

1. General description

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

2. Features and benefits

- High thermal cycling performance
- Low switching losses
- Low thermal resistance
- Soft recovery minimizes power-consuming oscillations
- Surface-mountable package

3. Applications

- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)
- High frequency switched-mode power supplies

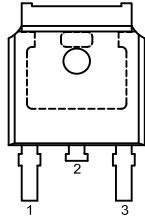
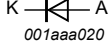
4. Quick reference data

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	$\delta = 0.5$; $T_{mb} \leq 132$ °C; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3	-	-	5	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; Fig. 4	-	-	60	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse	-	-	66	A
Static characteristics						
V_F	forward voltage	$I_F = 5$ A; $T_j = 25$ °C; Fig. 6	-	1.12	1.3	V
		$I_F = 5$ A; $T_j = 150$ °C; Fig. 6	-	0.97	1.11	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. 7	-	30	50	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	n.c.	not connected	 <p>DPAK (SOT428)</p>	 <p>001aaa020</p>
2	K	cathode[1]		
3	A	anode		
mb	K	cathode		

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

6. Ordering information

Table 3. Ordering information

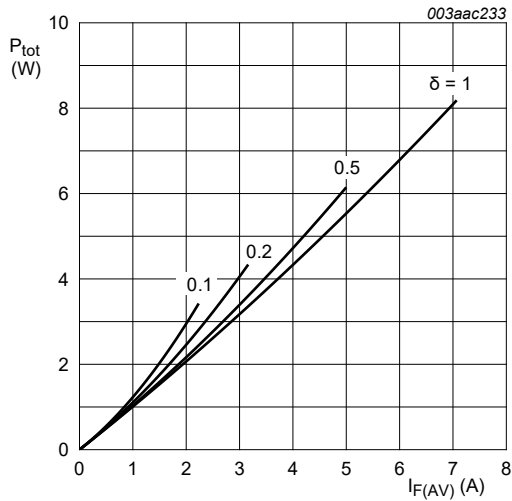
Type number	Package		Version
	Name	Description	
BYV25D-600	DPAK	plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)	SOT428

7. Limiting values

Table 4. Limiting values

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

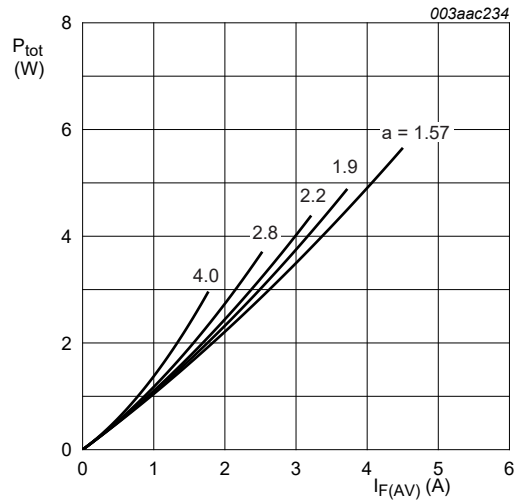
Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	600	V
V_{RWM}	crest working reverse voltage		-	600	V
V_R	reverse voltage	DC	-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 132\text{ }^\circ\text{C}$; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3	-	5	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $T_{mb} \leq 132\text{ }^\circ\text{C}$; square-wave pulse	-	10	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. 4	-	60	A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse	-	66	A
T_{stg}	storage temperature		-40	150	$^\circ\text{C}$
T_j	junction temperature		-	150	$^\circ\text{C}$



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

$$V_o = 0.985\text{ V}; R_s = 0.0245\ \Omega$$

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



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

$$V_o = 0.985\text{ V}; R_s = 0.0245\ \Omega$$

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

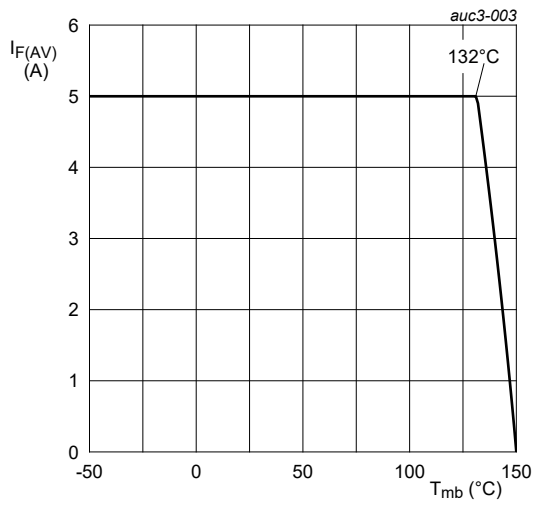


Fig. 3. Forward current as a function of mounting base temperature; maximum values

