

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

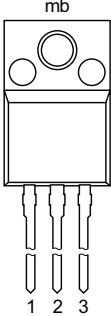
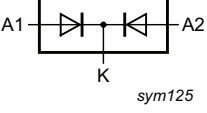
4. Quick reference data

Table 1. Quick reference data

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

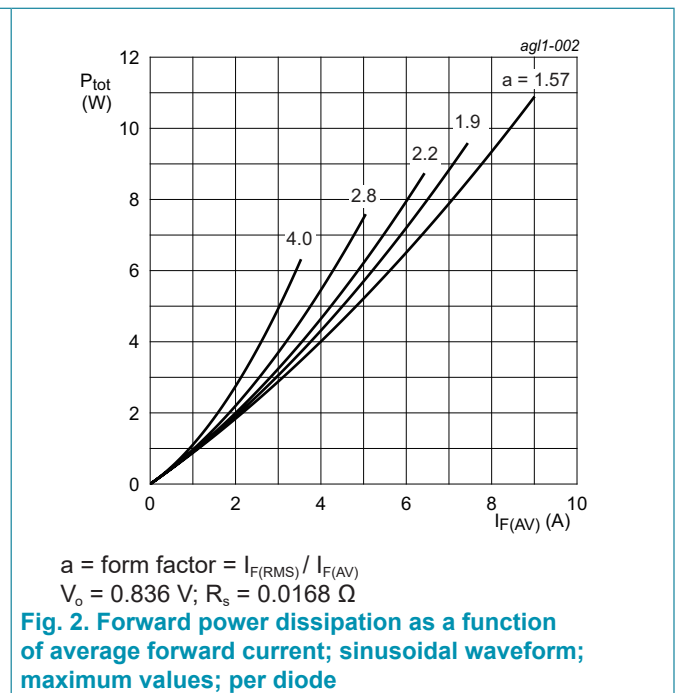
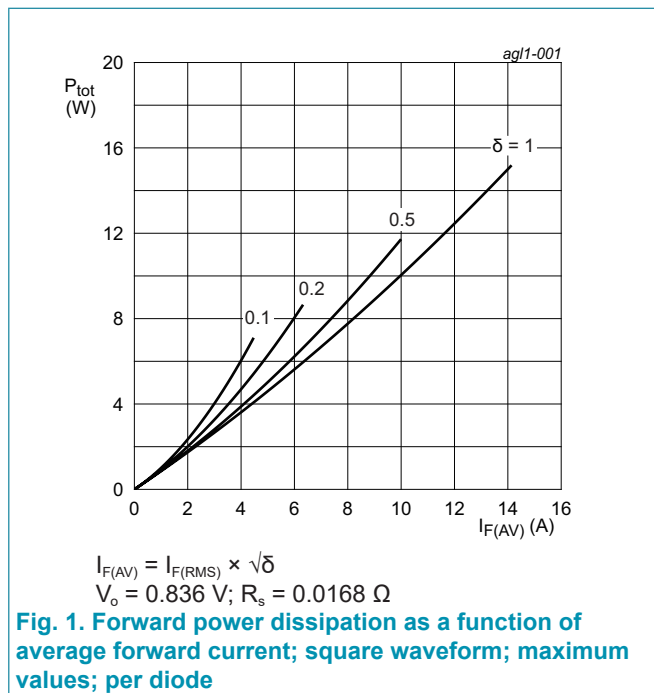
Type number	Marking codes
BYV32EX-300P	BYV32EX-300P

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; Fig. 1 ; Fig. 2 ; Fig. 3	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; Fig. 4	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	$^\circ\text{C}$



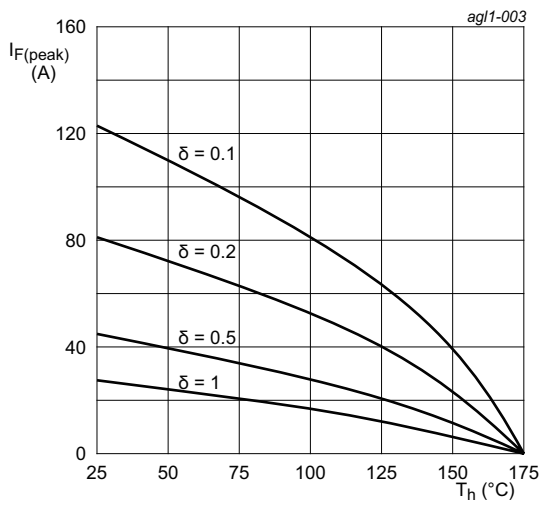


Fig. 3. Forward current as a function of heatsink temperature; maximum values; per diode

