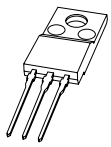


BYV34X-600

Dual rectifier diode ultrafast

Rev. 01 — 13 September 2007 Product data sheet

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

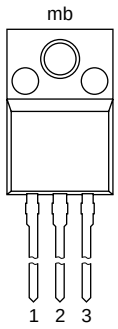
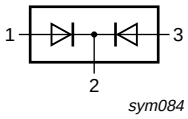
- Output rectifiers in high frequency switched-mode power supplies
- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)

1.4 Quick reference data

- $V_{RRM} \leq 600$ V
- $V_F \leq 1.16$ V
- $I_{O(AV)} \leq 20$ A
- $t_{rr} \leq 60$ 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		
	Name	Description	Version
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 µs; 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 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

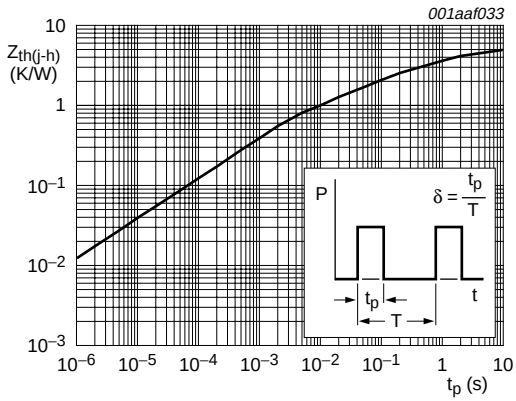


Fig 1. Transient thermal impedance from junction to heatsink as a function of pulse width

6. Isolation characteristics

Table 5. Isolation limiting values and characteristics

T_h = 25 °C unless otherwise specified.

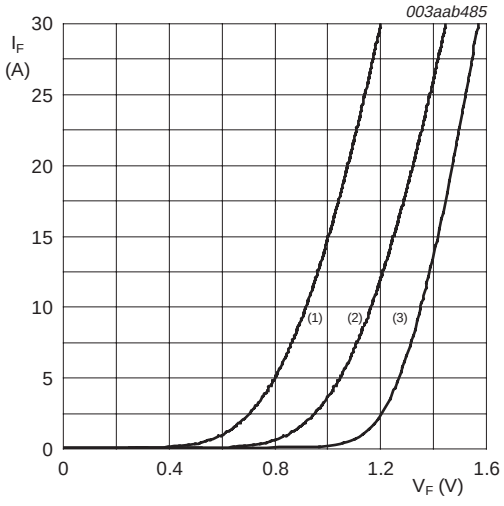
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	from all terminals to external heatsink; f = 50 Hz to 60 Hz; sinusoidal waveform; relative humidity ≤ 65 %; clean and dust free	-	-	2500	V
C_{isol}	isolation capacitance	from cathode to external heatsink; f = 1 MHz	-	10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

7. Characteristics

Table 6. Characteristics

T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	I_F = 10 A; T_j = 150 °C; see Figure 2	-	0.92	1.16	V
		I_F = 10 A; see Figure 2	-	1.07	1.36	V
I_R	reverse current	V_R = 600 V	-	10	50	µA
		V_R = 600 V; T_j = 100 °C	-	0.2	0.6	mA
Dynamic characteristics						
Q_r	recovered charge	I_F = 2 A to $V_R \geq$ 30 V; dI_F/dt = 20 A/µs; see Figure 3	-	40	70	nC
t_{rr}	reverse recovery time	I_F = 1 A to $V_R \geq$ 30 V; dI_F/dt = 100 A/µs; see Figure 3	-	50	60	ns
I_{RM}	peak reverse recovery current	I_F = 10 A to $V_R \geq$ 30 V; dI_F/dt = 50 A/µs; T_j = 100 °C; see Figure 3	-	3	5	A
V_{FR}	forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs; see Figure 4	-	3.2	-	V



