BYV32EB-300P

Dual ultrafast power diode

Rev.02 31 December 2019 Product data sheet

1. General description

Dual ultrafast power diode in a TO263 (D2PAK) 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

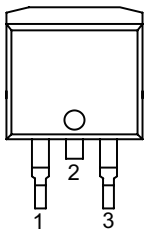
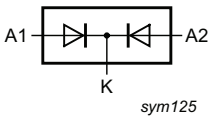
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values				Unit
Absolute maximum rating							
V_{RRM}	repetitive peak reverse voltage		300				V
$I_{O(AV)}$	average forward current	δ = 0.5 ; square-wave pulse; $T_{mb} \leq 155$ °C; both diodes conducting; Fig. 1; Fig. 2; Fig. 3	20				A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; $T_{mb} \leq 157$ °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	K	mounting base; connected to cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BYV32EB-300P	TO263	BYV32EB-300PJ	Reel	800	TO263E	26-May-2017

7. Marking

Table 4. Marking codes

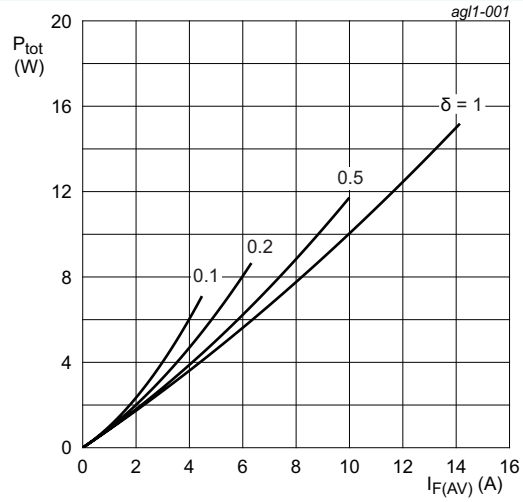
Type number	Marking codes
BYV32EB-300P	BYV32EB-300P

8. Limiting values

Table 5. Limiting values

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

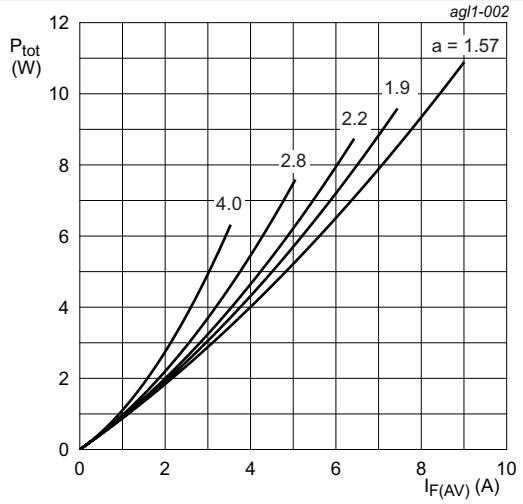
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		300	V
V_{RWM}	crest working reverse voltage		300	V
V_R	reverse voltage	DC	300	V
$I_{O(AV)}$	average output current	δ = 0.5 ; T_{mb} ≤ 155 °C; square-wave pulse; both diodes conducting; Fig. 1; Fig. 2; Fig. 3	20	A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; T_{mb} ≤ 157 °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
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

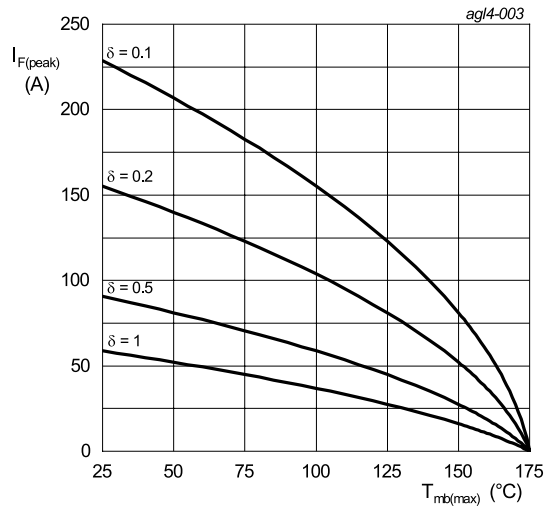


Fig. 3. Forward current as a function of mounting base temperature; maximum values; per diode

