BYV25D-600

Ultrafast power diode

26 September 2018 Product data sheet

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

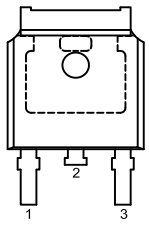
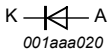
4. Quick reference data

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/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

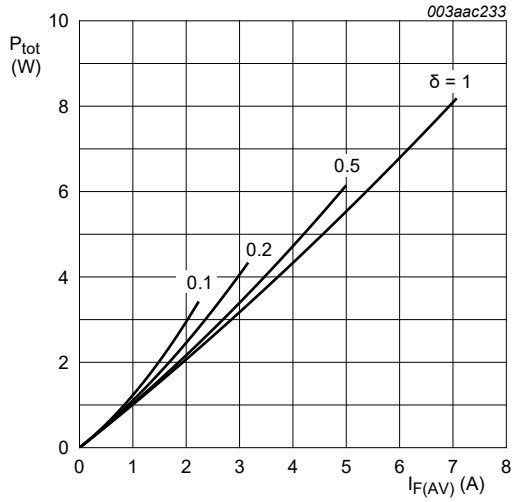
Type number	Package		
	Name	Description	Version
BYV25D-600	DPAK	plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)	SOT428

7. Limiting values

Table 4. Limiting values

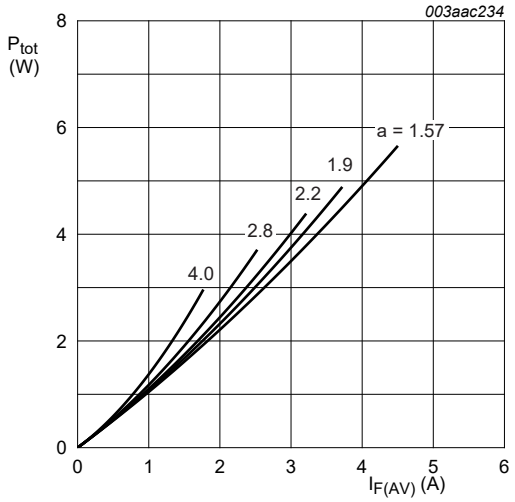
In accordance with the Absolute Maximum Rating System (IEC 60134).

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	$\delta = 0.5$; $T_{mb} \leq 132$ °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3		-	5	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $T_{mb} \leq 132$ °C; square-wave pulse		-	10	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
T_{stg}	storage temperature			-40	150	°C
T_j	junction temperature			-	150	°C



$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$
$V_o = 0.985$ V; $R_s = 0.0245$ Ω

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



a = form factor = $I_{F(RMS)} / I_{F(AV)}$
$V_o = 0.985$ V; $R_s = 0.0245$ Ω

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

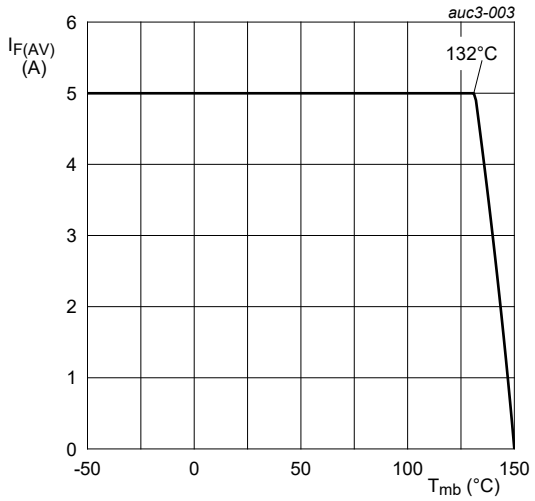


Fig. 3. Forward current as a function of mounting base temperature; maximum values

