



**THE DATASHEET OF  
BYV430W-600PQ**



## 1. General description

Dual ultrafast power diodes in a TO247 plastic package.

## 2. Features and benefits

- Very low on-state loss
- Reduces switching losses in associated MOSFET or IGBT
- Low leakage current
- Isolated plastic package

## 3. Applications

- Active PFC in air conditioner
- S.M.P.S Power Factor Correction (PFC)
- Half-bridge/full-bridge switched-mode power supplies

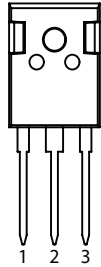
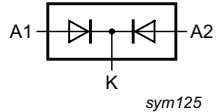
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
<b>Absolute maximum rating</b>						
$V_R$	repetitive peak reverse voltage	DC	600			V
$I_{O(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 105$ °C; square-wave pulse; both diodes conducting	60			A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25$ $\mu$ s; $T_{mb} \leq 105$ °C; square-wave pulse	60			A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; per diode; <a href="#">Fig. 4</a>	180			A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; per diode	200			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 30$ A; $T_j = 25$ °C; <a href="#">Fig. 6</a>	-	1.5	2	V
		$I_F = 30$ A; $T_j = 150$ °C; <a href="#">Fig. 6</a>	-	1.25	-	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 30$ A; $V_R = 30$ V; $di_F/dt = 200$ A/ $\mu$ s; $T_j = 25$ °C; <a href="#">Fig. 7</a>	-	53	90	ns
		$I_F = 30$ A; $V_R = 200$ V; $di_F/dt = 200$ A/ $\mu$ s; $T_j = 25$ °C; <a href="#">Fig. 7</a>	-	64	-	ns
		$I_F = 30$ A; $V_R = 200$ V; $di_F/dt = 200$ A/ $\mu$ s; $T_j = 125$ °C; <a href="#">Fig. 7</a>	-	113	-	ns

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1		 sym125
2	K	cathode		
3	A2	anode 2		
mb	K	mounting base; connected to cathode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BYV430W-600P	TO247	BYV430W-600PQ	Tube	30	SOT429	25-Mar-2013

## 7. Marking

Table 4. Marking codes

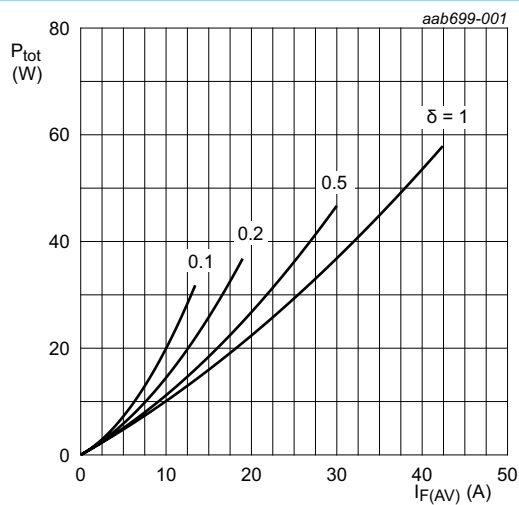
Type number	Marking codes
BYV430W-600P	BYV430W-600P

## 8. Limiting values

**Table 5. Limiting values**

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

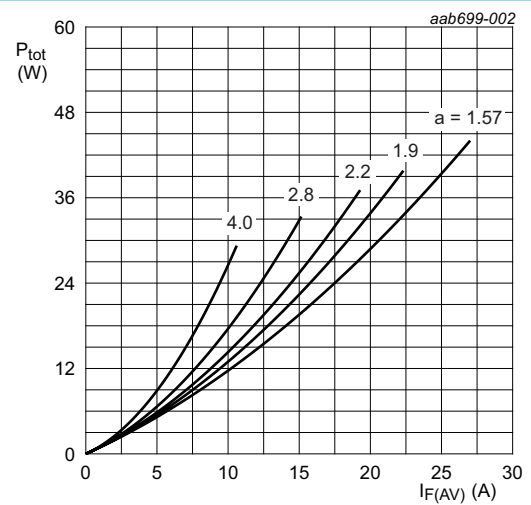
Symbol	Parameter	Conditions	Values	Unit
$V_{RRM}$	repetitive peak reverse voltage		600	V
$V_{RWM}$	crest working reverse voltage		600	V
$V_R$	reverse voltage	DC	600	V
$I_{O(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 105\text{ }^\circ\text{C}$ ; square-wave pulse; both diodes conducting	60	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 105\text{ }^\circ\text{C}$ ; square-wave pulse	60	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; per diode; <a href="#">Fig. 4</a>	180	A
		$t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; sine-wave pulse; per diode;	200	A
$T_{stg}$	storage temperature		-55 to 175	$^\circ\text{C}$
$T_j$	junction temperature		175	$^\circ\text{C}$



