BYV32EB-200P

Dual ultrafast power diodes

Rev.01 - 28 August 2017 Product data sheet

1. General description

Dual ultrafast power diode in TO263 (D2PAK) plastic package.

2. Features and benefits

- Low on-state loss
- Ultra low leakage
- 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

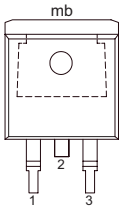
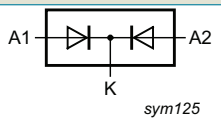
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
Absolute maximum rating						
V_{RRM}	repetitive peak reverse voltage		200			V
$I_{O(AV)}$	average output current	δ = 0.5 ; square-wave pulse; $T_{mb} \leq 143$ °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; $T_{mb} \leq 151$ °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	125			A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode	137			A
I_{RRM}	repetitive peak reverse current	square-wave pulse; f = 1 kHz; t_p = 2 µs; per diode	0.2			A
V_{ESD}	electrostatic discharge voltage	all pin; human body model; C = 250 pF; R = 1.5 kΩ	8			kV
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Unit**
Static characteristics						
V_F	forward voltage	I_F = 20A; T_j = 25 °C; per diode; Fig. 6	-	1.06	1.15	V
		I_F = 8 A; T_j = 150 °C; per diode; Fig. 6	-	0.76	0.85	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	-	18	25	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode		
2	K	cathode		
3	A	anode		
mb	mb	mounting base; connected to cathod		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYV32EB-200P	TO-263	plastic single-ended surface-mounted package (DPAK); 3-leads (one lead cropped)	DPAK

7. Marking

Table 4. Marking codes

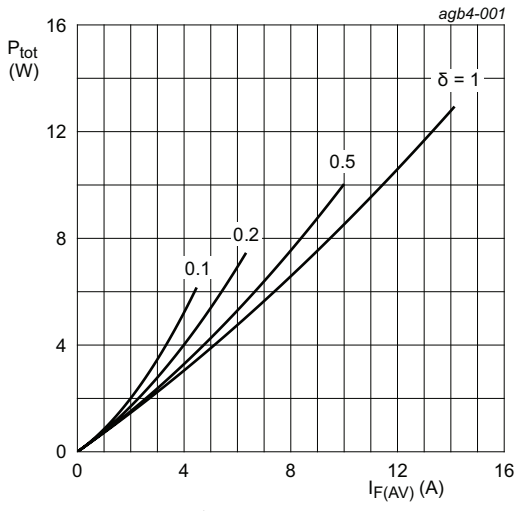
Type number	Marking codes
BYV32EB-200P	BYV32EB-200P

8. Limiting values

Table 5. Limiting values

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

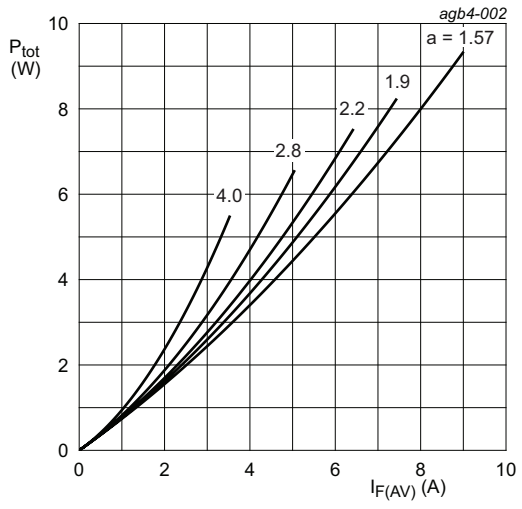
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		200	V
V_{RWM}	crest working reverse voltage		200	V
V_R	reverse voltage	DC	200	V
$I_{O(AV)}$	average output current	δ = 0.5 ; square-wave pulse; $T_{mb} \leq 143$ °C; both diodes conducting; Fig. 1; Fig. 2; Fig. 3	20	A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; $T_{mb} \leq 151$ °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	125	A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode	137	A
I_{RRM}	repetitive peak reverse current	square-wave pulse; f = 1 kHz; t_p = 2 µs; per diode	0.2	A
I_{RSM}	non-repetitive peak reverse current	square-wave pulse; t_p = 100 µs; per diode	0.2	A
T_{stg}	storage temperature		-65 to 175	°C
T_j	junction temperature		175	°C
V_{ESD}	electrostatic discharge voltage	all pin; human body model; C = 250 pF; R = 1.5 kΩ	8	8kV



