

1. General description

Enhanced ultrafast power diode in a SOT404 (D2PAK) plastic package

2. Features and benefits

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

3. Applications

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

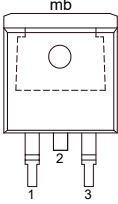
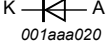
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_R	reverse voltage	DC	-	-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 126$ °C; SQW; Fig. 1 ; Fig. 2	-	-	5	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25$ μ s; $T_{mb} \leq 126$ °C; SQW	-	-	10	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; SIN; Fig. 3	-	-	60	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; SIN; Fig. 3	-	-	66	A
Static characteristics						
V_F	forward voltage	$I_F = 5$ A; $T_j = 25$ °C; Fig. 5	-	1.3	1.9	V
		$I_F = 5$ A; $T_j = 150$ °C; Fig. 5	-	1.1	1.7	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. 6	-	17.5	35	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	n.c.	not connected	 <p>D2PAK (SOT404)</p>	
2	K	cathode ^[1]		
3	A	anode		
mb	mb	mounting base; cathode		

[1] It is not possible to connect to pin 2 of the SOT404 package.

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYV25FB-600	D2PAK	plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped)	SOT404

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	$\delta = 0.5$; $T_{mb} \leq 126\text{ }^\circ\text{C}$; SQW; Fig. 1 ; Fig. 2	-	5	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 126\text{ }^\circ\text{C}$; SQW	-	10	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; SIN; Fig. 3	-	60	A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; SIN; Fig. 3	-	66	A
T_{stg}	storage temperature		-40	150	$^\circ\text{C}$
T_j	junction temperature		-	150	$^\circ\text{C}$

