

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

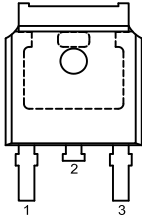
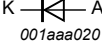
4. Quick reference data

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	δ = 0.5 ; T _{mb} ≤ 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/μs; 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	 DPAK (SOT428)	
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		
	Name	Description	Version
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	$^{\circ}\text{C}$

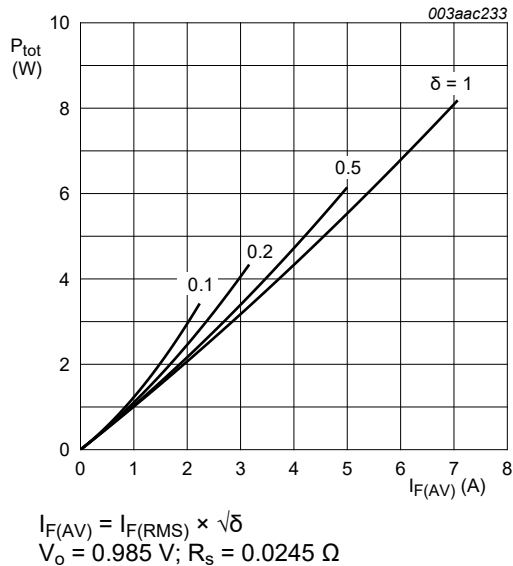


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

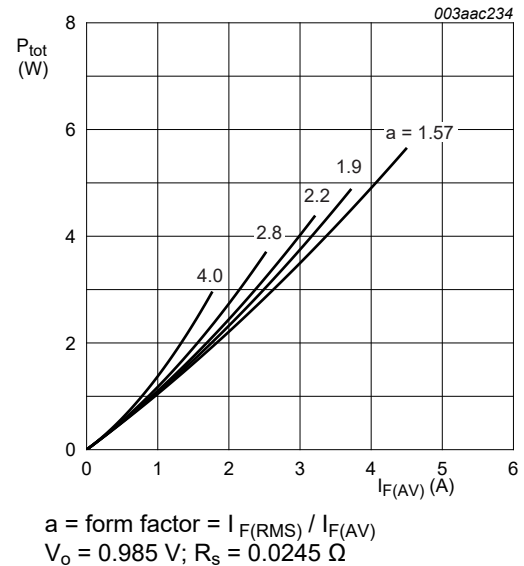


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

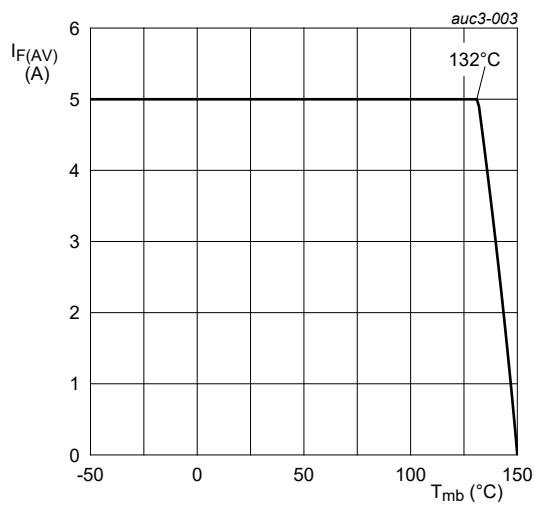


Fig. 3. Forward current as a function of mounting base temperature; maximum values

