



# BYV430K-300P

Dual ultrafast power diode

1 September 2015

Product data sheet

## 1. General description

2x30A, 300V Dual ultrafast power diode in a SOT1259 (3-lead TO-3P) plastic package.

## 2. Features and benefits

- Low forward voltage drop
- Fast Switching
- Soft recovery characteristics
- High thermal cycling performance
- Low thermal resistance

## 3. Applications

- Telecom power supplies
- Welding machines
- Secondary rectification in SMPS

## 4. Quick reference data

Table 1. Quick reference data

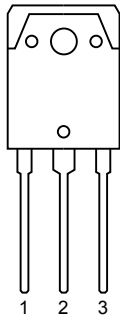
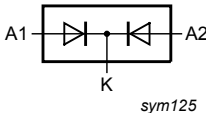
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	-	300	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 105$ °C; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	-	30	A
$I_{O(AV)}$	average output 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>	-	-	300	A
		$t_p = 8.3$ ms; $T_{J(init)} = 25$ °C; sine-wave pulse; per diode; <a href="#">Fig. 4</a>	-	-	330	A
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 30$ A; $T_J = 25$ °C; <a href="#">Fig. 6</a>	-	1	1.25	V
		$I_F = 30$ A; $T_J = 150$ °C; <a href="#">Fig. 6</a>	-	0.85	1	V



Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}$ ; $V_R = 30\text{ V}$ ; $di_F/dt = 50\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>	-	-	55	ns
		$I_F = 30\text{ A}$ ; $V_R = 200\text{ V}$ ; $di_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>	-	33	-	ns
		$I_F = 30\text{ A}$ ; $V_R = 200\text{ V}$ ; $di_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 125\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>	-	62	-	ns

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1	 <p>TO3P (SOT1259)</p>	 <p>sym125</p>
2	K	cathode		
3	A2	anode 2		
mb	mb	mounting base; connected to cathode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYV430K-300P	TO3P	Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO3P	SOT1259

## 7. Marking

Table 4. Marking codes

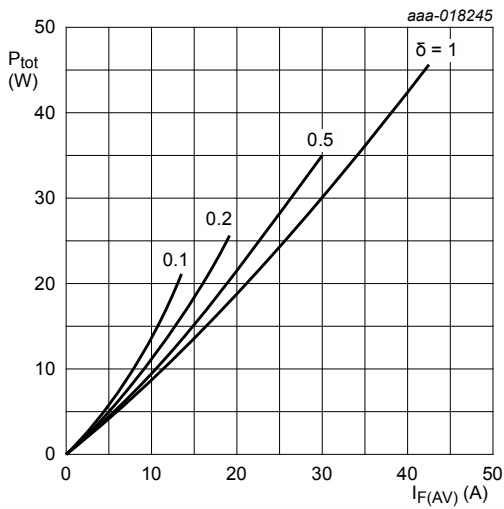
Type number	Marking code
BYV430K-300P	BYV430K-300P

## 8. Limiting values

**Table 5. Limiting values**

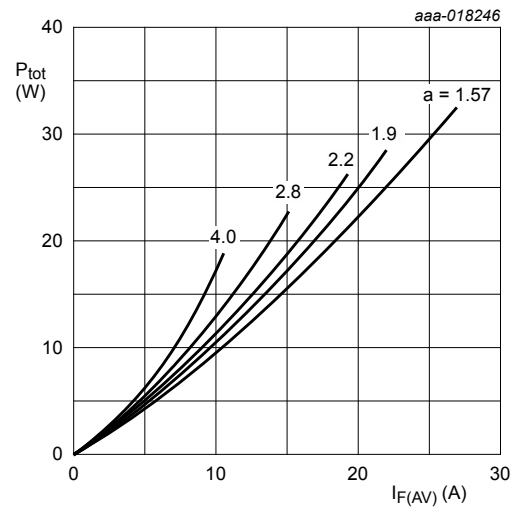
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	300	V
$V_{RWM}$	crest working reverse voltage		-	300	V
$V_R$	reverse voltage	DC	-	300	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 105$ °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3	-	30	A
$I_{O(AV)}$	average output 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; Fig. 4	-	300	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; per diode; Fig. 4	-	330	A
$T_{stg}$	storage temperature		-55	175	°C
$T_j$	junction temperature		-	175	°C



$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$   
 $V_o = 0.840$  V;  $R_s = 0.006$   $\Omega$

