W
		with heatsink compound; both diodes conducting	-	-	4.0	K/W
		without heatsink compound; per diode	-	-	7.0	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	55	-	K/W



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

## 6. Isolation characteristics

**Table 5. Isolation limiting values and characteristics**

$T_h = 25^\circ C$  unless otherwise specified.

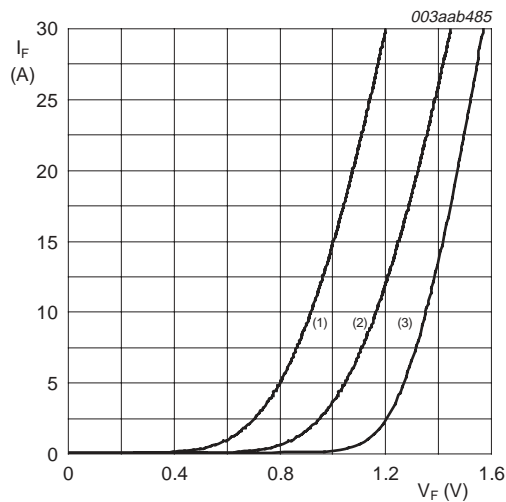
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	from all terminals to external heatsink; $f = 50$ Hz to 60 Hz; sinusoidal waveform; relative humidity $\leq 65\%$ ; clean and dust free	-	-	2500	V
$C_{isol}$	isolation capacitance	from cathode to external heatsink; $f = 1$ MHz	-	10	-	pF

## 7. Characteristics

**Table 6. Characteristics**

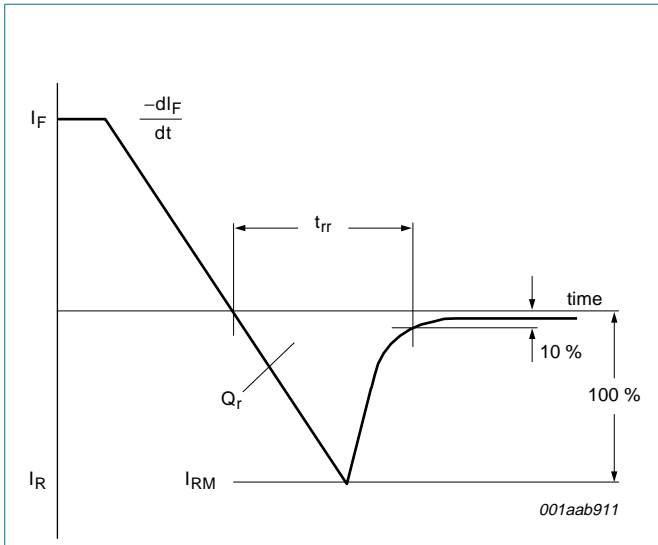
$T_j = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 10\text{ A}$ ; $T_j = 150\text{ °C}$ ; see <a href="#">Figure 2</a>	-	0.92	1.16	V
		$I_F = 10\text{ A}$ ; see <a href="#">Figure 2</a>	-	1.07	1.36	V
$I_R$	reverse current	$V_R = 600\text{ V}$	-	10	50	$\mu\text{A}$
		$V_R = 600\text{ V}$ ; $T_j = 100\text{ °C}$	-	0.2	0.6	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	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

