BYT28X-500

Dual ultrafast power diodes

Rev.01 - 20 August 2018 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.

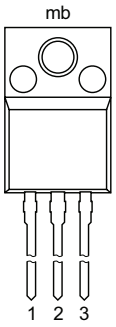
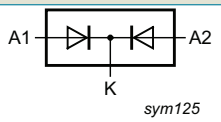
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values				Unit
Absolute maximum rating							
V_{RRM}	repetitive peak reverse voltage		500				V
$I_{O(AV)}$	average output current	δ = 0.5 ; square-wave pulse; $T_h \leq 84$ °C; both diodes conducting; Fig. 1; Fig. 2; Fig. 3	10				A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; $T_h \leq 108$ °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; Fig. 4	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**
Static characteristics							
V_F	forward voltage	I_F = 5 A; T_j = 25 °C; per diode; Fig. 6		-	1.05	1.4	V
		I_F = 5 A; T_j = 150 °C; per diode; Fig. 6		-	0.95	1.05	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; per diode; Fig. 7		-	28	60	ns

5. Pinning information

Table 2. Pinning information

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

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

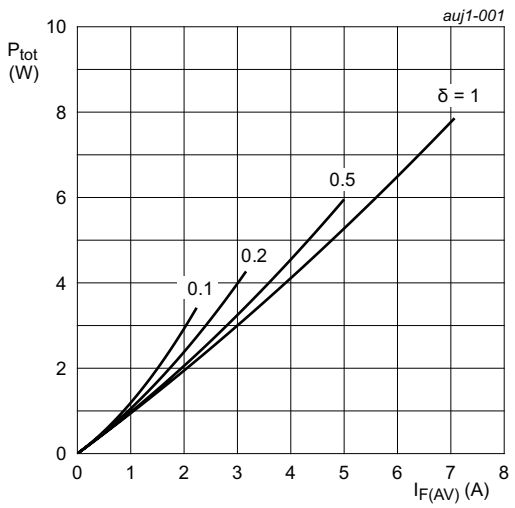
Type number	Marking codes
BYT28X-500	BYT28X-500

8. Limiting values

Table 5. Limiting values

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

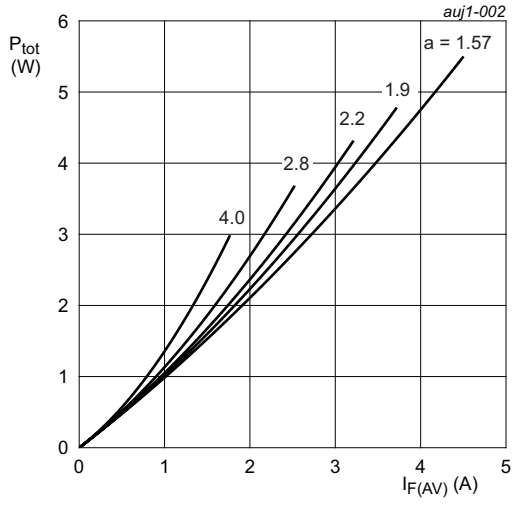
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		500	V
V_{RWM}	crest working reverse voltage		500	V
V_R	reverse voltage	DC	500	V
$I_{O(AV)}$	average output current	δ = 0.5 ; square-wave pulse; $T_h \leq 84$ °C; both diodes conducting; Fig. 1; Fig. 2; Fig. 3	10	A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; $T_h \leq 108$ °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; Fig. 4	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



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

V_o = 0.918; R_s = 0.0273 Ω

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



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

Vo = 0.918 V; Rs = 0.0273 Ω

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

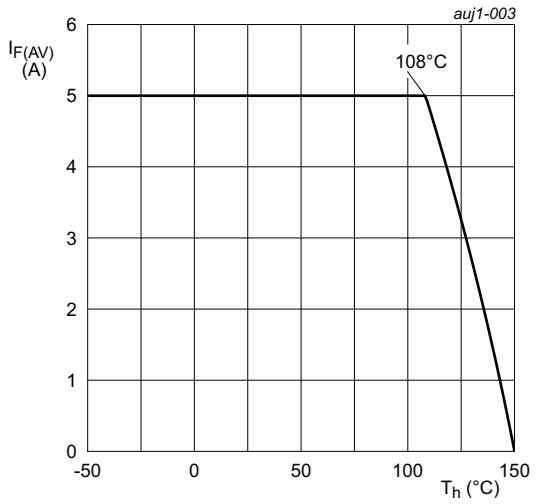


Fig. 3. Forward current as a function of heatsink temperature; maximum values; per diode