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

$$V_o = 0.899\text{ V}; R_s = 0.0110\text{ }\Omega$$

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



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

$$V_o = 0.899\text{ V}; R_s = 0.0110\text{ }\Omega$$

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

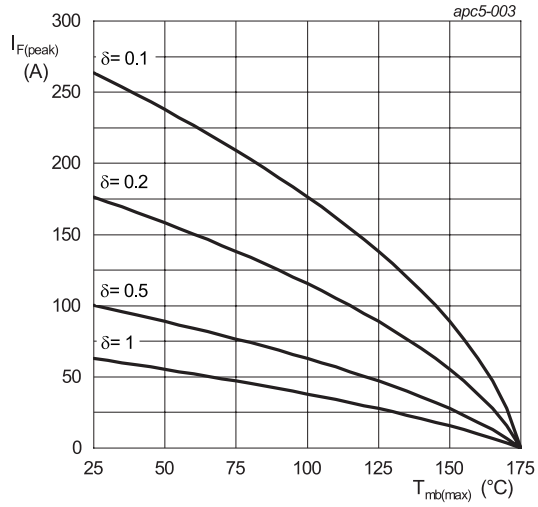


Fig. 3. Current derating as a function of mounting base temperature; per diode

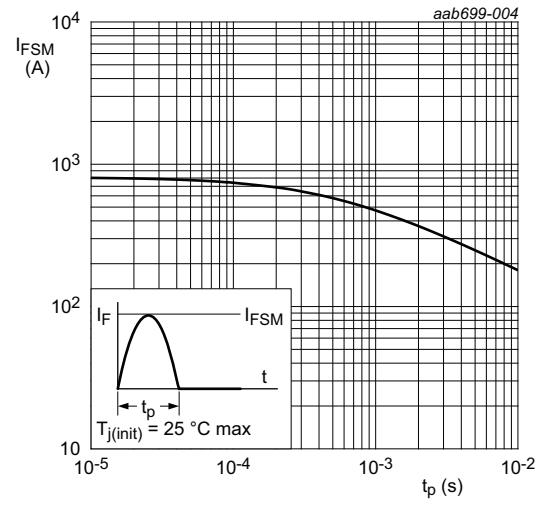


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

### 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>	-	1.17	1.5	K/W
		with heatsink compound; both diodes conducting	-	0.61	0.75	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	40	-	K/W

