



BYQ72EW-200

Dual ultrafast power diode

14 May 2015

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

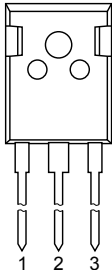
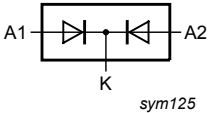
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	-	200	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 113\text{ }^{\circ}\text{C}$; square-wave pulse; per diode; Fig. 1 ; Fig. 2 ; Fig. 3	-	-	15	A
Static characteristics						
V_F	forward voltage	$I_F = 15\text{ A}$; $T_j = 150\text{ }^{\circ}\text{C}$; Fig. 6	-	0.78	0.9	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1\text{ A}$; $V_R = 30\text{ V}$; $dI_F/dt = 100\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 7	-	18	25	ns



5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1	 TO-247 (SOT429)	 sym125
2	K	cathode		
3	A2	anode 2		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYQ72EW-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

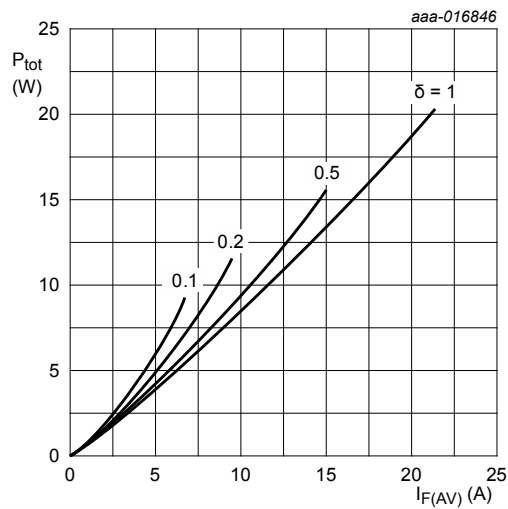
Type number	Marking code
BYQ72EW-200	BYQ72EW-200

8. Limiting values

Table 5. Limiting values

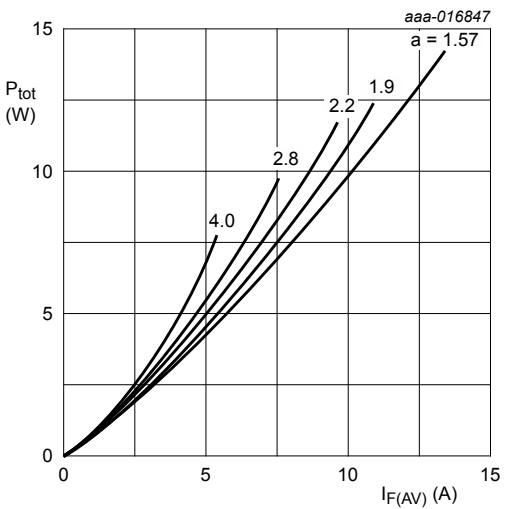
In accordance with the Absolute Maximum Rating System (IEC 60134).

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	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; Fig. 1 ; Fig. 2 ; Fig. 3		-	15	A
$I_{O(AV)}$	average output current	$\delta = 0.5$; $T_{mb} \leq 113\text{ }^{\circ}\text{C}$; square-wave pulse; both diodes conducting		-	30	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; sine-wave pulse; per diode; Fig. 4		-	200	A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; sine-wave pulse; per diode; Fig. 4		-	220	A
I_{RRM}	repetitive peak reverse current	$\delta = 0.001$; $t_p = 2\text{ }\mu\text{s}$; per diode		-	0.2	A
I_{RSM}	non-repetitive peak reverse current	$t_p = 100\text{ }\mu\text{s}$; per diode		-	0.2	A
T_{stg}	storage temperature			-40	150	$^{\circ}\text{C}$
T_j	junction temperature			-	150	$^{\circ}\text{C}$
Electrostatic discharge						
V_{ESD}	electrostatic discharge voltage	HBM; $C = 250\text{ pF}$; $R = 1.5\text{ k}\Omega$		-	8	kV



$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$
$$V_o = 0.79 \text{ V}; R_s = 0.008 \text{ }\Omega$$

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



$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$
$$V_o = 0.79 \text{ V}; R_s = 0.008 \text{ }\Omega$$

