

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

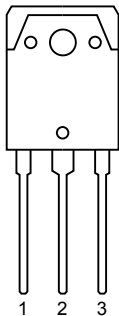
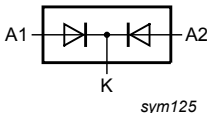
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _{RRM}	repetitive peak reverse voltage			-	-	300	V
I _{F(AV)}	average forward current	δ = 0.5 ; T _{mb} ≤ 105 °C; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3		-	-	30	A
I _{O(AV)}	average output current	δ = 0.5 ; T _{mb} ≤ 105 °C; square-wave pulse; both diodes conducting		-	-	60	A
I _{FRM}	repetitive peak forward current	δ = 0.5 ; t _p = 25 μs; T _{mb} ≤ 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
Static characteristics							
V _F	forward voltage	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



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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1	 TO3P (SOT1259)	 sym125
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

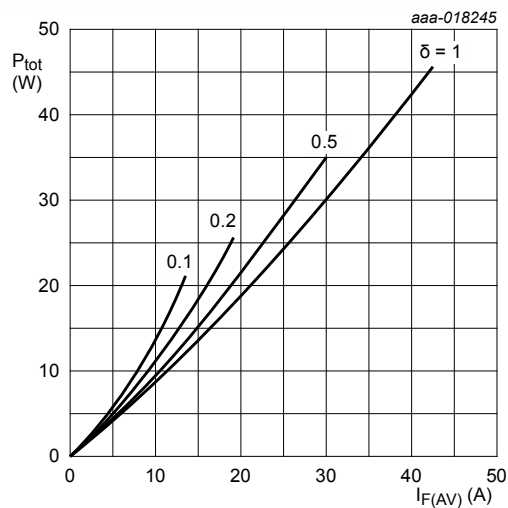
Type number	Marking code
BYV430K-300P	BYV430K-300P

8. Limiting values

Table 5. Limiting values

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

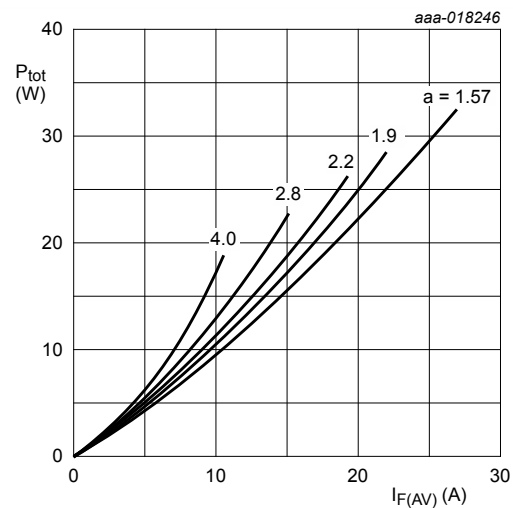
Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	300	V
V_{RWM}	crest working reverse voltage		-	300	V
V_R	reverse voltage	DC	-	300	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 105^\circ\text{C}$; square-wave pulse; Fig. 1; Fig. 2; Fig. 3	-	30	A
$I_{O(AV)}$	average output current	$\delta = 0.5$; $T_{mb} \leq 105^\circ\text{C}$; square-wave pulse; both diodes conducting	-	60	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 105^\circ\text{C}$; square-wave pulse	-	60	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25^\circ\text{C}$; sine-wave pulse; per diode; Fig. 4	-	300	A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25^\circ\text{C}$; sine-wave pulse; per diode; Fig. 4	-	330	A
T_{stg}	storage temperature		-55	175	$^\circ\text{C}$
T_j	junction temperature		-	175	$^\circ\text{C}$



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

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

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



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

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

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

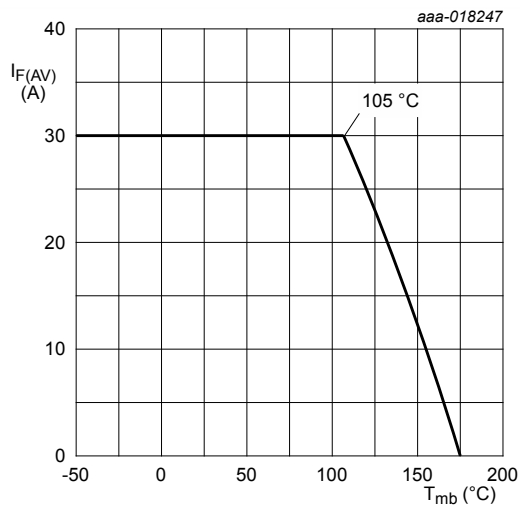


Fig. 3. Average forward current as a function of mounting base temperature; per diode; maximum values