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

V_o = 0.702; R_s = 0.0151 Ω

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



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

Vo = 0.702 V; Rs = 0.0151 Ω

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

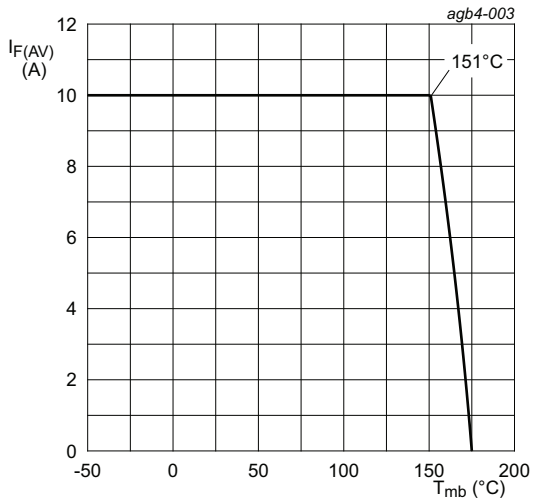


Fig. 3. Forward current as a function of mounting base temperature; maximum values; per diode

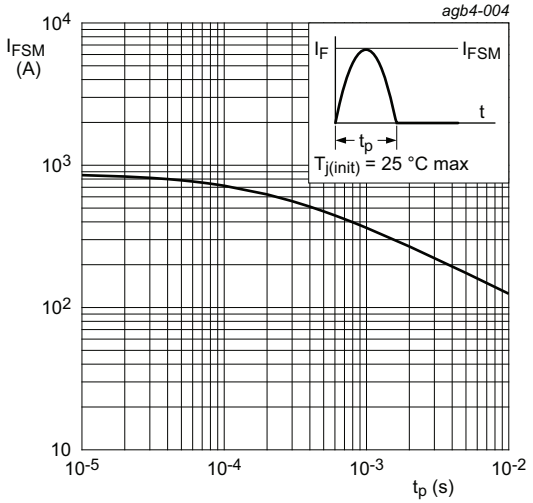


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

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	per diode; Fig. 5		-	-	2.4	K/W
		both diodes conducting; Fig. 5		-	-	1.6	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	50	-	K/W

