

# BYV72EW-200

Dual ultrafast power diode

24 July 2013

Product data sheet

## 1. General description

Dual ultrafast power diode in a SOT429 (3-lead TO-247) plastic package.

## 2. Features and benefits

- Very low on-state loss
- Fast switching
- Soft recovery characteristic minimizes power consuming oscillations
- High reverse surge capability
- High thermal cycling performance
- Low thermal resistance

## 3. Applications

Output rectifiers in high-frequency switched-mode power supplies

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	-	200	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 113$ °C; square-wave pulse; per diode; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	-	15	A
$I_{O(AV)}$	average output current	$\delta = 0.5$ ; $T_{mb} \leq 104$ °C; square-wave pulse; both diodes conducting	-	-	30	A
$I_{RSM}$	non-repetitive peak reverse current	$t_p = 100$ $\mu$ s; per diode	-	-	0.2	A
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 15$ A; $T_j = 150$ °C; <a href="#">Fig. 6</a>	-	0.78	0.9	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $dI_F/dt = 100$ A/ $\mu$ s; $T_j = 25$ °C; <a href="#">Fig. 7</a>	-	20	28	ns

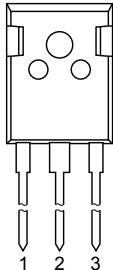
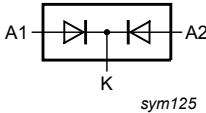


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## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1	 <p>TO-247 (SOT429)</p>	
2	K	cathode		
3	A2	anode 2		
mb	K	mounting base; cathode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYV72EW-200	TO-247	plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 3 lead TO-247	SOT429

## 7. Marking

Table 4. Marking codes

Type number	Marking code
BYV72EW-200	BYV72EW-200

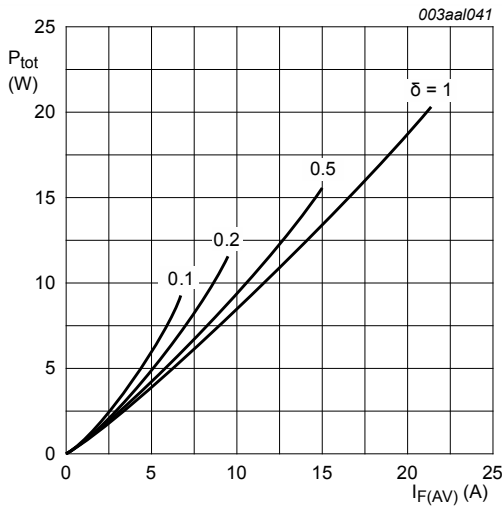
## 8. Limiting values

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		-	200	V
$V_{RWM}$	crest working reverse voltage		-	200	V
$V_R$	reverse voltage	$T_{mb} \leq 144\text{ }^\circ\text{C}$ ; DC	-	200	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 113\text{ }^\circ\text{C}$ ; square-wave pulse; per diode; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	15	A
$I_{O(AV)}$	average output current	$\delta = 0.5$ ; $T_{mb} \leq 104\text{ }^\circ\text{C}$ ; square-wave pulse; both diodes conducting	-	30	A

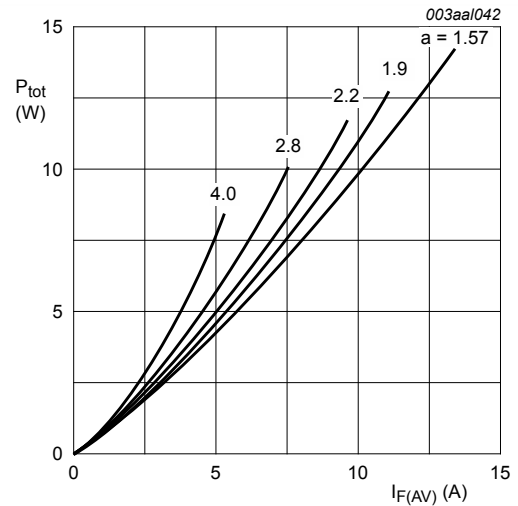
Symbol	Parameter	Conditions	Min	Max	Unit
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 10 ms; T <sub>j(initial)</sub> = 25 °C; sine-wave pulse; per diode; Fig. 4	-	170	A
		t <sub>p</sub> = 8.3 ms; T <sub>j(initial)</sub> = 25 °C; sine-wave pulse; per diode; Fig. 4	-	185	A
I <sub>RRM</sub>	repetitive peak reverse current	δ = 0.001 ; t <sub>p</sub> = 2 μs; per diode	-	0.2	A
I <sub>RSM</sub>	non-repetitive peak reverse current	t <sub>p</sub> = 100 μs; per diode	-	0.2	A
T <sub>stg</sub>	storage temperature		-40	150	°C
T <sub>j</sub>	junction temperature		-	150	°C
<b>Electrostatic discharge</b>					
V <sub>ESD</sub>	electrostatic discharge voltage	HBM; C = 250 pF; R = 1.5 kΩ	-	8	kV