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

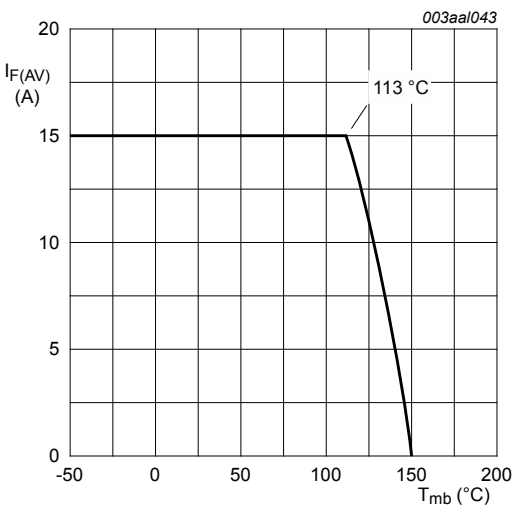


Fig. 3. Average forward current as a function of mounting base temperature; per diode; maximum values

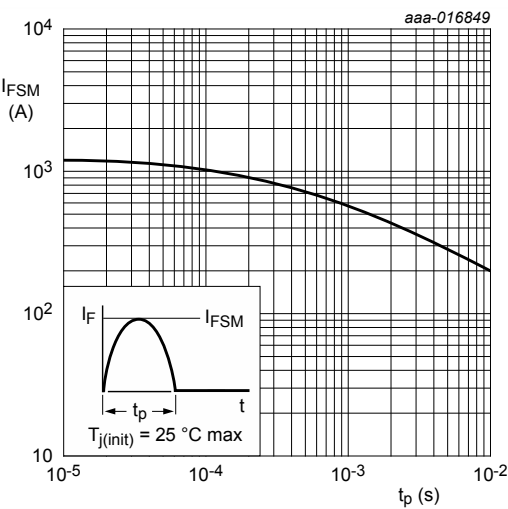
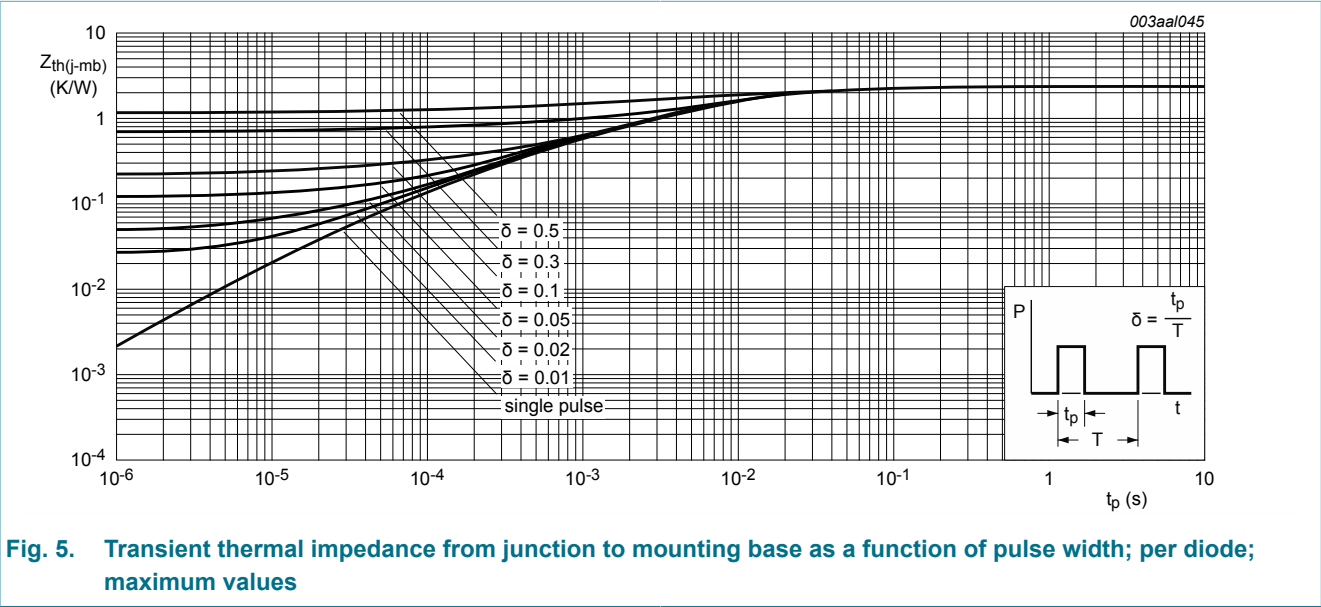