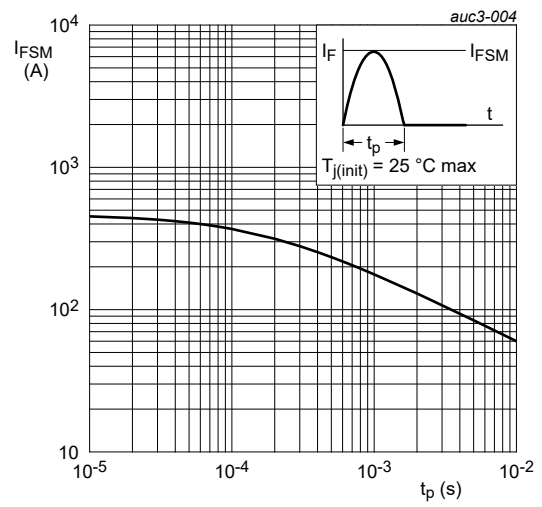


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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. 5	-	-	3	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	[1]	-	50	-	K/W

[1] device mounted on an FR4 PCB, single-sided copper, tin plated and standard footprint

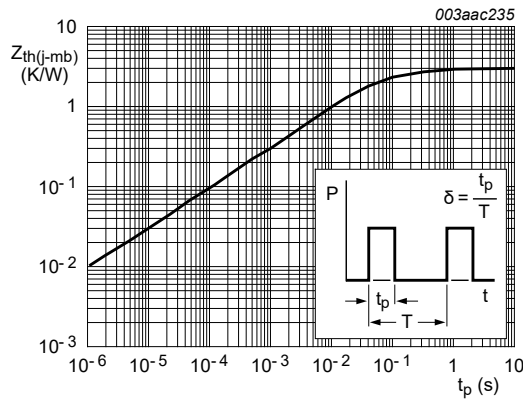
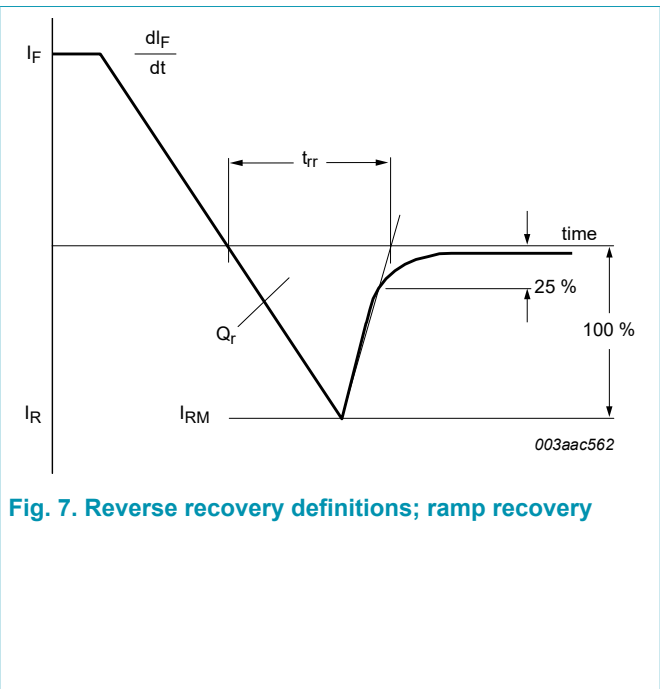
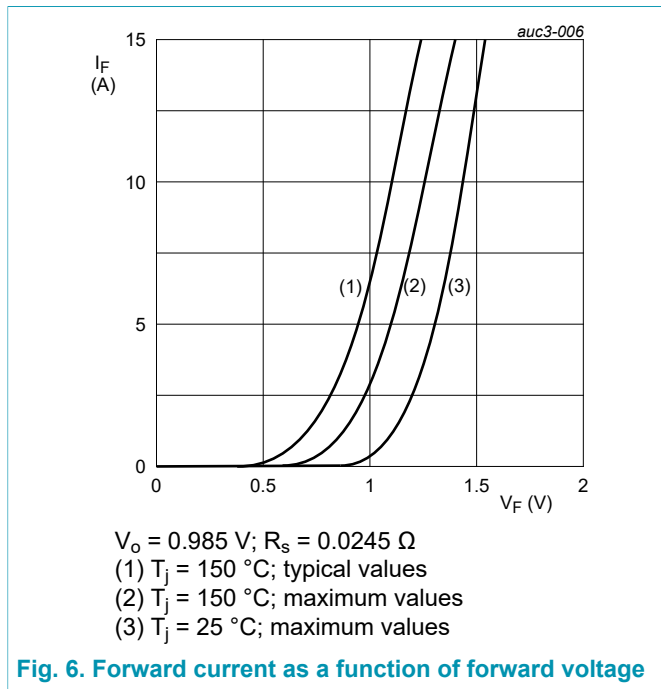