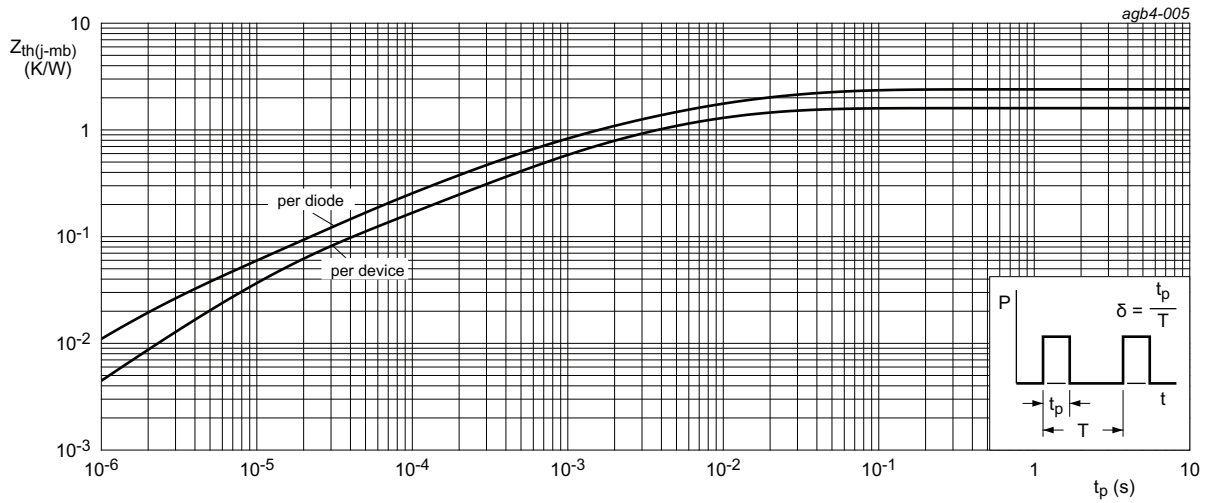
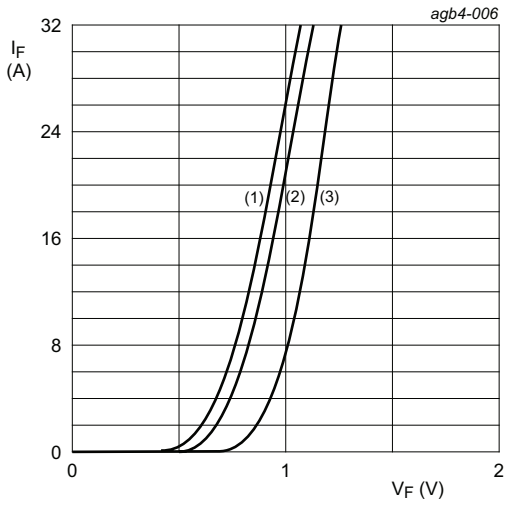


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V_F	forward current	I_F = 20 A; T_j = 25 °C; per diode; Fig. 6		-	1.06	1.15	V
		I_F = 10 A; T_j = 25 °C; per diode; Fig. 6		-	0.95	-	V
		I_F = 8 A; T_j = 150 °C; per diode; Fig. 6		-	0.76	0.85	V
I_R	reverse current	V_R = 200 V; T_j = 25 °C; per diode		-	0.3	5	µA
		V_R = 200 V; T_j = 150 °C; per diode		-	70	250	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		-	14.5	-	nC
		I_F = 2 A; V_R = 30 V; dI_F/dt = 20 A/µs; T_j = 25 °C; per diode; Fig. 7			13.5	-	nC
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		-	18	25	ns
I_{RM}	peak reverse recovery current	I_F = 1 A; V_R = 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; per diode; Fig. 7		-	1.7	-	A



V_o = 0.702 V; R_s = 0.0151 Ω
(1) T_j = 150 °C; typical values
(2) T_j = 150 °C; maximum values
(3) T_j = 25 °C; maximum values

