BYV32EX-300P

Dual ultrafast power diode

Rev.01 13 March 2019 Product data sheet

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

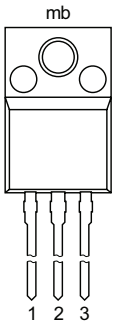
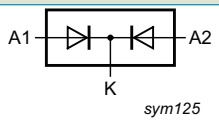
4. Quick reference data

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	δ = 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	δ = 0.5 ; t_p = 25 µs; $T_h \leq 126$ °C; square-wave pulse; per diode	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	220				A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode	242				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/µs; 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	mb	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

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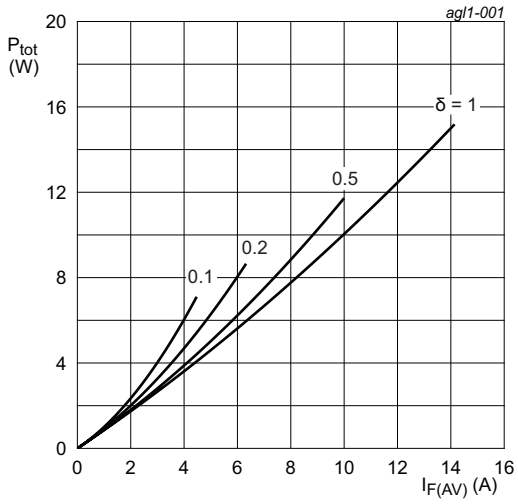
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8. Limiting values

Table 5. Limiting values

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

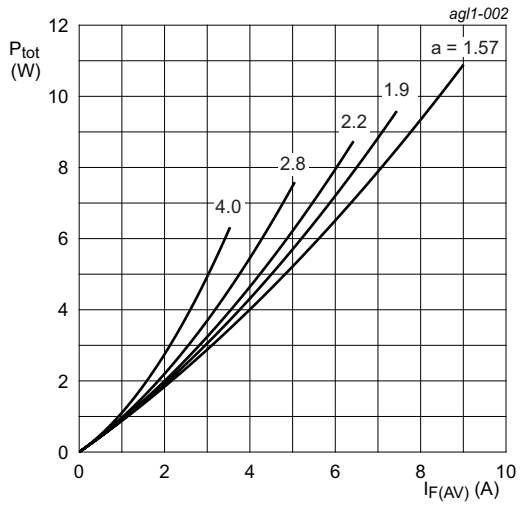
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		300	V
V_{RWM}	crest working reverse voltage		300	V
V_R	reverse voltage	DC	300	V
$I_{F(AV)}$	average forward current	δ = 0.5 ; square-wave pulse; $T_h \leq 126$ °C; per diode; Fig. 1; Fig. 2; Fig. 3	10	A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; $T_h \leq 126$ °C; square-wave pulse; per diode	20	A
$I_{O(AV)}$	average output current	δ = 0.5 ; $T_h \leq 93$ °C; square-wave pulse; both diodes conducting	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	220	A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode	242	A
T_{stg}	storage temperature		-65 to 175	°C
T_j	junction temperature		175	°C



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

V_o = 0.836 V; R_s = 0.0168 Ω

Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values; per diode



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

V_o = 0.836 V; R_s = 0.0168 Ω

Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values; per diode

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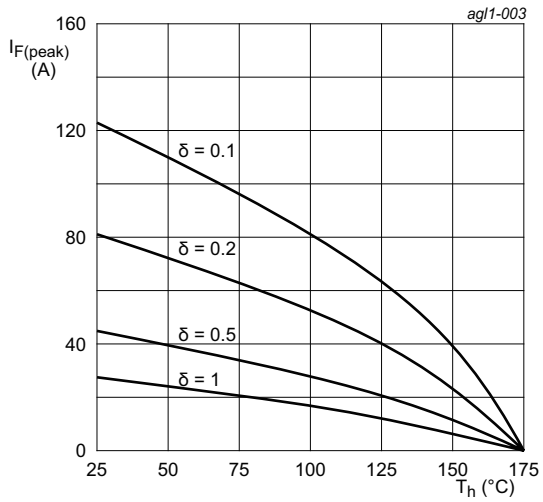


Fig. 3. Forward current as a function of heatsink temperature; maximum values; per diode

