

1. General description

Enhanced ultrafast power diode in a TO252 (DPAK) surface-mountable plastic package.

2. Features and benefits

- High thermal cycling performance
- Low on-state losses
- Low thermal resistance
- Soft recovery characteristic
- Surface-mountable package

3. Applications

- Dual mode (DCM and CCM) Power Factor Correction (PFC)
- Power Factor Correction (PFC) for Interleaved Topology
- U-inverter (DC-AC converter for individual solar panels)

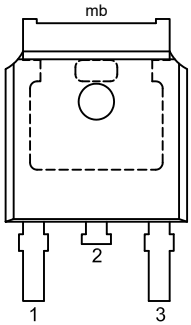
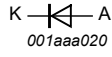
4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------------------------|---|-----|------|-----|------|
| V_R | reverse voltage | DC | - | - | 600 | V |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; $T_{mb} \leq 115$ °C; square-wave pulse; Fig. 1 ; Fig. 2 | - | - | 9 | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; $t_p = 25$ μ s; $T_{mb} \leq 115$ °C; square-wave pulse | - | - | 18 | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; Fig. 3 | - | - | 91 | A |
| | | $t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; Fig. 3 | - | - | 100 | A |
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 8$ A; $T_j = 25$ °C; Fig. 5 | - | 1.45 | 1.9 | V |
| | | $I_F = 8$ A; $T_j = 150$ °C | - | 1.25 | 1.7 | 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; Fig. 6 | - | 17.5 | 35 | ns |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------------------------------|---|---|
| 1 | n.c. | not connected |  <p style="text-align: center;">DPAK (TO252N)</p> |  |
| 2 | K | cathode[1] | | |
| 3 | A | anode | | |
| mb | K | mounting base; connected to cathode | | |

[1] It is not possible to connect to pin 2 of the SOT428 package.

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|---|---------|
| | Name | Description | Version |
| BYV29FD-600 | DPAK | plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped) | TO252N |

7. Limiting values

Table 4. Limiting values

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

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-------------|-------------------------------------|---|-----|-----|------------------|
| V_{RRM} | repetitive peak reverse voltage | | - | 600 | V |
| V_{RWM} | crest working reverse voltage | | - | 600 | V |
| V_R | reverse voltage | DC | - | 600 | V |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; $T_{mb} \leq 115\text{ }^\circ\text{C}$; square-wave pulse; Fig. 1 ; Fig. 2 | - | 9 | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 115\text{ }^\circ\text{C}$; square-wave pulse | - | 18 | 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; Fig. 3 | - | 91 | A |
| | | $t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse; Fig. 3 | - | 100 | A |
| T_{stg} | storage temperature | | -40 | 150 | $^\circ\text{C}$ |
| T_j | junction temperature | | - | 150 | $^\circ\text{C}$ |

