BYQ72EW-200

Dual ultrafast power diode

Rev.02 - 18 May 2023 Product data sheet

1. General description

Dual ultrafast power diodes in a TO247 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

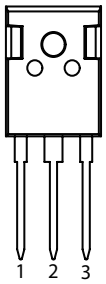
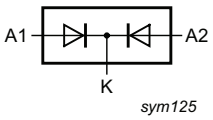
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values				Unit
Absolute maximum rating							
V_R	repetitive peak reverse voltage	DC		200			V
$I_{F(AV)}$	average forward current	δ = 0.5 ; T_{mb} ≤ 113 °C; square-wave pulse; per diode; Fig. 1; Fig. 2; Fig. 3		15			A
I_{FSM}	non-repetitive peak forward current	t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode; Fig. 4		200			A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode		220			A
Symbol	**Parameter**	**Conditions**		**Min**	**Typ**	**Max**	**Unit**
Static characteristics							
V_F	forward voltage	I_F = 15 A; T_j = 25 °C; per diode; Fig. 6		-	0.95	1.05	V
		I_F = 30 A; T_j = 25 °C; per diode; Fig. 6		-	1	1.2	V
		I_F = 15 A; T_j = 150 °C; per diode; Fig. 6		-	0.78	0.9	V
Dynamic characteristics							
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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1		
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
BYQ72EW-200	TO247	BYQ72EW-200Q	Tube	30	SOT429 (L)	25-Mar-2013
					TO247P (P)	31-Mar-2023

7. Marking

Table 4. Marking codes

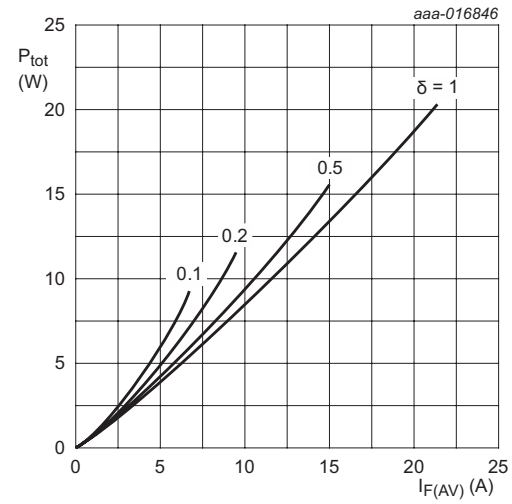
Type number	Marking codes	
	Assembly factory: L	Assembly factory: P
BYQ72EW-200	BYQ72EW 200 PJLxxxx xx	BYQ72EW 200 PJPxxxx xx

8. Limiting values

Table 5. Limiting values

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

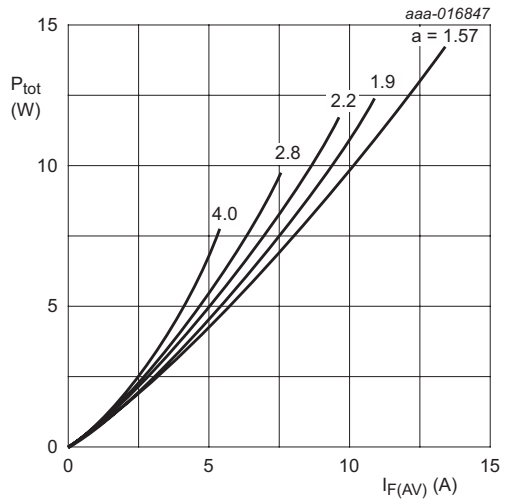
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		200	V
V_{RWM}	crest working reverse voltage		200	V
V_R	reverse voltage	DC	200	V
$I_{F(AV)}$	average forward current	δ = 0.5 ; T_{mb} ≤ 113 °C; square-wave pulse; per diode; Fig. 1; Fig. 2; Fig. 3	15	A
$I_{O(AV)}$	average forward current	δ = 0.5; T_{mb} ≤ 113 °C; square-wave pulse; both diodes conducting	30	A
I_{FSM}	non-repetitive peak forward current	t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode; Fig. 4	200	A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode;	220	A
I_{RRM}	repetitive peak reverse current	δ = 0.001; tp = 2 µs; per diode	0.2	A
I_{RSM}	non-repetitive peak reverse current	t_p = 100 µs; per diode	0.2	A
T_{stg}	storage temperature		-40 to 150	°C
T_j	junction temperature		150	°C
Electrostatic discharge				
V_{ESD}	electrostatic discharge voltage	HBM; C = 250 pF; R = 1.5 kΩ	8	kV



