

1. General description

Dual ultrafast power diode in a 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

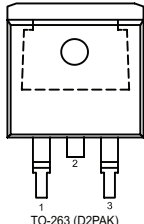
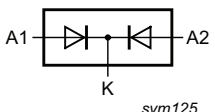
4. Quick reference data

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 forward current	$\delta = 0.5$; 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	$\delta = 0.5$; $t_p = 25$ μ s; $T_{mb} \leq 151$ °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; $t_p = 2$ μ s; per diode	0.2			A
V_{ESD}	electrostatic discharge voltage	all pin; human body model; $C = 250$ pF; $R = 1.5$ k Ω	8			kV
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 20$ A; $T_j = 25$ °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/ μ s; $T_j = 25$ °C; per diode; Fig. 7	-	18	25	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode	 <p>TO-263 (D2PAK)</p>	 <p>sym125</p>
2	K	cathode		
3	A2	anode		
mb	mb	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-200P	TO263	BYV32EB-200PJ	Reel	800	TO263N	26-Sep-2016

7. Marking

Table 4. Marking codes

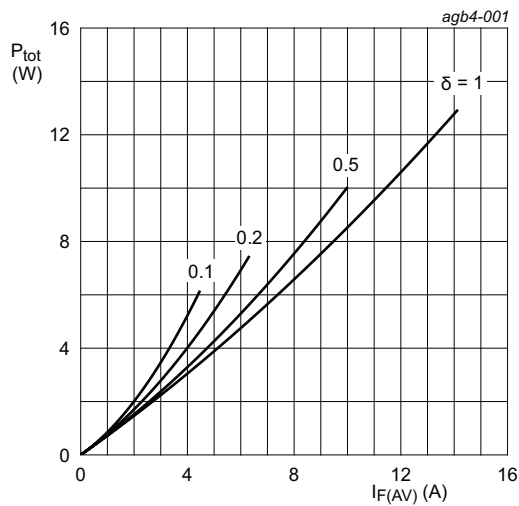
Type number	Marking codes
BYV32EB-200P	BYV32EB 200P

8. Limiting values

Table 5. Limiting values

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

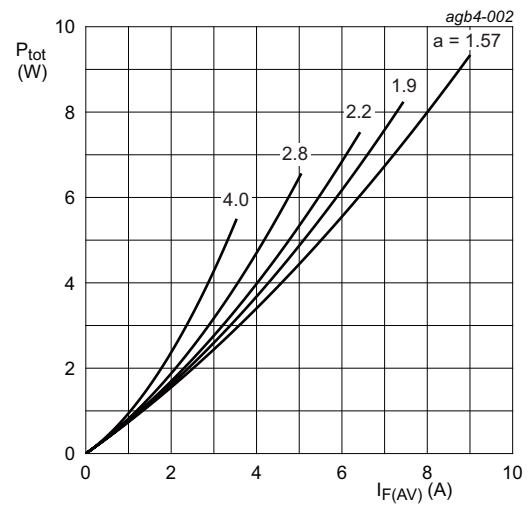
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		200	V
V_{RWM}	crest working reverse voltage		200	V
V_R	reverse voltage	DC	200	V
$I_{O(AV)}$	average output current	$\delta = 0.5$; $T_{mb} \leq 143\text{ }^\circ\text{C}$; square-wave pulse; both diodes conducting; Fig.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



