

## 1. General description

Dual, common cathode, ultrafast, epitaxial rectifier diodes in a TO220F 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.

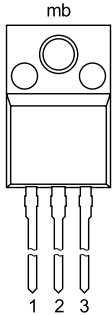
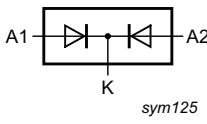
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
<b>Absolute maximum rating</b>						
$V_{RRM}$	repetitive peak reverse voltage		500			V
$I_{O(AV)}$	average output current	$\delta = 0.5$ ; $T_h \leq 84$ °C; square-wave pulse; both diodes conducting	10			A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25$ $\mu$ s; $T_h \leq 108$ °C; square-wave pulse; per diode	10			A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; per diode; <a href="#">Fig. 4</a>	65			A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; per diode	72			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 5$ A; $T_j = 25$ °C; per diode; <a href="#">Fig. 6</a>	-	1.05	1.4	V
		$I_F = 5$ A; $T_j = 150$ °C; per diode; <a href="#">Fig. 6</a>	-	0.95	1.05	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $di_F/dt = 100$ A/ $\mu$ s; $T_j = 25$ °C; per diode; <a href="#">Fig. 7</a>	-	28	60	ns

## 5. Pinning information

Table 2. Pinning information

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

## 6. Ordering information

Table 3. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BYT28X-500	TO-220F	BYT28X-500Q	Tube	50	SOT186A	14-Nov-2013

## 7. Marking

Table 4. Marking codes

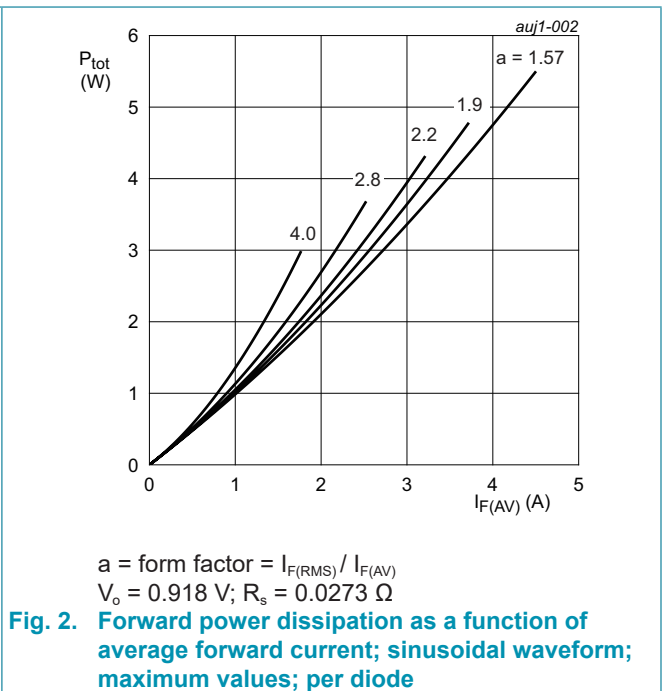
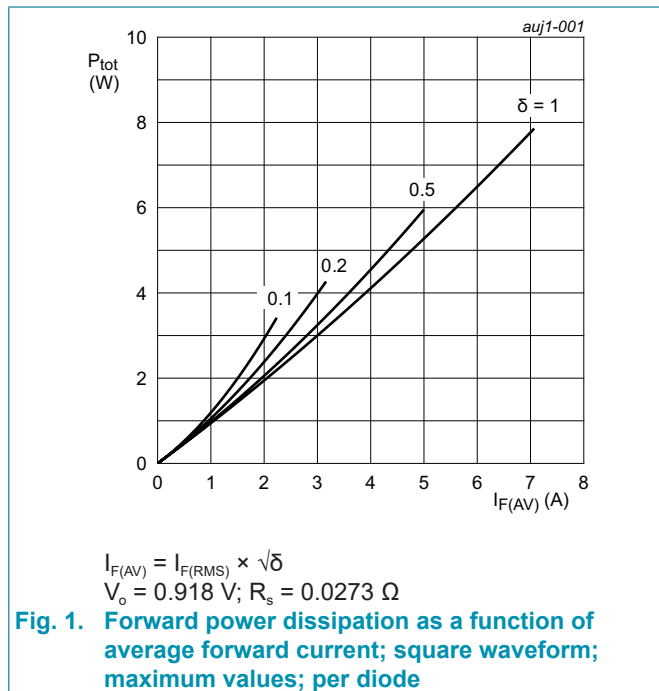
Type number	Marking codes	
	Assembly factory: d	Assembly factory: A
BYT28X-500	BYT28X 500 PJdxxxx xx	BYT28X 500 PJAxxxx xx

