

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

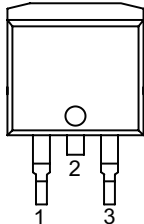
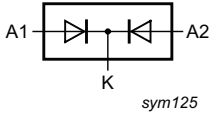
4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Values | | | Unit |
|--------------------------------|-------------------------------------|---|--------|-----|------|------|
| Absolute maximum rating | | | | | | |
| V_{RRM} | repetitive peak reverse voltage | | 300 | | | V |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; square-wave pulse; $T_{mb} \leq 157$ °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; $T_{mb} \leq 157$ °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/ 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 |  |  sym125 |
| 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

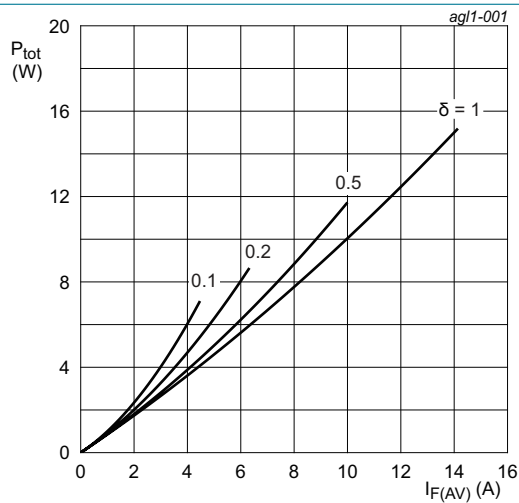
| Type number | Marking codes |
|--------------|---------------|
| BYV32EB-300P | BYV32EB-300P |

8. Limiting values

Table 5. Limiting values

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

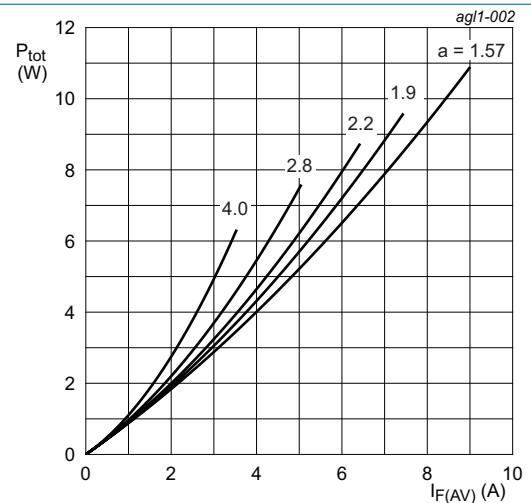
| Symbol | Parameter | Conditions | Values | Unit |
|-------------|-------------------------------------|---|------------|------------------|
| V_{RRM} | repetitive peak reverse voltage | | 300 | V |
| V_{RWM} | crest working reverse voltage | | 300 | V |
| V_R | reverse voltage | DC | 300 | V |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; square-wave pulse; $T_{mb} \leq 157\text{ }^\circ\text{C}$; per diode; Fig. 1 ; Fig. 2 ; Fig. 3 | 10 | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 157\text{ }^\circ\text{C}$; square-wave pulse; per diode | 20 | A |
| $I_{O(AV)}$ | average output current | $\delta = 0.5$; $T_{mb} \leq 155\text{ }^\circ\text{C}$; 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 | 220 | A |
| | | $t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse; per diode | 242 | A |
| T_{stg} | storage temperature | | -65 to 175 | $^\circ\text{C}$ |
| T_j | junction temperature | | 175 | $^\circ\text{C}$ |



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

$$V_o = 0.836\text{ V}; R_s = 0.0168\text{ }\Omega$$

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



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

$$V_o = 0.836\text{ V}; R_s = 0.0168\text{ }\Omega$$

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

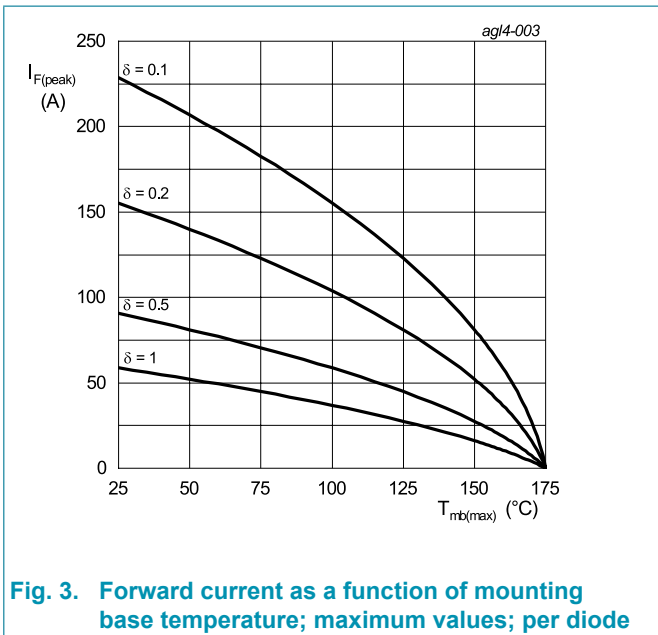


Fig. 3. Forward current as a function of mounting base temperature; maximum values; per diode