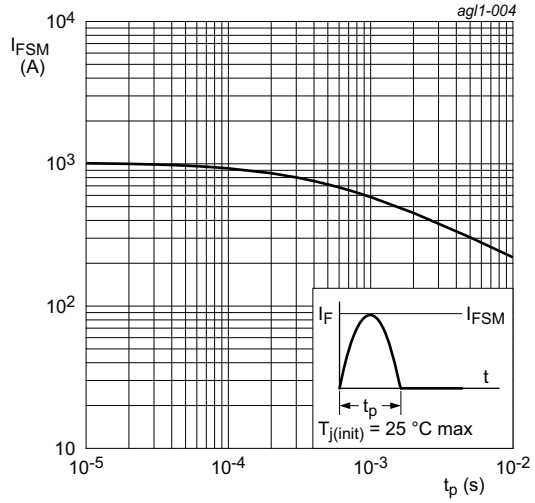


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound; per diode; Fig. 5		-	-	1.5	K/W
		with heatsink compound; both diodes conducting; Fig. 5		-	-	0.85	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	50	-	K/W

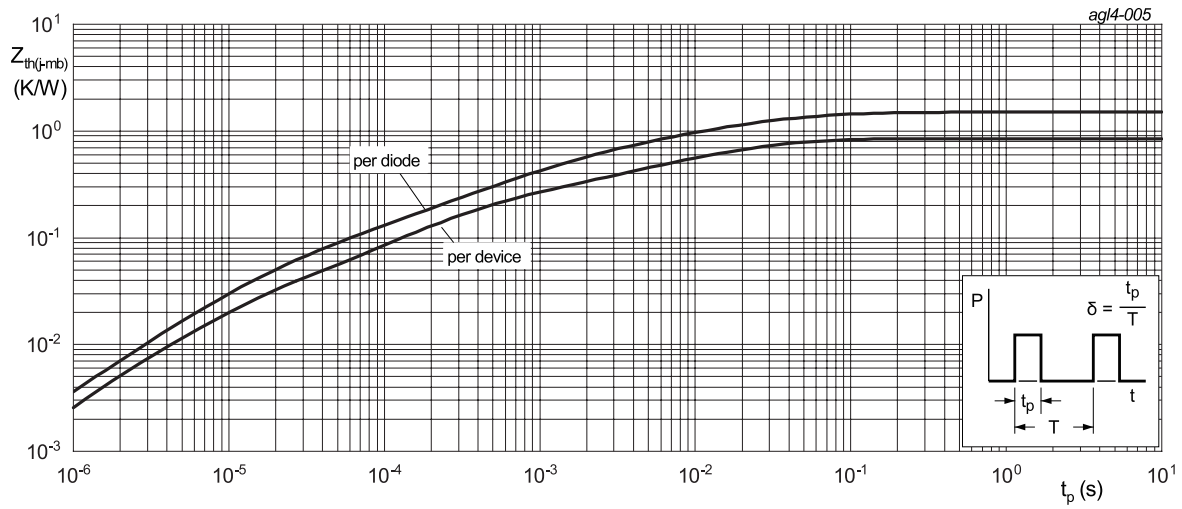
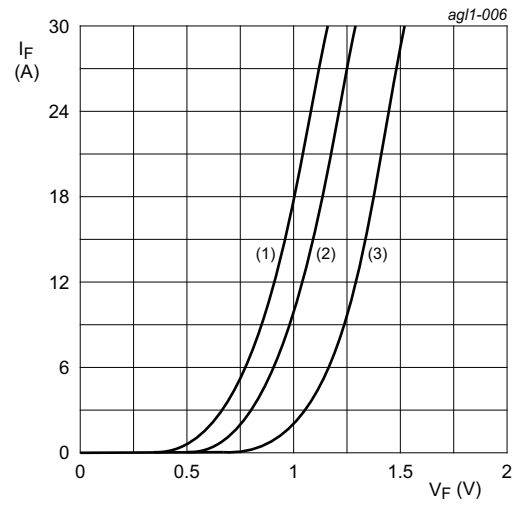


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. 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