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



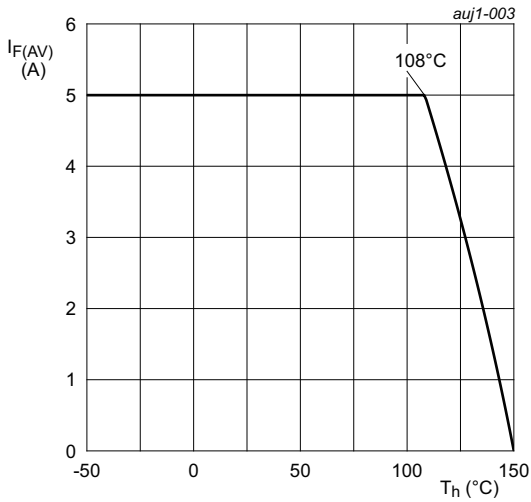


Fig. 3. Forward current as a function of heatsink temperature; maximum values; per diode

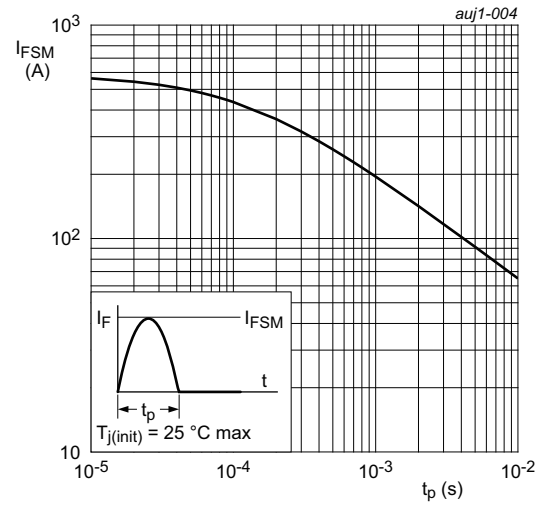


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

## 9. Thermal characteristics

Table 6. Thermal characteristics

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

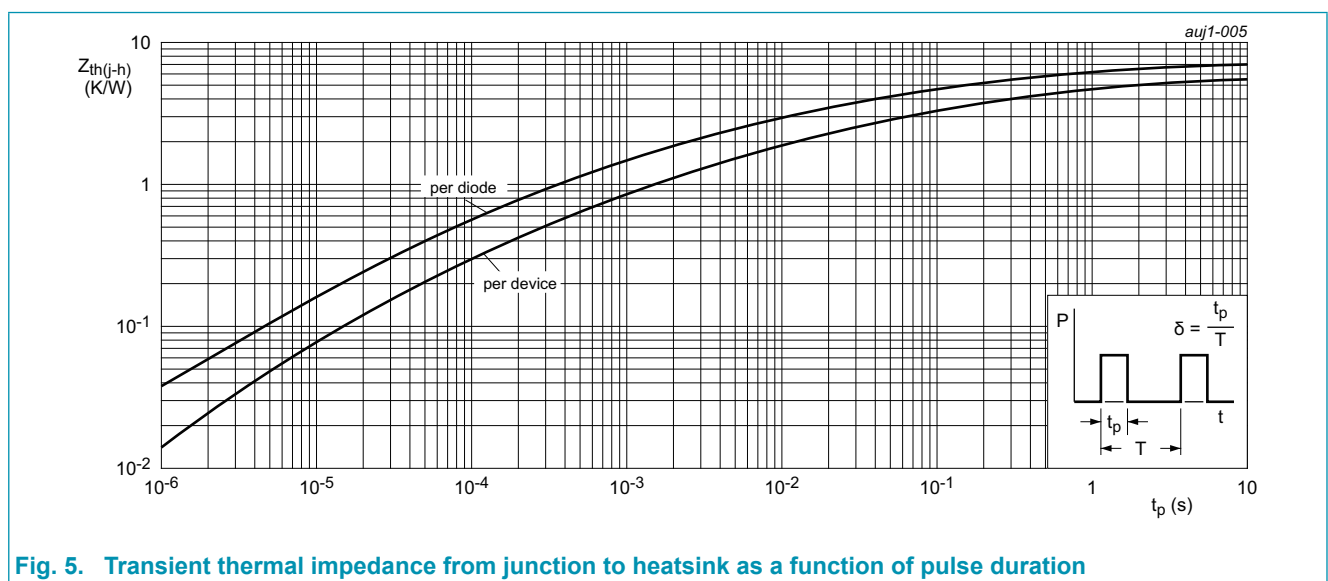


Fig. 5. Transient thermal impedance from junction to heatsink as a function of pulse duration