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

$$V_o = 0.702\text{ V}; R_s = 0.0151\text{ }\Omega$$

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



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

$$V_o = 0.702\text{ V}; R_s = 0.0151\text{ }\Omega$$

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

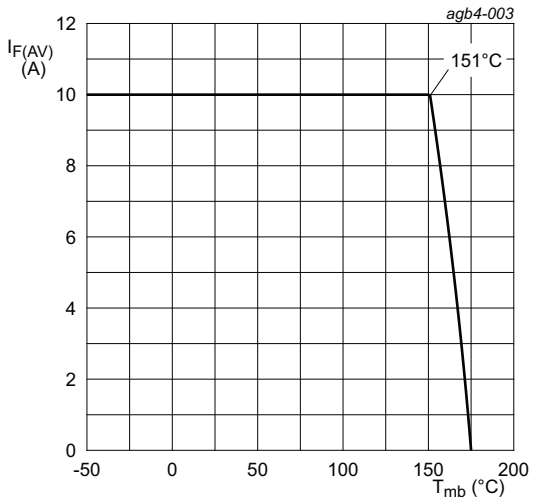


Fig. 3. Forward current as a function of mounting base temperature; maximum values; per diode

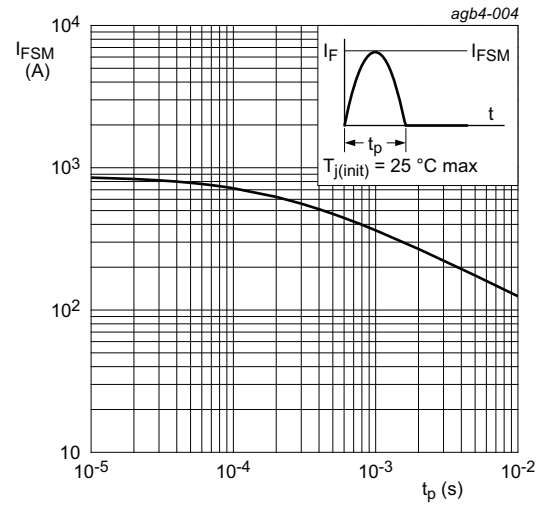


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

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

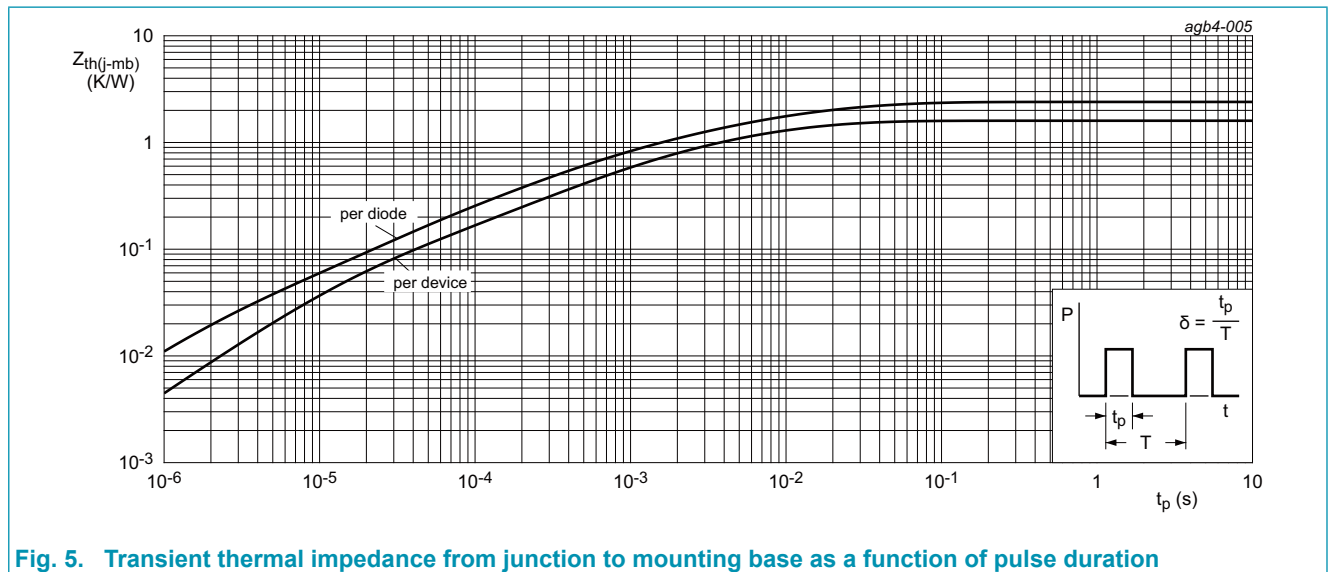
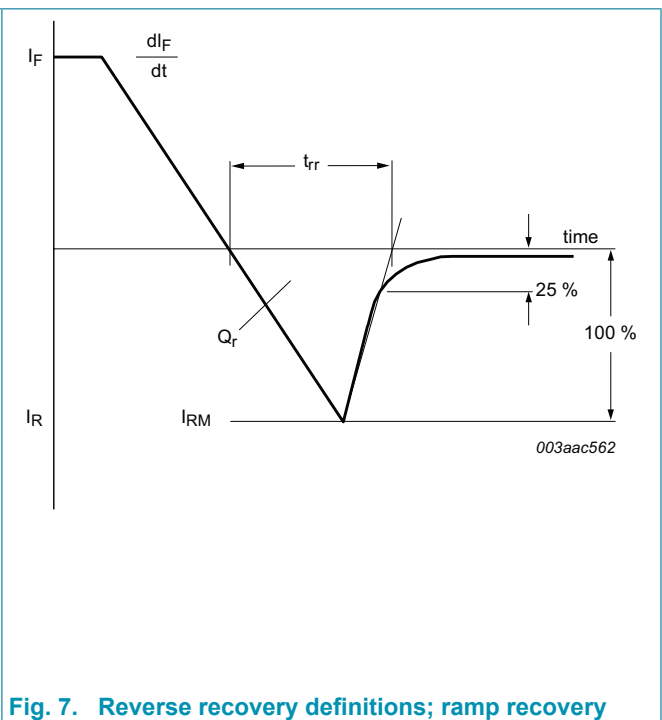
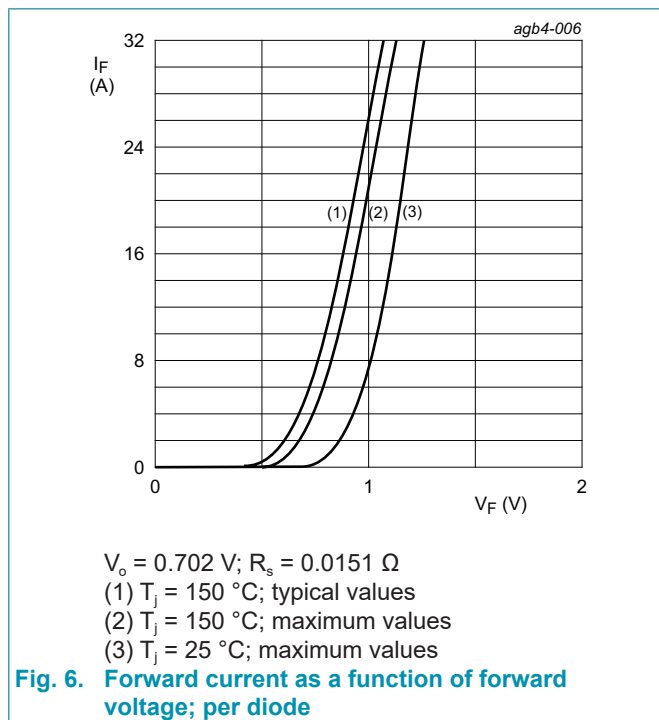


