Product data sheet

1. General description

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

2. Features and benefits

- · High thermal cycling performance
- Soft recovery characteristic
- Low on-state losses
- Surface-mountable package
- Low thermal resistance
- · Enhanced avalanche energy capability

3. Applications

- Dual Mode (DCM and CCM) PFC
- Power Factor Correction (PFC) for Interleaved Topology

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	-	600	V
I _{F(AV)}	average forward current	δ = 0.5 ; T _{mb} ≤ 118 °C; Square-wave pulse; Fig. 1; Fig. 2; Fig. 3	-	-	10	А
I _{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 μ s; $T_{mb} \le$ 118 °C; Square-wave pulse	-	-	20	А
I _{FSM}	non-repetitive peak	$t_p = 10 \text{ ms}; T_{j(init)} = 25 \text{ °C}; SIN; Fig. 4$	-	-	70	Α
	forward current	t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; SIN; <u>Fig. 4</u>	-	-	80	Α
Static chara	acteristics			'		
V _F	forward voltage	I _F = 10 A; T _j = 25 °C; <u>Fig. 6</u>	-	1.5	2	V
		I _F = 10 A; T _j = 150 °C; <u>Fig. 6</u>	-	-	1.6	V
Dynamic ch	naracteristics					
t _{rr}	reverse recovery time	$I_F = 1 \text{ A}$; $V_R = 30 \text{ V}$; $dI_F/dt = 50 \text{ A/}\mu\text{s}$; $T_j = 25 \text{ °C}$; Fig. 7	-	35	50	ns





Symbol	Parameter	Conditions		Min	Тур	Max	Unit
		$I_F = 10 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/$ $\mu s; T_j = 25 ^{\circ}\text{C}; Fig. 7$		-	50	-	ns
		$I_F = 10 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/$ $\mu s; T_j = 125 \text{ °C}; Fig. 7$		-	78	-	ns
Avalanche energy							
E _{AS}	non-repetitive avalanche energy	$I_R = 2.6 \text{ A}; T_{j(init)} = 25 \text{ °C}; L = 15 \text{ mH}$		-	50	-	mJ

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	n.c.	not connected	mb	K — A
2	K	cathode[1]		001aaa020
3	Α	anode		
mb	K	mounting base; connected to cathode	1 3	
			DPAK (SOT428)	

^[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		
BYV10ED-600P	DPAK	plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)	SOT428		

7. Marking

Table 4. Marking codes

Type number	Marking code
BYV10ED-600P	BYV10ED-600P

8. Limiting values

Table 5. 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	$\bar{\delta}$ = 0.5 ; T _{mb} ≤ 118 °C; Square-wave pulse; Fig. 1; Fig. 2; Fig. 3	-	10	А
I _{FRM}	repetitive peak forward current	δ = 0.5 ; t _p = 25 μs; T _{mb} ≤ 118 °C; Square-wave pulse	-	20	А
I _{FSM}	non-repetitive peak forward	$t_p = 10 \text{ ms}; T_{j(init)} = 25 \text{ °C}; \text{ SIN}; Fig. 4$	-	70	Α
	current	$t_p = 8.3 \text{ ms}; T_{j(init)} = 25 \text{ °C}; SIN; Fig. 4$	-	80	Α
T _{stg}	storage temperature		-40	175	°C
Tj	junction temperature		-	175	°C

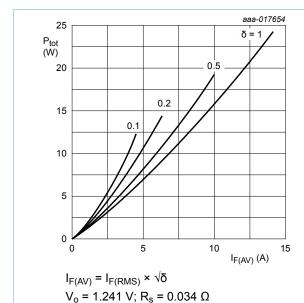


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

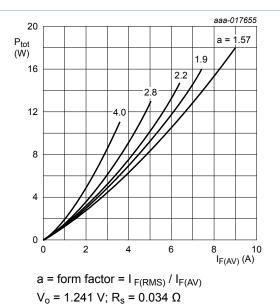


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

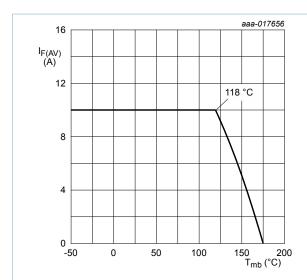


Fig. 3. Forward current as a function of mounting base temperature; maximum values

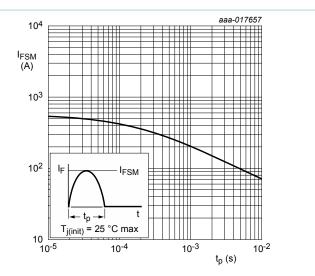


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
R _{th(j-mb)}	thermal resistance from junction to mounting base	With heatsink compound; Fig. 5	-	-	3	K/W
R _{th(j-a)}	thermal resistance from junction to ambient free air	in free air	-	50	-	K/W

