

## 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

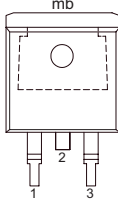
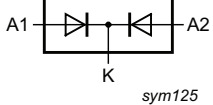
## 4. Quick reference data

Table 1. Quick reference data

| Symbol                         | Parameter                           | Conditions                                                                                                                                                 | Values |      |      | Unit |
|--------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|------|------|
| <b>Absolute maximum rating</b> |                                     |                                                                                                                                                            |        |      |      |      |
| $V_{RRM}$                      | repetitive peak reverse voltage     |                                                                                                                                                            | 200    |      |      | V    |
| $I_{O(AV)}$                    | average output current              | $\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 143$ °C; both diodes conducting; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> | 20     |      |      | A    |
| $I_{FRM}$                      | repetitive peak forward current     | $\delta = 0.5$ ; $t_p = 25$ $\mu$ 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; <a href="#">Fig. 4</a>                                                                   | 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; $t_p = 2$ $\mu$ s; per diode                                                                                               | 0.2    |      |      | A    |
| $V_{ESD}$                      | electrostatic discharge voltage     | all pin; human body model; $C = 250$ pF; $R = 1.5$ k $\Omega$                                                                                              | 8      |      |      | kV   |
| Symbol                         | Parameter                           | Conditions                                                                                                                                                 | Min    | Typ  | Max  | Unit |
| <b>Static characteristics</b>  |                                     |                                                                                                                                                            |        |      |      |      |
| $V_F$                          | forward voltage                     | $I_F = 20$ A; $T_J = 25$ °C; per diode; <a href="#">Fig. 6</a>                                                                                             | -      | 1.06 | 1.15 | V    |
|                                |                                     | $I_F = 8$ A; $T_J = 150$ °C; per diode; <a href="#">Fig. 6</a>                                                                                             | -      | 0.76 | 0.85 | V    |
| <b>Dynamic characteristics</b> |                                     |                                                                                                                                                            |        |      |      |      |
| $t_{rr}$                       | reverse recovery time               | $I_F = 1$ A; $V_R = 30$ V; $di_F/dt = 100$ A/ $\mu$ s; $T_J = 25$ °C; per diode; <a href="#">Fig. 7</a>                                                    | -      | 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

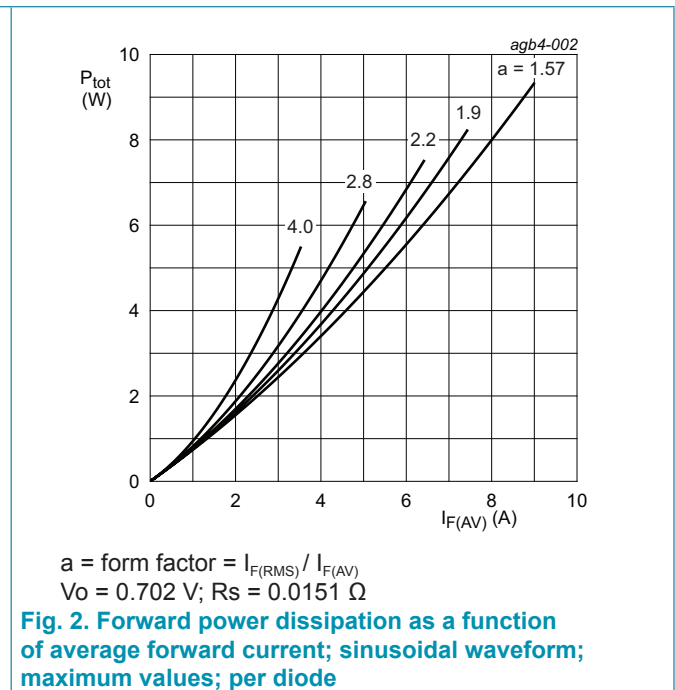
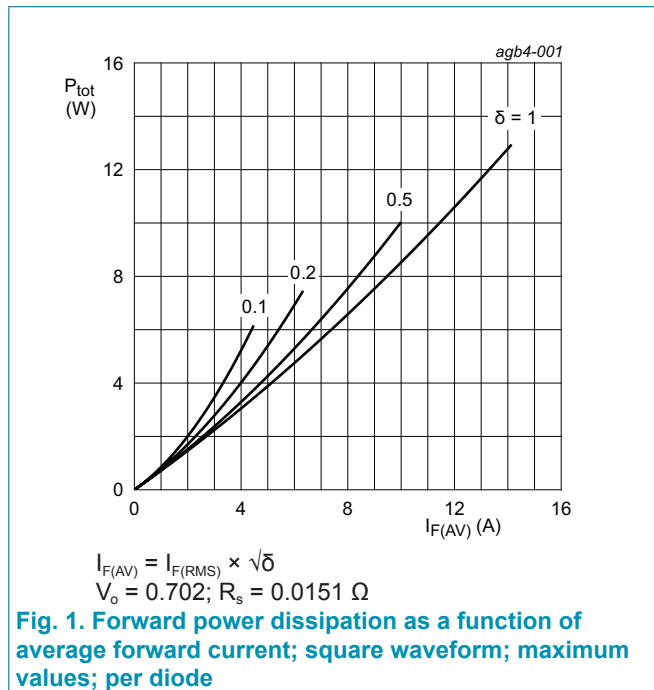
| Type number  | Marking codes |
|--------------|---------------|
| BYV32EB-200P | BYV32EB-200P  |