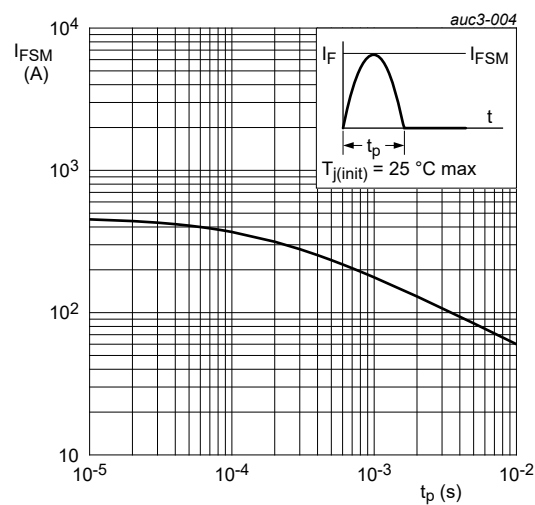


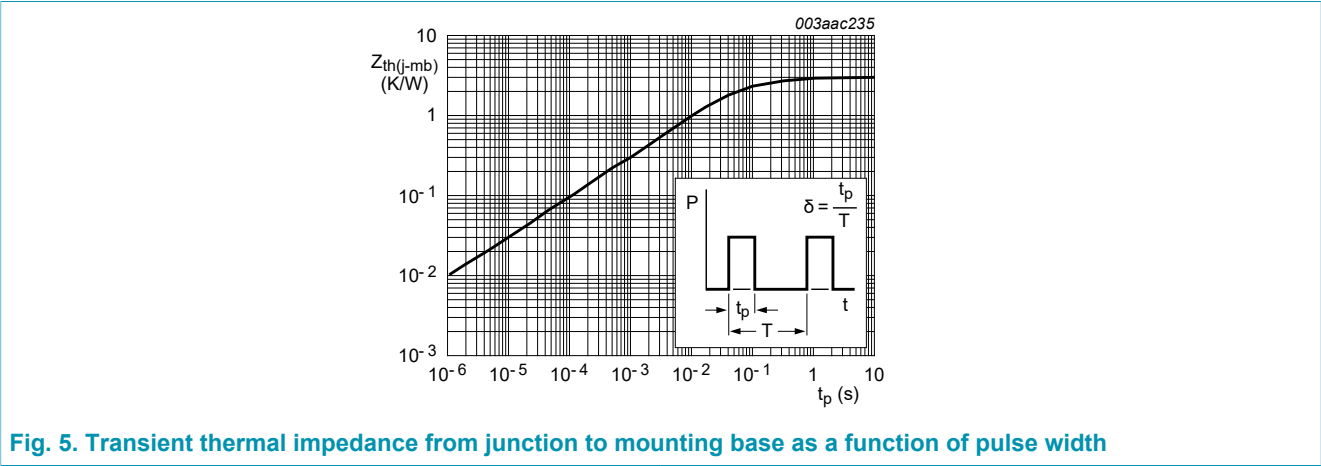
Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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

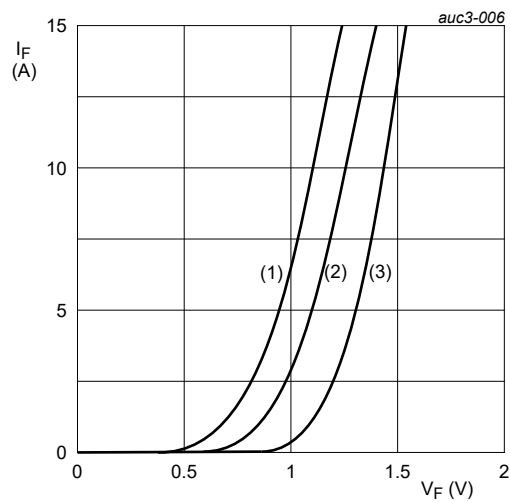
[1] device mounted on an FR4 PCB, single-sided copper, tin plated and standard footprint



9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
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
I _R	reverse current	V _R = 600 V; T _J = 25 °C		-	2	50	μA
		V _R = 600 V; T _J = 100 °C		-	0.1	0.35	mA
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; Fig. 7		-	30	50	ns
I _{RM}	peak reverse recovery current	I _F = 10 A; V _R = 30 V; dI _F /dt = 50 A/μs; T _J = 25 °C; Fig. 7		-	2.4	4	A
Q _r	recovered charge	I _F = 2 A; V _R = 30 V; dI _F /dt = 20 A/μs; T _J = 25 °C; Fig. 7		-	30	50	nC
V _{FR}	forward recovery voltage	I _F = 10 A; dI _F /dt = 10 A/μs; T _J = 25 °C		-	3.2	-	V



V_o = 0.985 V; R_s = 0.0245 Ω
(1) T_j = 150 °C; typical values
(2) T_j = 150 °C; maximum values
(3) T_j = 25 °C; maximum values