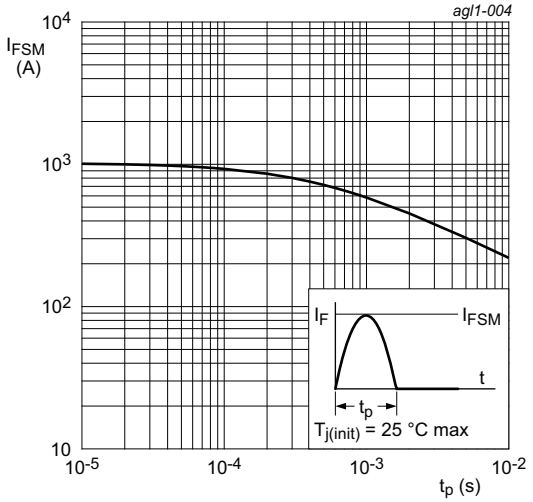


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

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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

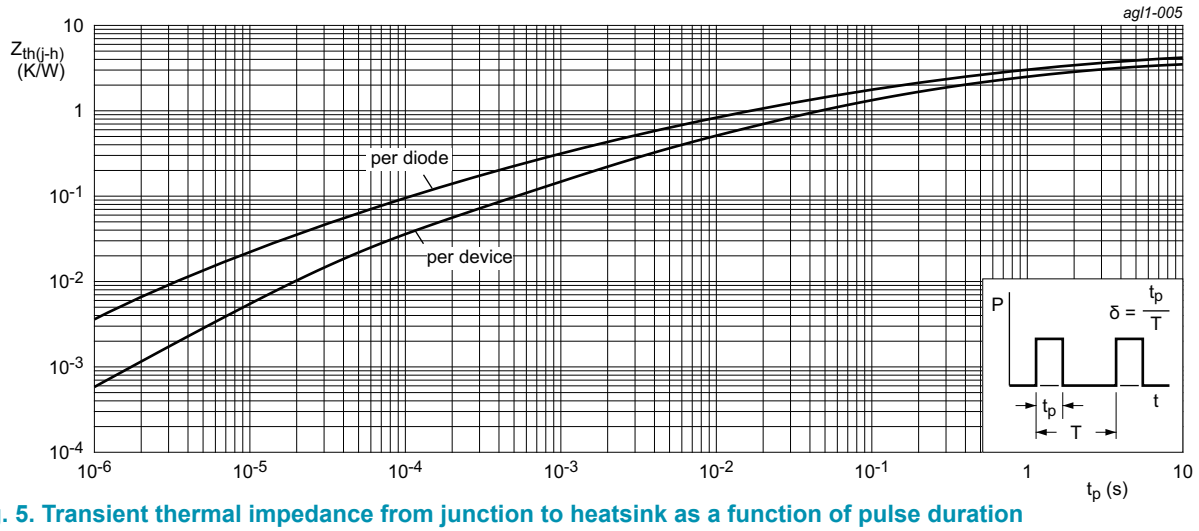


Fig. 5. Transient thermal impedance from junction to heatsink as a function of pulse duration

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

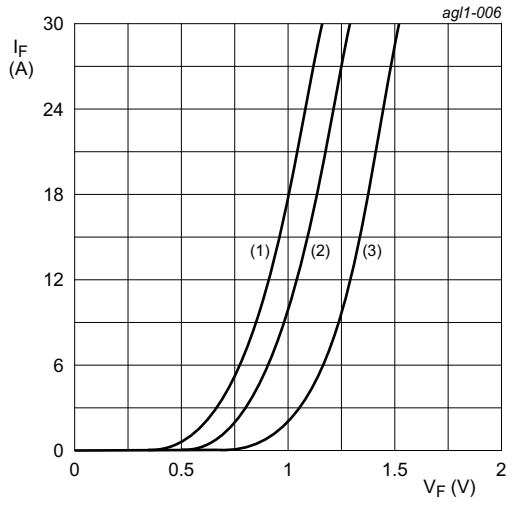
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11. Characteristics

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



V_o = 0.836 V; R_s = 0.0168 Ω
(1) T_j = 125 °C; typical values
(2) T_j = 125 °C; maximum values
(3) T_j = 25 °C; maximum values