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

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

$$V_O = 0.744 \text{ V}; R_S = 0.010 \text{ } \Omega$$



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

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

$$V_O = 0.744 \text{ V}; R_S = 0.010 \text{ } \Omega$$

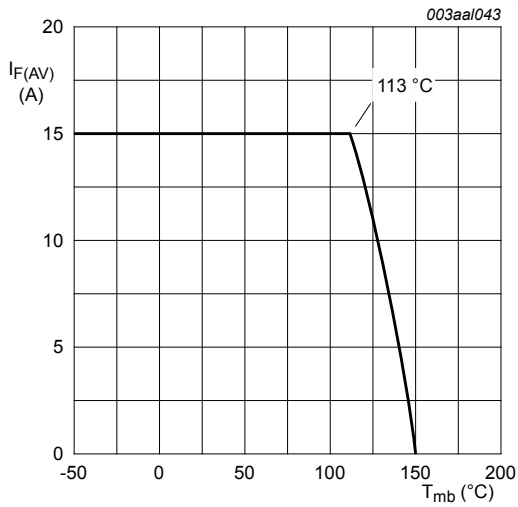


Fig. 3. Average forward current as a function of mounting base temperature; per diode; maximum values

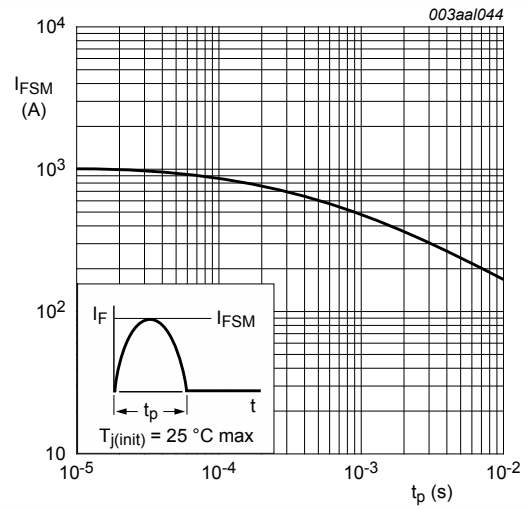


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; per diode; maximum values

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound; per diode; <a href="#">Fig. 5</a>	-	-	2.4	K/W
		with heatsink compound; both diodes conducting	-	-	1.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	45	-	K/W

