
# BYV29FD-600

## Enhanced ultrafast power diode

Rev. 01 — 7 March 2011 Product data sheet

## 1. Product profile

### 1.1 General description

Enhanced ultrafast power diode in a SOT428 (DPAK) surface-mountable plastic package.

### 1.2 Features and benefits

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

### 1.3 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)

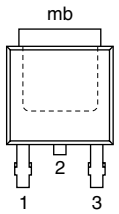
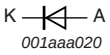
### 1.4 Quick reference data

**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{RRM}$ | repetitive peak reverse voltage | | - | - | 600 | V |
| $I_{F(AV)}$ | average forward current | square-wave pulse; δ = 0.5 ; $T_{mb}$ ≤ 115 °C; see Figure 1; see Figure 2 | - | - | 9 | A |
| **Static characteristics** | | | | | | |
| $V_F$ | forward voltage | $I_F$ = 8 A; $T_j$ = 25 °C; see Figure 5 | - | 1.45 | 1.9 | V |
| | | $I_F$ = 8 A; $T_j$ = 150 °C; see Figure 5 | - | 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/µs; $T_j$ = 25 °C; see Figure 6 | - | 17.5 | 35 | ns |

## 2. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | n.c. | not connected |   SOT428 (DPAK) |   |
| 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.

## 3. Ordering information

**Table 3. Ordering information**

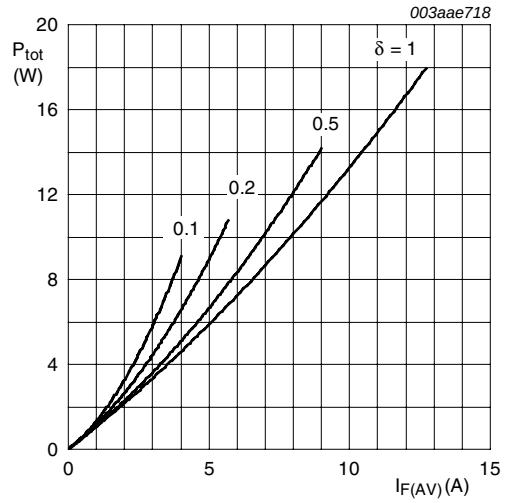
| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BYV29FD-600 | DPAK | plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped) | SOT428 |

## 4. Limiting values

**Table 4. Limiting values**

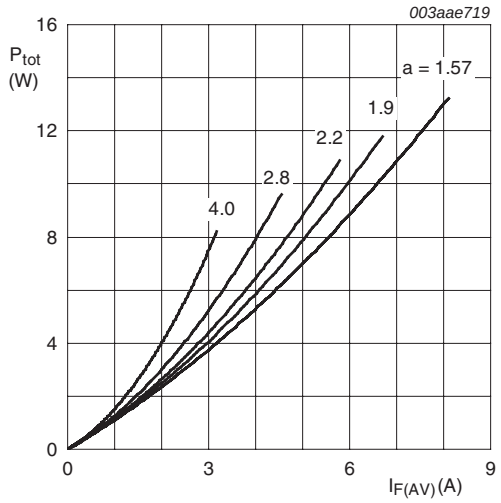
*In accordance with the Absolute Maximum Rating System (IEC 60134).*

| 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 | square-wave pulse; δ = 0.5 ; $T_{mb} \leq 115$ °C; see Figure 1; see Figure 2 | - | 9 | A |
| $I_{FRM}$ | repetitive peak forward current | square-wave pulse; δ = 0.5 ; $t_p$ = 25 µs; $T_{mb} \leq 115$ °C | - | 18 | A |
| $I_{FSM}$ | non-repetitive peak forward current | $t_p$ = 10 ms; sine-wave pulse; $T_{j(init)}$ = 25 °C; see Figure 3 | - | 91 | A |
| | | $t_p$ = 8.3 ms; sine-wave pulse; $T_{j(init)}$ = 25 °C; see Figure 3 | - | 100 | A |
| $T_{stg}$ | storage temperature | | -40 | 150 | °C |
| $T_j$ | junction temperature | | - | 150 | °C |