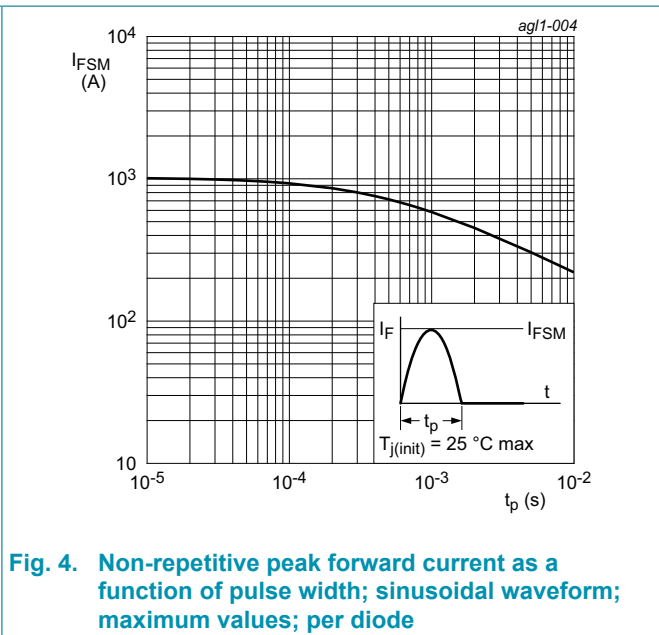


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

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 | 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 |

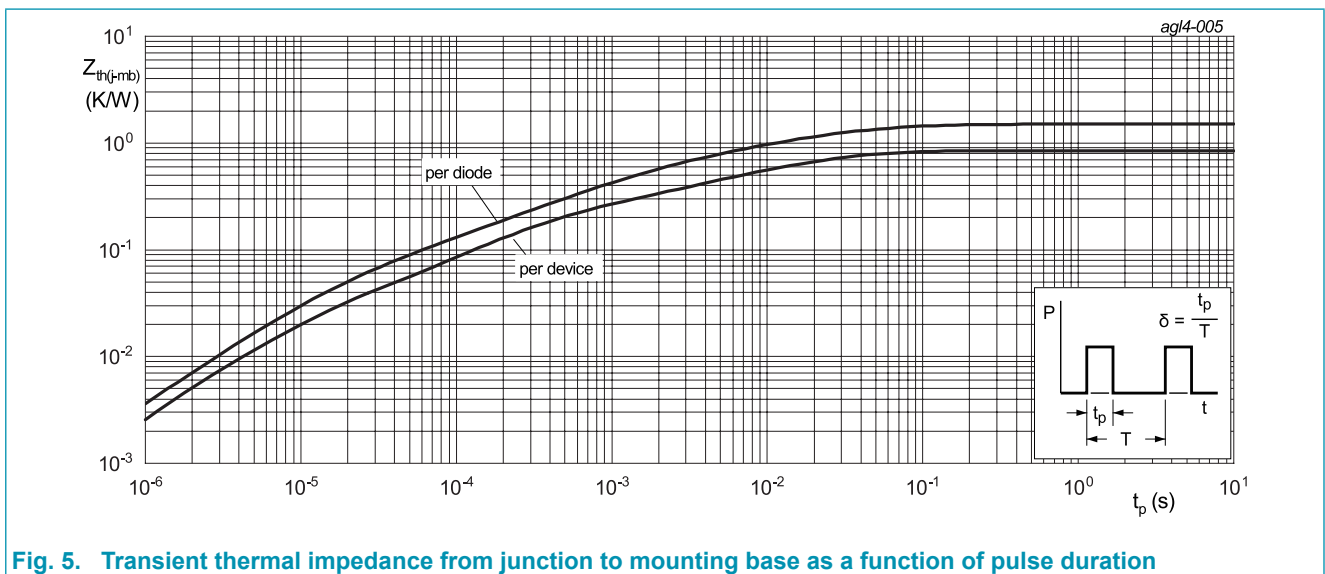
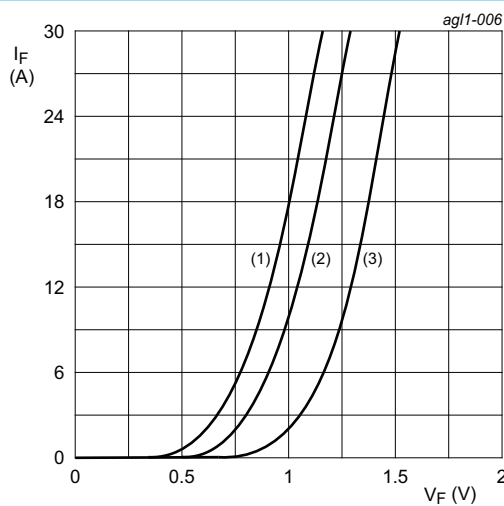