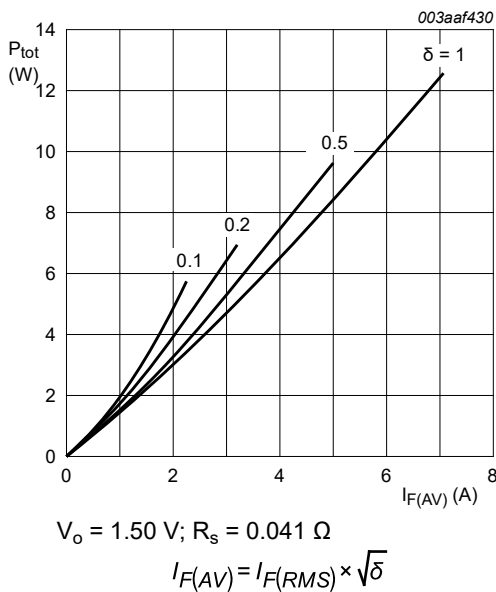


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

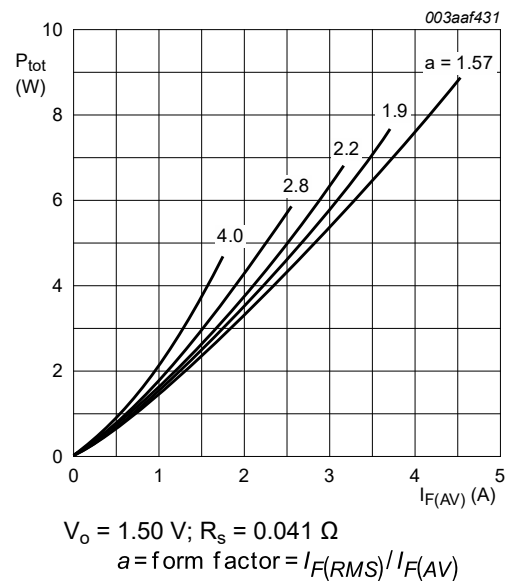
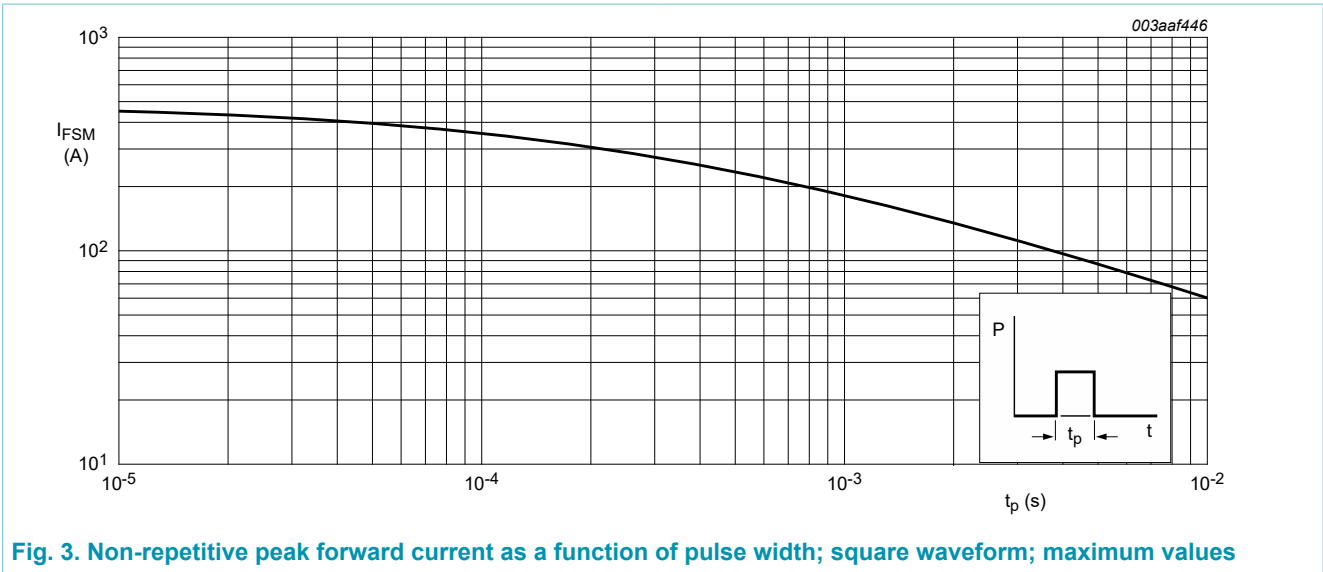


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values



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. 4	-	-	2.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	[1]	50	-	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

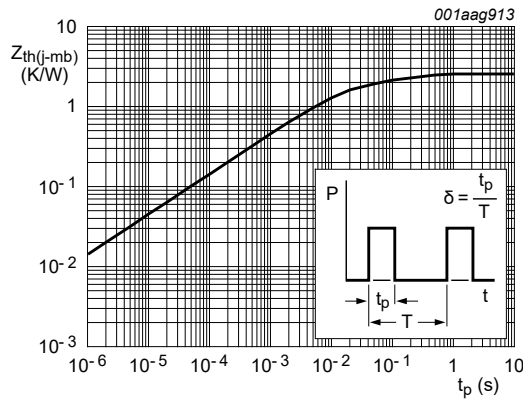


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse width

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 5 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 5}$	-	1.3	1.9	V
		$I_F = 5 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{ Fig. 5}$	-	1.1	1.7	V
I_R	reverse current	$V_R = 600 \text{ V}; T_j = 100 \text{ }^\circ\text{C}$	-	-	1.5	mA
		$V_R = 600 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	-	50	μA
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 6}$	-	17.5	35	ns
I_{RM}	peak reverse recovery current	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}$	-	1.5	-	A
Q_r	recovered charge		-	13	-	nC
V_{FR}	forward recovery voltage	$I_F = 1 \text{ A}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$	-	3.2	-	V