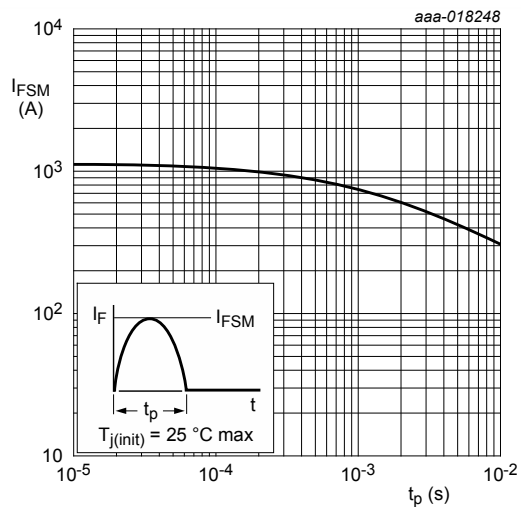


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; per diode; maximum values

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	-	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

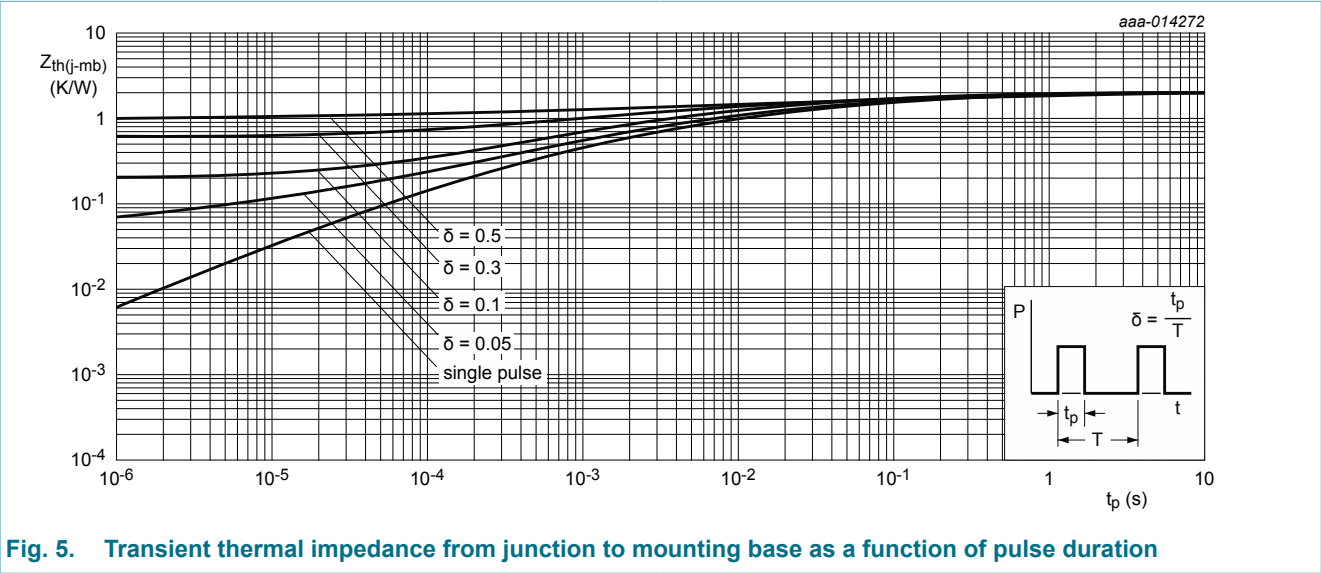
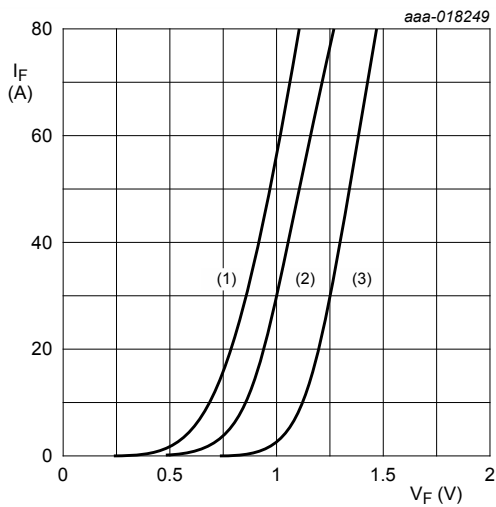


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
	characteristics general note	characteristics are per diode unless otherwise stated		-	-	-	
Static characteristics							
V _F	forward voltage	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							
Q _r	recovered 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
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		-	-	55	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