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

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




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

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

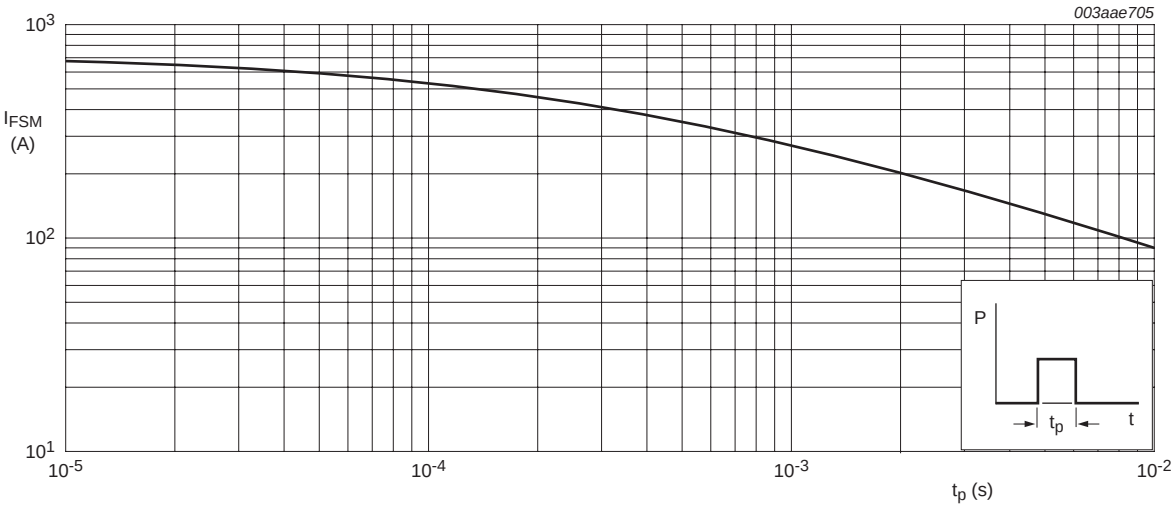



**Fig 3. Non-repetitive peak forward current as a function of pulse width; square waveform; maximum values**

## 5. Thermal characteristics

**Table 5. Thermal characteristics**

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

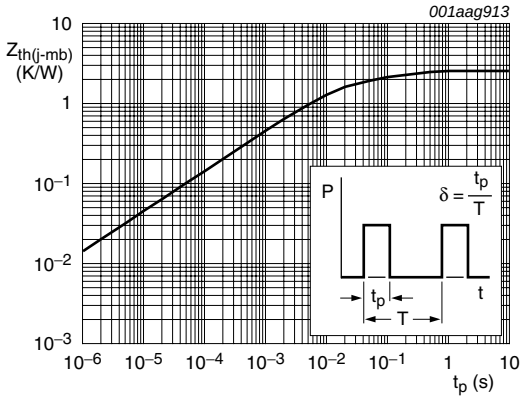
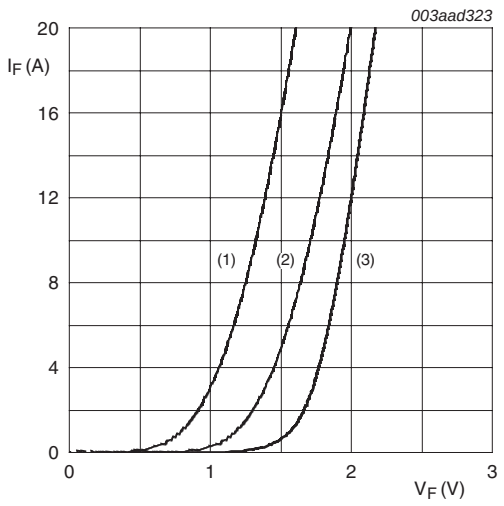



**Fig 4. Transient thermal impedance from junction to mounting base as a function of pulse width**

## 6. Characteristics

**Table 6. Characteristics**

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static characteristics** | | | | | | |
| $V_F$ | forward voltage | $I_F$ = 8 A; $T_j$ = 25 °C; see Figure 5 | - | 1.45 | 1.9 | V |
| | | $I_F$ = 8 A; $T_j$ = 150 °C; see Figure 5 | - | 1.25 | 1.7 | V |
| $I_R$ | reverse current | $V_R$ = 600 V; $T_j$ = 100 °C | - | - | 1.5 | mA |
| | | $V_R$ = 600 V; $T_j$ = 25 °C | - | - | 50 | µA |
| **Dynamic characteristics** | | | | | | |
| $Q_r$ | recovered charge | $I_F$ = 1 A; $V_R$ = 30 V; $dI_F/dt$ = 100 A/µs; see Figure 6 | - | 13 | - | nC |
| $t_{rr}$ | reverse recovery time | $I_F$ = 1 A; $V_R$ = 30 V; $dI_F/dt$ = 100 A/µs; $T_j$ = 25 °C; see Figure 6 | - | 17.5 | 35 | ns |
| $I_{RM}$ | peak reverse recovery current | $I_F$ = 1 A; $V_R$ = 30 V; $dI_F/dt$ = 100 A/µs; see Figure 6 | - | 1.5 | - | A |
| $V_{FR}$ | forward recovery voltage | $I_F$ = 1 A; $dI_F/dt$ = 100 A/µs; see Figure 7 | - | 3.2 | - | V |