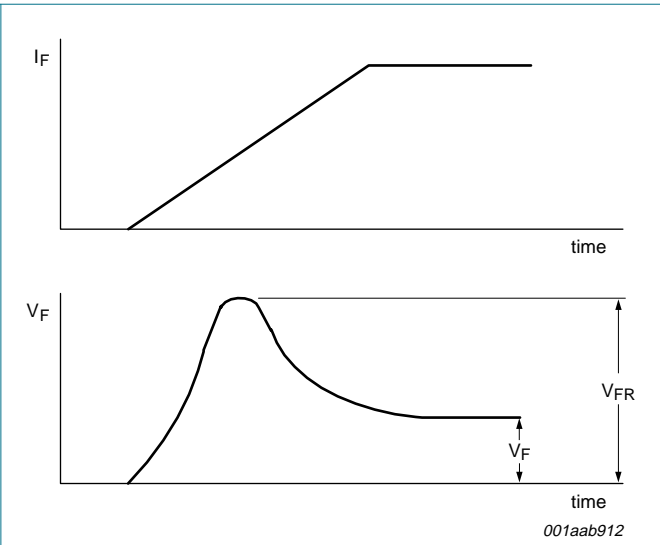


- (1)  $T_j = 150\text{ °C}$ ; typical values
- (2)  $T_j = 150\text{ °C}$ ; maximum values
- (3)  $T_j = 25\text{ °C}$ ; maximum values

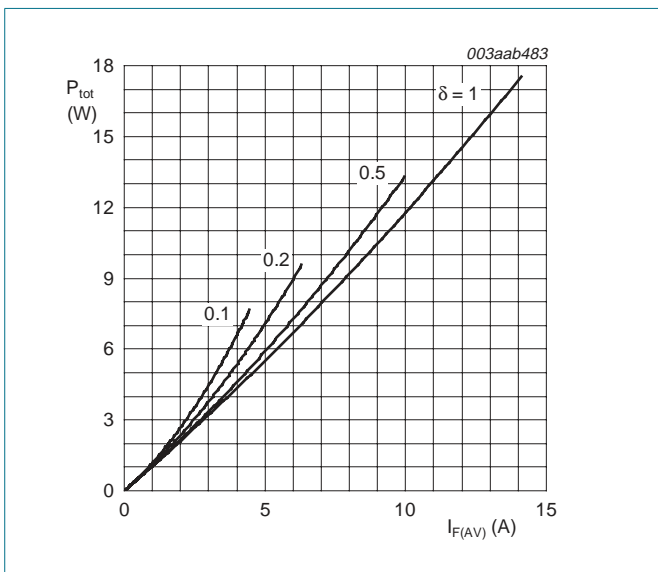
**Fig 2. Forward current as a function of forward voltage**



**Fig 3. Reverse recovery definitions**

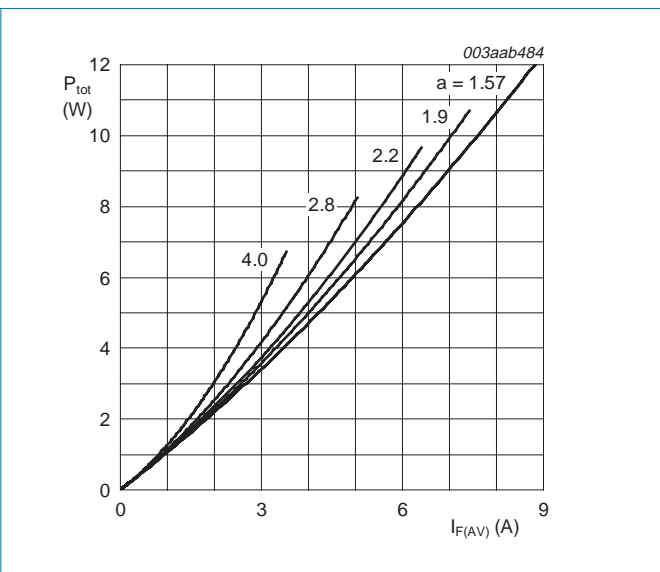


**Fig 4. Forward recovery definitions**



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

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



$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$

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

## 8. Package outline

Plastic single-ended package; isolated heatsink mounted;  
1 mounting hole; 3-lead TO-220 'full pack'