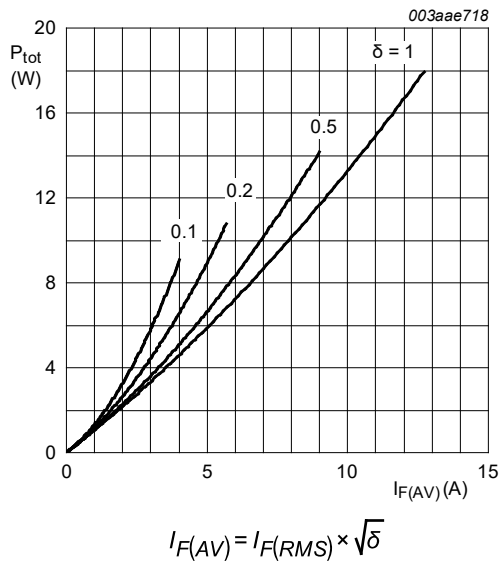


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

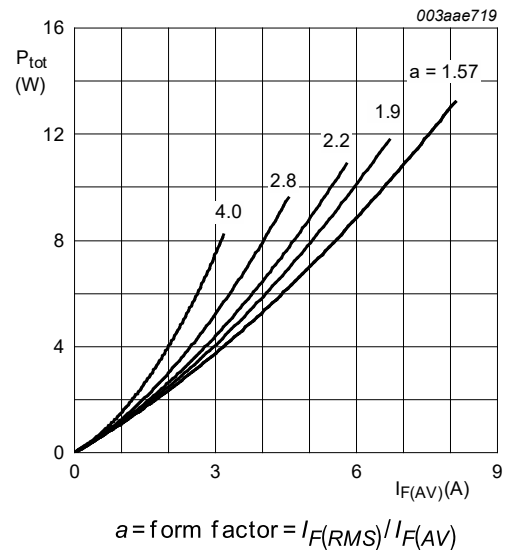


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

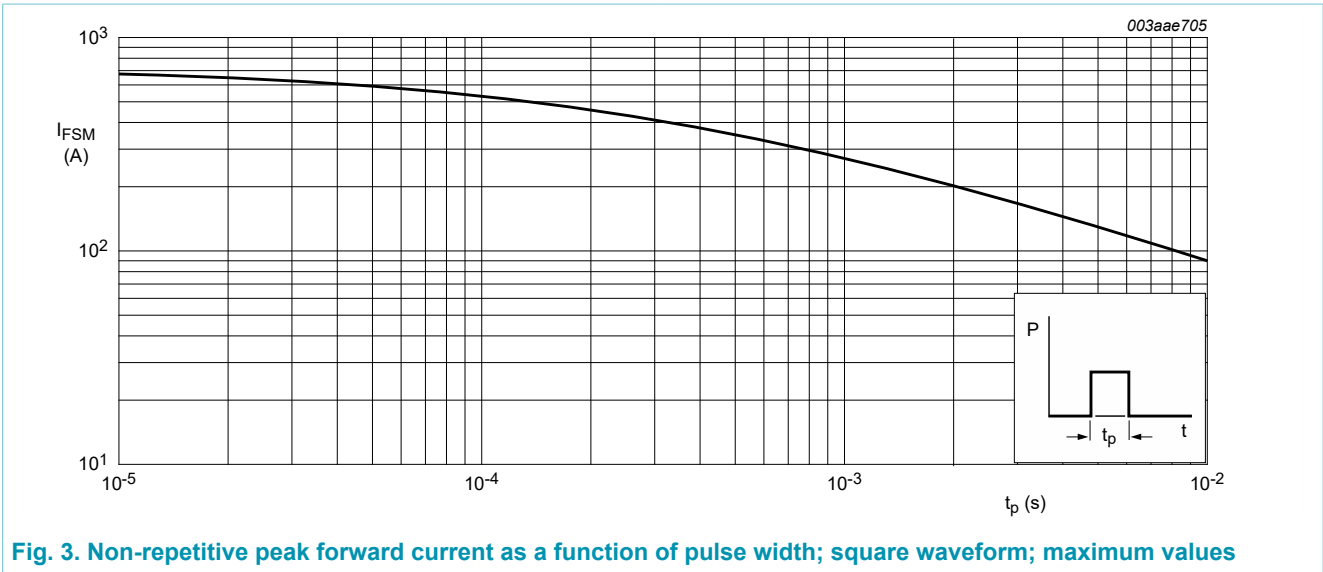


Fig. 3. Non-repetitive peak forward current as a function of pulse width; square waveform; maximum values

8. Thermal characteristics

Table 5. Thermal characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------------|--|------------------------|-----|-----|-----|------|
| $R_{th(j-mb)}$ | thermal resistance from junction to mounting base | Fig. 4 | - | - | 2.5 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient free air | in free air | - | 60 | - | K/W |

