BYV430W-300P

Dual ultrafast power diode

Rev.02 - 19 May 2023 Product data sheet

1. General description

2x30A, 300V dual ultrafast power diode in a TO247 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

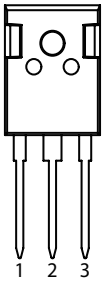
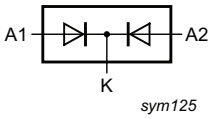
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Absolute maximum rating							
V_R	reverse voltage	DC		-	-	300	V
$I_{F(AV)}$	average forward current	δ = 0.5; T_{mb} ≤ 103 °C; square-wave pulse; per diode; Fig. 1; Fig. 2; Fig. 3		-	-	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		-	-	300	A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode		-	-	330	A
Static characteristics							
V_F	forward voltage	I_F = 30 A; T_j = 25 °C; per diode; Fig. 6		-	1	1.25	V
		I_F = 30 A; T_j = 150 °C; per diode; Fig. 6		-	0.85	1	V
Dynamic characteristics							
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt = 50 A/µs; T_j = 25 °C; Fig. 7		-	-	50	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
BYV430W-300P	TO247	BYV430W-300PQ	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
BYV430W-300P	BYV430W 300P PJLxxxx xx	BYV430W 300P PJPxxxx xx

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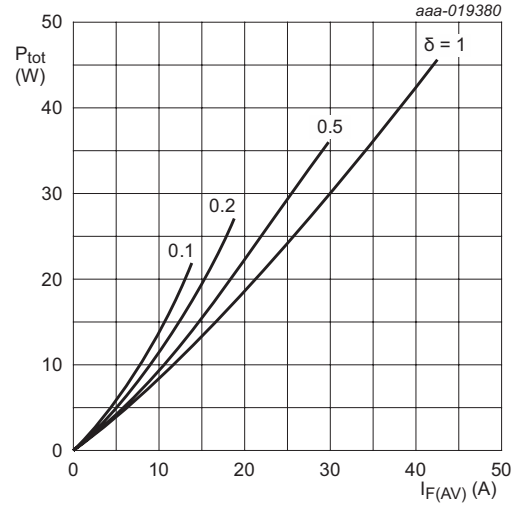
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8. Limiting values

Table 5. Limiting values

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

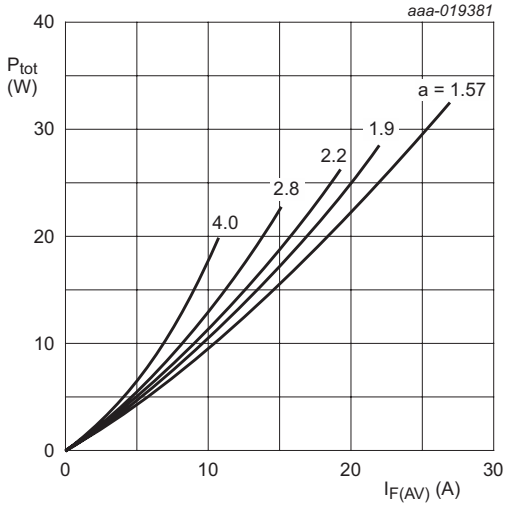
Symbol	Parameter	Conditions		Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage			-	300	V
V_{RWM}	crest working reverse voltage			-	300	V
V_R	reverse voltage	DC		-	300	V
$I_{F(AV)}$	average forward current	δ = 0.5; $T_{mb} \leq 103$ °C; square-wave pulse; per diode; Fig. 1; Fig. 2; Fig. 3		-	30	A
$I_{O(AV)}$	average output current	δ = 0.5; $T_{mb} \leq 103$ °C; square-wave pulse; both diodes conducting		-	60	A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; square-wave pulse; per diode		-	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		-	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 = 0.817 V; R_s = 0.006 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 = 0.817 V; R_s = 0.006 Ω

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

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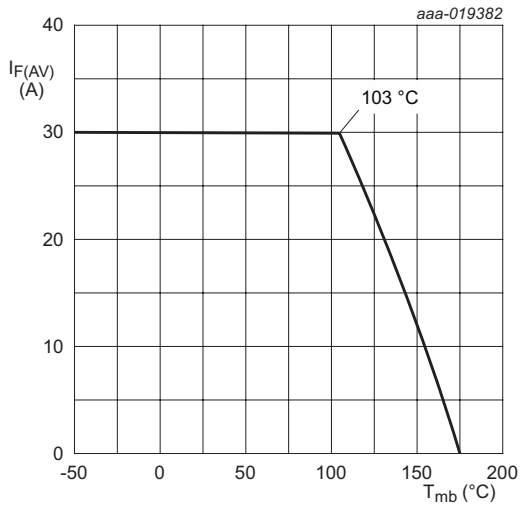