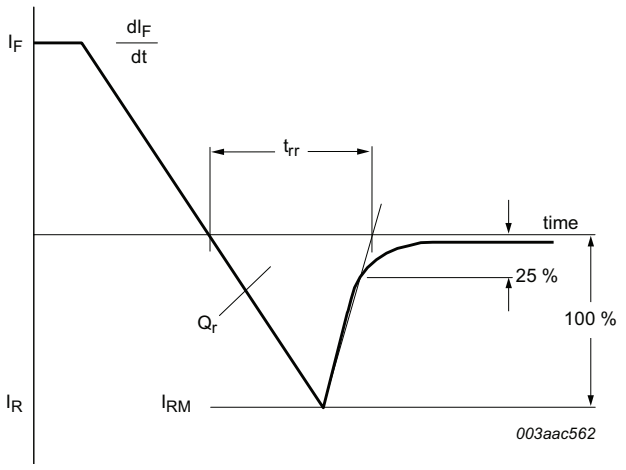
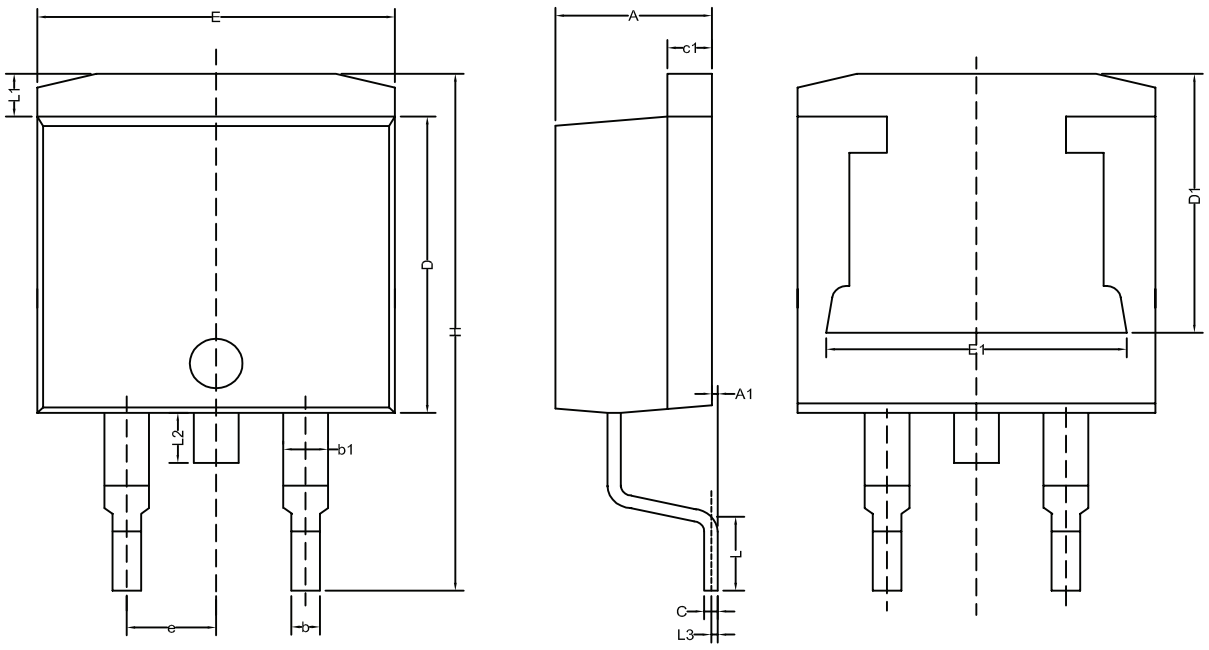
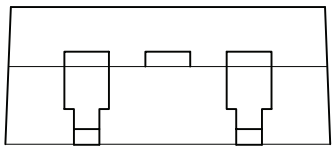


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

Plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped) TO263





Unit		A	A1	b	b1	c	c1	D	D1	E	E1	e	H	L	L1	L2	L3
MM	min	4.35	0.00	0.69	1.14	0.38	1.14	8.50	7.50	10.00	8.25	2.54 (BSC)	14.60	2.50	1.00	1.27	0.25 (BSC.)
	max	4.75	0.15	0.99	1.73	0.61	1.40	9.02	8.00	10.40	8.80		15.60	2.79	1.65	1.78	

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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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13. Contents

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