SOT186A

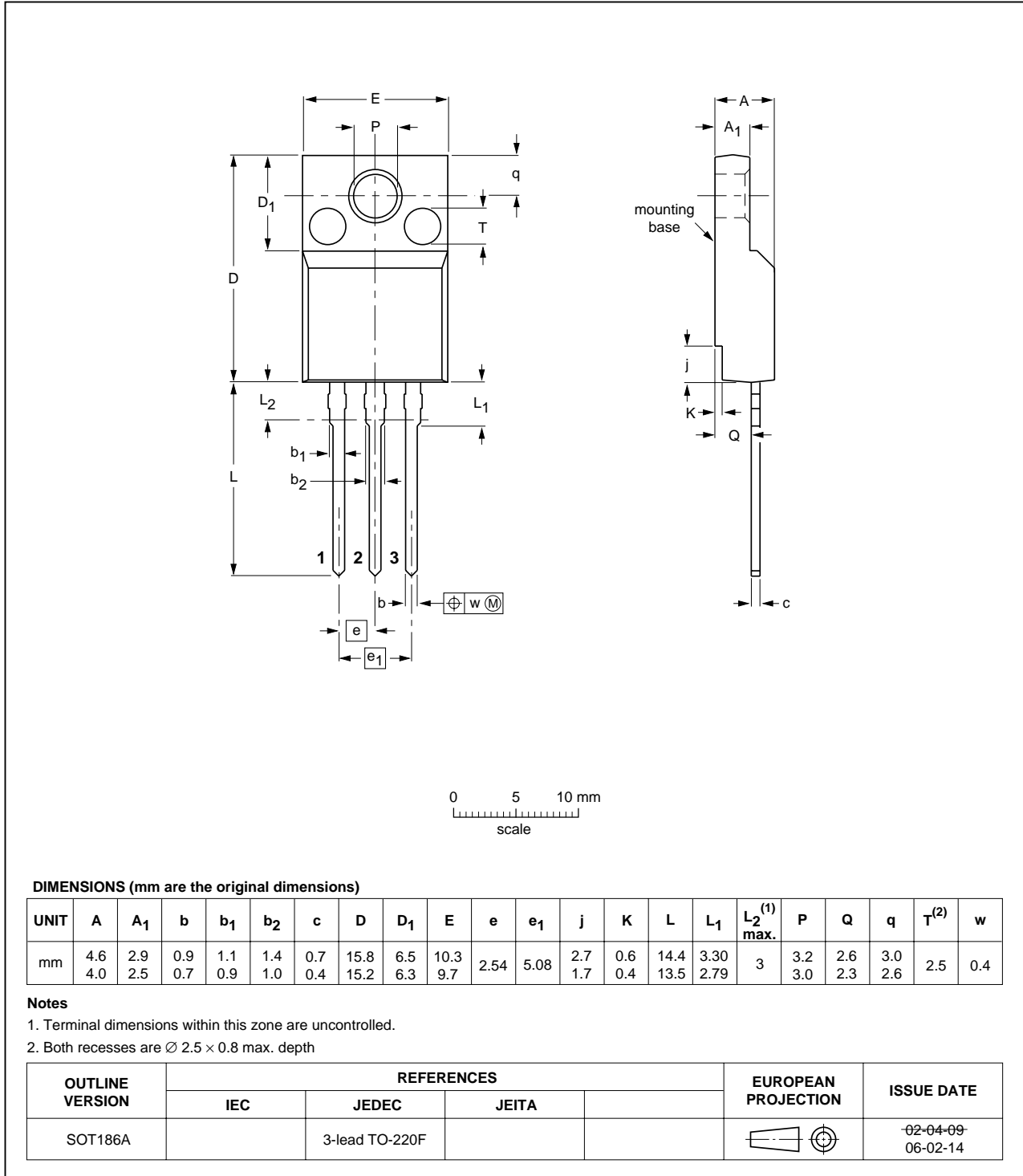


Fig 7. Package outline SOT186A (3-lead TO-220F)

## 9. Revision history

**Table 7. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYV34X-600 V.2	20180928	Product data sheet	-	BYV34X-600_1
Modification:	Change from NXP version to WeEn Version			
BYV34X-600_1	20070913	Product data sheet	-	-

## 10. 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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