Fig. 3. Average forward current as a function of mounting base temperature; maximum values; per diode

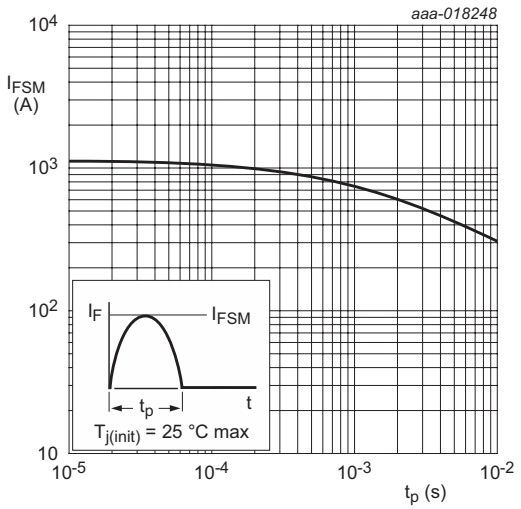


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

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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		-	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

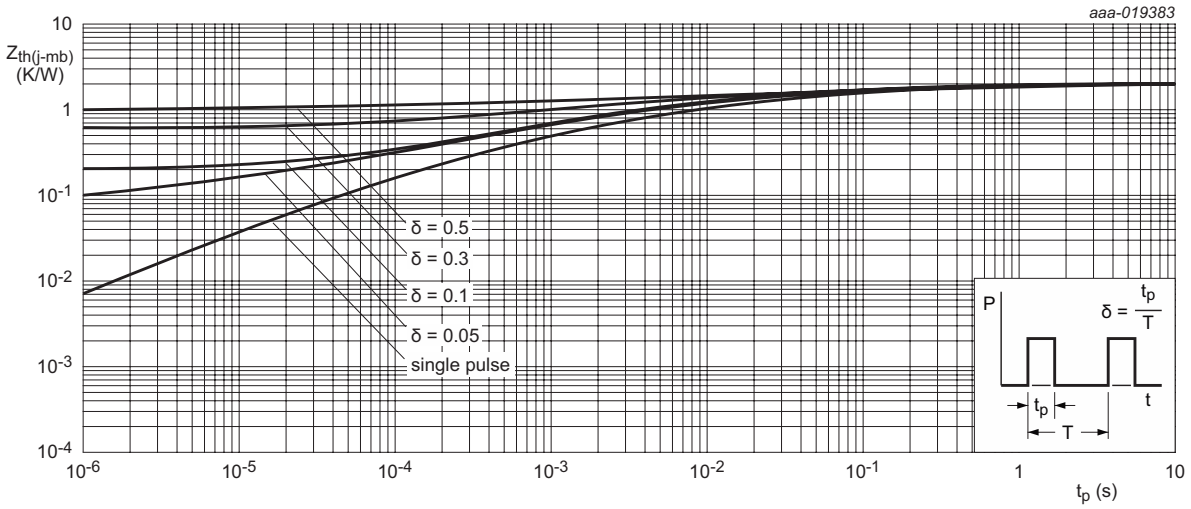


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration; maximum values; per diode