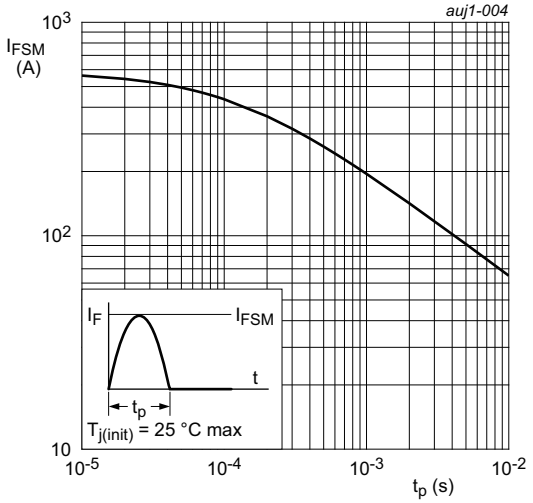


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

9. Thermal characteristics

Table 6. Thermal characteristics

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

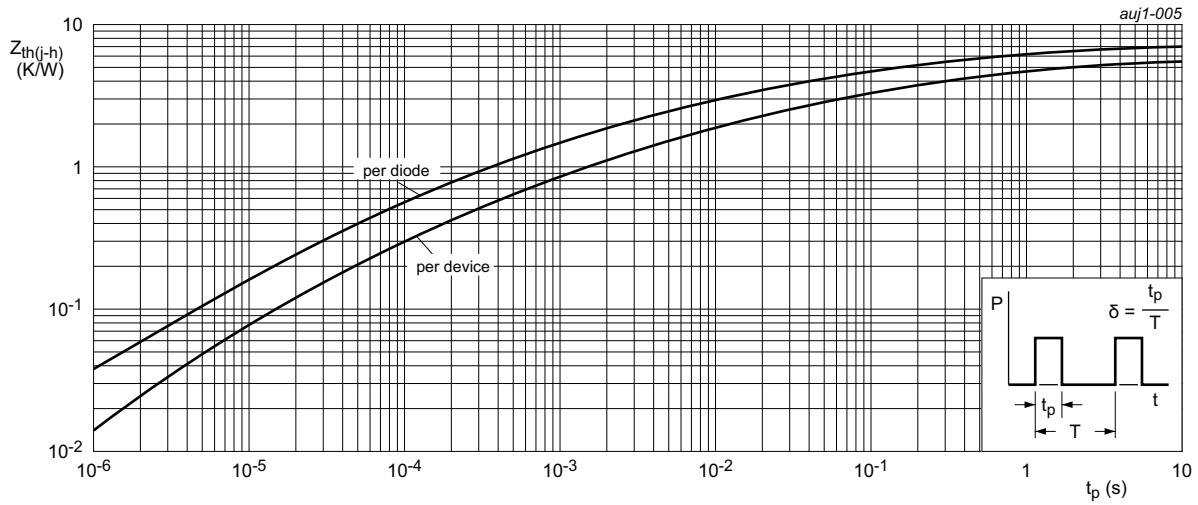


Fig. 5. Transient thermal impedance from junction to heatsink as a function of pulse duration

10. Isolation characteristics

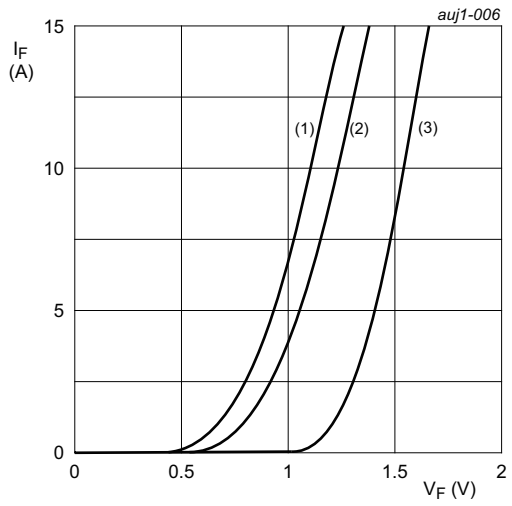
Table 7. Isolation characteristics

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
Static characteristics							
V_F	forward current	I_F = 5 A; T_j = 25 °C; per diode; Fig. 6		-	1.05	1.4	V
		I_F = 5 A; T_j = 150 °C; per diode; Fig. 6		-	0.95	1.05	V
I_R	reverse current	V_R = 500 V; T_j = 25 °C; per diode		-	2	10	µA
		V_R = 500 V; T_j = 100 °C; per diode		-	0.17	0.5	mA
Dynamic characteristics							
Q_r	reverse charge	I_F = 1 A; V_R = 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; per diode; Fig. 7		-	32	60	nC
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; per diode; Fig. 7		-	28	60	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; per diode; Fig. 7		-	2	3	A



V_o = 0.918 V; R_s = 0.0273 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