## 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              | $\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 143\text{ }^\circ\text{C}$ ; both diodes conducting; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> | 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; <a href="#">Fig. 4</a>                                                    | 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          | 8kV              |



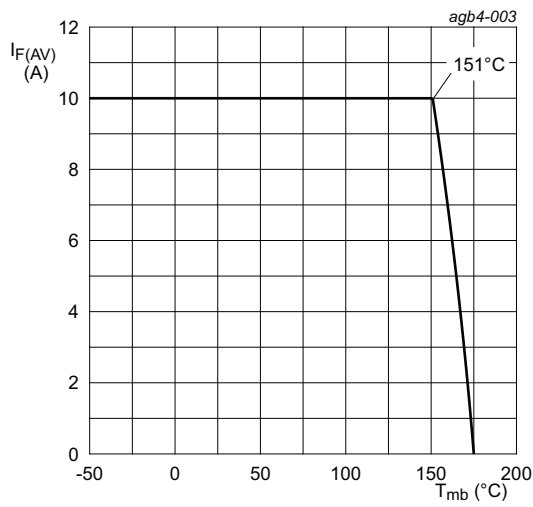


Fig. 3. Forward current as a function of mounting base temperature; maximum values; per diode

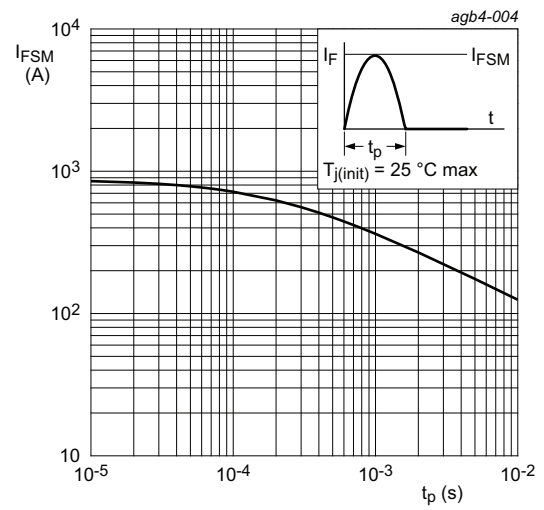


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

### 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; <a href="#">Fig. 5</a>              | -   | -   | 2.4 | K/W  |
|                |                                                      | both diodes conducting; <a href="#">Fig. 5</a> | -   | -   | 1.6 | K/W  |
| $R_{th(j-a)}$  | thermal resistance from junction to ambient free air | in free air                                    | -   | 50  | -   | K/W  |