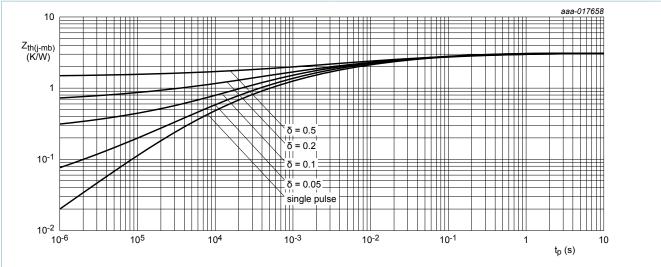


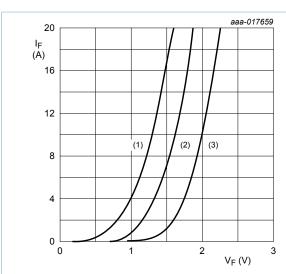
Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Static chara	acteristics		'			
V _F	forward voltage	I _F = 10 A; T _j = 25 °C; <u>Fig. 6</u>	-	1.5	2	V
		I _F = 10 A; T _j = 150 °C; <u>Fig. 6</u>	-	-	1.6	V
I _R	reverse current	V _R = 600 V; T _j = 25 °C	-	-	10	μA
		V _R = 600 V; T _j = 150 °C	-	-	500	μA
Dynamic ch	naracteristics		'		'	,
Q _r	recovered charge	I _F = 10 A; V _R = 200 V; dI _F /dt = 200 A/ μs; T _j = 25 °C; <u>Fig. 7</u>	-	123	-	nC
		$I_F = 10 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/$ μ s; $T_j = 125 ^{\circ}\text{C}; Fig. 7$	-	305	-	nC
t _{rr}	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 50 \text{ A/}\mu\text{s};$ $T_j = 25 \text{ °C}; Fig. 7$	-	35	50	ns
		I_F = 10 A; V_R = 200 V; dI_F/dt = 200 A/ μ s; T_j = 25 °C; Fig. 7	-	50	-	ns
		I_F = 10 A; V_R = 200 V; dI_F/dt = 200 A/ μ s; T_j = 125 °C; Fig. 7	-	78	-	ns
I _{RM}	peak reverse recovery current	I_F = 10 A; V_R = 200 V; dI_F/dt = 200 A/ μ s; T_j = 25 °C; Fig. 7	-	4.9	-	A
		I_F = 10 A; V_R = 200 V; dI_F/dt = 200 A/ μ s; T_j = 125 °C; Fig. 7	-	7.8	-	A
Avalanche	energy	1		-	1	
E _{AS}	non-repetitive avalanche energy	I _R = 2.6 A; T _{j(init)} = 25 °C; L = 15 mH	-	50	-	mJ

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 V_o = 1.241 V; R_s = 0.034 Ω

(1) T_j = 150 °C; typical values

(2) T_i = 150 °C; maximum values

(3) T_i = 25 °C; maximum values

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

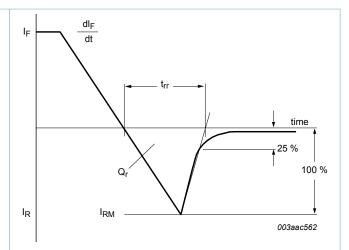
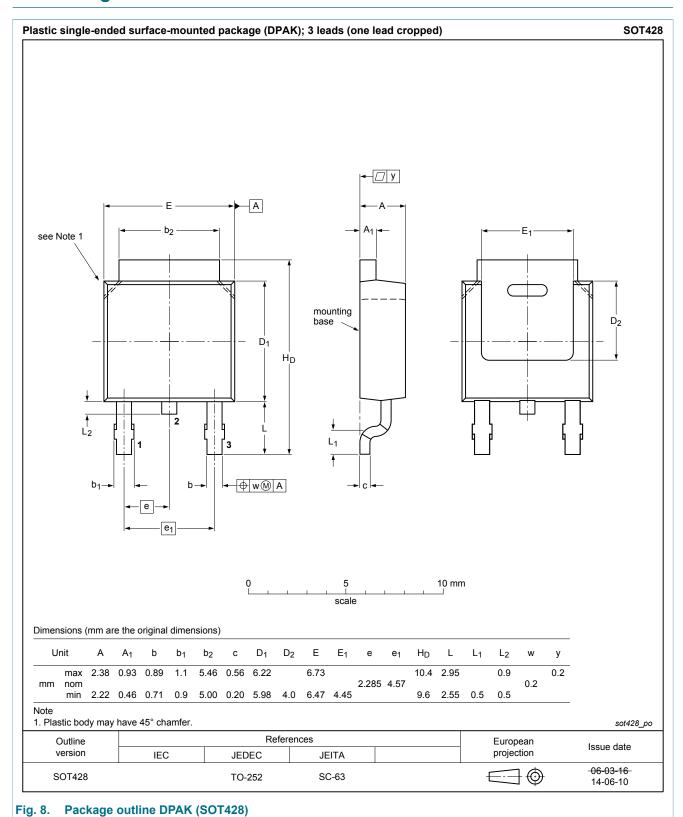


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline



12. Legal information

12.1 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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