Fig. 6. Forward current as a function of forward voltage; per diode

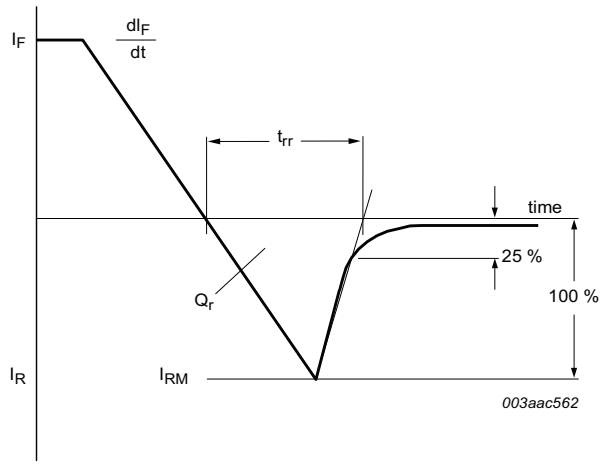


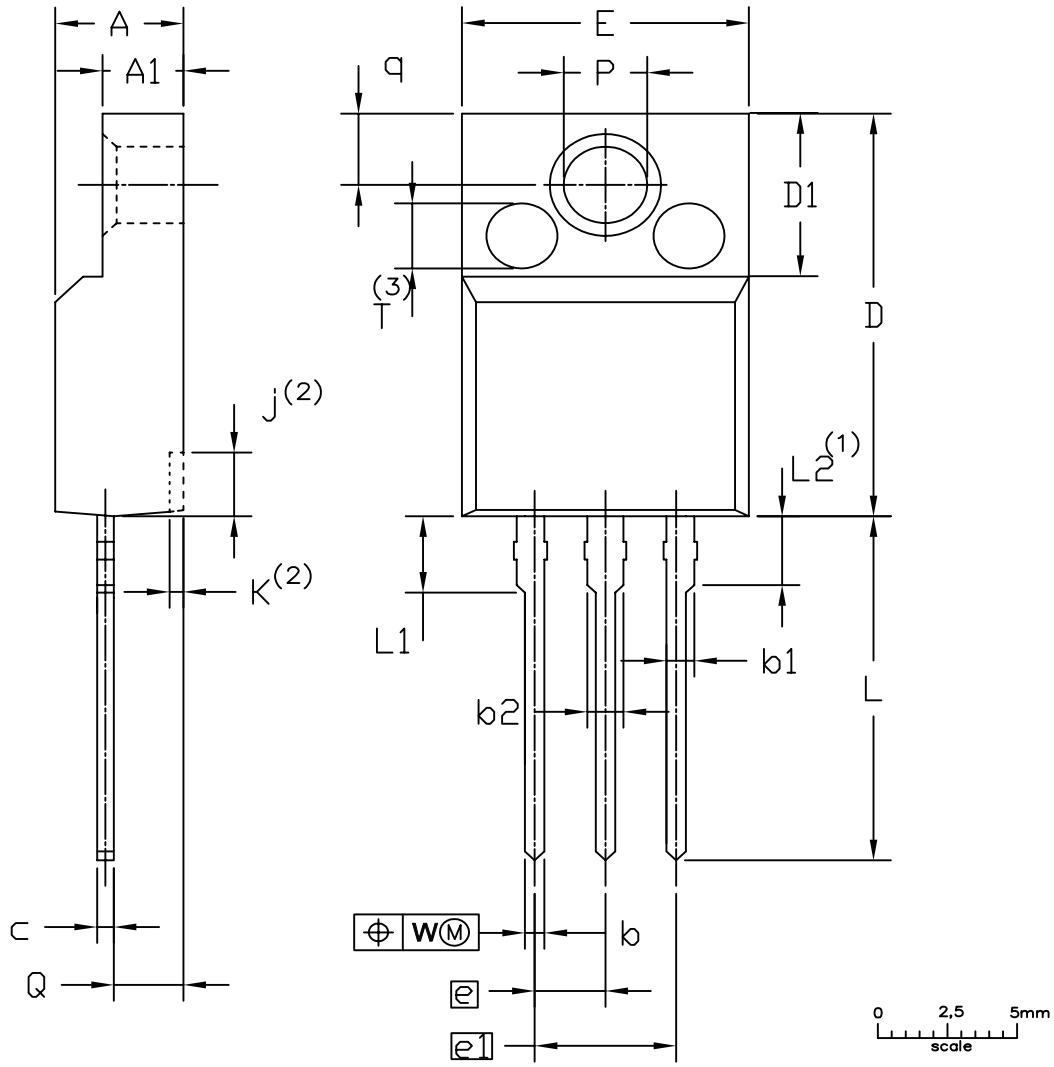
Fig. 7. Reverse recovery definitions; ramp recovery

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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
1. Terminal dimensions within this zone are uncotrolled
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

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