

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

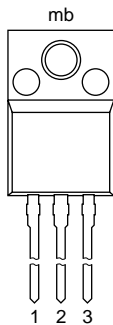
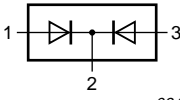
- Output rectifiers in high frequency switched-mode power supplies
- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)

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		
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; $\delta = 1.0$; $T_h \leq 100\text{ °C}$	-	600	V
$I_{O(AV)}$	average output current	square waveform; $\delta = 0.5$; $T_h \leq 44\text{ °C}$; both diodes conducting	-	20	A
I_{FRM}	repetitive peak forward current	$t = 25\text{ }\mu\text{s}$; square waveform; $\delta = 0.5$; $T_h \leq 44\text{ °C}$; per diode	-	20	A
I_{FSM}	non-repetitive peak forward current	$t = 10\text{ ms}$; sinusoidal waveform; per diode	-	120	A
		$t = 8.3\text{ ms}$; 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 Figure 1	-	-	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

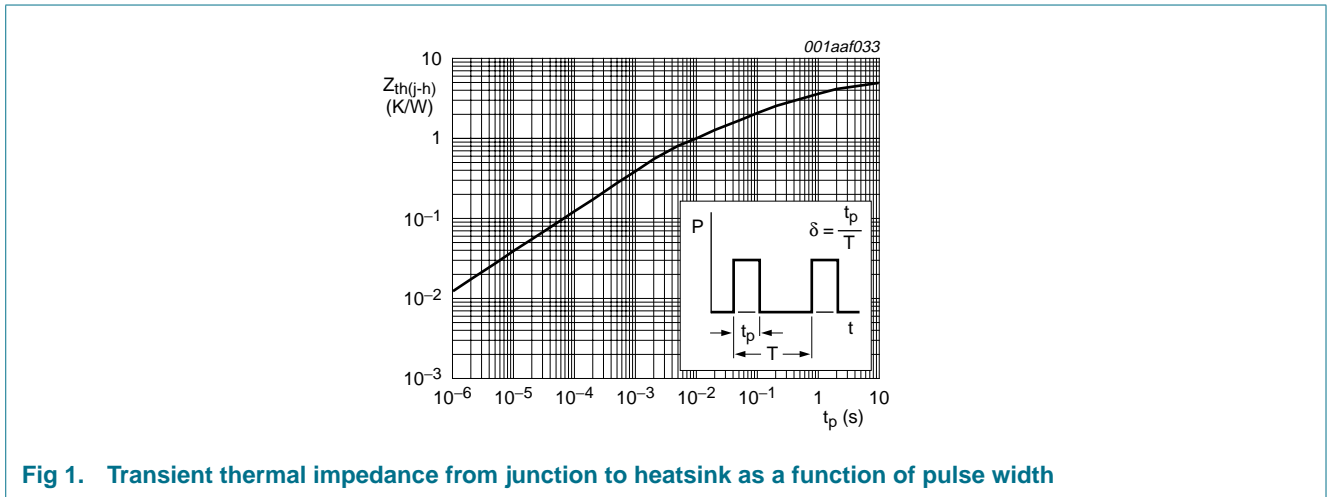


Fig 1. Transient thermal impedance from junction to heatsink as a function of pulse width

6. Isolation characteristics

Table 5. Isolation limiting values and characteristics

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

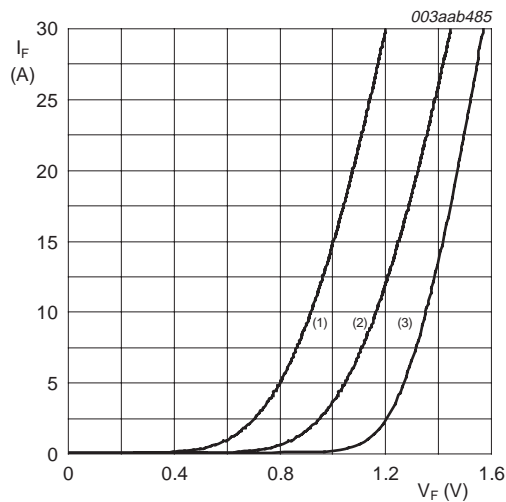
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	from all terminals to external heatsink; $f = 50$ Hz to 60 Hz; sinusoidal waveform; relative humidity $\leq 65\%$; clean and dust free	-	-	2500	V
C_{isol}	isolation capacitance	from cathode to external heatsink; $f = 1$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