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; per diode; maximum values

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; Fig. 5	-	1.2	2.4	K/W
		with heatsink compound; both diodes conducting	-	0.7	1.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	45	-	K/W

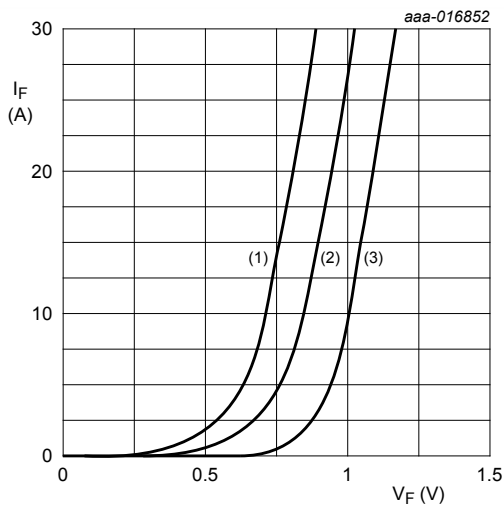


10. Characteristics

Table 7. Characteristics

characteristics are per diode unless otherwise stated

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V _F	forward voltage	I _F = 15 A; T _j = 25 °C; Fig. 6		-	0.95	1.05	V
		I _F = 30 A; T _j = 25 °C; Fig. 6		-	1	1.2	V
		I _F = 15 A; T _j = 150 °C; Fig. 6		-	0.78	0.9	V
I _R	reverse current	V _R = 200 V; T _j = 25 °C		-	3	20	μA
		V _R = 200 V; T _j = 100 °C		-	0.3	1	mA
Dynamic characteristics							
Q _r	recovered charge	I _F = 2 A; V _R = 30 V; dI _F /dt = 20 A/μs; T _j = 25 °C; Fig. 7		-	6	15	nC
		I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/μs; T _j = 25 °C		-	10	-	nC
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/μs; T _j = 25 °C; Fig. 7		-	18	25	ns
I _{RM}	peak reverse recovery current	I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/μs; T _j = 25 °C		-	1	-	A
V _{FRM}	forward recovery voltage	I _F = 1 A; dI _F /dt = 10 A/μs; T _j = 25 °C; Fig. 8		-	1	-	V



$V_o = 0.79\text{ V}$; $R_s = 0.008\text{ }\Omega$
(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

