**Product data sheet** 

# 1. General description

Dual, common cathode, ultrafast, epitaxial rectifier diodes in a SOT186A package.

### 2. Features and benefits

- · Low forward voltage drop
- Fast switching
- Soft reverse recovery characteristics
- · High thermal cycling performance

# 3. Applications

· Output rectifiers in high frequency switched-mode power supplies.

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Va	lues		Unit
Absolute	maximum rating						
$V_{RRM}$	repetitive peak reverse voltage			5	000		V
I <sub>O(AV)</sub>	average output current	$\delta$ = 0.5 ; square-wave pulse; T <sub>h</sub> ≤ 84 °C; both diodes conducting; Fig. 1; Fig. 2; Fig. 3	10			A	
I <sub>FRM</sub>	repetitive peak forward current	$\delta$ = 0.5 ; t <sub>p</sub> = 25 μs; T <sub>h</sub> ≤ 108 °C; square-wave pulse ; per diode	10			А	
I <sub>FSM</sub>	non-repetitive peak forward current	$t_p$ = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode; Fig. 4	65 72			А	
		$t_p$ = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode				А	
Symbol	Parameter	Conditions		Min	Тур	Max	Unit
Static ch	aracteristics						
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 5 A; T <sub>j</sub> = 25 °C; per diode; <u>Fig. 6</u>		-	1.05	1.4	V
		I <sub>F</sub> = 5 A; T <sub>j</sub> = 150 °C; per diode; <u>Fig. 6</u>		-	0.95	1.05	V
Dynamic	characteristics						
t <sub>rr</sub>	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s};$ $T_j = 25 \text{ °C}; \text{ per diode}; \underline{\text{Fig. 7}}$		-	28	60	ns

**WeEn Semiconductors** 

**BYT28X-500** 

**Dual ultrafast power diodes** 

# 5. Pinning information

#### **Table 2. Pinning information**

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	Α	anode	mb	A1   A2
2	K	cathode		
3	Α	anode		K sym125
mb	n.c.	mounting base; isolated		
			1 2 3	

# 6. Ordering information

### **Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
BYT28X-500	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 "full pack"	SOT186A

# 7. Marking

#### Table 4. Marking codes

Type number	Marking codes
BYT28X-500	BYT28X-500

**Dual ultrafast power diodes** 

# 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		500	V
$V_{RWM}$	crest working reverse voltage		500	V
$V_R$	reverse voltage	DC	500	V
I <sub>O(AV)</sub>	average output current	$\delta$ = 0.5; square-wave pulse; $T_h \le 84$ °C; both diodes conducting; Fig. 1; Fig. 2; Fig. 3	10	А
I <sub>FRM</sub>	repetitive peak forward current	$δ = 0.5$ ; $t_p = 25 \mu s$ ; $T_h \le 108 °C$ ; square-wave pulse; per diode	10	А
I <sub>FSM</sub>	non-repetitive peak forward current	$t_p$ = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode; Fig. 4	65	А
		$t_p$ = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode	72	А
T <sub>stg</sub>	storage temperature		-40 to 150	°C
T <sub>j</sub>	junction temperature		150	°C

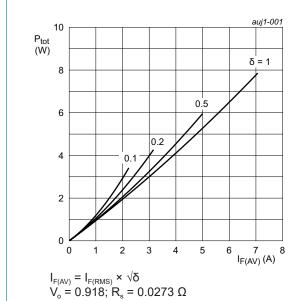
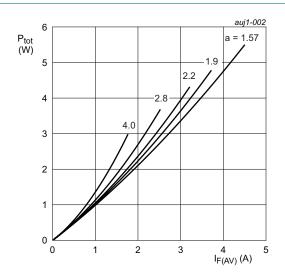


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values; per diode



a = form factor =  $I_{\text{F(RMS)}}/I_{\text{F(AV)}}$ Vo = 0.918 V; Rs = 0.0273  $\Omega$ 

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

### **Dual ultrafast power diodes**

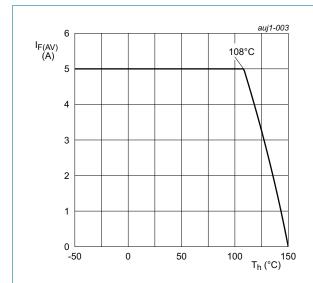


Fig. 3. Forward current as a function of heatsink temperature; maximum values; per diode

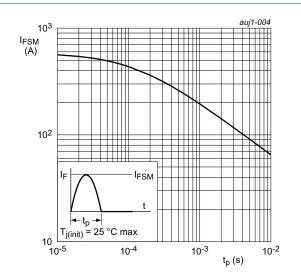


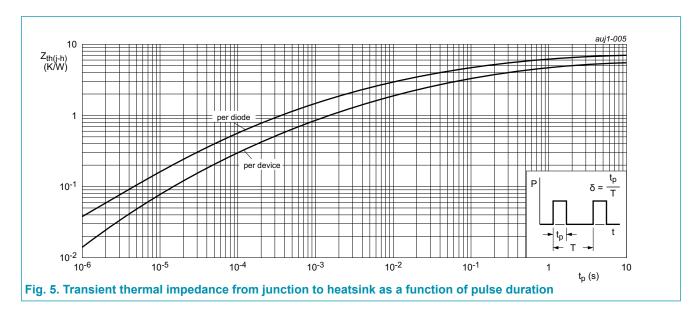
Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