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

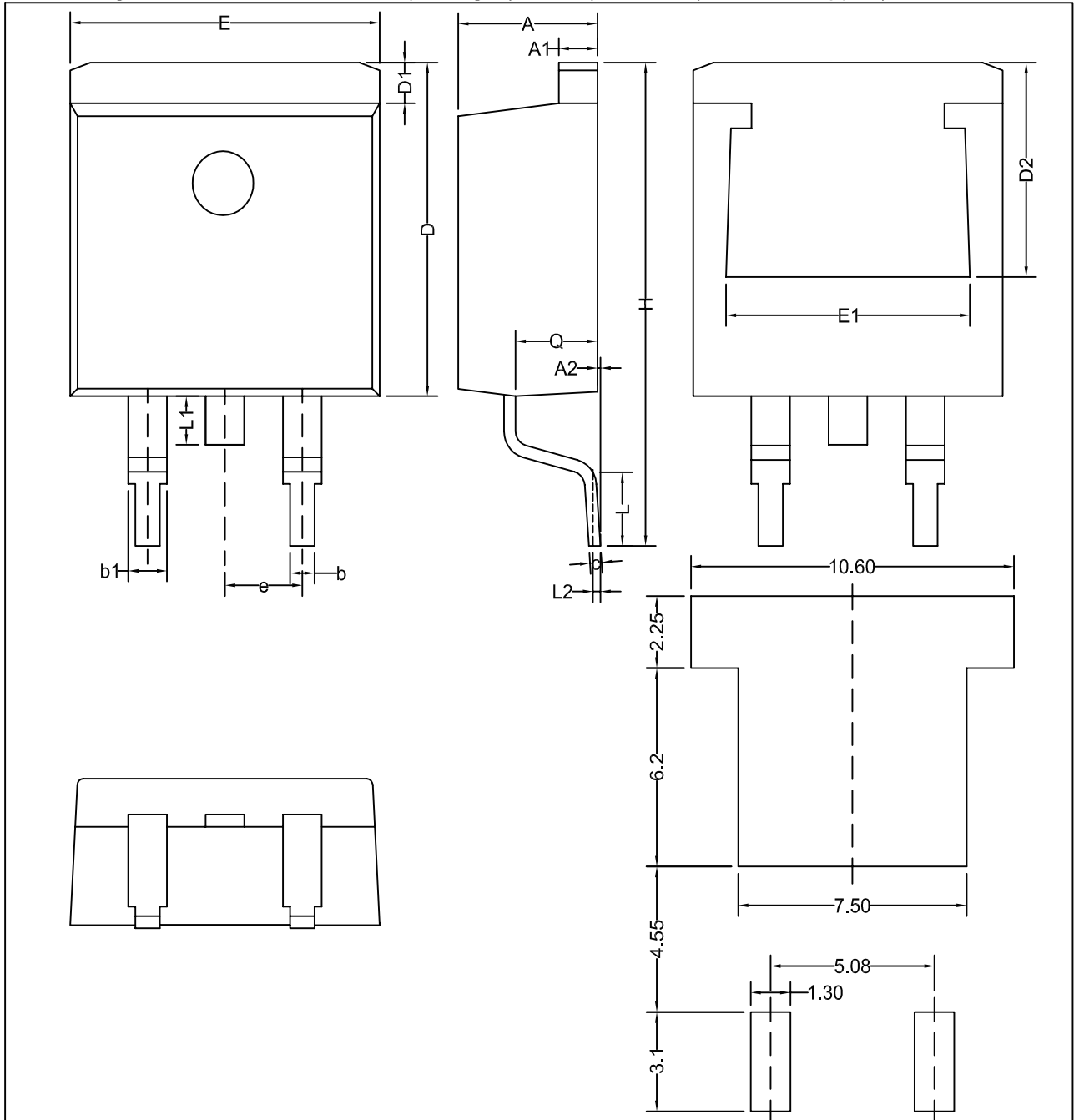
Table 7. Characteristics

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



11. Package outline

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



Recommended Footprint

Unit	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	---	9.70	7.80	14.80	2.10	---	---	2.20
max	4.70	1.40	0.25	0.90	1.45	0.64	11.00	1.60	---	2.54 (BSC)	10.30	---	15.80	2.90	1.75	0.25 (BSC)	2.79

12. 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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