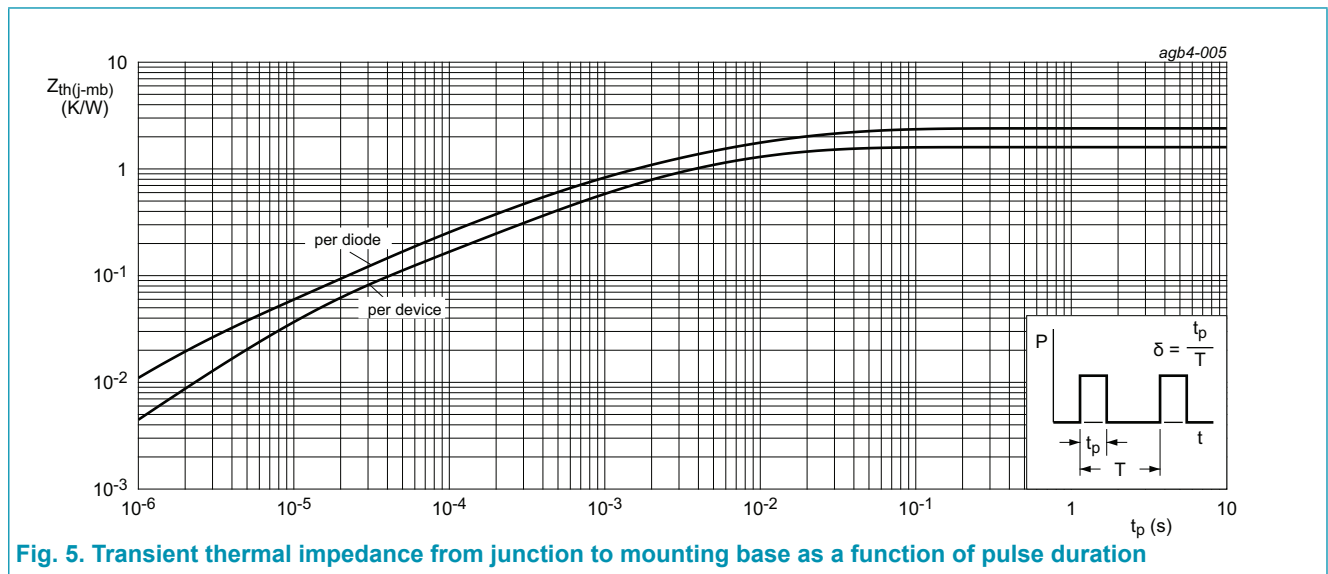
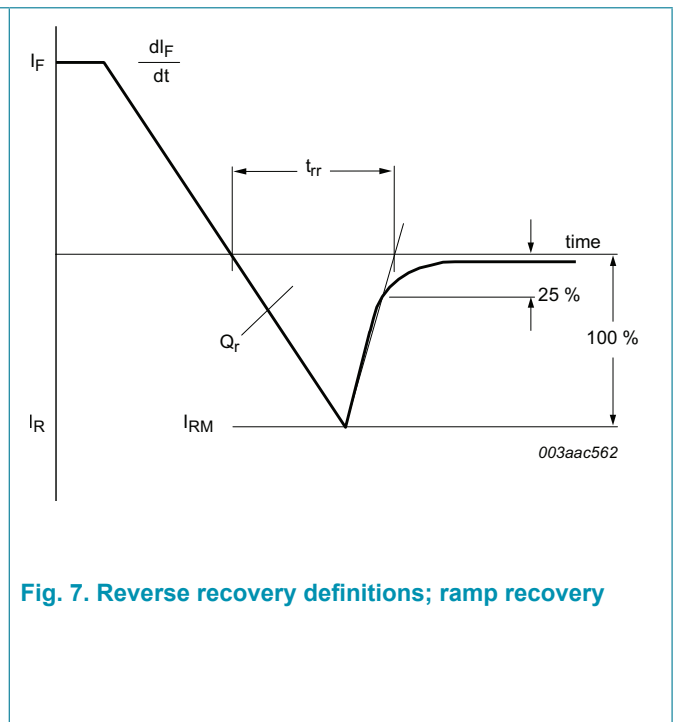
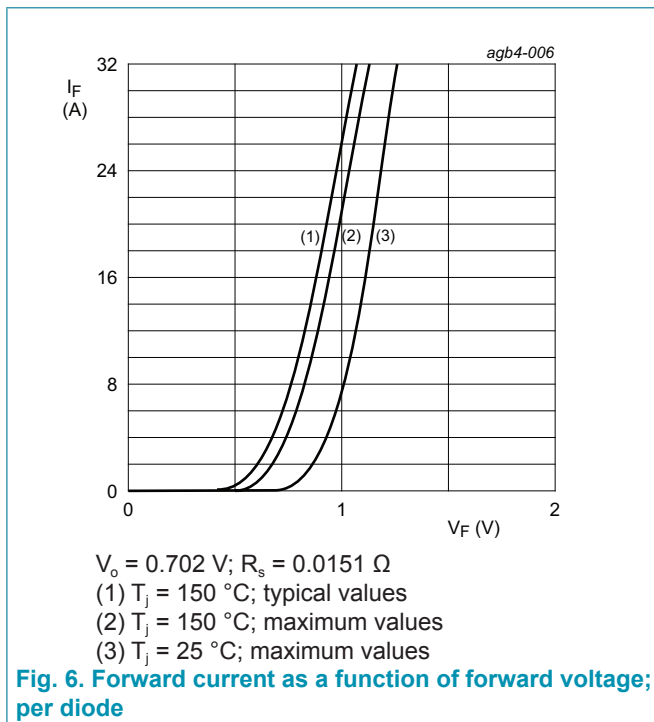