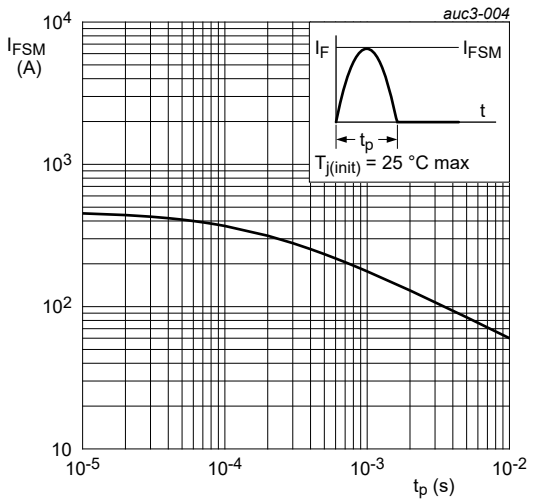


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j\text{-}mb)}$	thermal resistance from junction to mounting base	Fig. 5		-	-	3	K/W
$R_{th(j\text{-}a)}$	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

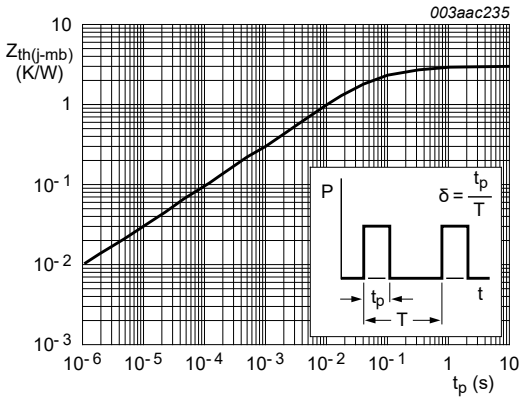
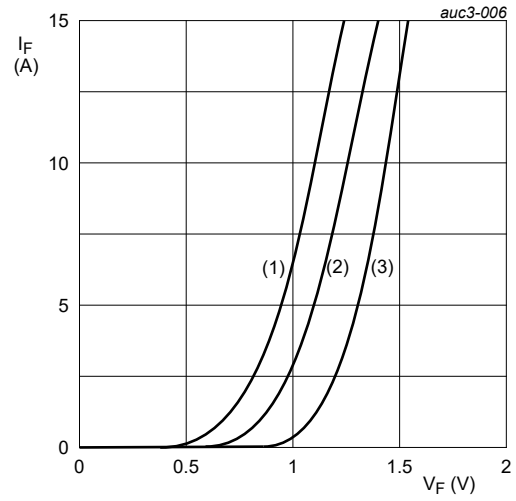


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse width

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	I_F = 5 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