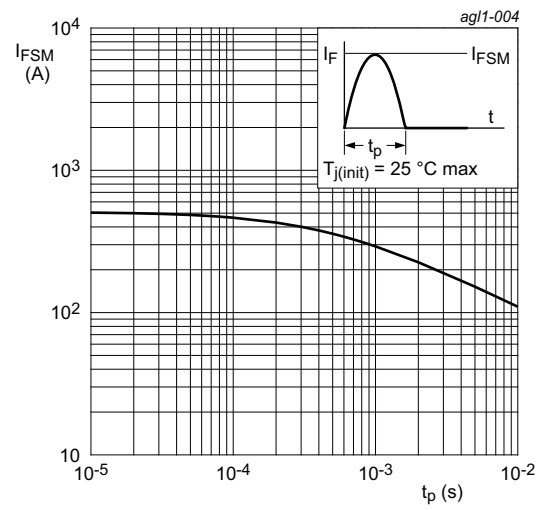


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

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; Fig. 5	-	-	4.2	K/W
		with heatsink compound; both diodes conducting; Fig. 5	-	-	3.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	60	-	K/W

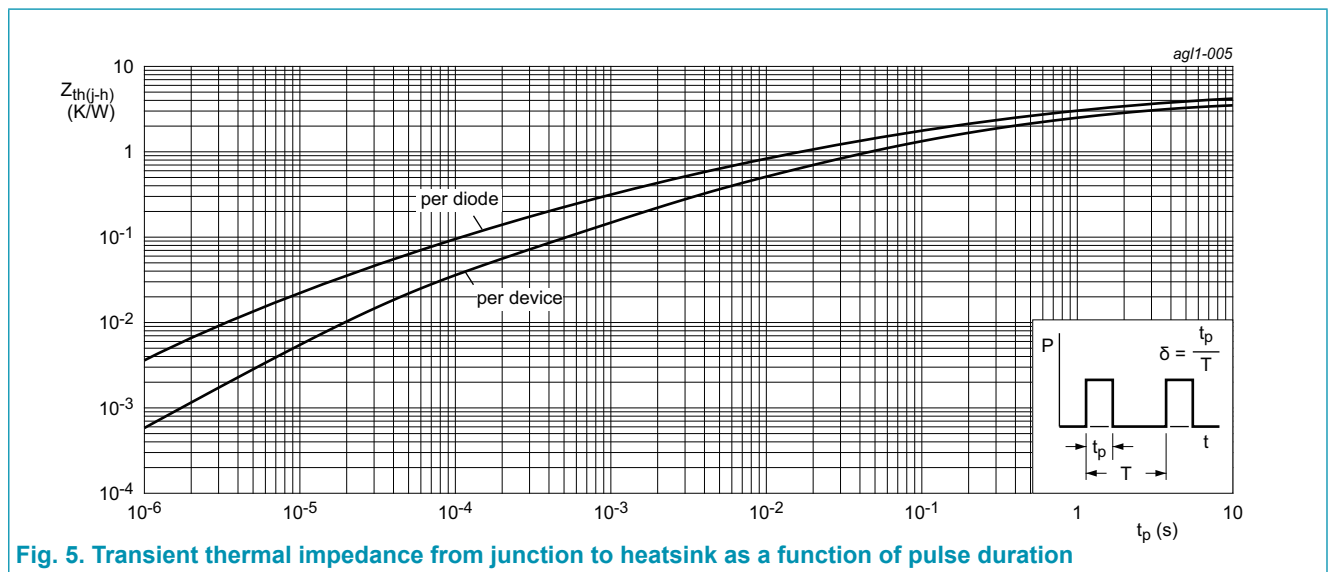


Fig. 5. Transient thermal impedance from junction to heatsink as a function of pulse duration