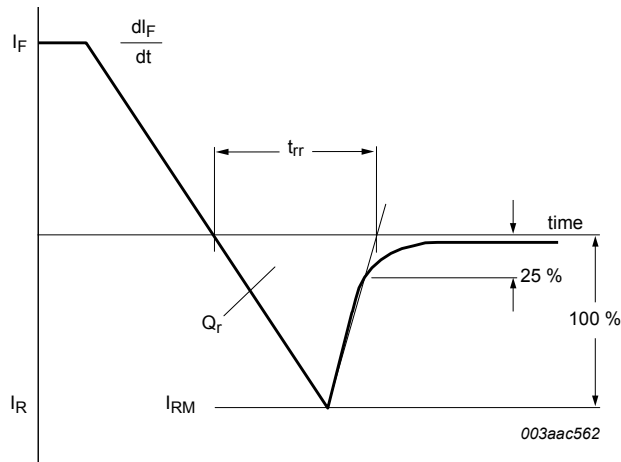


Fig. 7. Reverse recovery definitions; ramp recovery

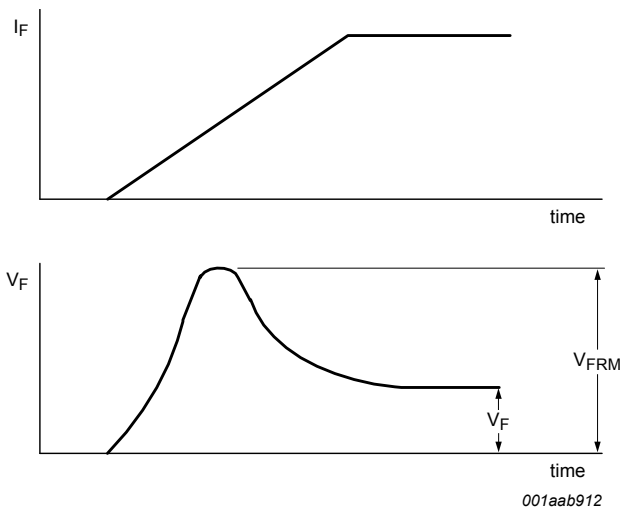


Fig. 8. Forward recovery definitions

11. Package outline

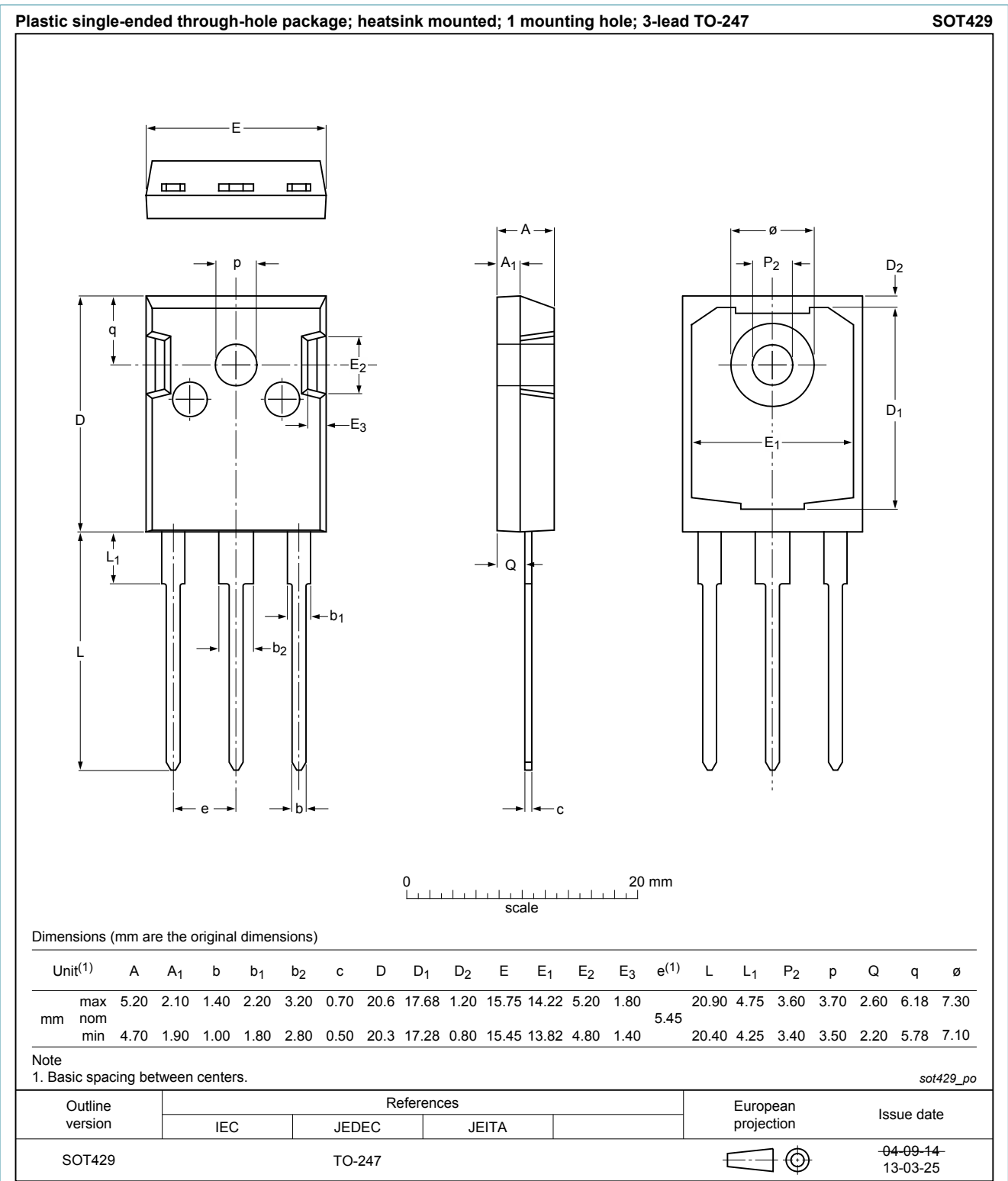


Fig. 9. Package outline TO-247 (SOT429)

12. Legal information

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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.
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