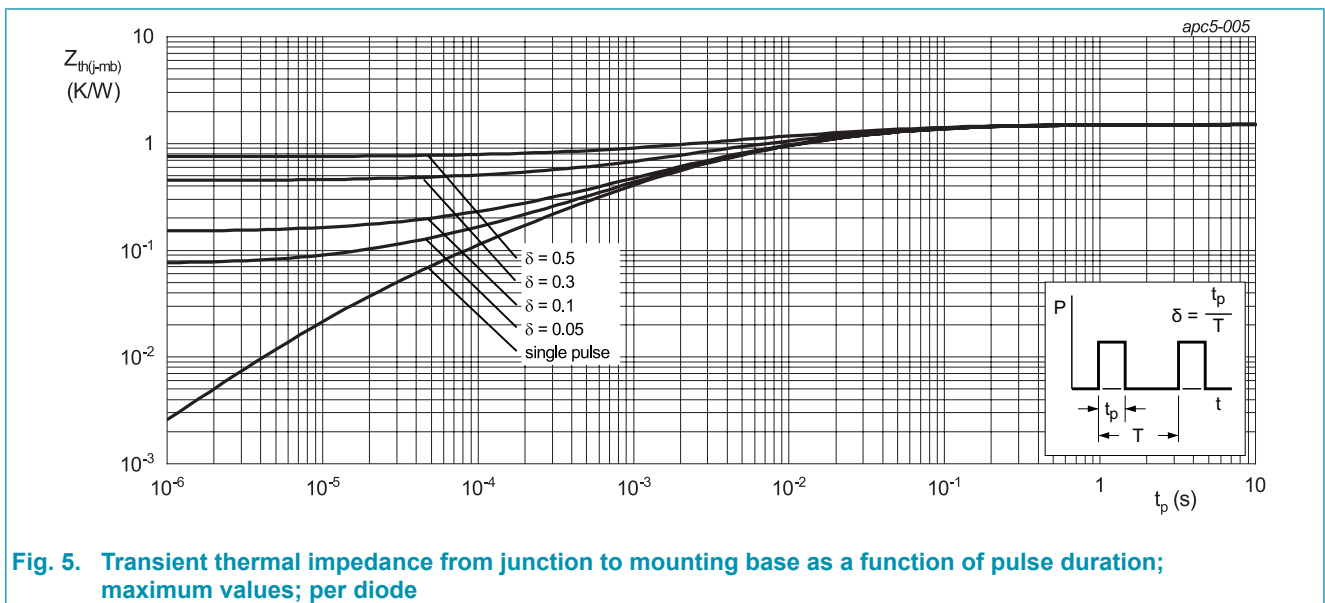
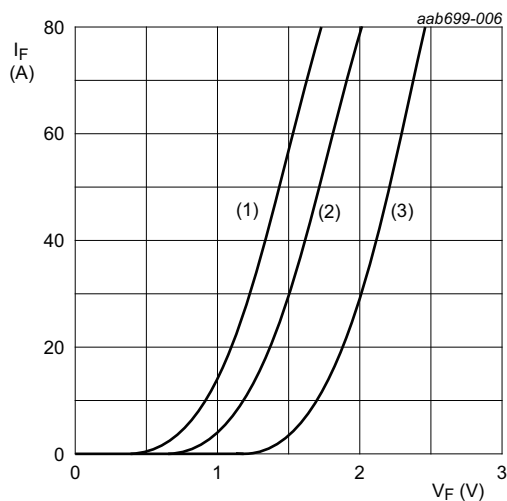


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration; maximum values; per diode

### 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 30 A; T <sub>J</sub> = 25 °C; Fig. 6	-	1.5	2	V
		I <sub>F</sub> = 30 A; T <sub>J</sub> = 150 °C; Fig. 6	-	1.25	-	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 600 V; T <sub>J</sub> = 25 °C	-	-	10	µA
		V <sub>R</sub> = 600 V; T <sub>J</sub> = 150 °C	-	-	500	µA
<b>Dynamic characteristics</b>						
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 30 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 200 A/µs; T <sub>J</sub> = 25 °C; Fig. 7	-	53	90	ns
		I <sub>F</sub> = 30 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/µs; T <sub>J</sub> = 25 °C; Fig. 7	-	64	-	ns
		I <sub>F</sub> = 30 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/µs; T <sub>J</sub> = 125 °C; Fig. 7	-	113	-	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 30 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/µs; T <sub>J</sub> = 25 °C; Fig. 7	-	7.3	-	A
		I <sub>F</sub> = 30 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/µs; T <sub>J</sub> = 125 °C; Fig. 7	-	13.5	-	A
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 30 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/µs; T <sub>J</sub> = 25 °C; Fig. 7	-	245	-	nC
		I <sub>F</sub> = 30 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/µs; T <sub>J</sub> = 125 °C; Fig. 7	-	760	-	nC



(1) T<sub>J</sub> = 150 °C; typical values  
 (2) T<sub>J</sub> = 150 °C; maximum values  
 (3) T<sub>J</sub> = 25 °C; maximum values  
 V<sub>0</sub> = 0.899 V; R<sub>s</sub> = 0.0110 Ω