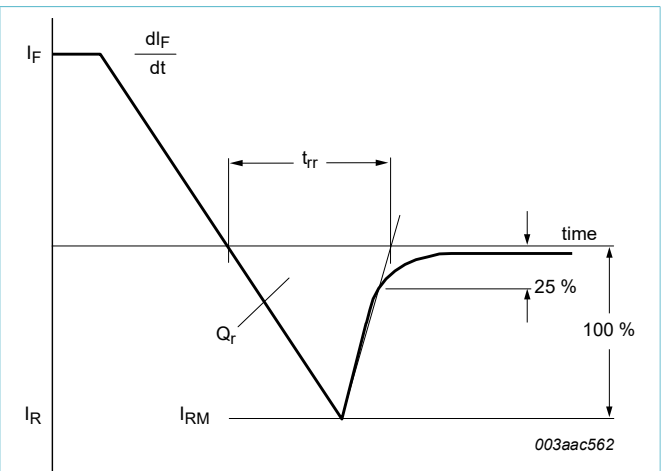
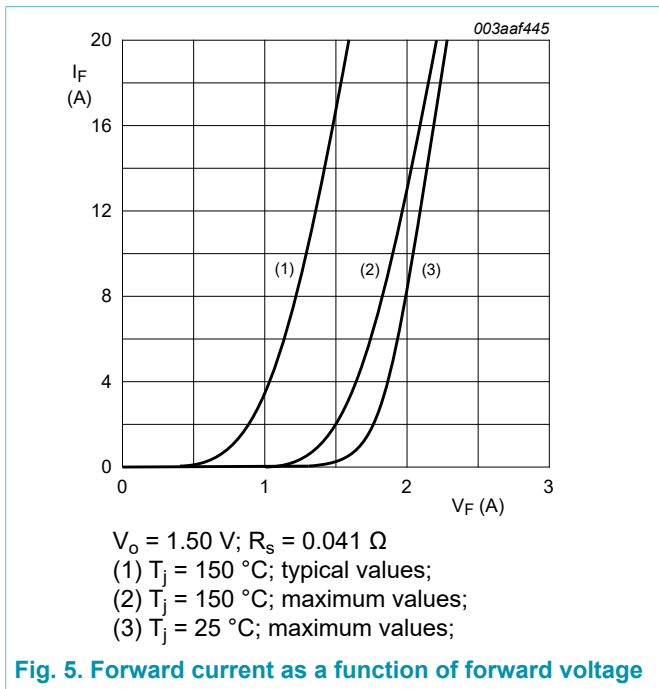


