

## 1. General description

Ultrafast power diode in a SOT186A (TO-220F) plastic package.

## 2. Features and benefits

- Ultra low leakage current
- High junction temperature up to 175 °C
- Low on-state loss
- Fast switching
- Soft recovery characteristic minimizes power consuming oscillations
- High reverse surge capability
- High thermal cycling performance
- Low thermal resistance

## 3. Applications

- Home appliance power supply
- Secondary rectification

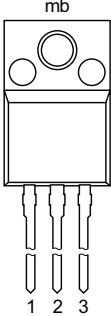
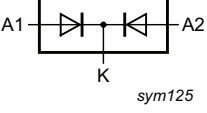
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
<b>Absolute maximum rating</b>						
$V_{RRM}$	repetitive peak reverse voltage		300			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; square-wave pulse; $T_h \leq 126$ °C; per diode; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	10			A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25$ $\mu$ s; $T_h \leq 126$ °C; square-wave pulse	20			A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(initial)} = 25$ °C; sine-wave pulse; per diode; <a href="#">Fig. 4</a>	110			A
		$t_p = 8.3$ ms; $T_{j(initial)} = 25$ °C; sine-wave pulse; per diode	121			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 10$ A; $T_j = 25$ °C; per diode; <a href="#">Fig. 6</a>	-	-	1.25	V
		$I_F = 10$ A; $T_j = 125$ °C; per diode; <a href="#">Fig. 6</a>	-	-	1	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $di_F/dt = 100$ A/ $\mu$ s; $T_j = 25$ °C; per diode; <a href="#">Fig. 7</a>	-	-	25	ns

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode		
2	K	cathode		
3	A2	anode		
mb	K	mounting base; isolated		

## 6. Ordering information

Table 3. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BYV32EX-300P	TO-220F	BYV32EX-300PQ	Tube	50	SOT186A	14-Nov-2013

## 7. Marking

Table 4. Marking codes

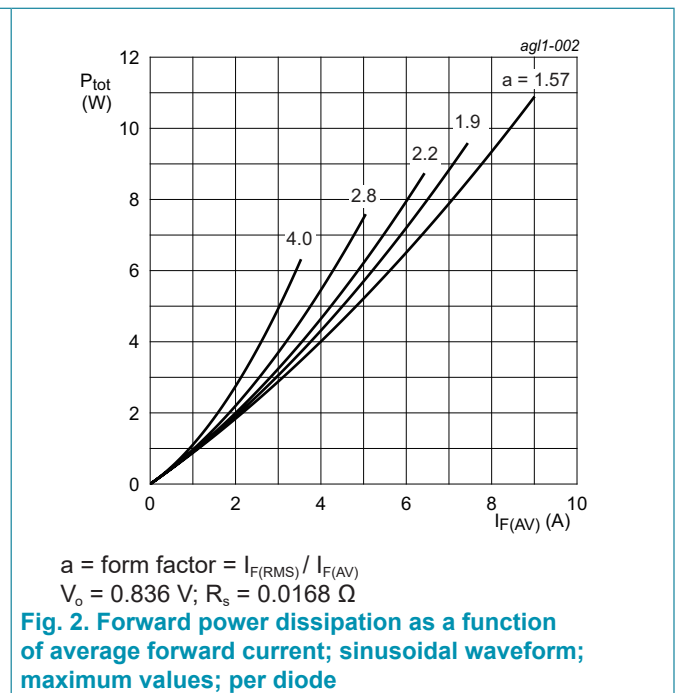
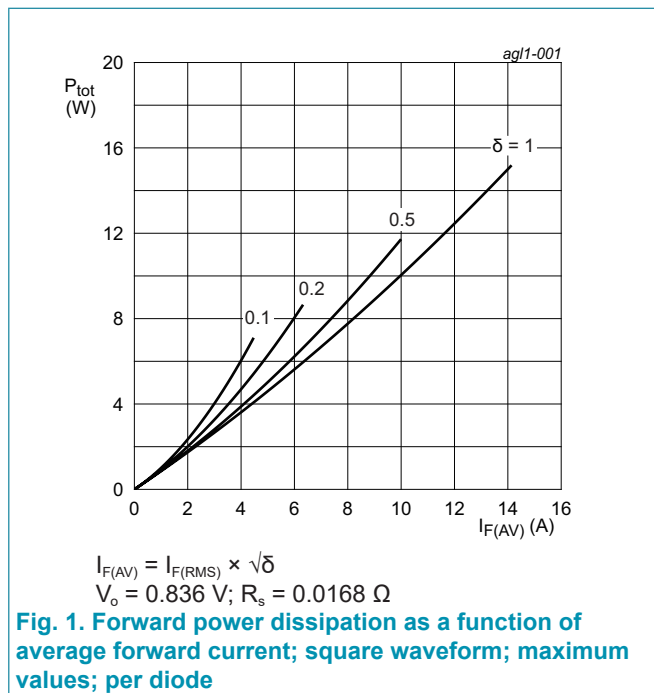
Type number	Marking codes
BYV32EX-300P	BYV32EX-300P