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

$V_o = 0.79$ V; $R_s = 0.008$ Ω

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



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

$V_o = 0.79$ V; $R_s = 0.008$ Ω

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

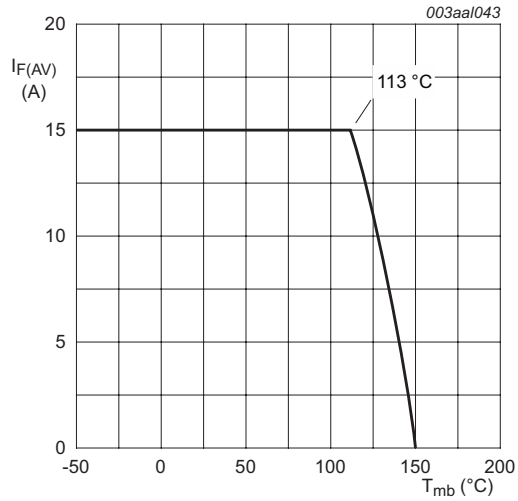


Fig. 3. Average forward current as a function of mounting base temperature; maximum values; per diode

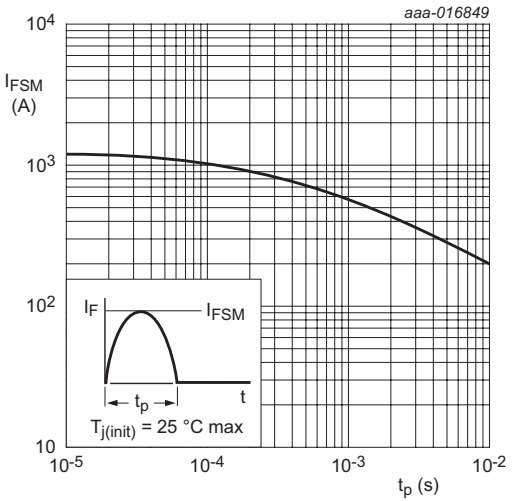


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

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; 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 free air	in free air		-	45	-	K/W