## 10. Isolation characteristics

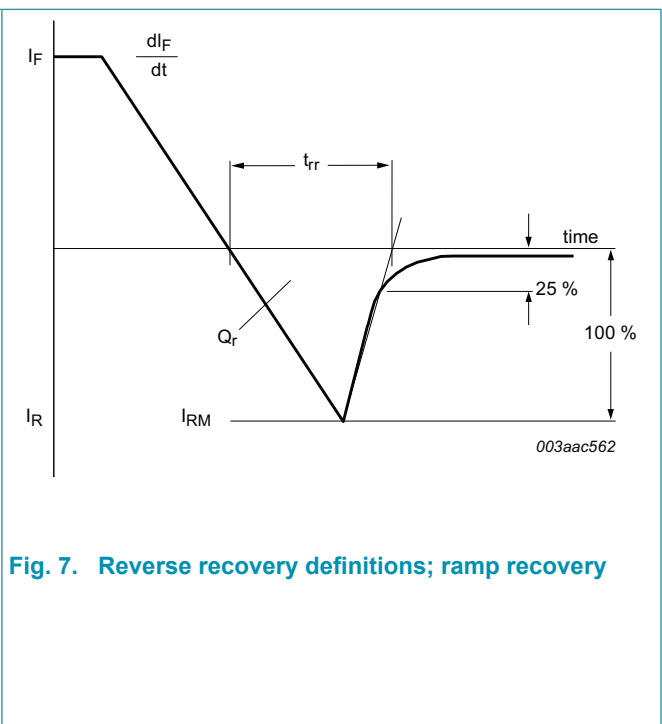
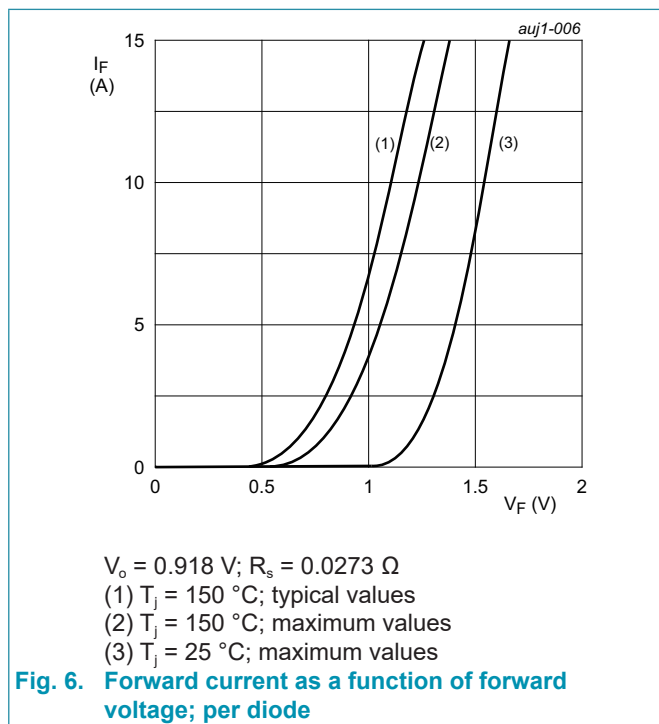
Table 7. Isolation characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	50 Hz ≤ f ≤ 60 Hz; RH ≤ 65 %; from all pins to external heatsink; sinusoidal waveform; clean and dust free	-	-	2500	V
$C_{isol}$	isolation capacitance	from cathode to external heatsink	-	10	-	pF

### 11. Characteristics

Table 8. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward current	$I_F = 5 \text{ A}; T_j = 25 \text{ }^\circ\text{C};$ per diode; <a href="#">Fig. 6</a>	-	1.05	1.4	V
		$I_F = 5 \text{ A}; T_j = 150 \text{ }^\circ\text{C};$ per diode; <a href="#">Fig. 6</a>	-	0.95	1.05	V
$I_R$	reverse current	$V_R = 500 \text{ V}; T_j = 25 \text{ }^\circ\text{C};$ per diode	-	2	10	$\mu\text{A}$
		$V_R = 500 \text{ V}; T_j = 100 \text{ }^\circ\text{C};$ per diode	-	0.17	0.5	mA
<b>Dynamic characteristics</b>						
$Q_r$	reverse charge	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C};$ per diode; <a href="#">Fig. 7</a>	-	32	60	nC
$t_{rr}$	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C};$ per diode; <a href="#">Fig. 7</a>	-	28	60	ns
$I_{RM}$	peak reverse recovery current	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C};$ per diode; <a href="#">Fig. 7</a>	-	2	3	A

