

## 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 thermal cycling performance
- Low thermal resistance

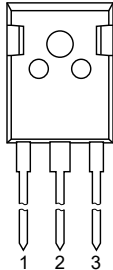
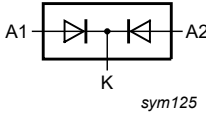
## 3. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_R$	reverse voltage	DC	-	-	400	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 104$ °C; square-wave pulse; per diode; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	-	15	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>	-	-	170	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; per diode	-	-	185	A
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 15$ A; $T_j = 25$ °C; <a href="#">Fig. 6</a>	-	1.08	1.25	V
		$I_F = 30$ A; $T_j = 25$ °C; <a href="#">Fig. 6</a>	-	1.15	1.36	V
		$I_F = 15$ A; $T_j = 150$ °C; <a href="#">Fig. 6</a>	-	0.95	1.12	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>	-	35	60	ns

### 4. Pinning information

Table 2. Pinning information

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

### 5. Ordering information

Table 3. Ordering information

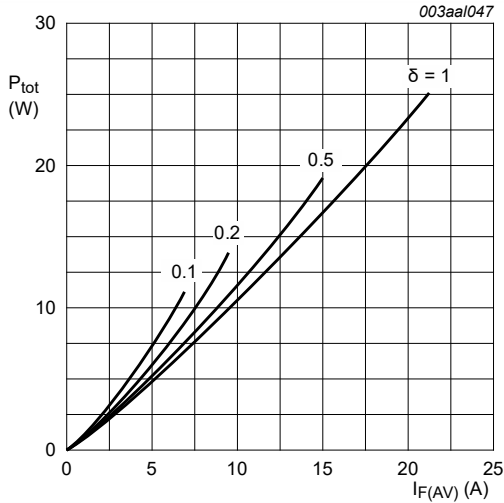
Type number	Package		
	Name	Description	Version
BYV74W-400	TO-247	plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 3 lead TO-247	SOT429

## 6. Limiting values

**Table 4. Limiting values**

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

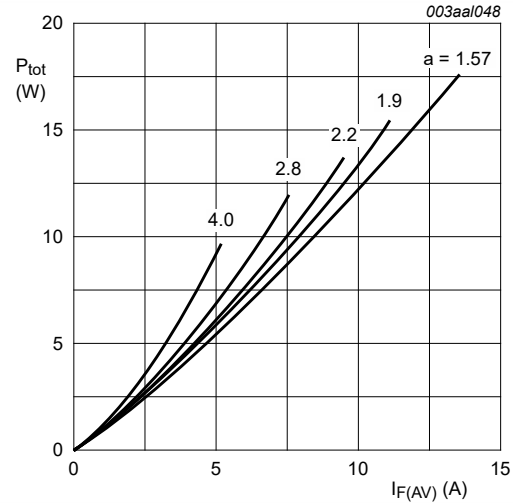
Symbol	Parameter	Conditions	Min	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	400	V
$V_{RWM}$	crest working reverse voltage		-	400	V
$V_R$	reverse voltage	DC; $T_{mb} \leq 136\text{ °C}$	-	400	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 104\text{ °C}$ ; square-wave pulse; 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	$\delta = 0.5$ ; $T_{mb} \leq 94\text{ °C}$ ; square-wave pulse; both diodes conducting	-	30	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; sine-wave pulse; per diode; <a href="#">Fig. 4</a>	-	170	A
		$t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; sine-wave pulse; per diode	-	185	A
$T_{stg}$	storage temperature		-40	150	°C
$T_j$	junction temperature		-	150	°C



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

$$V_o = 0.959\text{ V}; R_s = 0.010\ \Omega$$

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



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

$$V_o = 0.959\text{ V}; R_s = 0.010\ \Omega$$

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

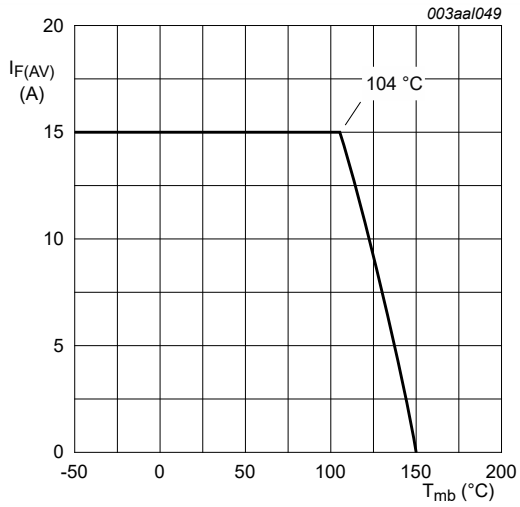


Fig. 3. Average forward current as a function of mounting base temperature; per diode; maximum values