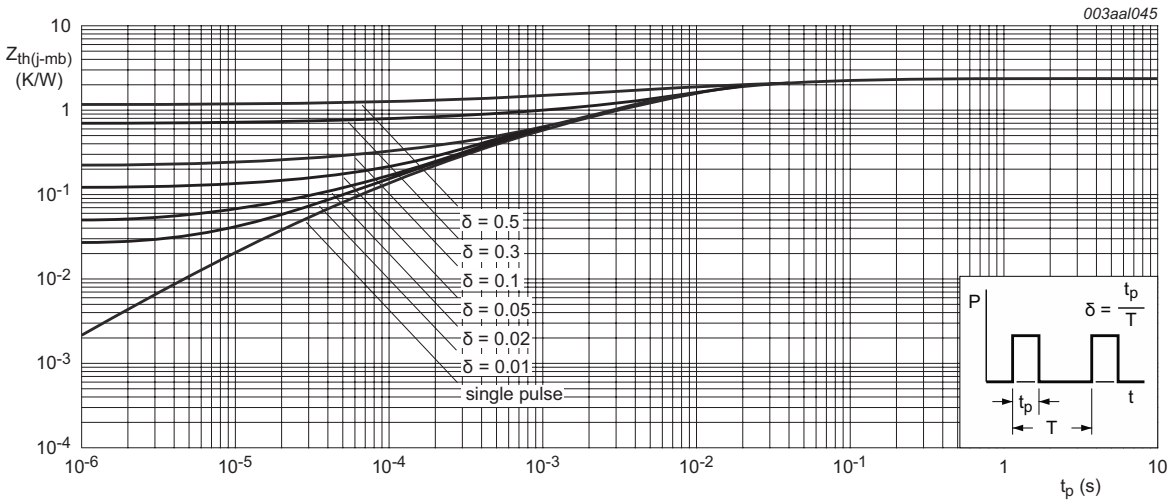
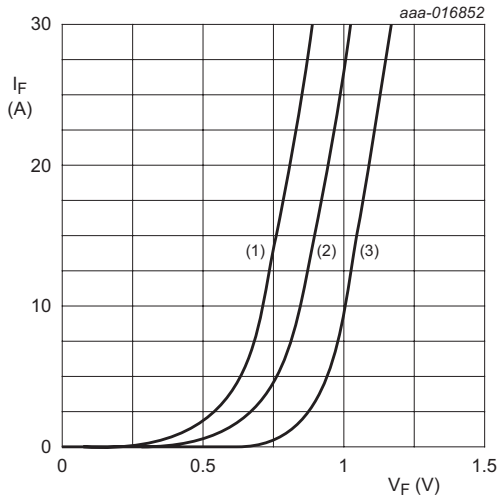


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse width; maximum values; per diode

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	I_F = 15 A; T_j = 25 °C; per diode; Fig. 6		-	0.95	1.05	V
		I_F = 30 A; T_j = 25 °C; per diode; Fig. 6		-	1	1.2	V
		I_F = 15 A; T_j = 150 °C; per diode; Fig. 6		-	0.78	0.9	V
I_R	reverse current	V_R = 200 V; T_j = 25 °C; per diode		-	3	20	µA
		V_R = 200 V; T_j = 100 °C; per diode		-	0.3	1	mA
Dynamic characteristics							
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
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
V_{FR}	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 V; R_s = 0.008 Ω
(1) T_j = 150 °C; typical values
(2) T_j = 150 °C; maximum values
(3) T_j = 25 °C; maximum values