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

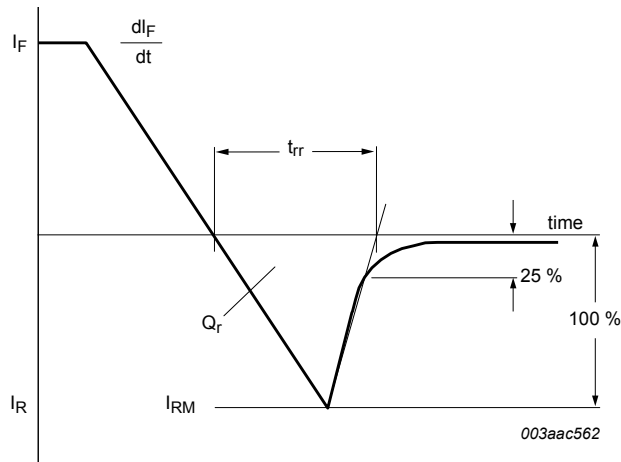


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

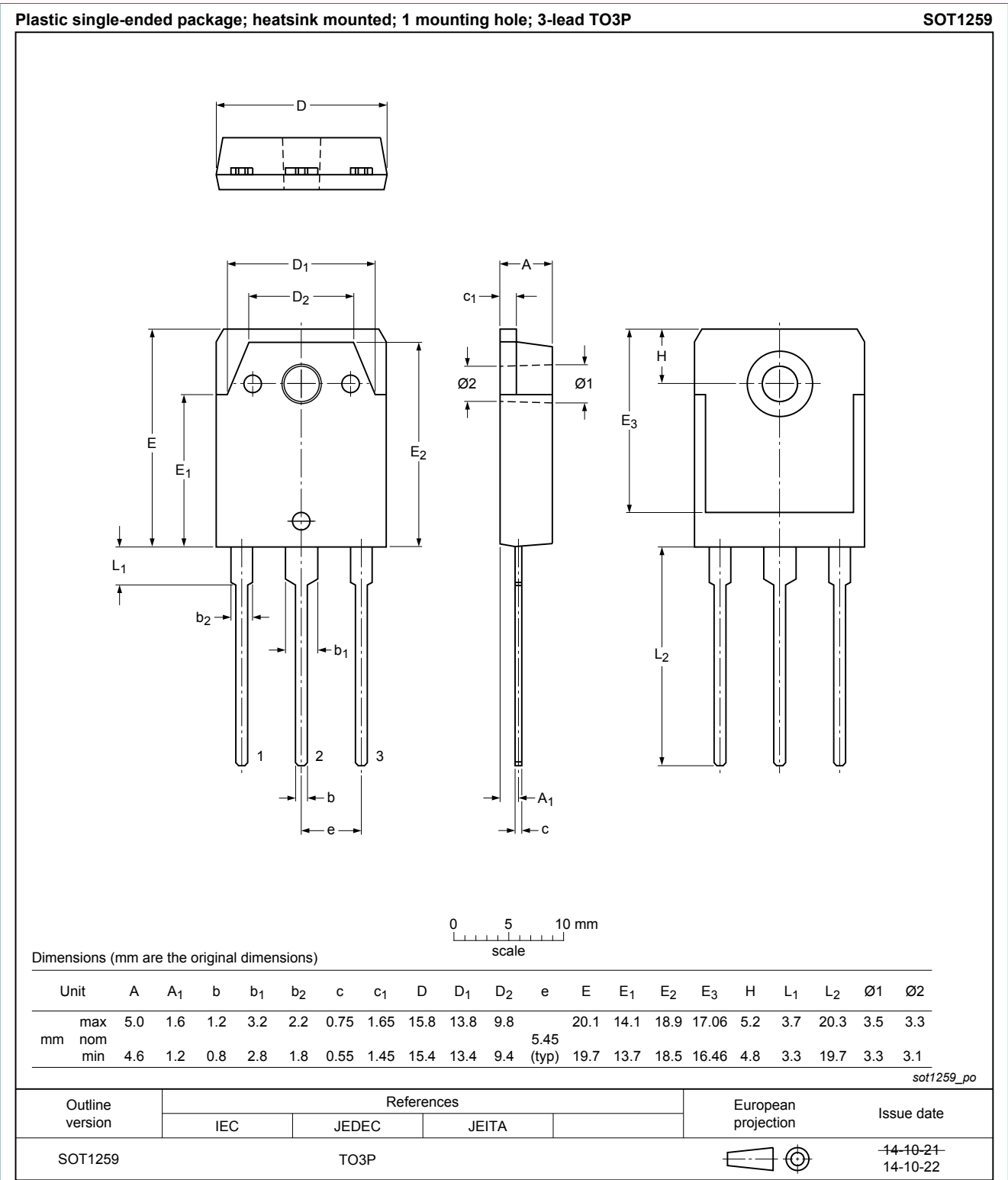


Fig. 8. Package outline TO3P (SOT1259)

12. Legal information

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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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