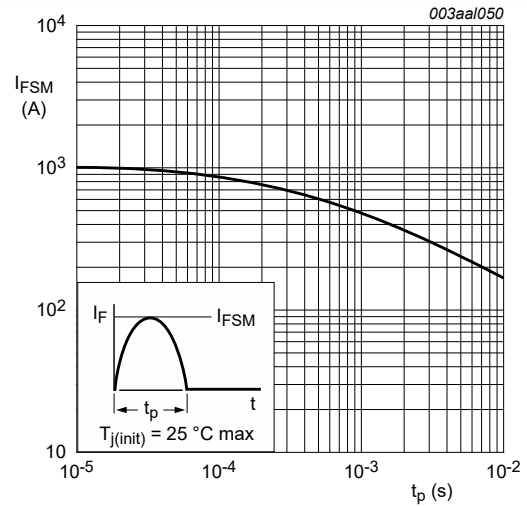


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; per diode; maximum values

### 7. Thermal characteristics

Table 5. 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 free air	in free air	-	45	-	K/W

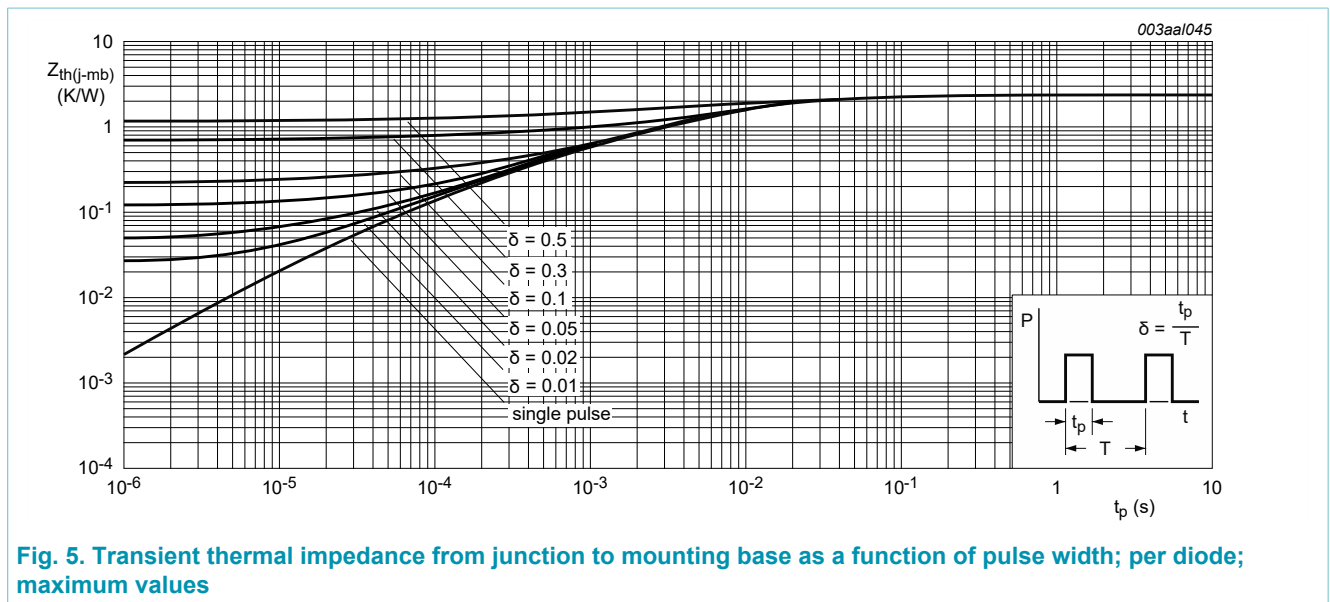


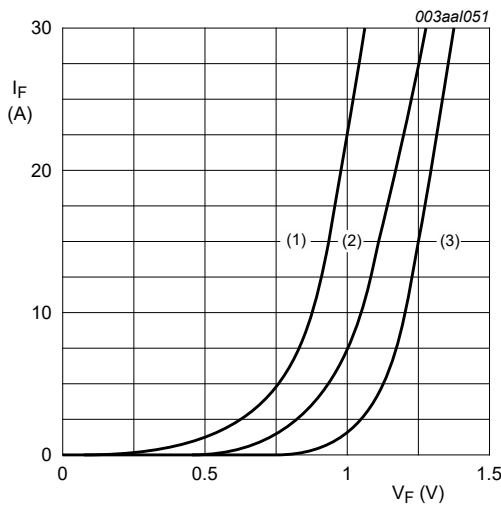
Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse width; per diode; maximum values

### 8. Characteristics

**Table 6. Characteristics**

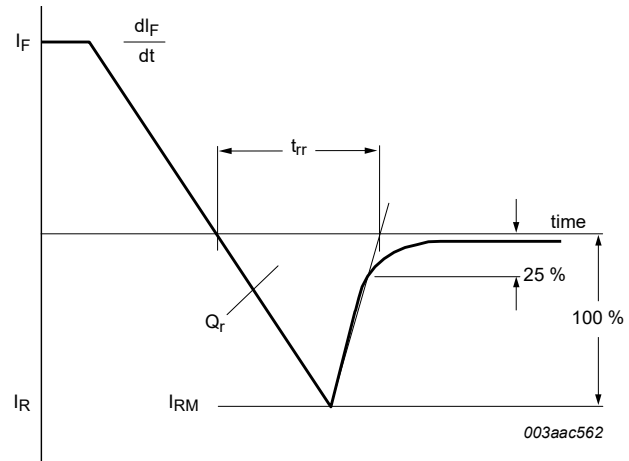
characteristics are per diode unless otherwise stated

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 15 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>	-	1.08	1.25	V
		I <sub>F</sub> = 30 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>	-	1.15	1.36	V
		I <sub>F</sub> = 15 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 6</a>	-	0.95	1.12	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 400 V; T <sub>j</sub> = 25 °C	-	10	50	μA
		V <sub>R</sub> = 400 V; T <sub>j</sub> = 100 °C	-	0.3	0.8	mA
<b>Dynamic characteristics</b>						
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>	-	35	60	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 10 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 50 A/μs; T <sub>j</sub> = 100 °C; <a href="#">Fig. 7</a>	-	4.2	5.2	A
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 2 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 20 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>	-	40	60	nC
V <sub>FR</sub>	forward recovery voltage	I <sub>F</sub> = 10 A; dI <sub>F</sub> /dt = 10 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 8</a>	-	2.5	-	V



V<sub>0</sub> = 0.959 V; R<sub>s</sub> = 0.010 Ω  
 (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