## 8. Limiting values

**Table 5. Limiting values**

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

Symbol	Parameter	Conditions	Values	Unit
$V_{RRM}$	repetitive peak reverse voltage		300	V
$V_{RWM}$	crest working reverse voltage		300	V
$V_R$	reverse voltage	DC	300	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; square-wave pulse; $T_h \leq 126\text{ }^\circ\text{C}$ ; per diode; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	10	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_h \leq 126\text{ }^\circ\text{C}$ ; square-wave pulse; per diode	20	A
$I_{O(AV)}$	average output current	$\delta = 0.5$ ; $T_h \leq 93\text{ }^\circ\text{C}$ ; square-wave pulse; both diodes conducting	20	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; sine-wave pulse; per diode; <a href="#">Fig. 4</a>	110	A
		$t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; sine-wave pulse; per diode	121	A
$T_{stg}$	storage temperature		-65 to 175	$^\circ\text{C}$
$T_j$	junction temperature		175	$^\circ\text{C}$



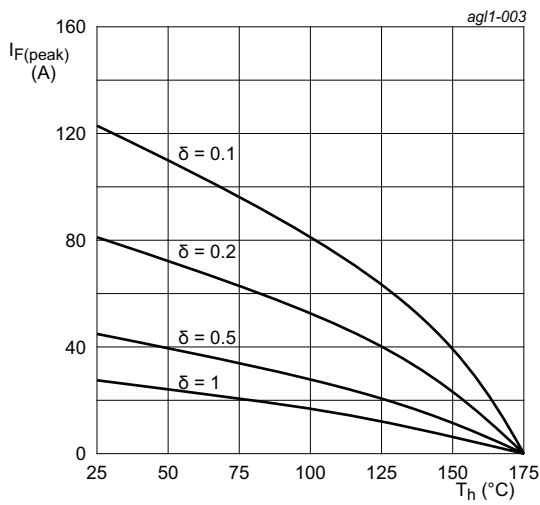


Fig. 3. Forward current as a function of heatsink temperature; maximum values; per diode

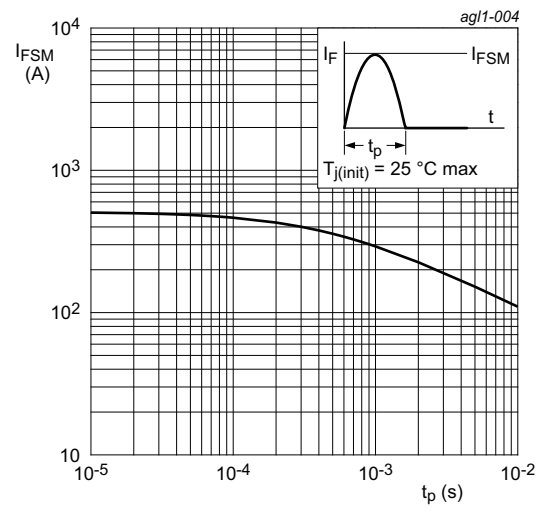


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-h)}$	thermal resistance from junction to heatsink	with heatsink compound; per diode; <a href="#">Fig. 5</a>	-	-	4.2	K/W
		with heatsink compound; both diodes conducting; <a href="#">Fig. 5</a>	-	-	3.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	60	-	K/W