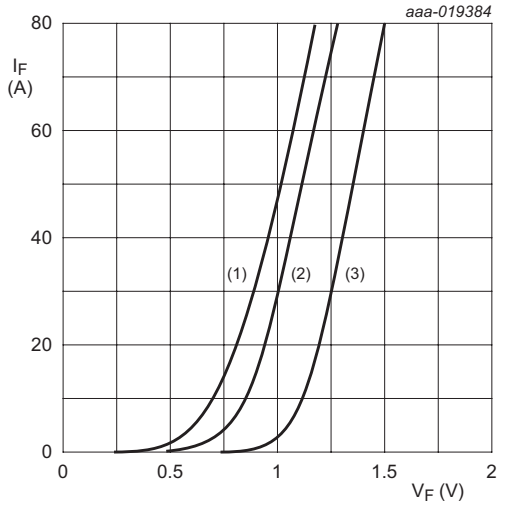
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10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V_F	forward current	I_F = 30 A; T_j = 25 °C; Fig. 6		-	1	1.25	V
		I_F = 30 A; T_j = 150 °C; Fig. 6		-	0.85	1	V
I_R	reverse current	V_R = 300 V; T_j = 25 °C		-	0.4	10	µA
		V_R = 300 V; T_j = 150 °C		-	-	500	µA
Dynamic characteristics							
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt = 50 A/µs; T_j = 25 °C; Fig. 7		-	-	50	ns
		I_F = 30 A; V_R = 200 V; dI_F/dt = 200 A/µs; T_j = 25 °C; Fig. 7		-	33	-	ns
		I_F = 30 A; V_R = 200 V; dI_F/dt = 200 A/µs; T_j = 125 °C; Fig. 7		-	62	-	ns
I_{RM}	peak reverse recovery current	I_F = 30 A; V_R = 200 V; dI_F/dt = 200 A/µs; T_j = 25 °C; Fig. 7		-	5.3	-	A
		I_F = 30 A; V_R = 200 V; dI_F/dt = 200 A/µs; T_j = 125 °C; Fig. 7		-	10.5	-	A
Q_r	reverse charge	I_F = 30 A; V_R = 200 V; dI_F/dt = 200 A/µs; T_j = 25 °C; Fig. 7		-	89	-	nC
		I_F = 30 A; V_R = 200 V; dI_F/dt = 200 A/µs; T_j = 125 °C; Fig. 7		-	337	-	nC