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



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

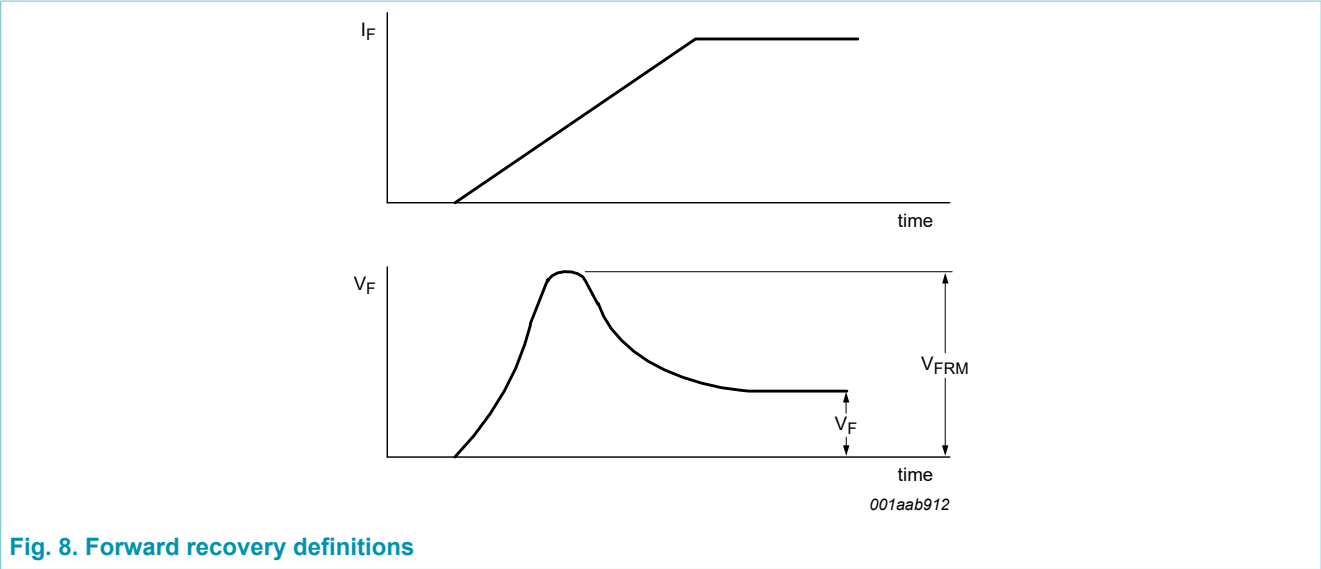
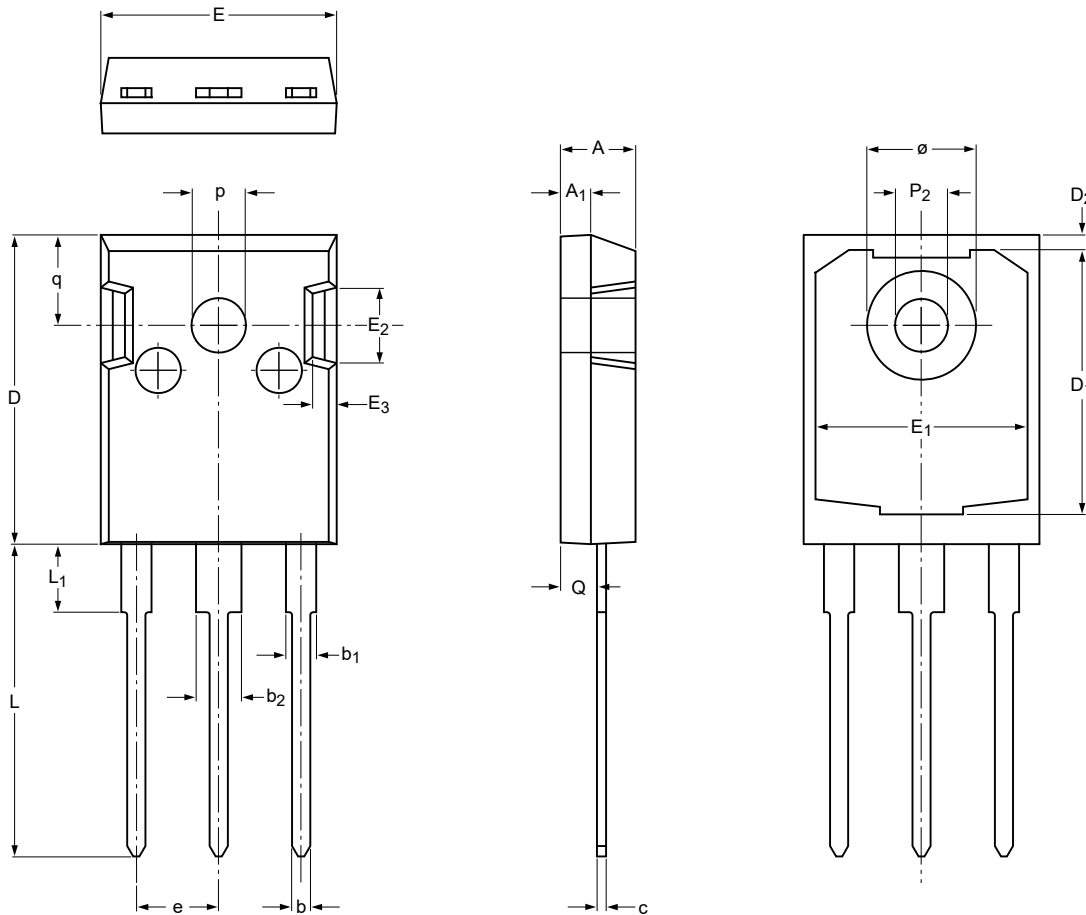


Fig. 8. Forward recovery definitions

9. 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	∅	
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)



## 10. 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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