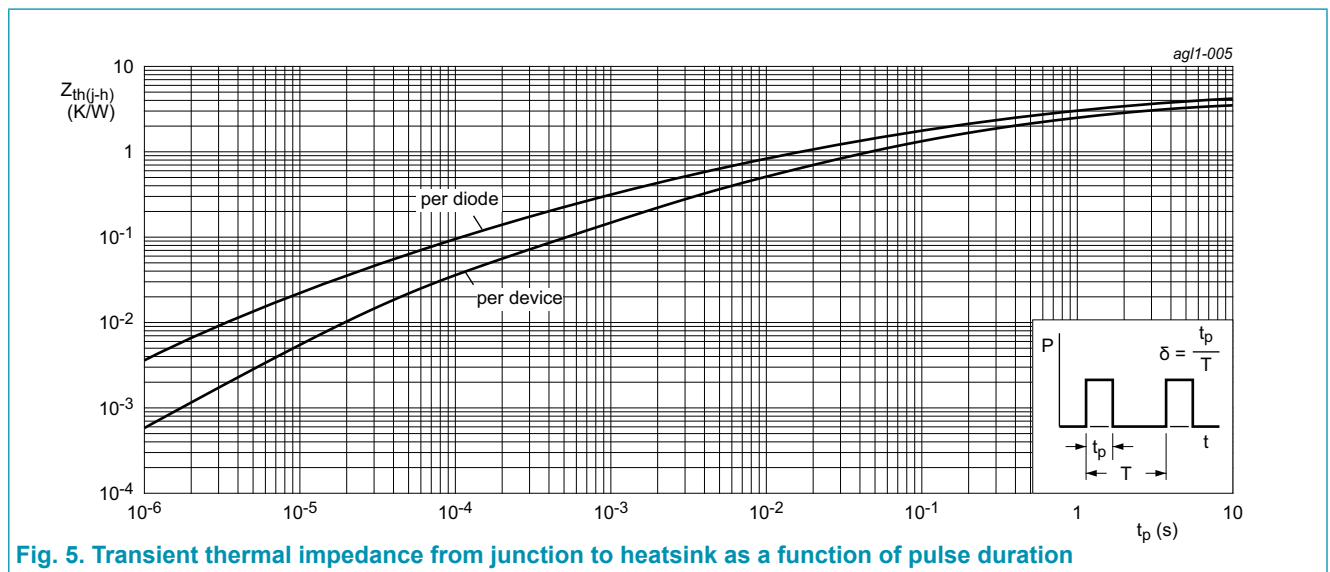


Fig. 5. Transient thermal impedance from junction to heatsink as a function of pulse duration