7. Characteristics

Table 6. Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 10\text{ A}$; $T_j = 150\text{ }^\circ\text{C}$; see Figure 2	-	0.92	1.16	V
		$I_F = 10\text{ A}$; see Figure 2	-	1.07	1.36	V
I_R	reverse current	$V_R = 600\text{ V}$	-	10	50	μA
		$V_R = 600\text{ V}$; $T_j = 100\text{ }^\circ\text{C}$	-	0.2	0.6	mA
Dynamic characteristics						
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 Figure 3	-	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 Figure 3	-	50	60	ns
I_{RM}	peak reverse recovery current	$I_F = 10\text{ A}$ to $V_R \geq 30\text{ V}$; $dI_F/dt = 50\text{ A}/\mu\text{s}$; $T_j = 100\text{ }^\circ\text{C}$; see Figure 3	-	3	5	A
V_{FR}	forward recovery voltage	$I_F = 10\text{ A}$; $dI_F/dt = 10\text{ A}/\mu\text{s}$; see Figure 4	-	3.2	-	V



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

Fig 2. Forward current as a function of forward voltage

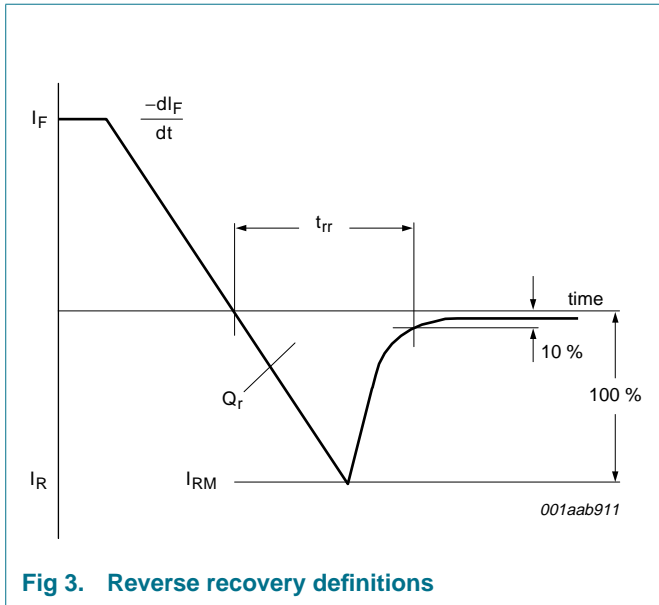


Fig 3. Reverse recovery definitions

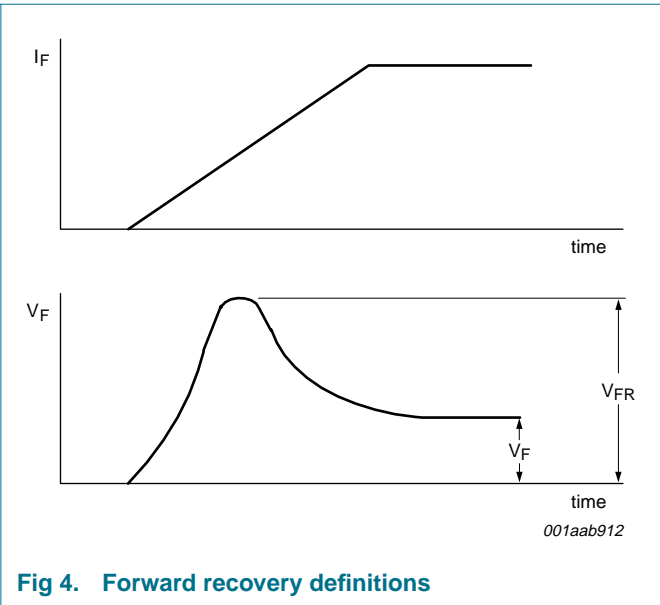


Fig 4. Forward recovery definitions

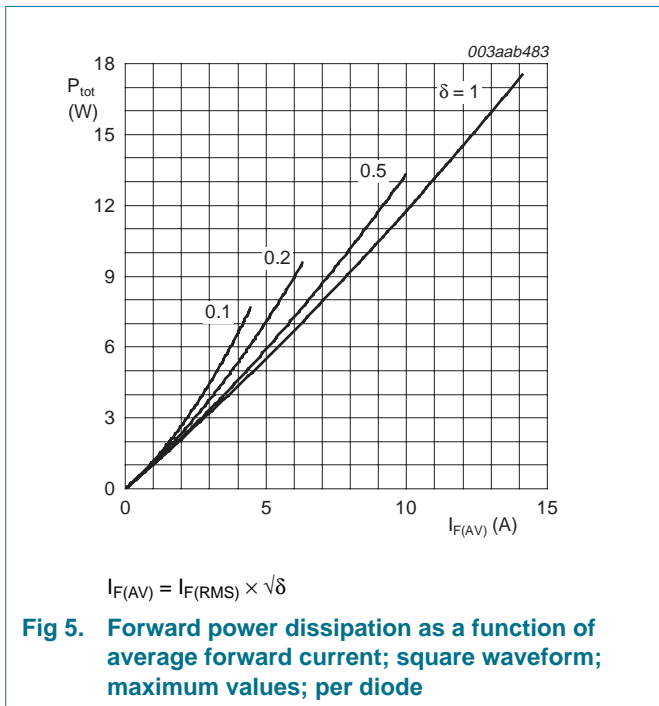


Fig 5. Forward power dissipation as a function of average forward current; square waveform; maximum values; per diode