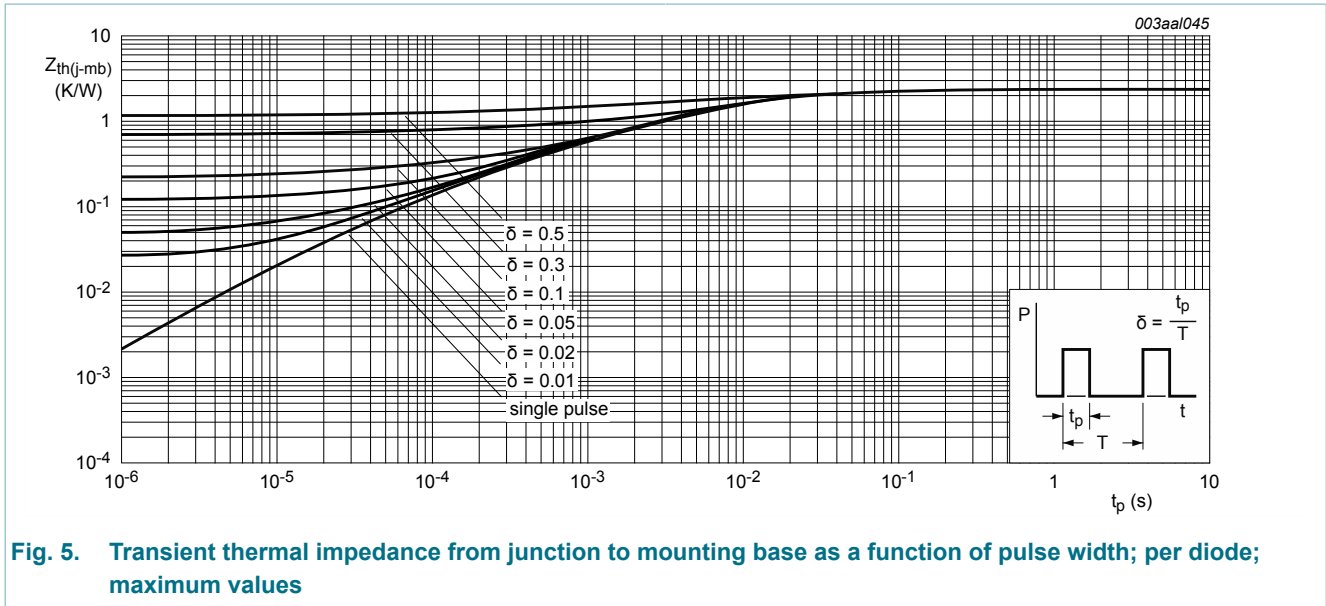


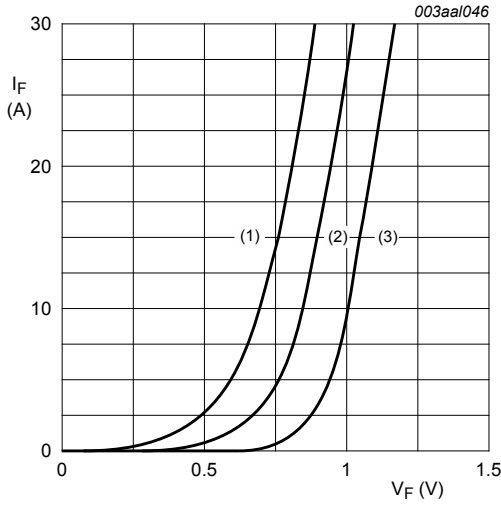
Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse width; per diode; maximum values

## 10. Characteristics

Table 7. Characteristics

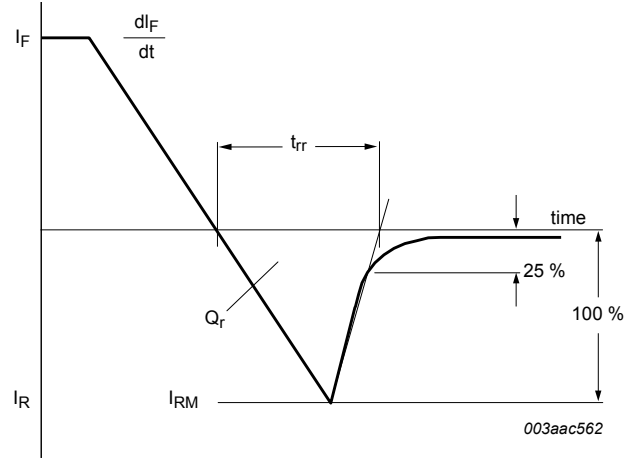
characteristics are per diode unless otherwise stated

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 15 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 6}$	-	0.95	1.05	V
		$I_F = 30 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 6}$	-	1	1.2	V
		$I_F = 15 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{ Fig. 6}$	-	0.78	0.9	V
$I_R$	reverse current	$V_R = 200 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	10	100	$\mu\text{A}$
		$V_R = 200 \text{ V}; T_j = 100 \text{ }^\circ\text{C}$	-	0.5	1	mA
<b>Dynamic characteristics</b>						
$Q_r$	recovered charge	$I_F = 2 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 20 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$	-	6	15	nC
$t_{rr}$	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$	-	20	28	ns
$V_{FRM}$	forward recovery voltage	$I_F = 1 \text{ A}; dI_F/dt = 10 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 8}$	-	1	-	V

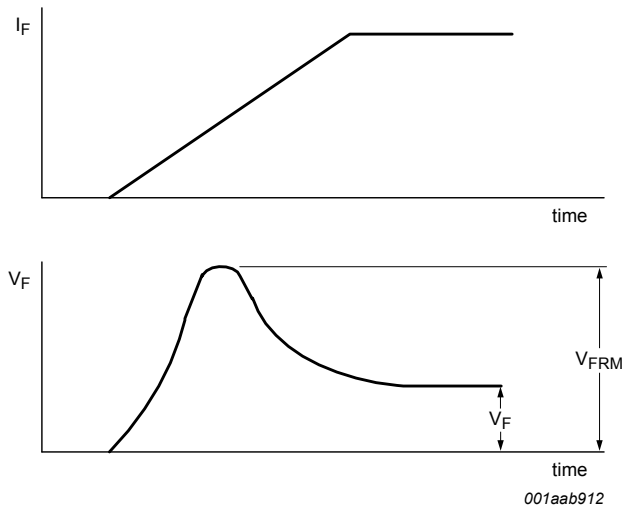


**Fig. 6. Forward current as a function of forward voltage; per diode**

- (1)  $T_j = 150\text{ °C}$ ; typical values;
  - (2)  $T_j = 150\text{ °C}$ ; maximum values;
  - (3)  $T_j = 25\text{ °C}$ ; maximum values;
- $V_O = 0.744\text{ V}$ ;  $R_S = 0.010\text{ }\Omega$