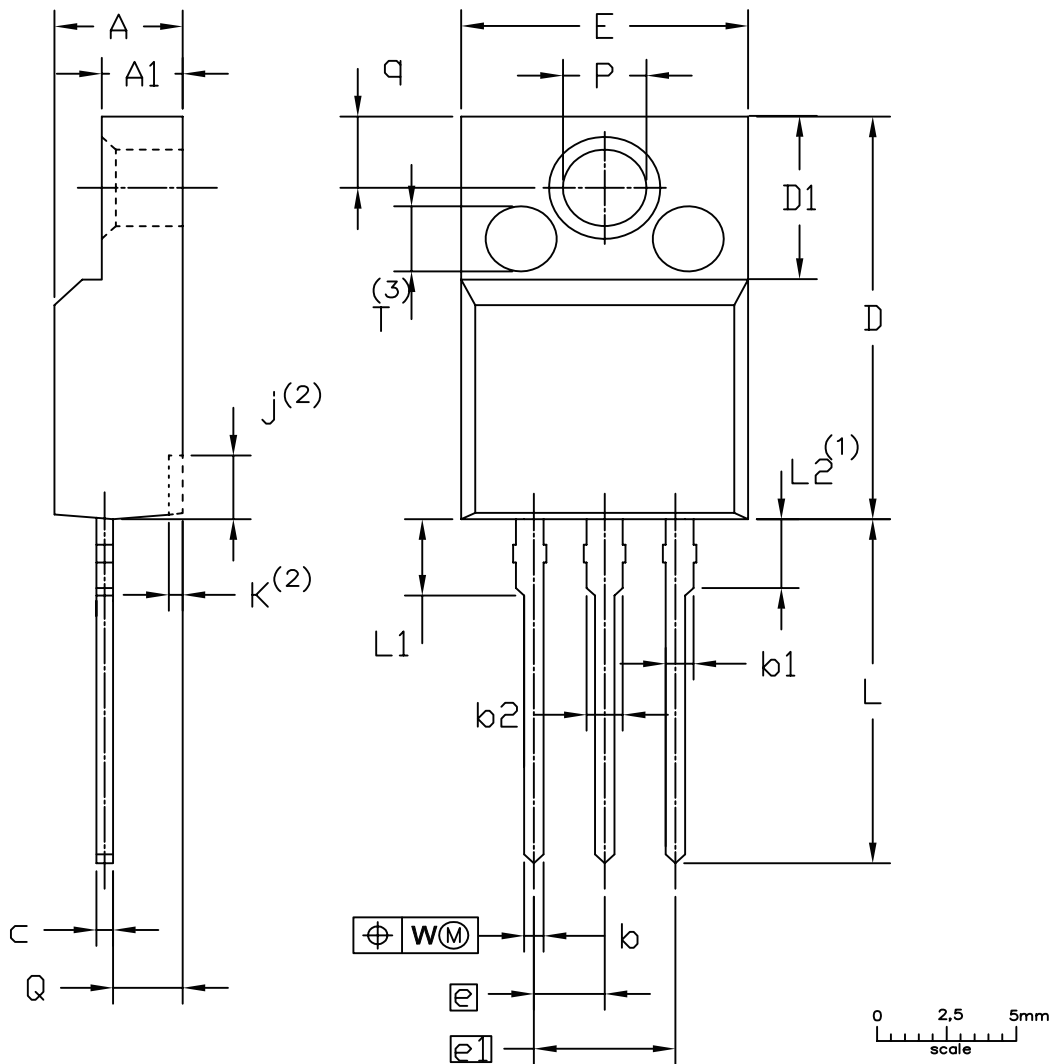


## 12. Package outline

Assembly factory: d & A

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 "full pack"

SOT186A



UNIT	A	A <sub>1</sub>	b	b <sub>1</sub>	b <sub>2</sub>	c	D	D <sub>1</sub>	E	e	e <sub>1</sub>	j <sup>(2)</sup>	k <sup>(2)</sup>	L	L <sub>1</sub>	L <sub>2</sub> <sup>(1)</sup> max.	P	Q	q	W	T <sup>(3)</sup>
mm	4.6	2.9	0.9	1.1	1.4	0.7	15.8	6.5	10.3	2.54	5.08	2.7	0.6	14.4	3.30	3	3.2	2.6	3.0	0.4	2.5
	4.0	2.5	0.7	0.9	1.0	0.4	15.2	6.3	9.7			1.7	0.4	13.5	2.79		3.0	2.3	2.6		

**Notes**

- Terminal dimensions within this zone are uncontrolled
- Dot lines area designs may vary
- Eject pin mark is for reference only

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT186A		3 LEADS TO220F			2013-11-14

## 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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
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- [2] The term 'short data sheet' is explained in section "Definitions".
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Date of release: 11 October 2021

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