(1) $T_j = 150\ °C$; typical values
(2) $T_j = 150\ °C$; maximum values
(3) $T_j = 25\ °C$; maximum values

**Fig 5. Forward current as a function of forward voltage**

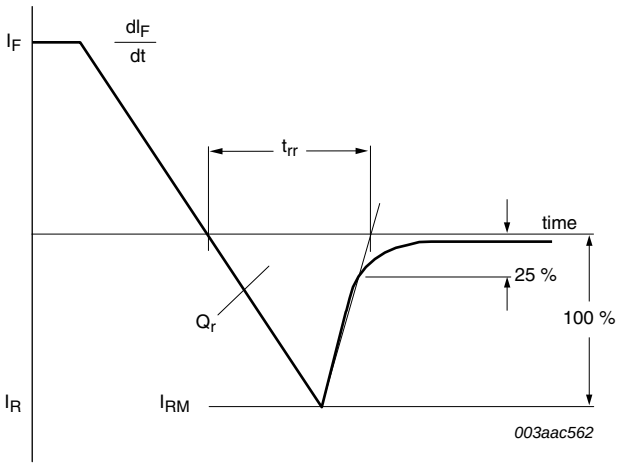



**Fig 6. Reverse recovery definitions; ramp recovery**

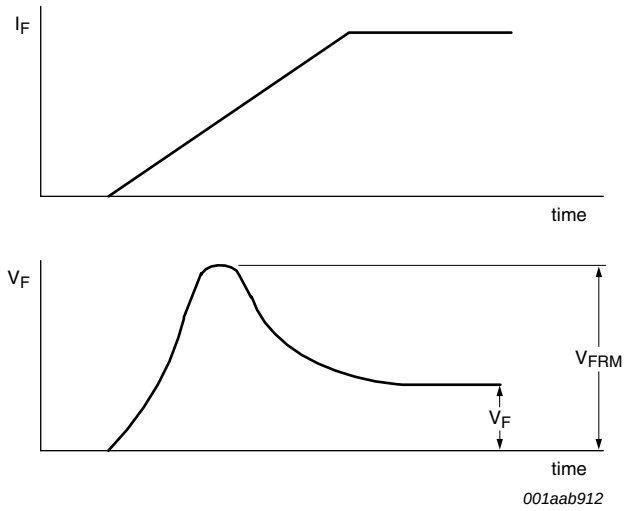
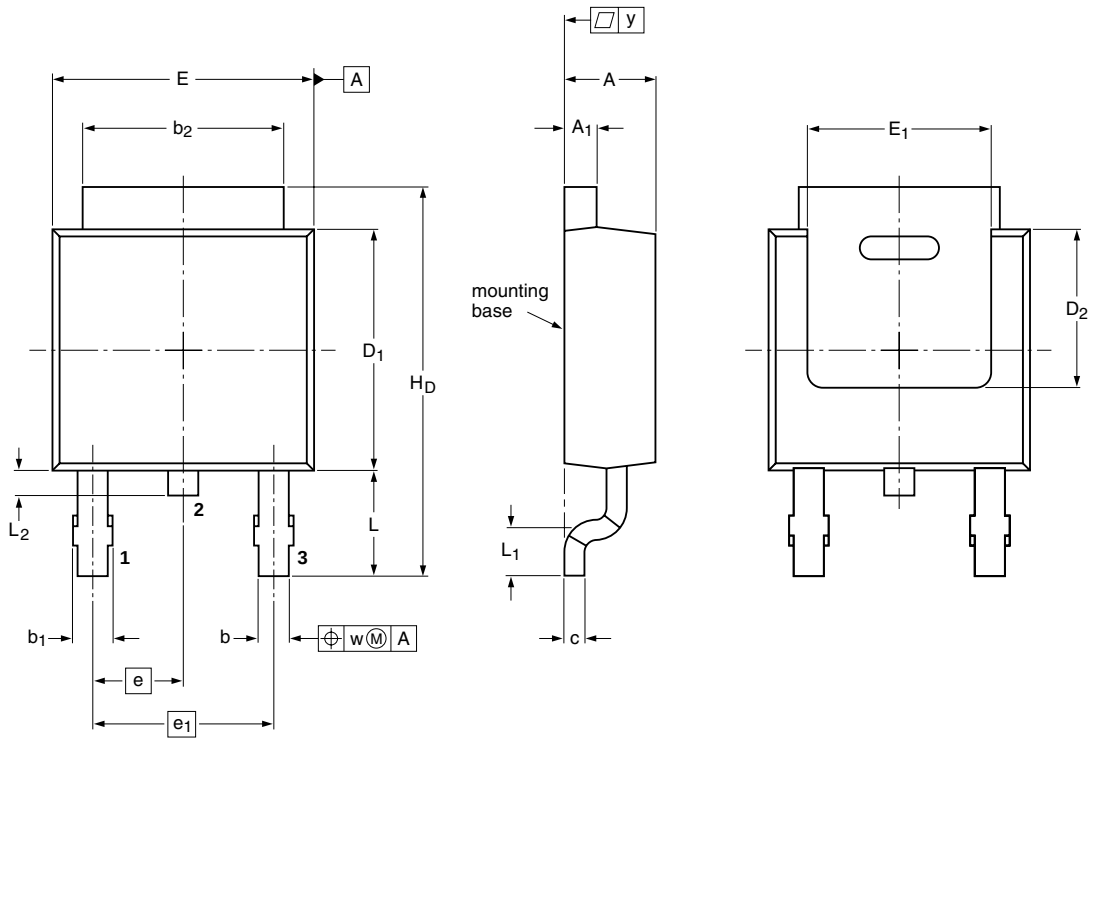