V_o = 0.817 V; R_s = 0.006 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

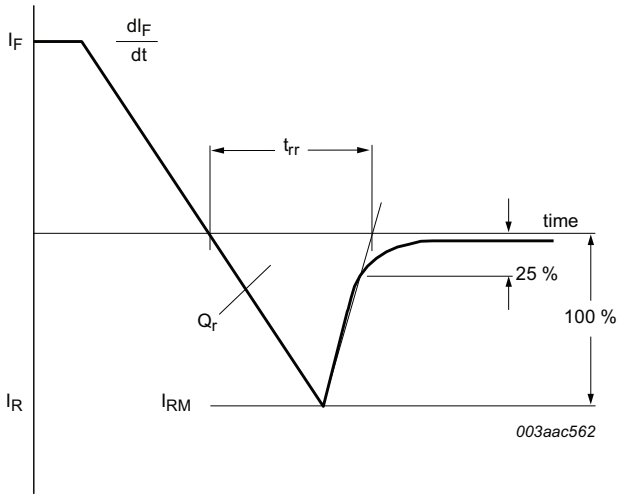


Fig. 7. Reverse recovery definitions; ramp recovery

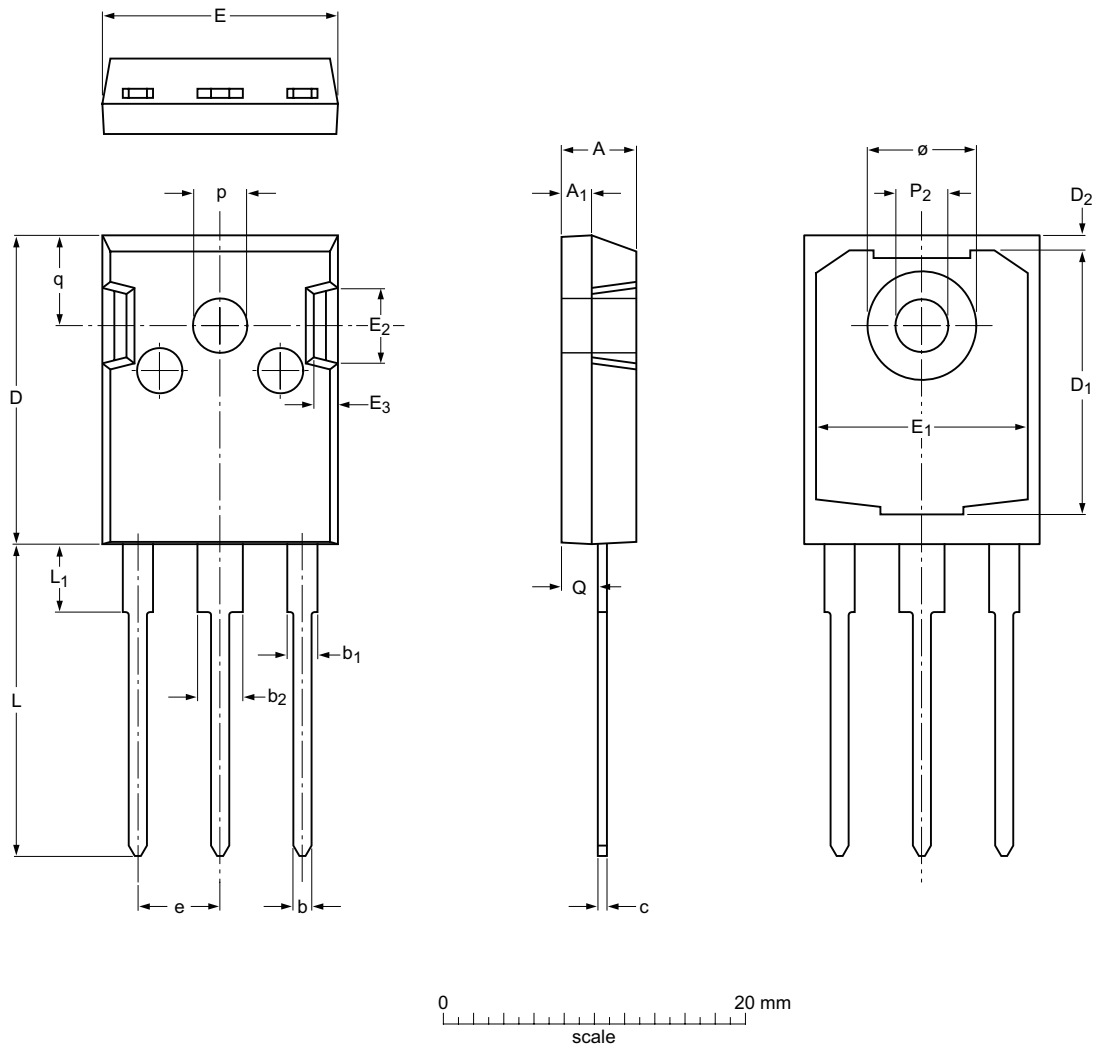
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11. Package outline

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	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

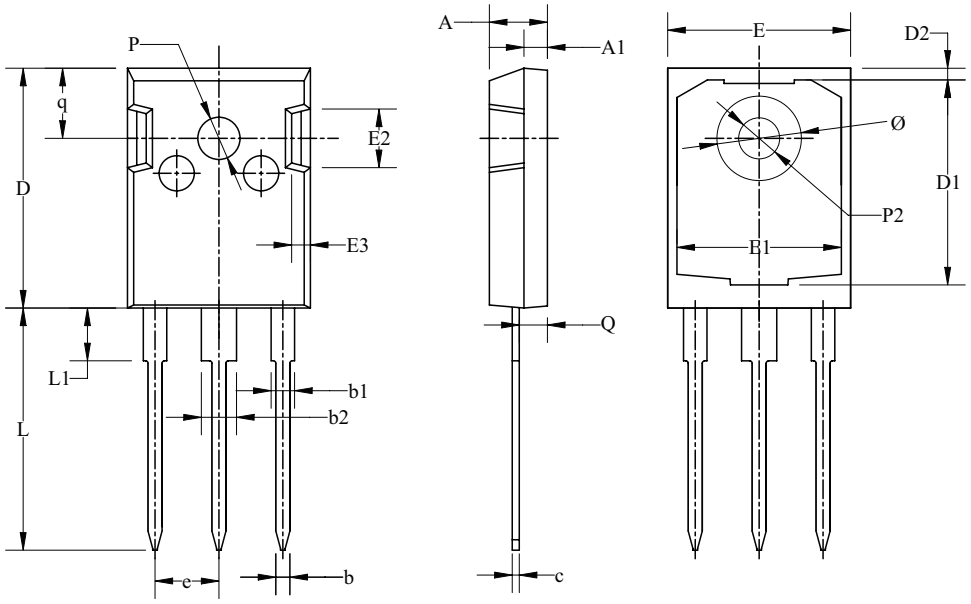
Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT429		TO-247				~~04-09-14~~ 13-03-25

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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

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