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

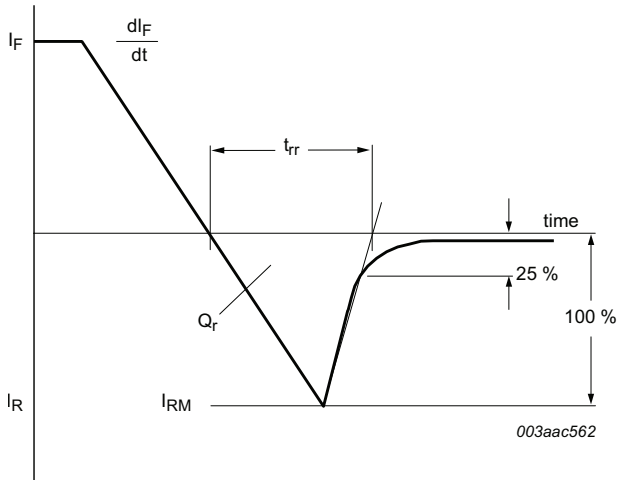
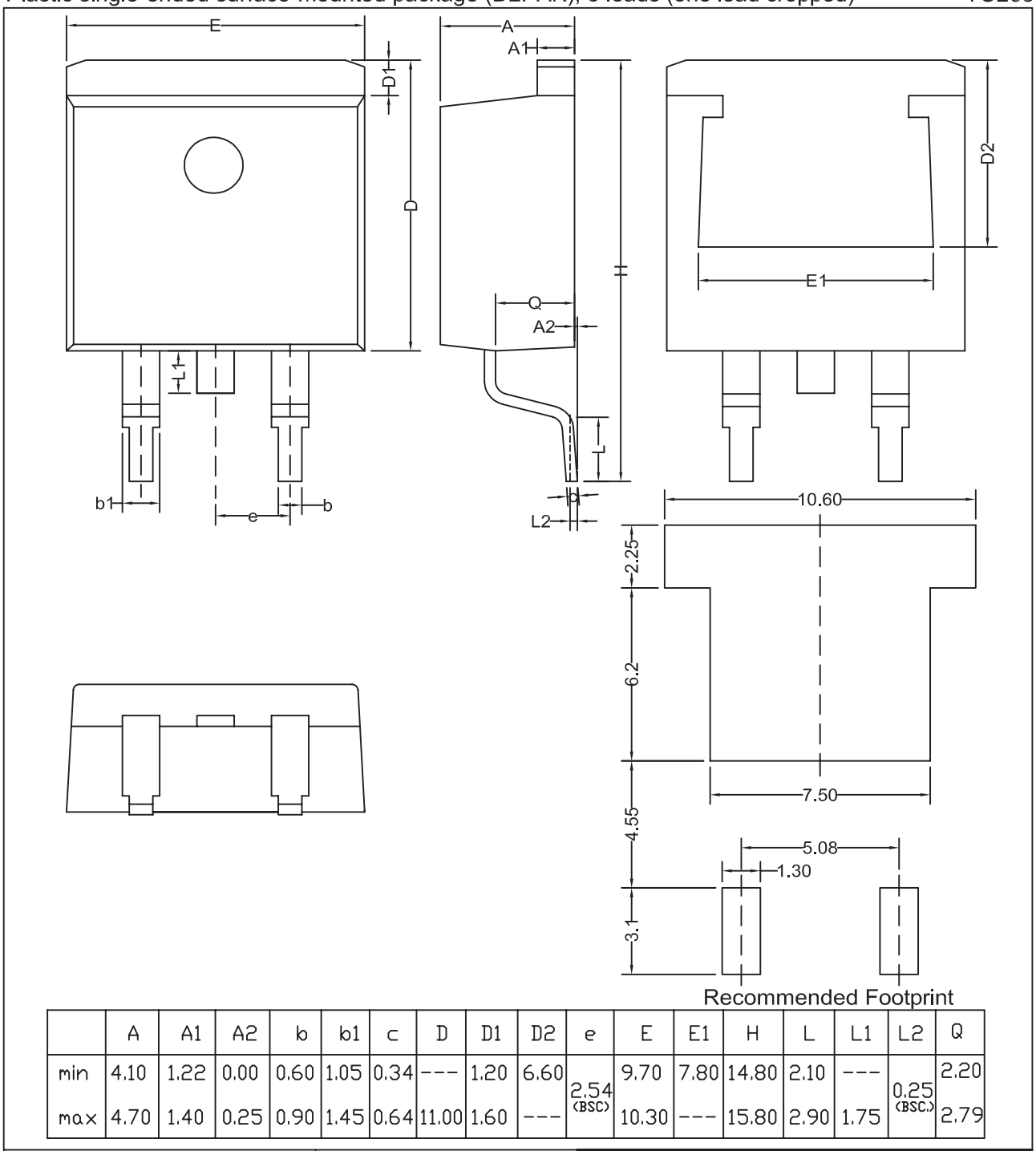


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

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



	A	A1	A2	b	b1	c	D	D1	D2	e	E	E1	H	L	L1	L2	Q
min	4.10	1.22	0.00	0.60	1.05	0.34	---	1.20	6.60	2.54 (BSC)	9.70	7.80	14.80	2.10	---	0.25 (BSC.)	2.20
max	4.70	1.40	0.25	0.90	1.45	0.64	11.00	1.60	---		10.30	---	15.80	2.90	1.75		2.79

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