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse width

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 5 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 6}$	-	1.12	1.3	V
		$I_F = 5 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{ Fig. 6}$	-	0.97	1.11	V
I_R	reverse current	$V_R = 600 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	2	50	μA
		$V_R = 600 \text{ V}; T_j = 100 \text{ }^\circ\text{C}$	-	0.1	0.35	mA
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$	-	30	50	ns
I_{RM}	peak reverse recovery current	$I_F = 10 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 50 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$	-	2.4	4	A
Q_r	recovered charge	$I_F = 2 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 20 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$	-	30	50	nC
V_{FR}	forward recovery voltage	$I_F = 10 \text{ A}; dI_F/dt = 10 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}$	-	3.2	-	V



10. Package outline

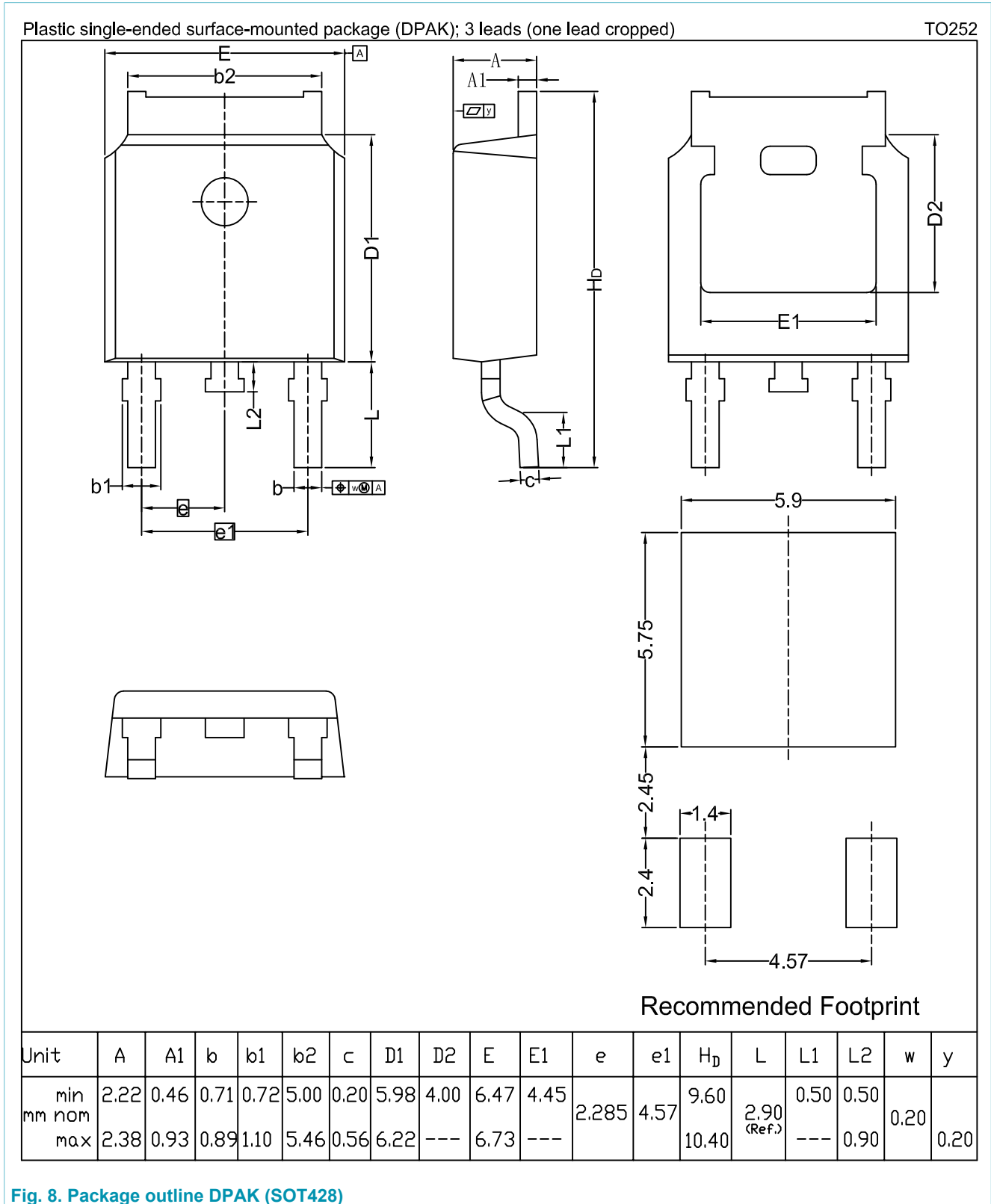


Fig. 8. Package outline DPAK (SOT428)

11. 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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