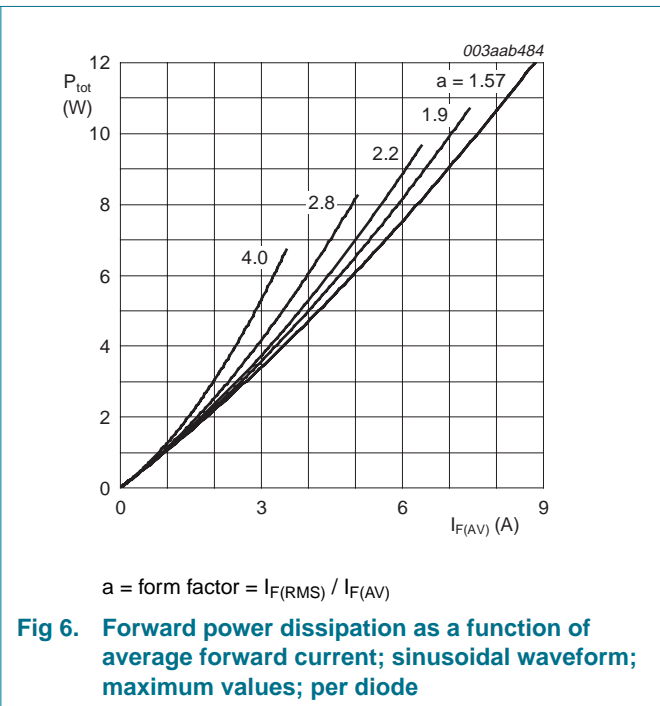
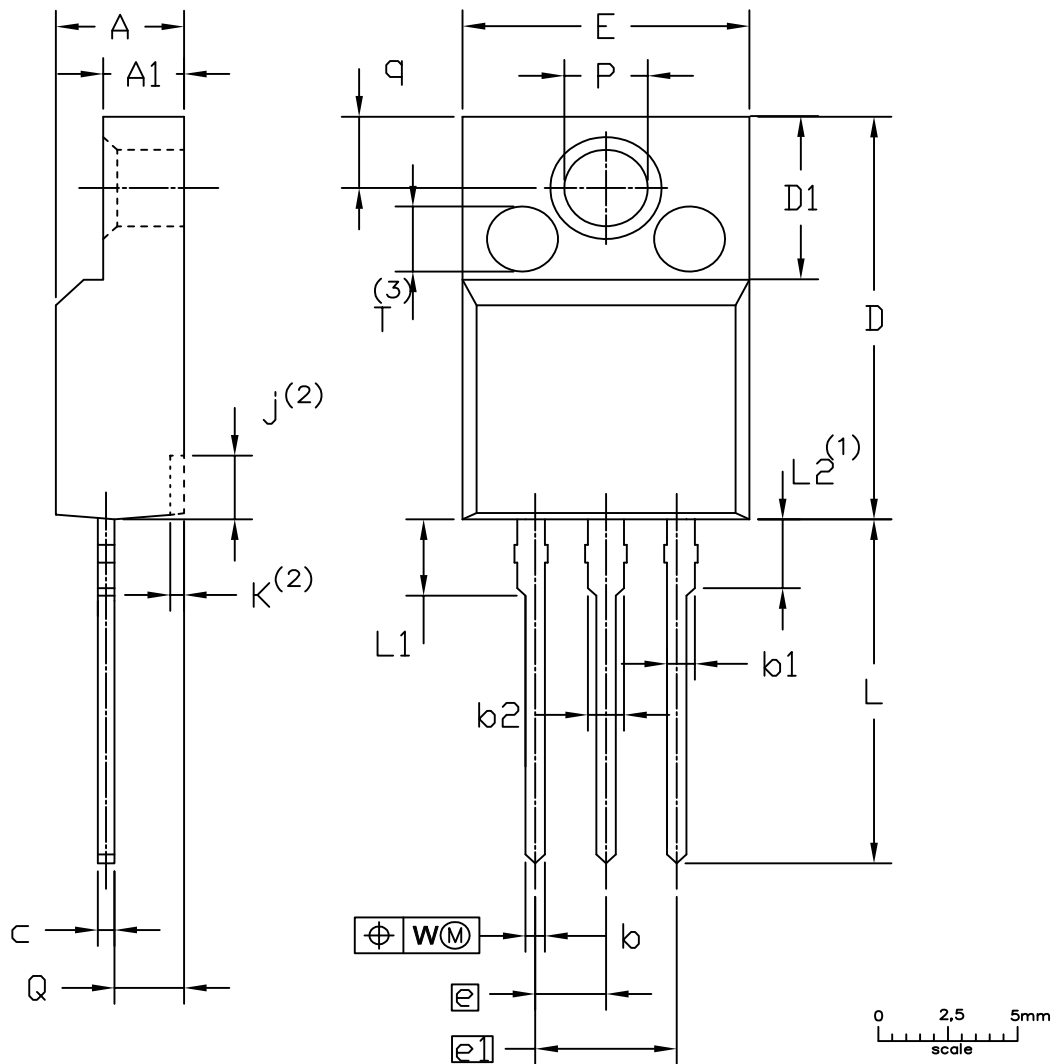


Fig 6. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values; per diode

8. Package outline

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

SOT186A



UNIT	A	A ₁	b	b ₁	b ₂	c	D	D ₁	E	e	e ₁	j ⁽²⁾	k ⁽²⁾	L	L ₁	L ₂ ⁽¹⁾ max.	P	Q	q	W	T ⁽³⁾
mm	4.6	2.9	0.9	1.1	1.4	0.7	15.8	6.5	10.3		5.08	2.7	0.6	14.4	3.30		3.2	2.6	3.0	0.4	2.5
	4.0	2.5	0.7	0.9	1.0	0.4	15.2	6.3	9.7	2.54		1.7	0.4	13.5	2.79	3	3.0	2.3	2.6		

Notes

1. Terminal dimensions within this zone are uncontrolled
2. Dot lines area designs may vary
3. Eject pin mark is for reference only

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT186A		3 LEADS TO220F			2013-11-14

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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