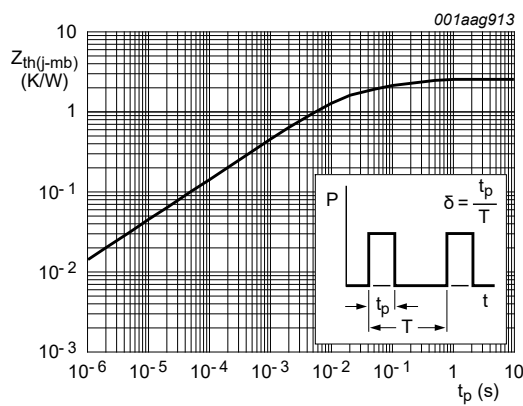
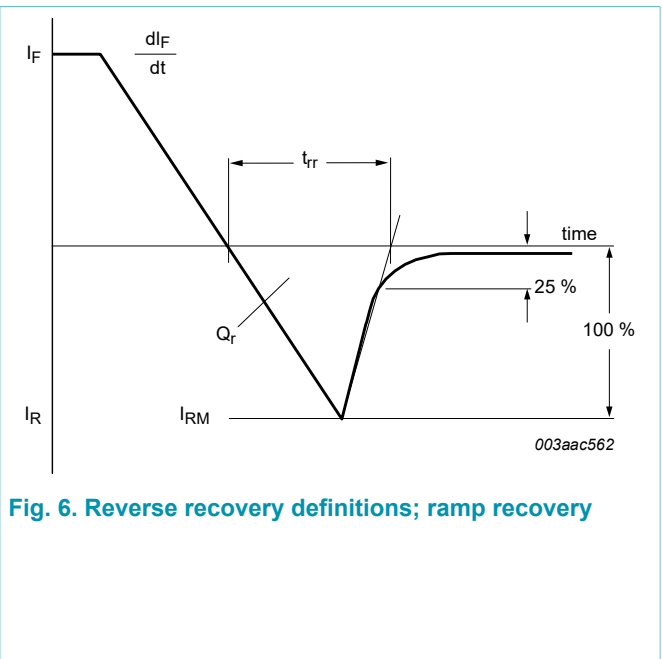
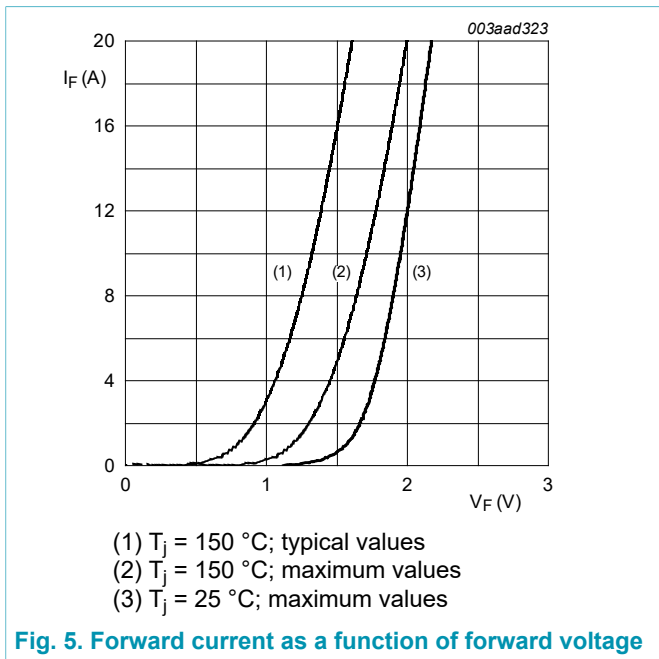


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse width

9. Characteristics

Table 6. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------------------|---|-----|------|-----|---------------|
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 8 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 5}$ | - | 1.45 | 1.9 | V |
| | | $I_F = 8 \text{ A}; T_j = 150 \text{ }^\circ\text{C}$ | - | 1.25 | 1.7 | V |
| I_R | reverse current | $V_R = 600 \text{ V}; T_j = 100 \text{ }^\circ\text{C}$ | - | - | 1.5 | mA |
| | | $V_R = 600 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$ | - | - | 50 | μA |
| Dynamic characteristics | | | | | | |
| t_{rr} | reverse recovery time | $I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 6}$ | - | 17.5 | 35 | ns |
| I_{RM} | peak reverse recovery current | $I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; \text{ Fig. 6}$ | - | 1.5 | - | A |
| Q_r | recovered charge | | - | 13 | - | nC |
| V_{FR} | forward recovery voltage | $I_F = 1 \text{ A}; dI_F/dt = 100 \text{ A}/\mu\text{s}; \text{ Fig. 6}$ | - | 3.2 | - | V |