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

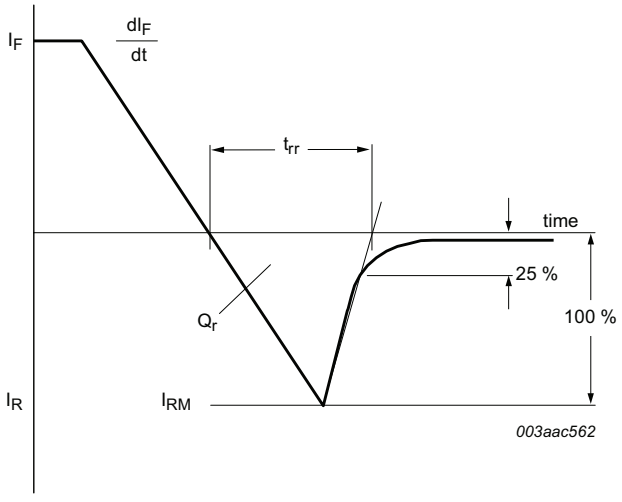


Fig. 7. Reverse recovery definitions; ramp recovery

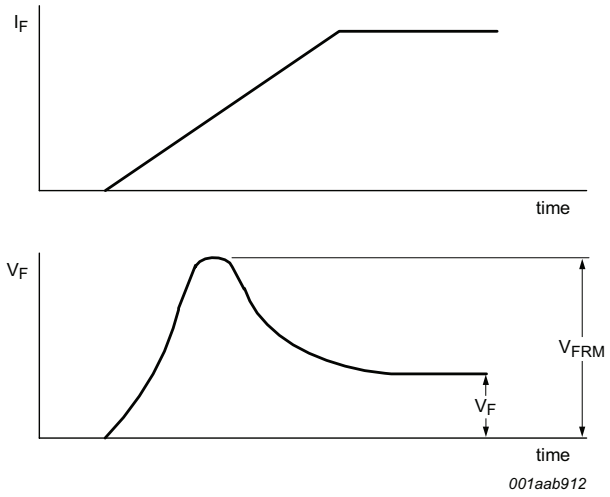
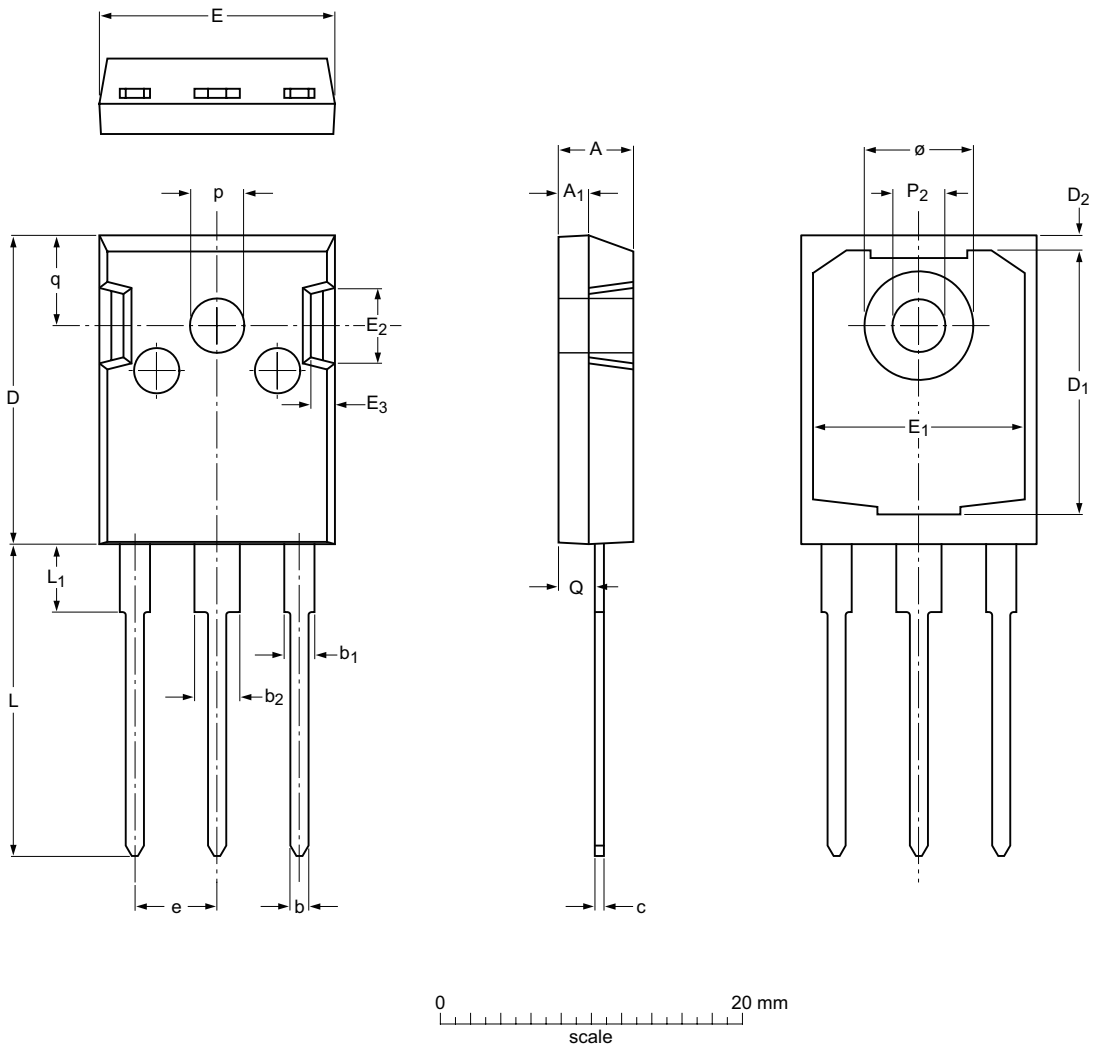