Fig. 6. Forward current as a function of forward voltage

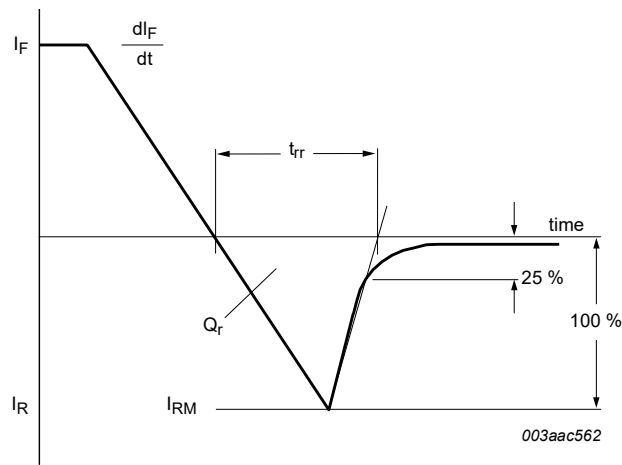
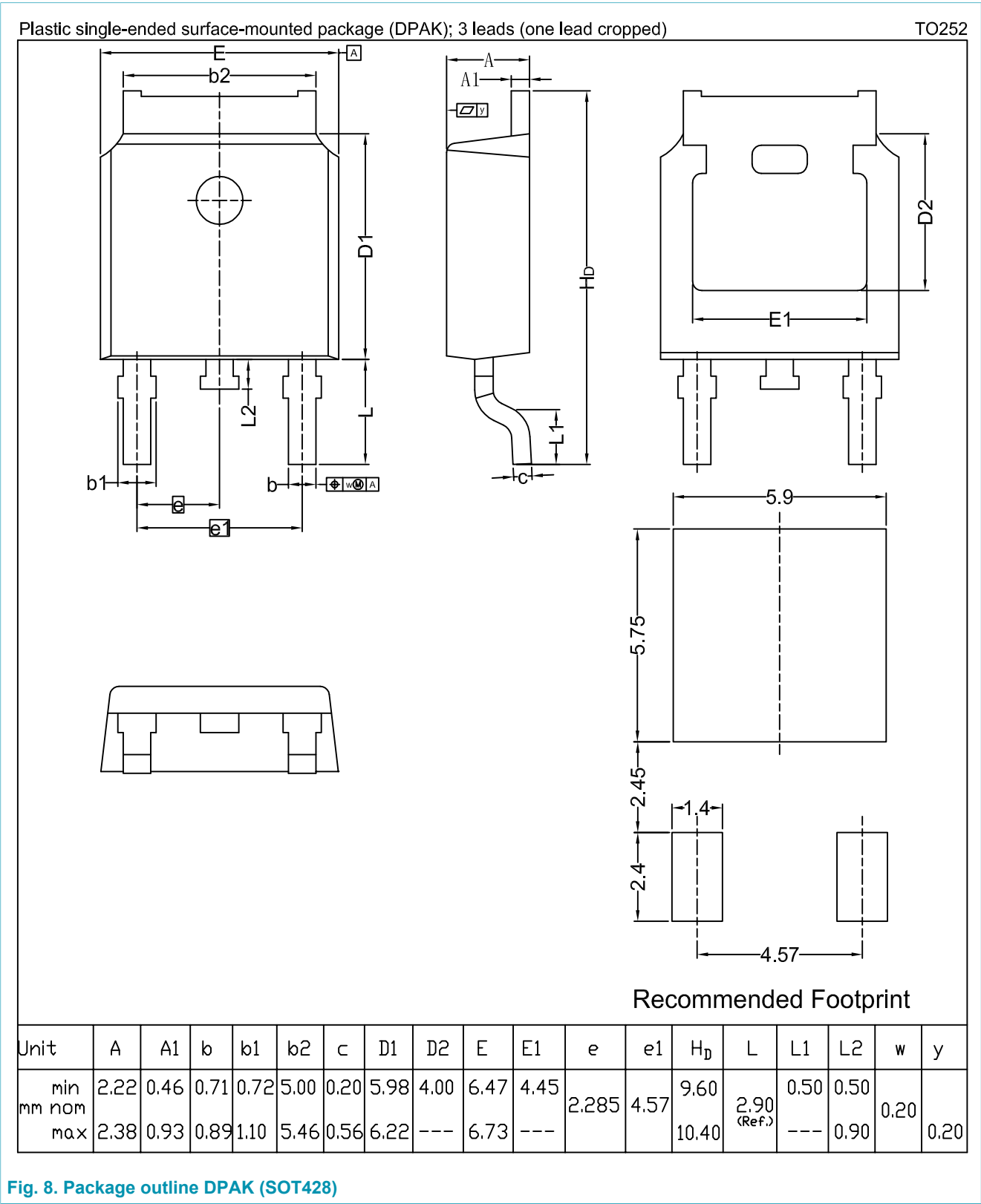


Fig. 7. Reverse recovery definitions; ramp recovery

10. Package outline



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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