10. Package outline

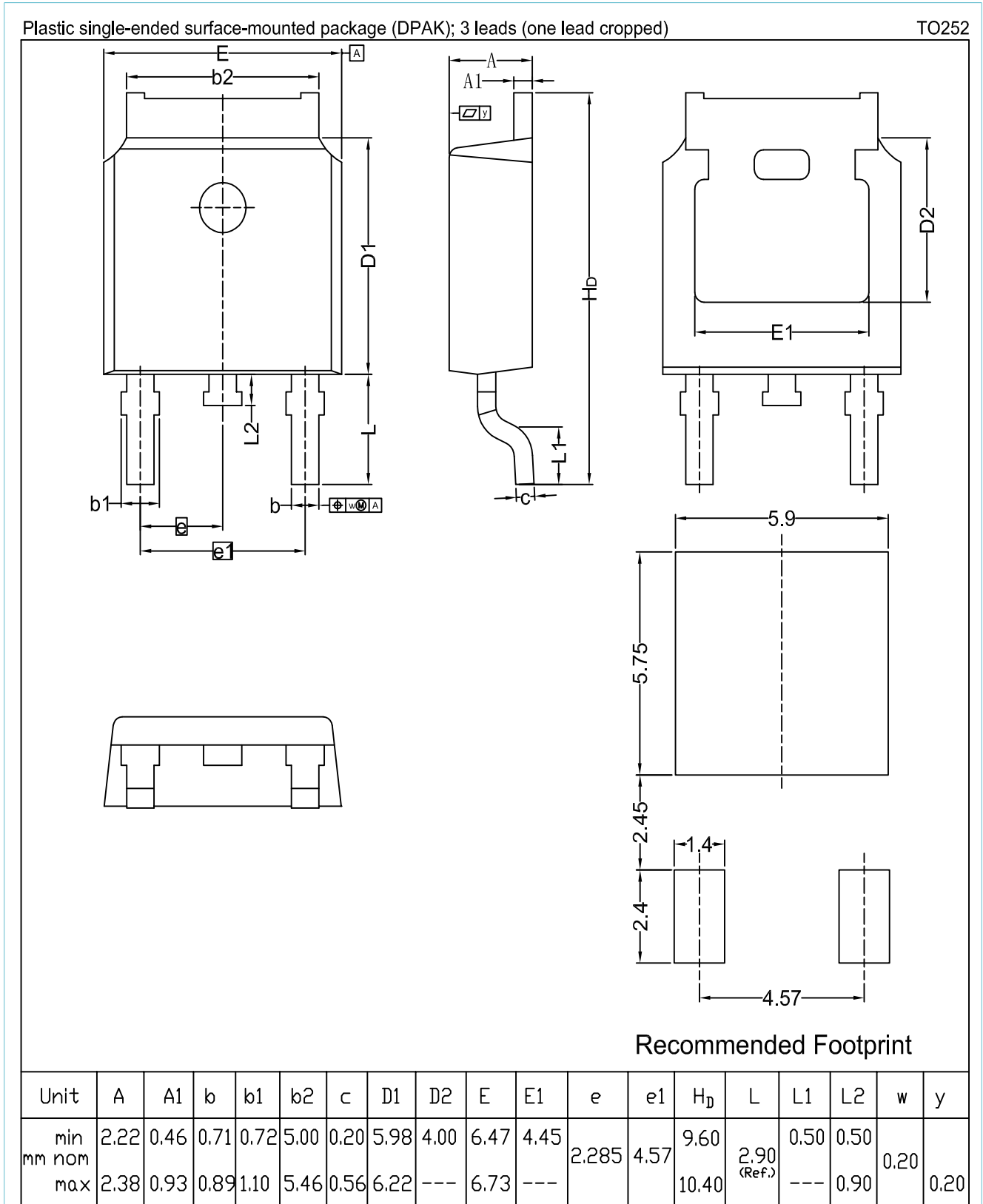


Fig. 7. Package outline DPAK (TO252N)

11. Revision history

Table 6. Revision history

| Document ID | Date | Changes |
|--------------------|----------|--|
| BYV29FD-600 Rev.01 | 20110307 | <ul style="list-style-type: none">Initial release |
| BYV29FD-600 Rev.02 | 20170815 | <ul style="list-style-type: none">The format of this data sheet has been redesigned to comply with the new identity guidelines of WeEn Semiconductors.Legal texts have been adapted to the new company name where appropriate.Update "Package outline" due to subcon transfer. |
| BYV29FD-600 Rev.03 | 20171122 | <ul style="list-style-type: none">Add version number and revision history on this datasheet.Update "SOT428" to "TO252" on "General description" section. |

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. |
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| Product [short] data sheet | Production | This document contains the product specification. |

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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