(1) T_j = 150 °C; typical values

(2) T_j = 150 °C; maximum values

(3) T_j = 25 °C; maximum values

Fig 2. Forward current as a function of forward voltage

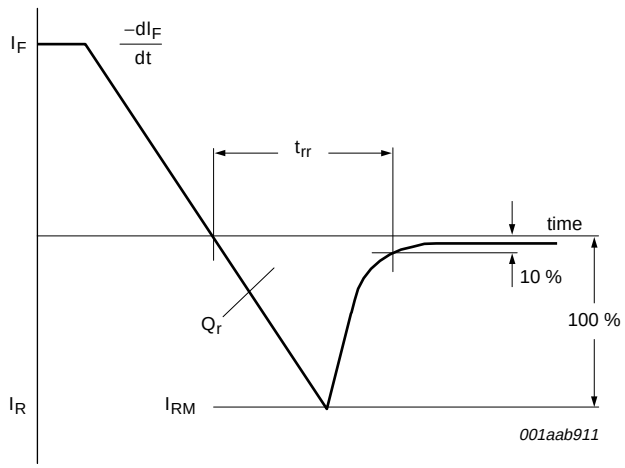


Fig 3. Reverse recovery definitions

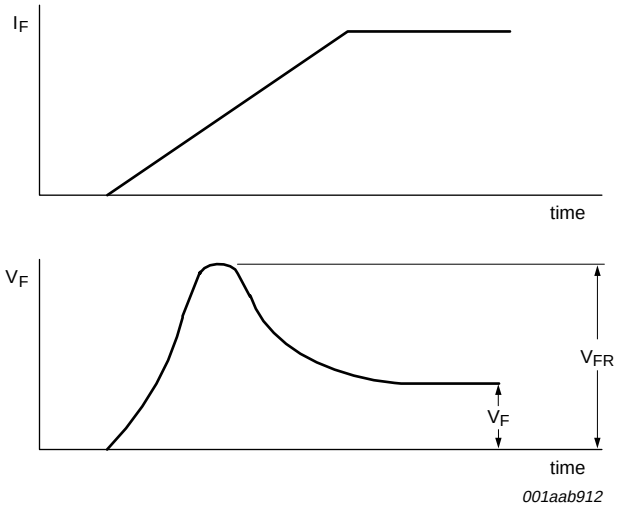
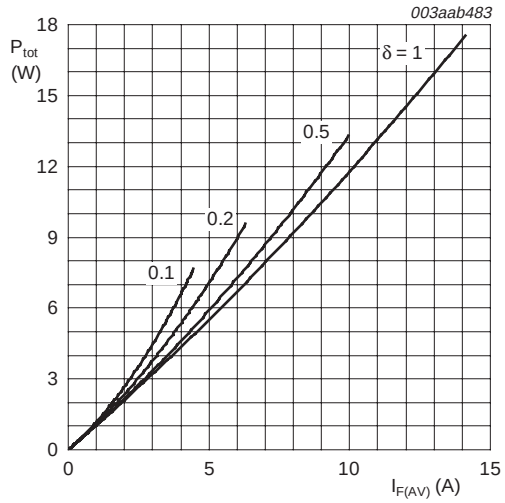
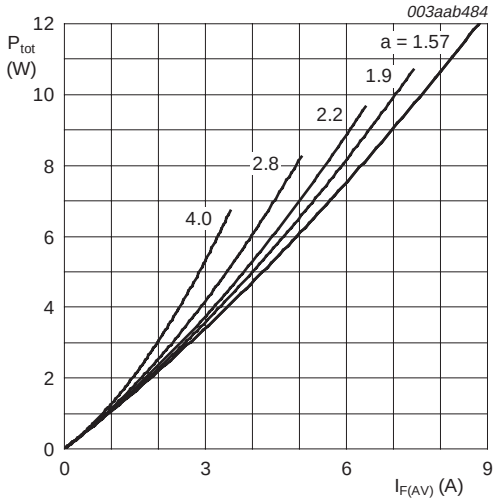


Fig 4. Forward recovery definitions



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

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



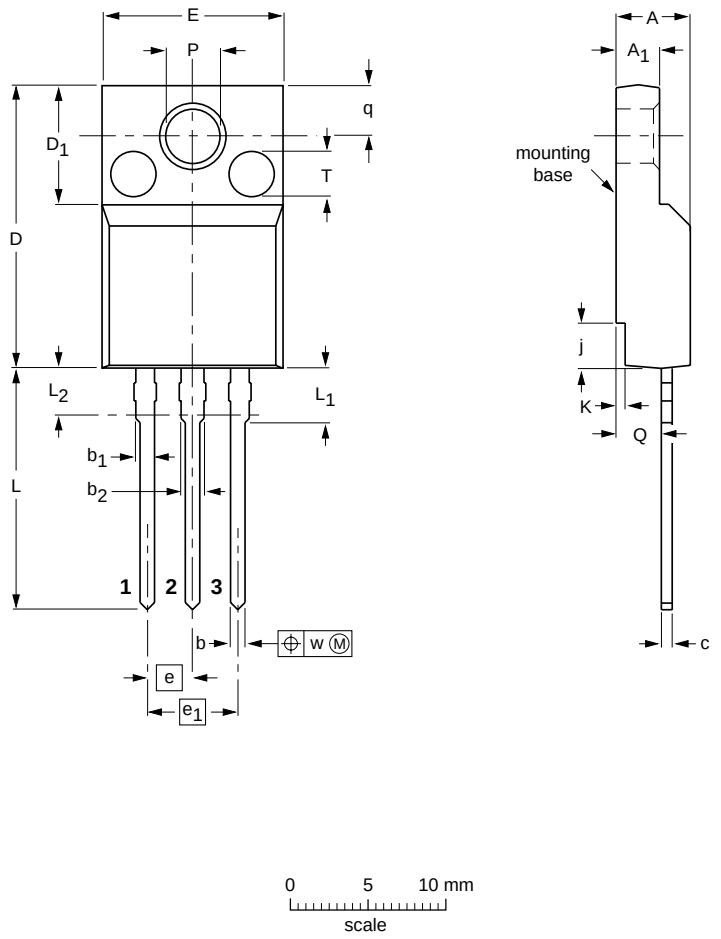
a = form factor = $I_{F(RMS)} / I_{F(AV)}$

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

8. Package outline

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

SOT186A



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b	b_1	b_2	c	D	D_1	E	e	e_1	j	K	L	L_1	L_2 (1) max.	P	Q	q	T (2)	w
mm	4.6 4.0	2.9 2.5	0.9 0.7	1.1 0.9	1.4 1.0	0.7 0.4	15.8 15.2	6.5 6.3	10.3 9.7	2.54	5.08	2.7 1.7	0.6 0.4	14.4 13.5	3.30 2.79	3	3.2 3.0	2.6 2.3	3.0 2.6	2.5	0.4

Notes

1. Terminal dimensions within this zone are uncontrolled.
2. Both recesses are ∅ 2.5 × 0.8 max. depth

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT186A		3-lead TO-220F				~~02-04-09~~ 06-02-14

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_1	20070913	Product data sheet	-	-

10. Legal information

10.1 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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