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



$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$   
 $V_o = 0.840$  V;  $R_s = 0.006$   $\Omega$

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

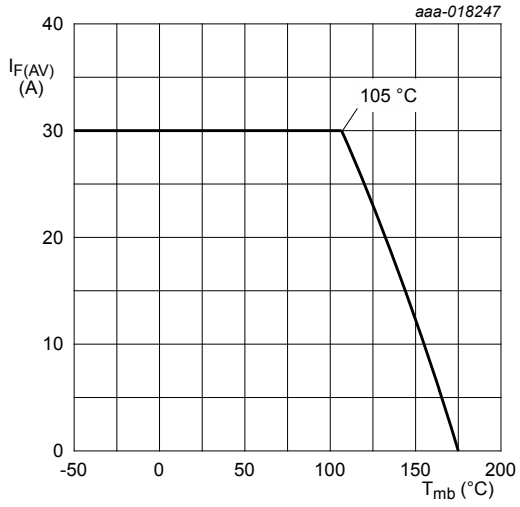


Fig. 3. Average forward current as a function of mounting base temperature; per diode; maximum values

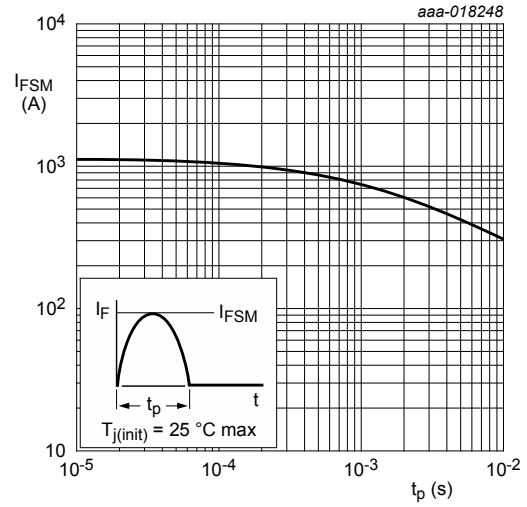


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; per diode; maximum values

### 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>	-	0.8	2	K/W
		with heatsink compound; both diodes conducting	-	-	1.2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	45	-	K/W

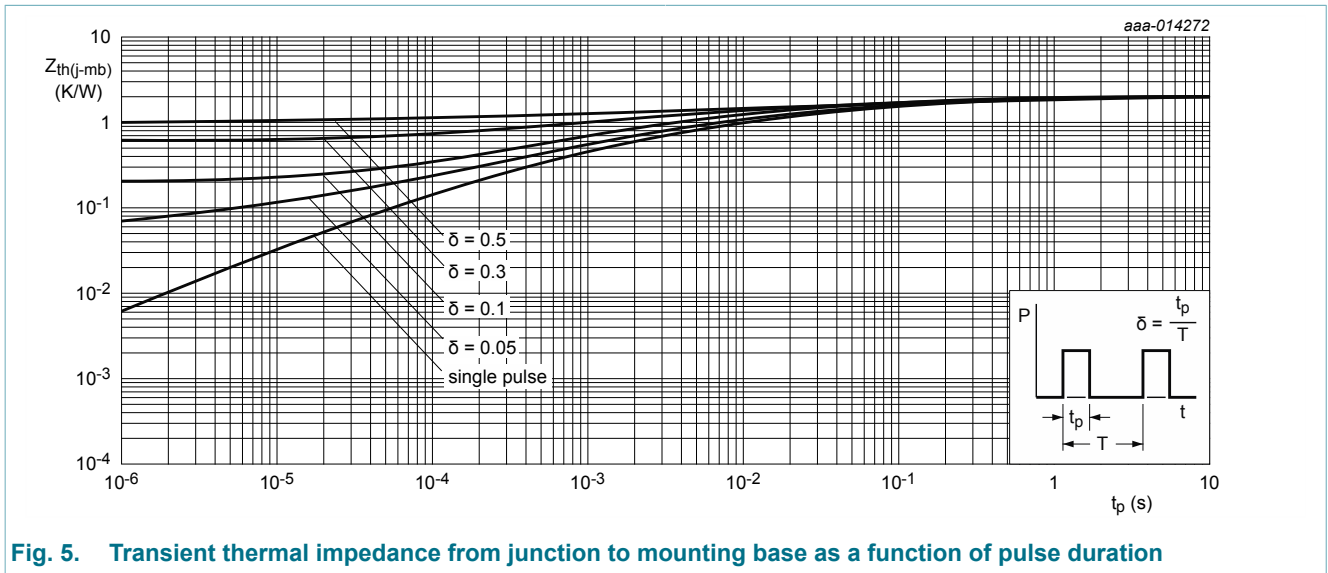
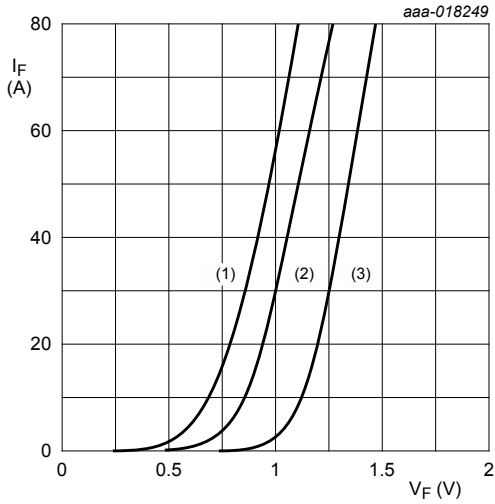