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

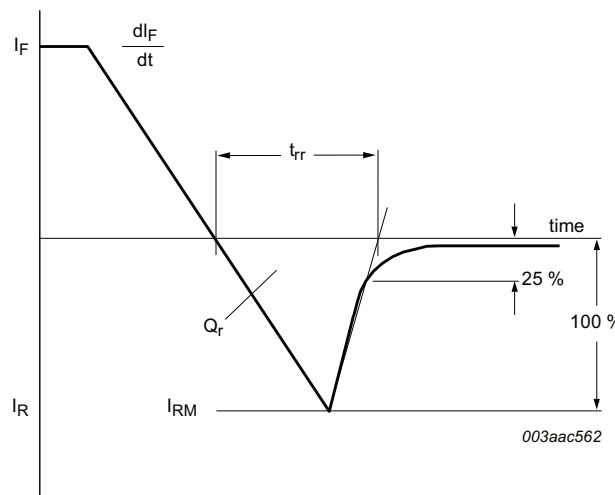
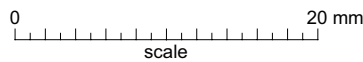
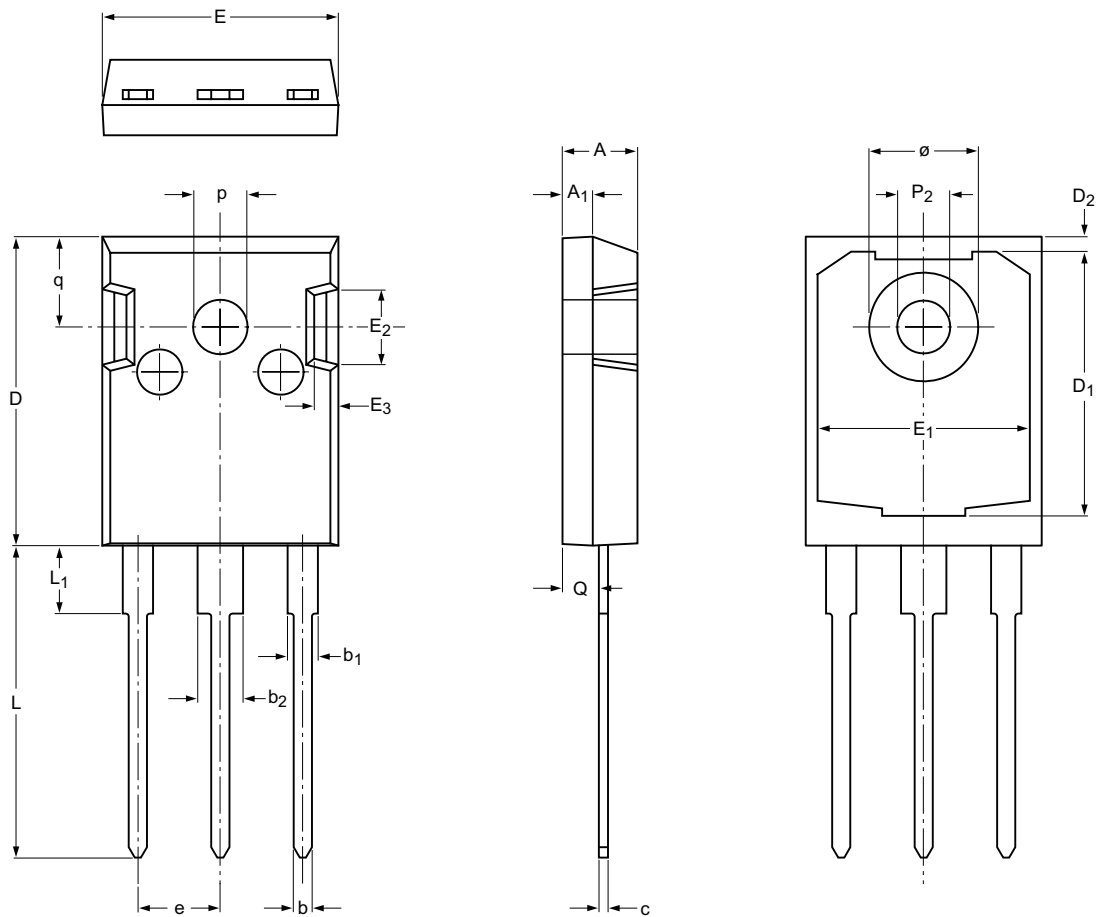


Fig. 7. Reverse recovery definitions; ramp recovery

### 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		20.90	4.75	3.60	3.70	2.60	6.18	7.30	
nom														5.45								
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

## 12. 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.
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