**Dual ultrafast power diodes** 

## 9. Thermal characteristics

#### **Table 6. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
$R_{th(j-h)}$	thermal resistance	per diode; <u>Fig. 5</u>	-	-	7	K/W
	from junction to heatsink	both diodes conducting; Fig. 5	-	-	5.5	K/W
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient free air	in free air	-	55	-	K/W



### 10. Isolation characteristics

**Table 7. Isolation characteristics** 

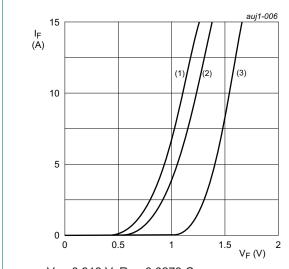
Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V <sub>isol(RMS)</sub>	RMS isolation voltage	50 Hz ≤ f ≤ 60 Hz; RH ≤ 65 %; from all pins to external heatsink; sinusoidal waveform; clean and dust free	-	-	2500	V
C <sub>isol</sub>	isolation capacitance	from cathode to external heatsink	-	10	-	PF

### **Dual ultrafast power diodes**

## 11. Characteristics

### **Table 8. Characteristics**

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Static cha	aracteristics					
$V_{F}$	forward current	$I_F = 5 \text{ A}$ ; $T_j = 25 \text{ °C}$ ; per diode; Fig. 6	-	1.05	1.4	V
		I <sub>F</sub> = 5 A; T <sub>j</sub> = 150 °C; per diode; <u>Fig. 6</u>	-	0.95	1.05	V
I <sub>R</sub>	reverse current	$V_R = 500 \text{ V}; T_j = 25 ^{\circ}\text{C}; \text{ per diode}$	-	2	10	μA
		$V_R = 500 \text{ V}; T_j = 100 ^{\circ}\text{C}; \text{ per diode}$	-	0.17	0.5	mA
Dynamic	characteristics					
$Q_r$	reverse charge	$I_F = 1 \text{ A}$ ; $V_R = 30 \text{ V}$ ; $dI_F/dt = 100 \text{ A/}\mu\text{s}$ ; $T_j = 25 \text{ °C}$ ; per diode; Fig. 7	-	32	60	nC
t <sub>rr</sub>	reverse recovery time	$I_F = 1 \text{ A}$ ; $V_R = 30 \text{ V}$ ; $dI_F/dt = 100 \text{ A/}\mu\text{s}$ ; $T_j = 25 \text{ °C}$ ; per diode; Fig. 7	-	28	60	ns
I <sub>RM</sub>	peak reverse recovery current	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A/}\mu\text{s};$ $T_j = 25 \text{ °C}; \text{ per diode}; Fig. 7$	-	2	3	А



 $V_o$  = 0.918 V;  $R_s$  = 0.0273  $\Omega$ 

(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

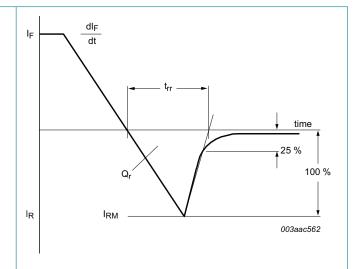
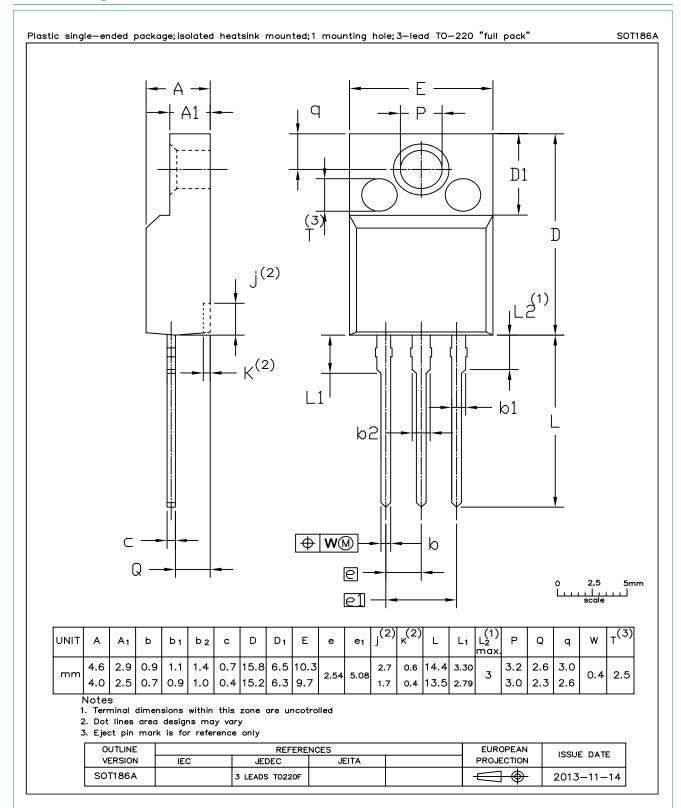


Fig. 7. Reverse recovery definitions; ramp recovery

# 12. Package outline



### **Dual ultrafast power diodes**

# 13. 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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# **Dual ultrafast power diodes**

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## **Dual ultrafast power diodes**

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