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

## 10. Characteristics

Table 7. Characteristics

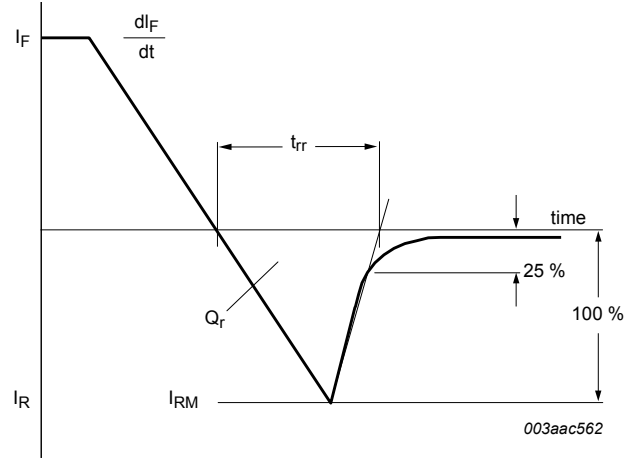
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
	characteristics general note	characteristics are per diode unless otherwise stated	-	-	-	
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 30\text{ A}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 6</a>	-	1	1.25	V
		$I_F = 30\text{ A}$ ; $T_j = 150\text{ °C}$ ; <a href="#">Fig. 6</a>	-	0.85	1	V
$I_R$	reverse current	$V_R = 300\text{ V}$ ; $T_j = 25\text{ °C}$	-	0.4	10	$\mu\text{A}$
		$V_R = 300\text{ V}$ ; $T_j = 150\text{ °C}$	-	-	500	$\mu\text{A}$
<b>Dynamic characteristics</b>						
$Q_r$	recovered charge	$I_F = 30\text{ A}$ ; $V_R = 200\text{ V}$ ; $di_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>	-	89	-	nC
		$I_F = 30\text{ A}$ ; $V_R = 200\text{ V}$ ; $di_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 125\text{ °C}$ ; <a href="#">Fig. 7</a>	-	337	-	nC
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}$ ; $V_R = 30\text{ V}$ ; $di_F/dt = 50\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>	-	-	55	ns
		$I_F = 30\text{ A}$ ; $V_R = 200\text{ V}$ ; $di_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>	-	33	-	ns
		$I_F = 30\text{ A}$ ; $V_R = 200\text{ V}$ ; $di_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 125\text{ °C}$ ; <a href="#">Fig. 7</a>	-	62	-	ns
$I_{RM}$	peak reverse recovery current	$I_F = 30\text{ A}$ ; $V_R = 200\text{ V}$ ; $di_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>	-	5.3	-	A
		$I_F = 30\text{ A}$ ; $V_R = 200\text{ V}$ ; $di_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 125\text{ °C}$ ; <a href="#">Fig. 7</a>	-	10.5	-	A



$V_o = 0.840 \text{ V}; R_s = 0.006 \Omega$

- (1)  $T_j = 150 \text{ }^\circ\text{C}$ ; typical values
- (2)  $T_j = 150 \text{ }^\circ\text{C}$ ; maximum values
- (3)  $T_j = 25 \text{ }^\circ\text{C}$ ; maximum values