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

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 |



V₀ = 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

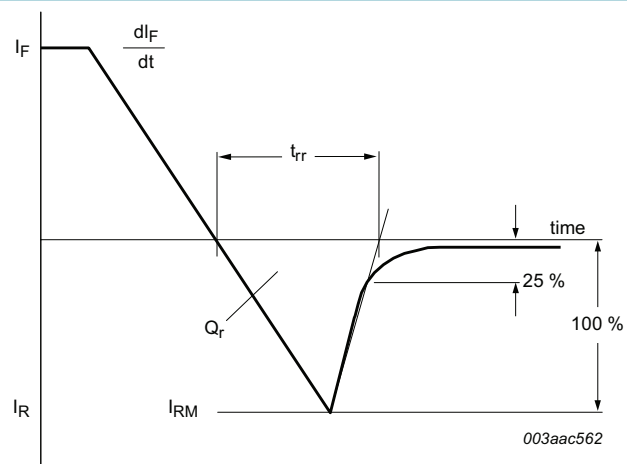
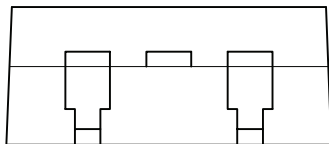
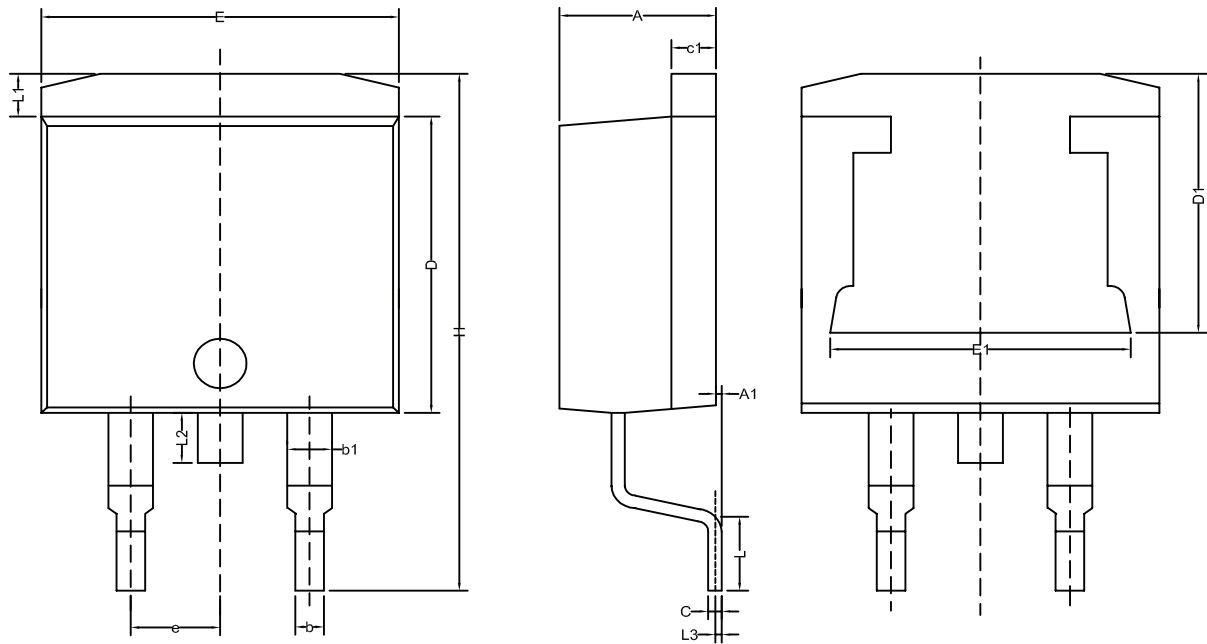


Fig. 7. Reverse recovery definitions; ramp recovery

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 | 14.60 | 2.50 | 1.00 | 1.27 | |
| | 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 | 0.25 |
| | | | | | | | | | | | 2.54 | | | | | (BSC) |
| | | | | | | | | | | | | | | | | (BSC) |

12. Legal information

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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. |
| 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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Телефон: 8 (812) 309-75-97 (многоканальный)

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Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А