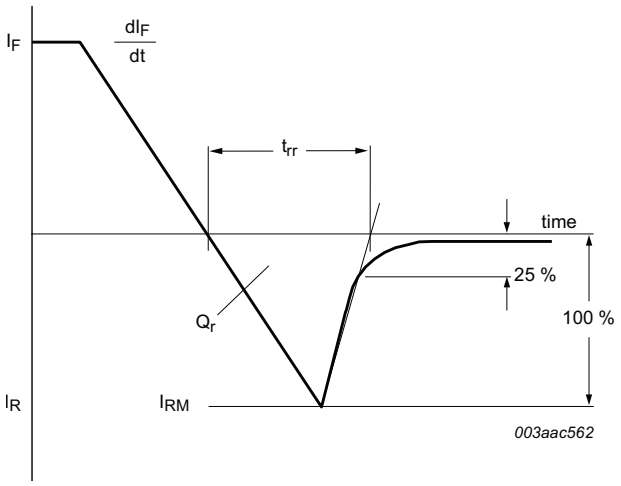
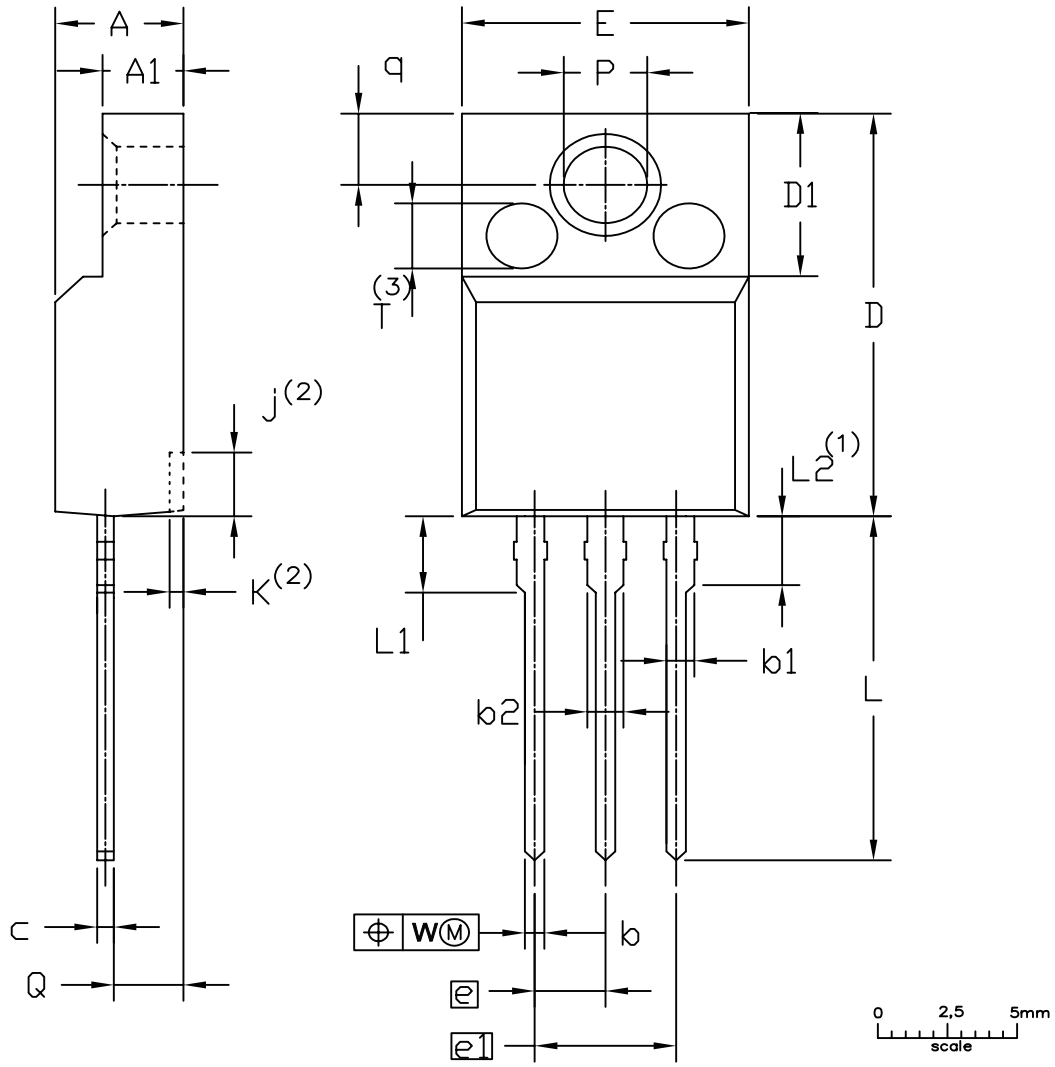


Fig. 7. Reverse recovery definitions; ramp recovery

12. Package outline

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 "full pack" SOT186A



UNIT	A	A_1	b	b_1	b_2	c	D	D_1	E	e	e_1	j(2)	K(2)	L	L_1	L_2(1) max.	P	Q	q	W	T(3)
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
1. Terminal dimensions within this zone are uncotrolled
2. Dot lines area designs may vary
3. 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

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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.
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