**Fig 7. Forward recovery definitions**

## 7. Package outline

**Plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)** **SOT428**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $A_1$ | b | $b_1$ | $b_2$ | c | $D_1$ | $D_2$ min | E | $E_1$ min | e | $e_1$ | $H_D$ | L | $L_1$ min | $L_2$ | w | y max |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 2.38<br>2.22 | 0.93<br>0.46 | 0.89<br>0.71 | 1.1<br>0.9 | 5.46<br>5.00 | 0.56<br>0.20 | 6.22<br>5.98 | 4.0 | 6.73<br>6.47 | 4.45 | 2.285 | 4.57 | 10.4<br>9.6 | 2.95<br>2.55 | 0.5 | 0.9<br>0.5 | 0.2 | 0.2 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT428 | | TO-252 | SC-63 | | | ~~06-02-14~~<br>06-03-16 |

**Fig 8. Package outline SOT428 (DPAK)**

## 8. Soldering

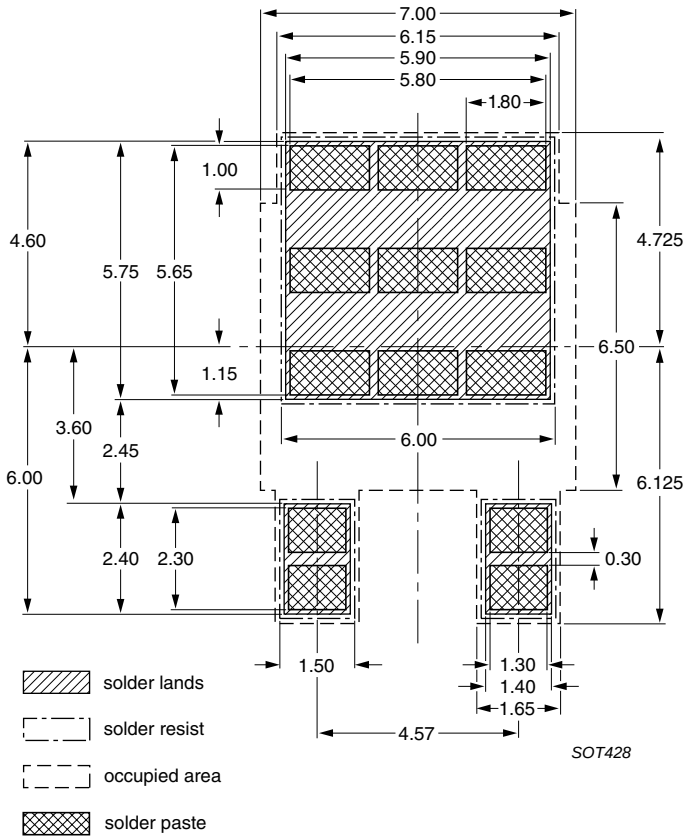



**Fig 9. Reflow soldering footprint for SOT428 (DPAK)**

# 9. Revision history

**Table 7. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BYV29FD-600 v.1 | 20110307 | Product data sheet | - | - |

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| Document status [1] [2] | Product status [3] | Definition |
|---|---|---|
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## 12. Contents





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