Fig. 6. Reverse recovery definitions; ramp recovery

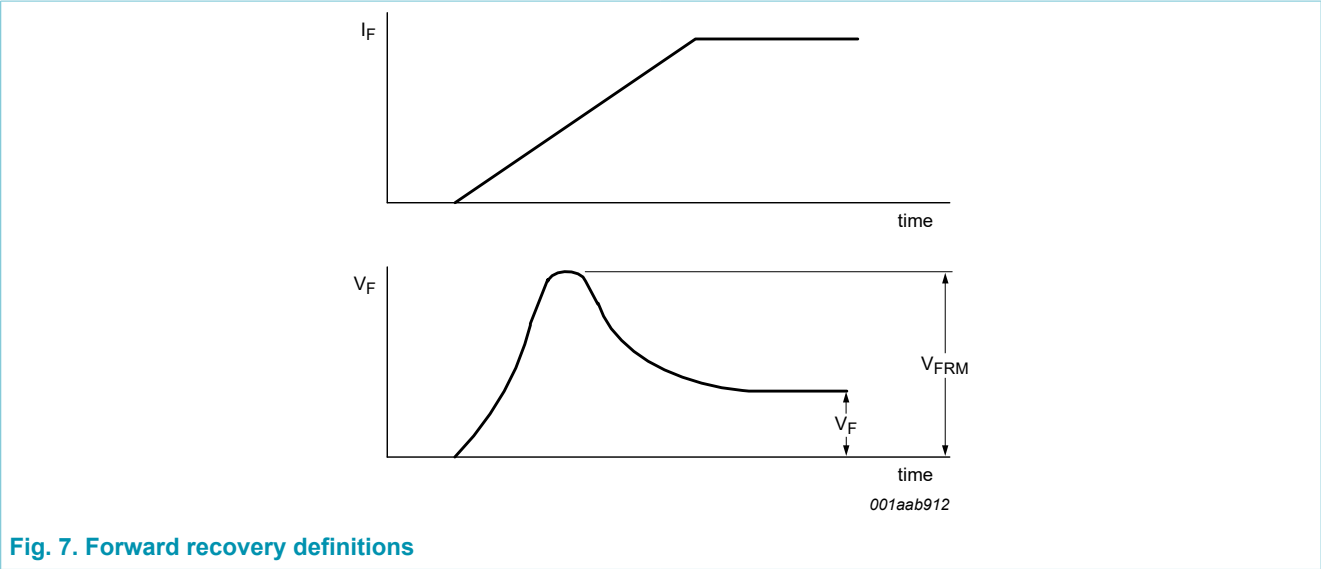


Fig. 7. Forward recovery definitions

10. Package outline

Plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped) TO263

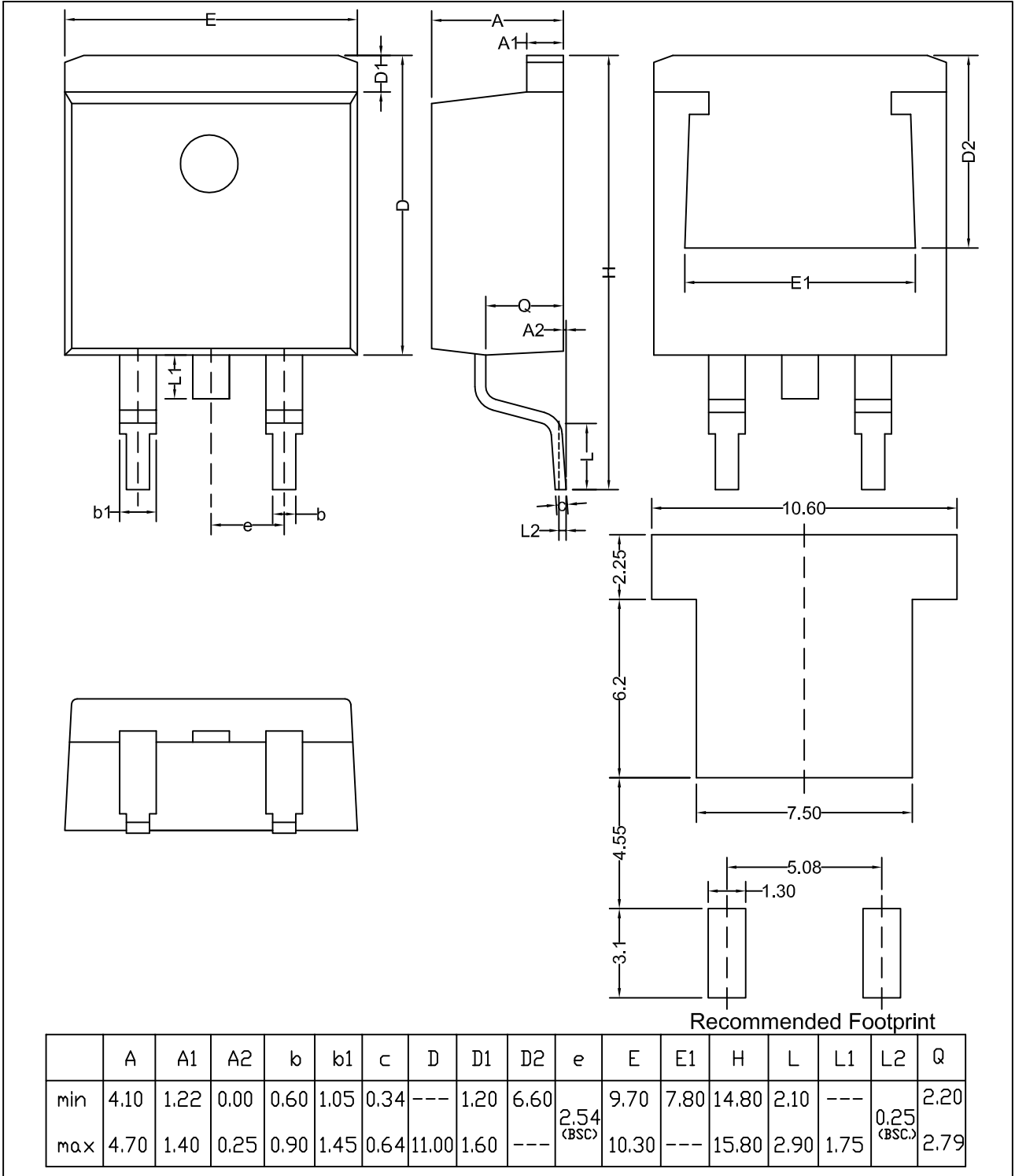


Fig. 8. Package outline D2PAK (SOT404)

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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.
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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