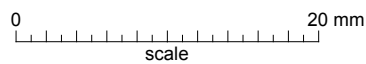
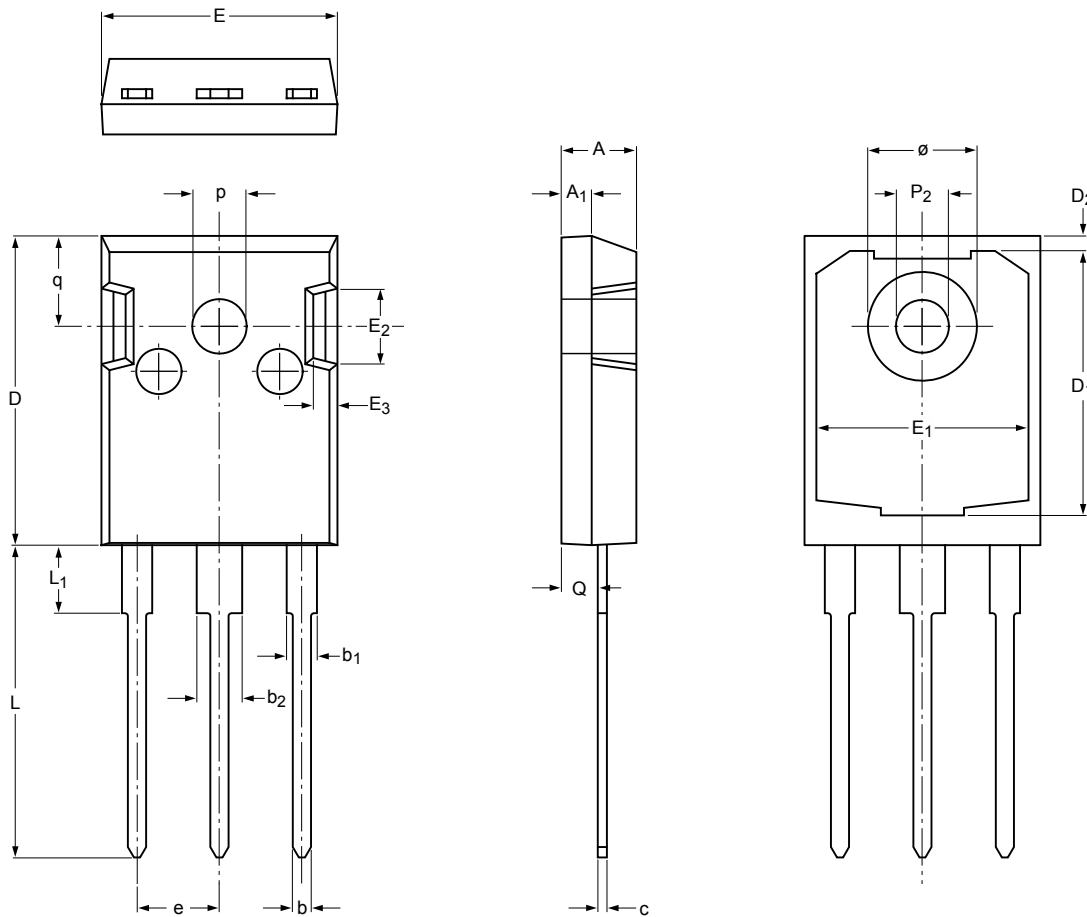
**Fig. 7. Reverse recovery definitions; ramp recovery**



**Fig. 8. Forward recovery definitions**

11. Package outline

Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 3-lead TO-247 SOT429



Dimensions (mm are the original dimensions)

Unit <sup>(1)</sup>	A	A <sub>1</sub>	b	b <sub>1</sub>	b <sub>2</sub>	c	D	D <sub>1</sub>	D <sub>2</sub>	E	E <sub>1</sub>	E <sub>2</sub>	E <sub>3</sub>	e <sup>(1)</sup>	L	L <sub>1</sub>	P <sub>2</sub>	p	Q	q	ø	
max	5.20	2.10	1.40	2.20	3.20	0.70	20.6	17.68	1.20	15.75	14.22	5.20	1.80	5.45	20.90	4.75	3.60	3.70	2.60	6.18	7.30	
nom																						
min	4.70	1.90	1.00	1.80	2.80	0.50	20.3	17.28	0.80	15.45	13.82	4.80	1.40		20.40	4.25	3.40	3.50	2.20	5.78	7.10	

Note

1. Basic spacing between centers.

sot429\_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT429		TO-247				-04-09-14- 13-03-25

Fig. 9. Package outline TO-247 (SOT429)

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