10. Isolation characteristics

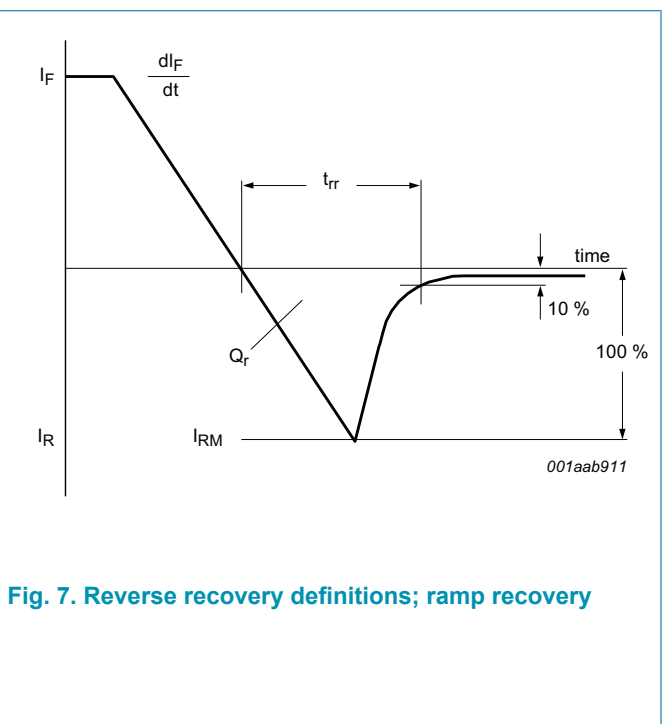
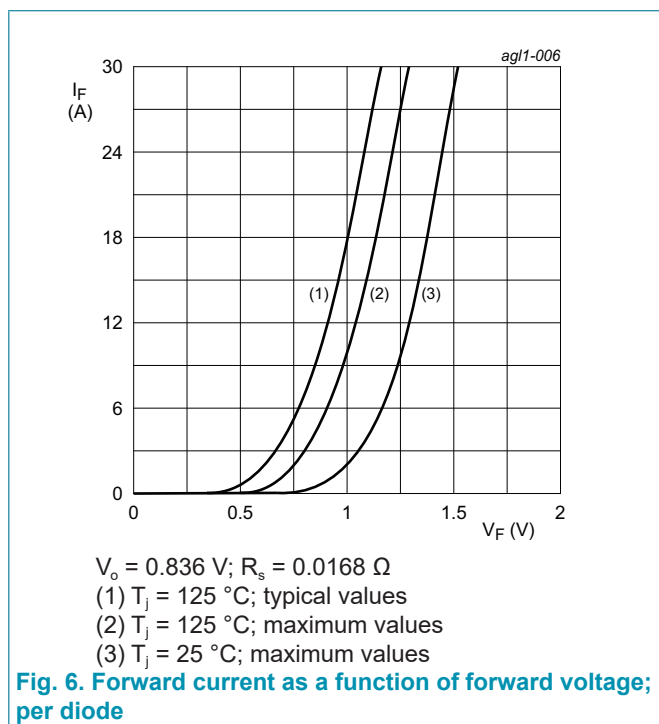
Table 7. Isolation characteristics