## 10. Isolation characteristics

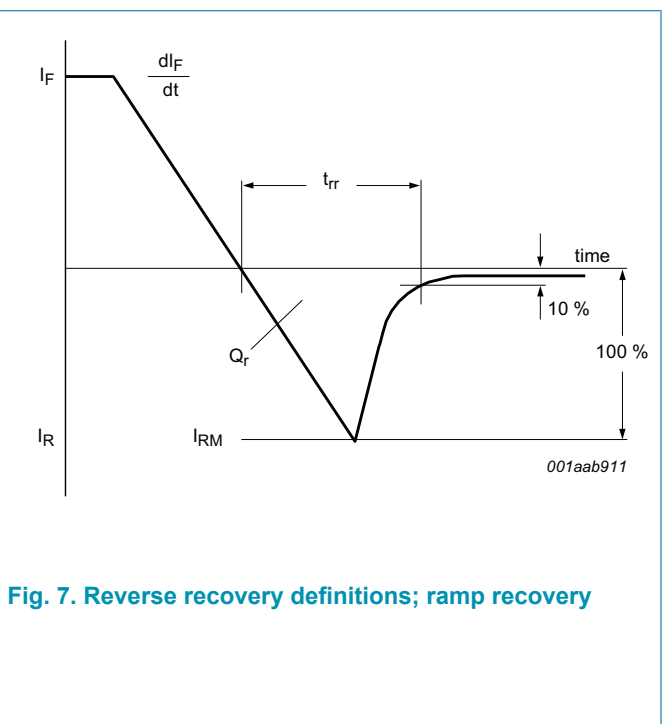
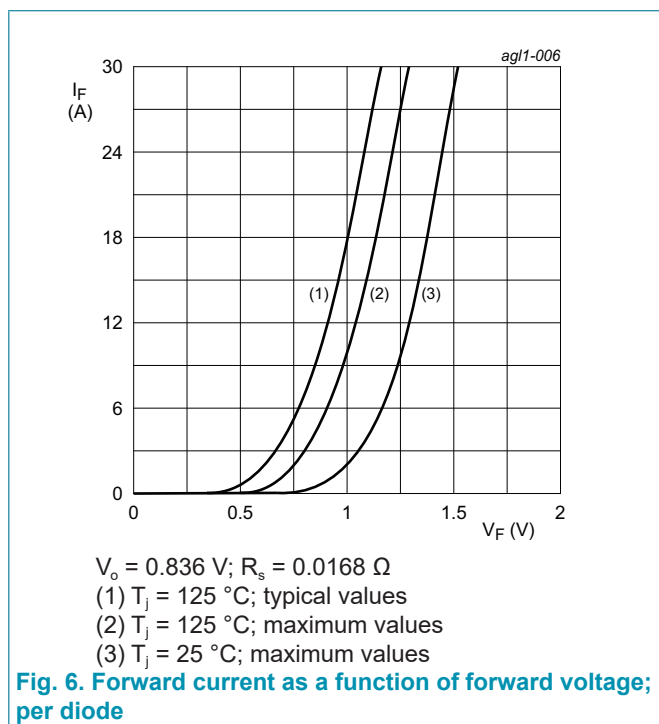
Table 7. Isolation characteristics