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

### 10. Characteristics

Table 7. Characteristics

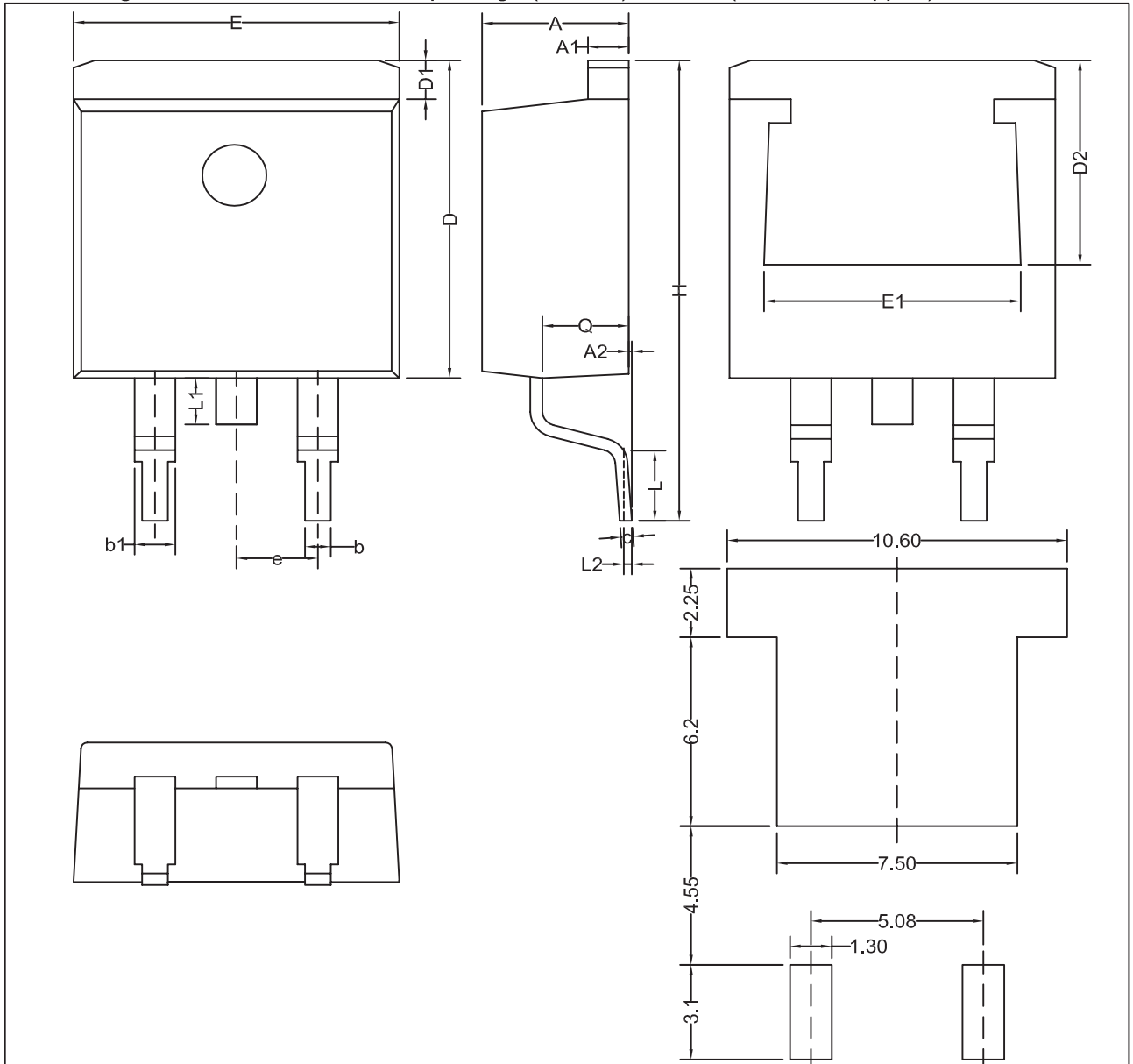
| Symbol                         | Parameter                     | Conditions                                                                                                                                            | Min | Typ  | Max  | Unit          |
|--------------------------------|-------------------------------|-------------------------------------------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



### 11. Package outline

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

TO263



Recommended Footprint

|     | 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<br>(BSC) | 9.70  | 7.80 | 14.80 | 2.10 | ---  | 0.25<br>(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 |

## 12. Legal information

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|--------------------------------|--------------------|---------------------------------------------------------------------------------------|
| Objective [short] data sheet   | Development        | This document contains data from the objective specification for product development. |
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