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

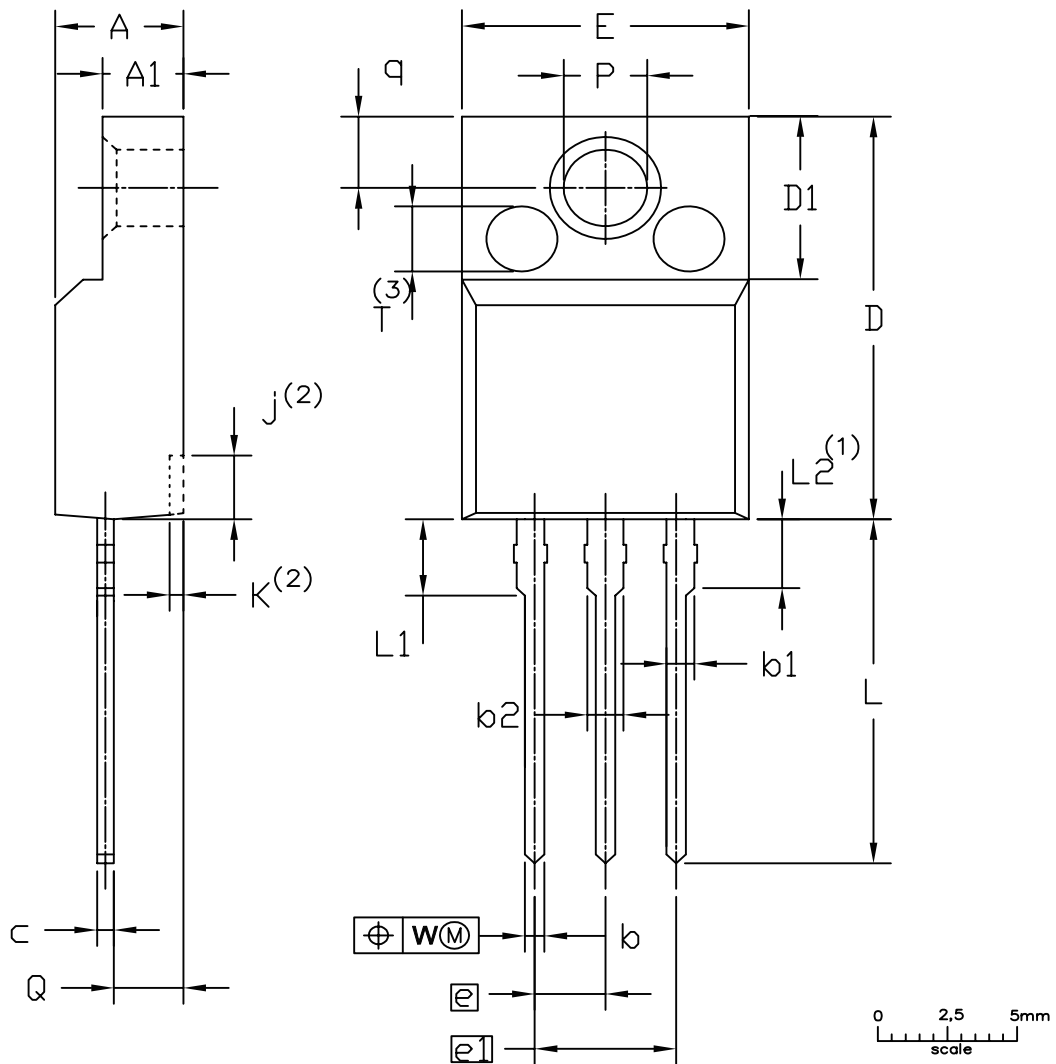
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V _F	forward current	I _F = 10 A; T _j = 25 °C; per diode; Fig. 6	-	-	1.25	V
		I _F = 10 A; T _j = 125 °C; per diode; Fig. 6	-	-	1	V
I _R	reverse current	V _R = 300 V; T _j = 25 °C; per diode	-	-	20	µA
		V _R = 300 V; T _j = 125 °C; per diode	-	-	300	µA
Dynamic characteristics						
Q _r	reverse charge	I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/µs; T _j = 25 °C; per diode; Fig. 7	-	9	-	nC
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 50 A/µs; T _j = 25 °C; per diode; Fig. 7	-	-	35	ns
		I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/µs; T _j = 25 °C; per diode; Fig. 7	-	-	25	ns
		I _F = 10 A; V _R = 200 V; dI _F /dt = 200 A/µs; T _j = 25 °C; per diode; Fig. 7	-	25	-	ns
		I _F = 10 A; V _R = 200 V; dI _F /dt = 200 A/µs; T _j = 125 °C; per diode; Fig. 7	-	33	-	ns
I _{RM}	peak reverse recovery current	I _F = 1 A; V _R = 30 V; dI _F /dt = 50 A/µs; T _j = 25 °C; per diode; Fig. 7	-	0.7	-	A
		I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/µs; T _j = 25 °C; per diode; Fig. 7	-	1.1	-	A
		I _F = 10 A; V _R = 200 V; dI _F /dt = 200 A/µs; T _j = 25 °C; per diode; Fig. 7	-	2.8	-	A
		I _F = 10 A; V _R = 200 V; dI _F /dt = 200 A/µs; T _j = 125 °C; per diode; Fig. 7	-	-	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 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	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

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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- [2] The term 'short data sheet' is explained in section "Definitions".
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Date of release: 13 March 2019



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