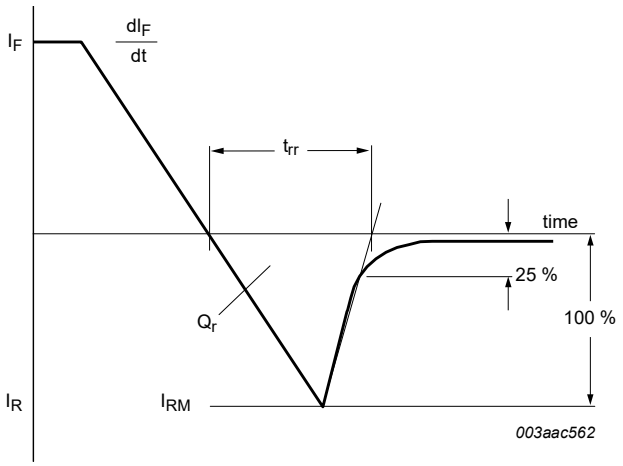
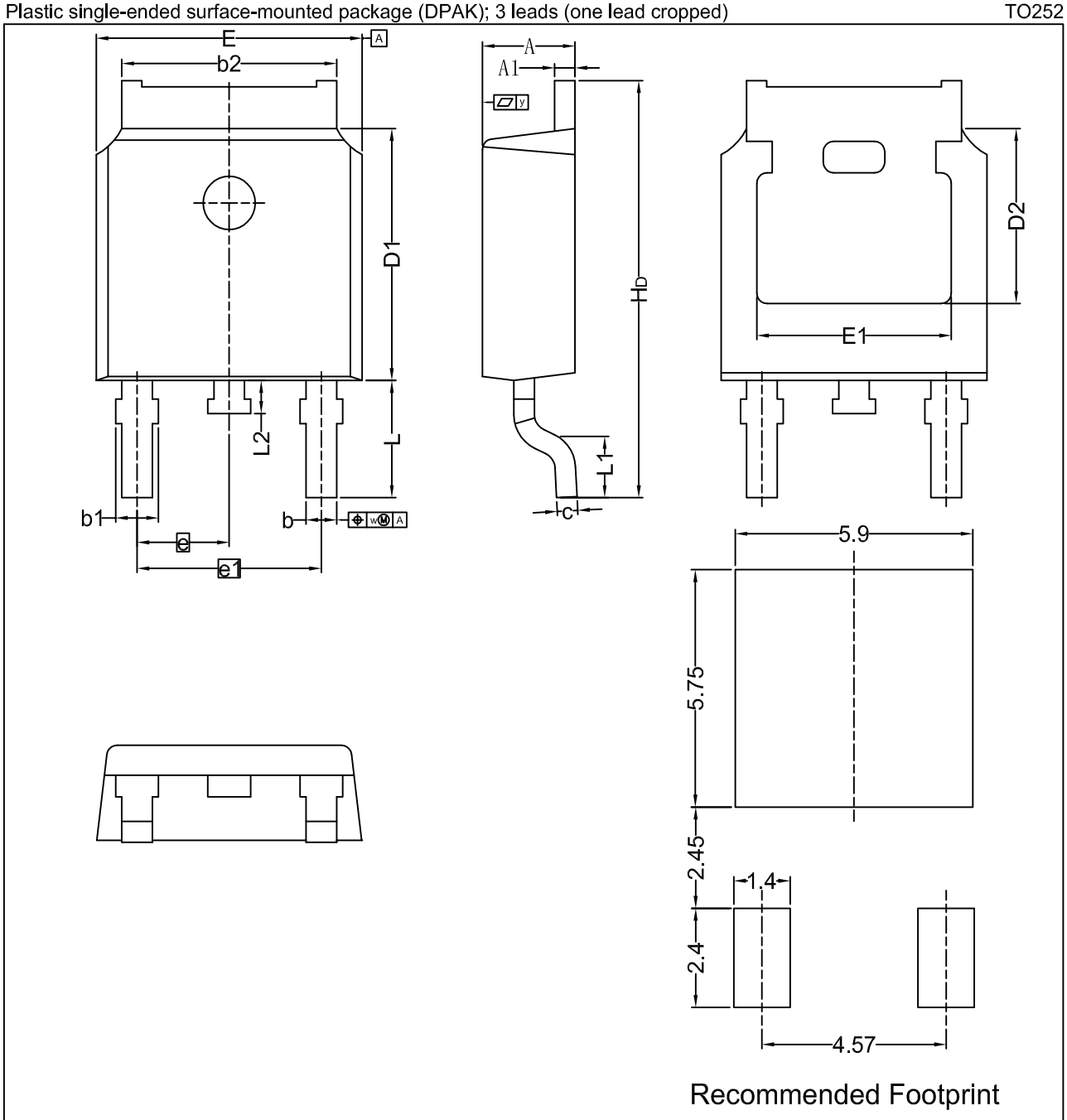


Fig. 7. Reverse recovery definitions; ramp recovery

10. Package outline

Plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped) TO252



Unit	A	A1	b	b1	b2	c	D1	D2	E	E1	e	e1	H_D	L	L1	L2	w	y
min	2.22	0.46	0.71	0.72	5.00	0.20	5.98	4.00	6.47	4.45	2.285	4.57	9.60	2.90 (Ref.)	0.50	0.50	0.20	
mm nom																		
max	2.38	0.93	0.89	1.10	5.46	0.56	6.22	---	6.73	---			10.40		---	0.90		0.20

Fig. 8. Package outline DPAK (SOT428)

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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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12. Contents

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