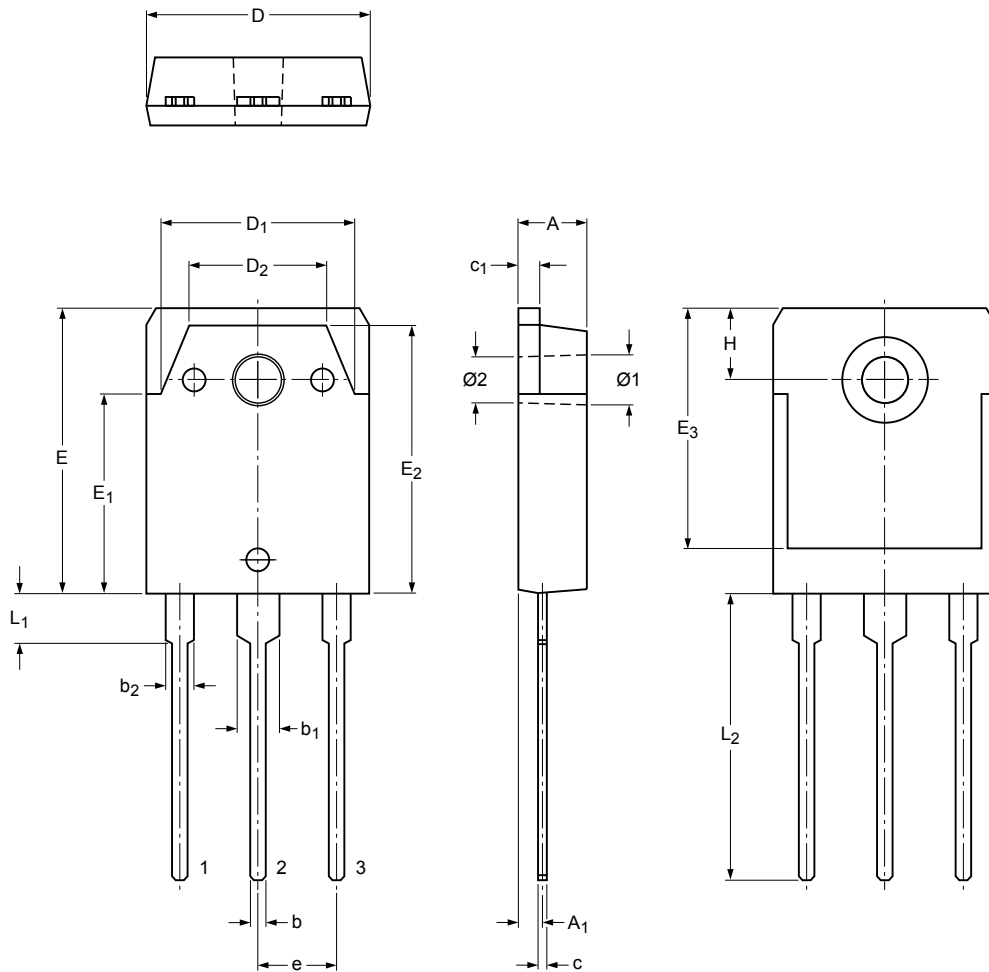
**Fig. 6. Forward current as a function of forward voltage, per diode**



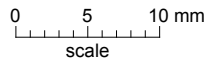
**Fig. 7. Reverse recovery definitions; ramp recovery**

11. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO3P SOT1259



Dimensions (mm are the original dimensions)



Unit	A	A <sub>1</sub>	b	b <sub>1</sub>	b <sub>2</sub>	c	c <sub>1</sub>	D	D <sub>1</sub>	D <sub>2</sub>	e	E	E <sub>1</sub>	E <sub>2</sub>	E <sub>3</sub>	H	L <sub>1</sub>	L <sub>2</sub>	Ø1	Ø2
max	5.0	1.6	1.2	3.2	2.2	0.75	1.65	15.8	13.8	9.8		20.1	14.1	18.9	17.06	5.2	3.7	20.3	3.5	3.3
nom											5.45									
min	4.6	1.2	0.8	2.8	1.8	0.55	1.45	15.4	13.4	9.4	(typ)	19.7	13.7	18.5	16.46	4.8	3.3	19.7	3.3	3.1

sot1259\_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT1259		TO3P			14-10-21 14-10-22

Fig. 8. Package outline TO3P (SOT1259)



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Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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