Fig. 8. Forward recovery definitions

11. Package outline

Assembly factory: L

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



Dimensions (mm are the original dimensions)

Unit[1]		A	A_1	b	b_1	b_2	c	D	D_1	D_2	E	E_1	E_2	E_3	e[1]	L	L_1	P_2	p	Q	q	ø
mm	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

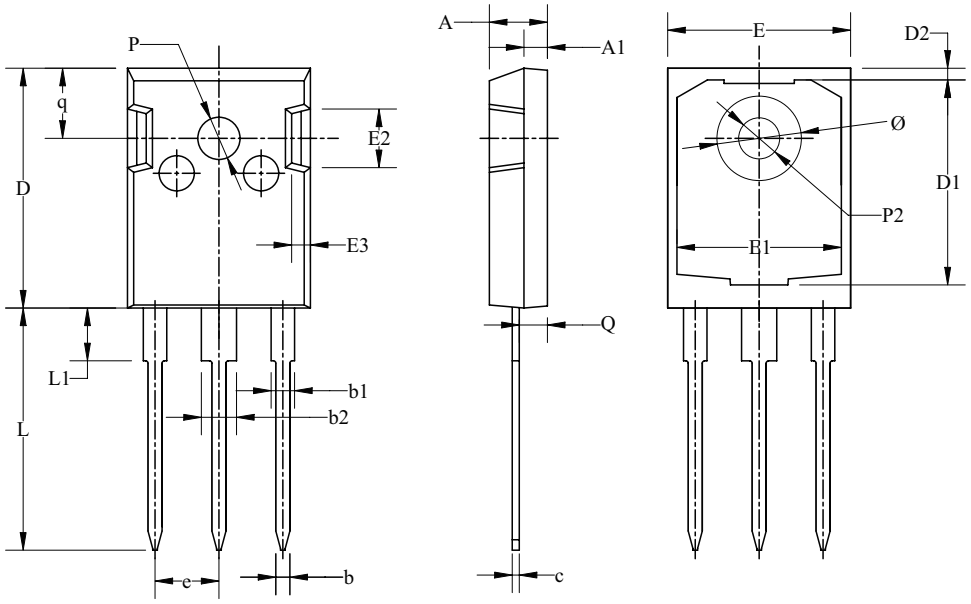
Note
1. Basic spacing between centers.

sot429_po

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

Assembly factory: P

Plastic single-ended through-hole pack age; headsink mounted; 1 mounting hole; 3 leads TO-247 TO247



Dim	All Dimensions in Millimeters		
	Min	Typ	Max
A	4.70	4.95	5.20
A1	1.90	2.00	2.10
b	1.00	1.20	1.40
b1	1.80	2.00	2.20
b2	2.80	3.00	3.20
c	0.50	0.60	0.70
D	20.30	20.45	20.60
D1	17.28	17.48	17.68
D2	0.80	1.00	1.20
E	15.45	15.60	15.75
E1	13.82	14.02	14.22
E2	4.80	5.00	5.20
E3	1.40	1.60	1.80
e	5.45 BSC		
L	20.40	20.65	20.90
L1	4.25	4.50	4.75
P2	3.40	3.50	3.60
P	3.50	3.60	3.70
Q	2.20	2.40	2.60
q	5.78	5.98	6.18
Ø	7.10	7.19	7.30

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.
Product [short] data sheet	Production	This document contains the product specification.

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[2] The term 'short data sheet' is explained in section "Definitions".
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13. Contents

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