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

### 11. Characteristics

Table 8. Characteristics

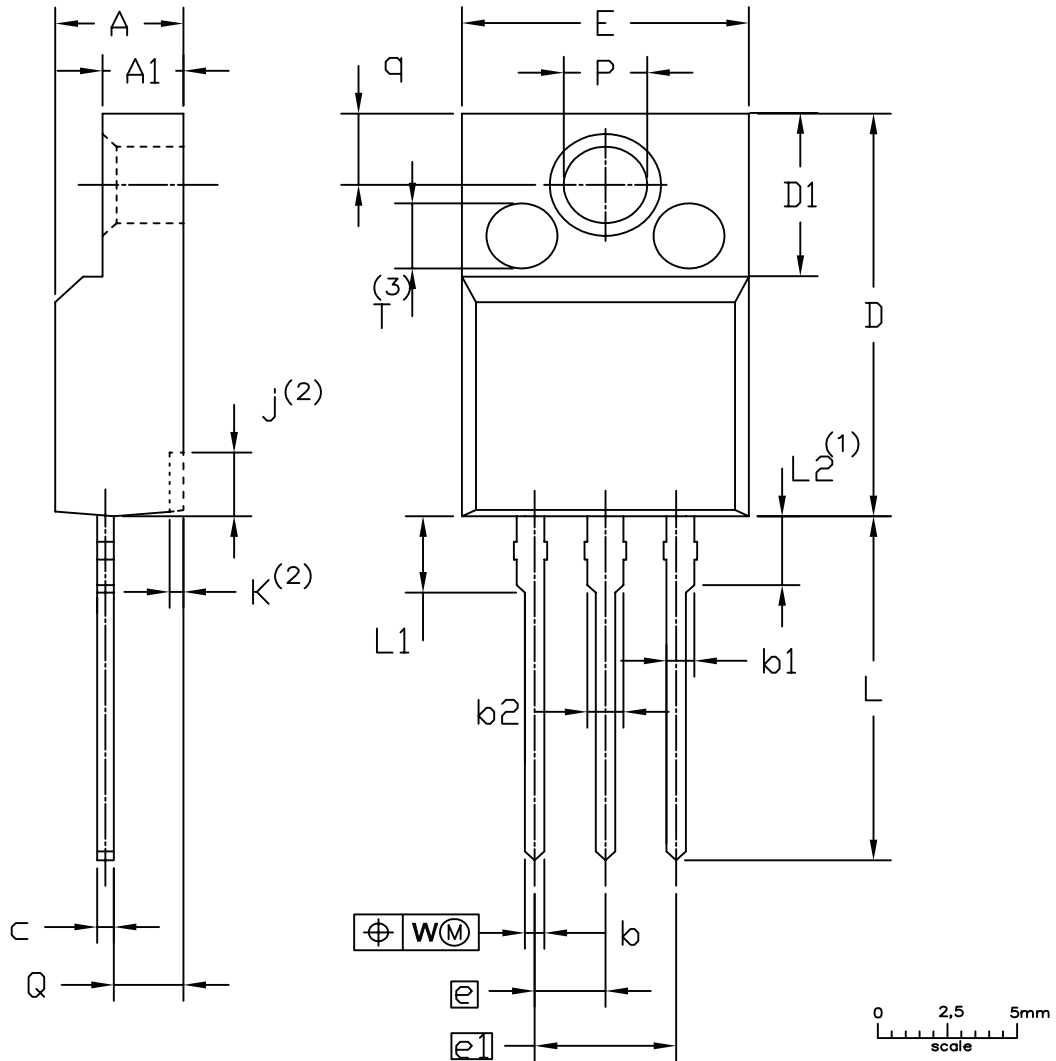
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward current	$I_F = 10\text{ A}; T_j = 25\text{ °C};$ per diode; <a href="#">Fig. 6</a>	-	-	1.25	V
		$I_F = 10\text{ A}; T_j = 125\text{ °C};$ per diode; <a href="#">Fig. 6</a>	-	-	1	V
$I_R$	reverse current	$V_R = 300\text{ V}; T_j = 25\text{ °C};$ per diode	-	-	20	$\mu\text{A}$
		$V_R = 300\text{ V}; T_j = 125\text{ °C};$ per diode	-	-	300	$\mu\text{A}$
<b>Dynamic characteristics</b>						
$Q_r$	reverse charge	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s};$ $T_j = 25\text{ °C};$ per diode; <a href="#">Fig. 7</a>	-	9	-	nC
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 50\text{ A}/\mu\text{s};$ $T_j = 25\text{ °C};$ per diode; <a href="#">Fig. 7</a>	-	-	35	ns
		$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s};$ $T_j = 25\text{ °C};$ per diode; <a href="#">Fig. 7</a>	-	-	25	ns
		$I_F = 10\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s};$ $T_j = 25\text{ °C};$ per diode; <a href="#">Fig. 7</a>	-	25	-	ns
		$I_F = 10\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s};$ $T_j = 125\text{ °C};$ per diode; <a href="#">Fig. 7</a>	-	33	-	ns
$I_{RM}$	peak reverse recovery current	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 50\text{ A}/\mu\text{s};$ $T_j = 25\text{ °C};$ per diode; <a href="#">Fig. 7</a>	-	0.7	-	A
		$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s};$ $T_j = 25\text{ °C};$ per diode; <a href="#">Fig. 7</a>	-	1.1	-	A
		$I_F = 10\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s};$ $T_j = 25\text{ °C};$ per diode; <a href="#">Fig. 7</a>	-	2.8	-	A
		$I_F = 10\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s};$ $T_j = 125\text{ °C};$ per diode; <a href="#">Fig. 7</a>	-	-	8	A



12. Package outline

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

SOT186A



UNIT	A	A <sub>1</sub>	b	b <sub>1</sub>	b <sub>2</sub>	c	D	D <sub>1</sub>	E	e	e <sub>1</sub>	j <sup>(2)</sup>	k <sup>(2)</sup>	L	L <sub>1</sub>	L <sub>2</sub> <sup>(1)</sup> max.	P	Q	q	W	T <sup>(3)</sup>
mm	4.6	2.9	0.9	1.1	1.4	0.7	15.8	6.5	10.3	2.54	5.08	2.7	0.6	14.4	3.30	3	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			1.7	0.4	13.5	2.79		3.0	2.3	2.6		

Notes

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

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

## 13. Legal information

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Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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