

1. General description

Ultrafast, dual common cathode, epitaxial rectifier diodes in a SOT428 (DPAK) plastic package.

2. Features and benefits

- Fast switching
- Low thermal resistance
- Soft recovery characteristic
- Low forward voltage drop
- Reverse surge capability
- High thermal cycling performance

3. Applications

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

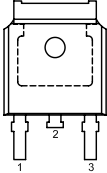
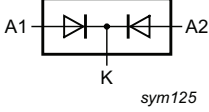
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
Absolute maximum rating						
V_{RRM}	repetitive peak reverse voltage		200			V
$I_{O(AV)}$	average output current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 119\text{ }^{\circ}\text{C}$; both diodes conducting; Fig. 5 ; Fig. 6	10			A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 119\text{ }^{\circ}\text{C}$; square-wave pulse; per diode	10			A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; sine-wave pulse; per diode	50			A
		$t_p = 8.3\text{ ms}$; sine-wave pulse; per diode	55			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 5\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 2	-	0.95	1.1	V
		$I_F = 5\text{ A}$; $T_j = 150\text{ }^{\circ}\text{C}$; Fig. 2	-	0.8	0.895	V
		$I_F = 10\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 2	-	1.1	1.25	V
Dynamic characteristics						
t_{rr}	reverse recovery time	ramp recovery; $I_F = 1\text{ A}$; $V_R = 30\text{ V}$; $di_F/dt = 100\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 3	-	15	25	ns
		step recovery; when switched from $I_F = 0.5\text{ A}$ to $I_R = 1\text{ A}$; measured at $I_R = 0.25\text{ A}$	-	10	20	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1		
2	K	cathode [1]		
3	A2	anode 2		
mb	K	mounting base; connected to cathode		

[1] It is not possible to connect to pin 2 of the SOT428 package.

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYQ28ED-200	DPAK	plastic single-ended surface-mounted package (DPAK); 3-leads (one lead cropped)	SOT428

7. Marking

Table 4. Marking codes

Type number	Marking codes
BYQ28ED-200	BYQ28ED-200

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		200	V
V_{RWM}	crest working reverse voltage		200	V
V_R	reverse voltage	$\delta = 1.0$; square-wave pulse;	200	V
$I_{O(AV)}$	average output current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 119\text{ }^\circ\text{C}$; both diodes conducting; Fig. 5 ; Fig. 6	10	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 119\text{ }^\circ\text{C}$; square-wave pulse; per diode	10	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; sine-wave pulse; per diode	50	A
		$t_p = 8.3\text{ ms}$; sine-wave pulse; per diode	55	A
I_{RM}	peak reverse recovery current	$\delta = 0.001$; $t_p = 2\text{ }\mu\text{s}$	0.2	A
I_{RSM}	non-repetitive peak reverse current	$t_p = 100\text{ }\mu\text{s}$	0.2	A
T_{stg}	storage temperature		-40 to 150	$^\circ\text{C}$
T_j	junction temperature		150	$^\circ\text{C}$
Electrostatic discharge				
V_{ESD}	electrostatic discharge voltage	all pins; human body model; $C = 250\text{ pF}$; $R = 1.5\text{ k}\Omega$	8	kV

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; both diodes conducting	-	-	3	K/W
		with heatsink compound; per diode; Fig 1	-	-	4.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W

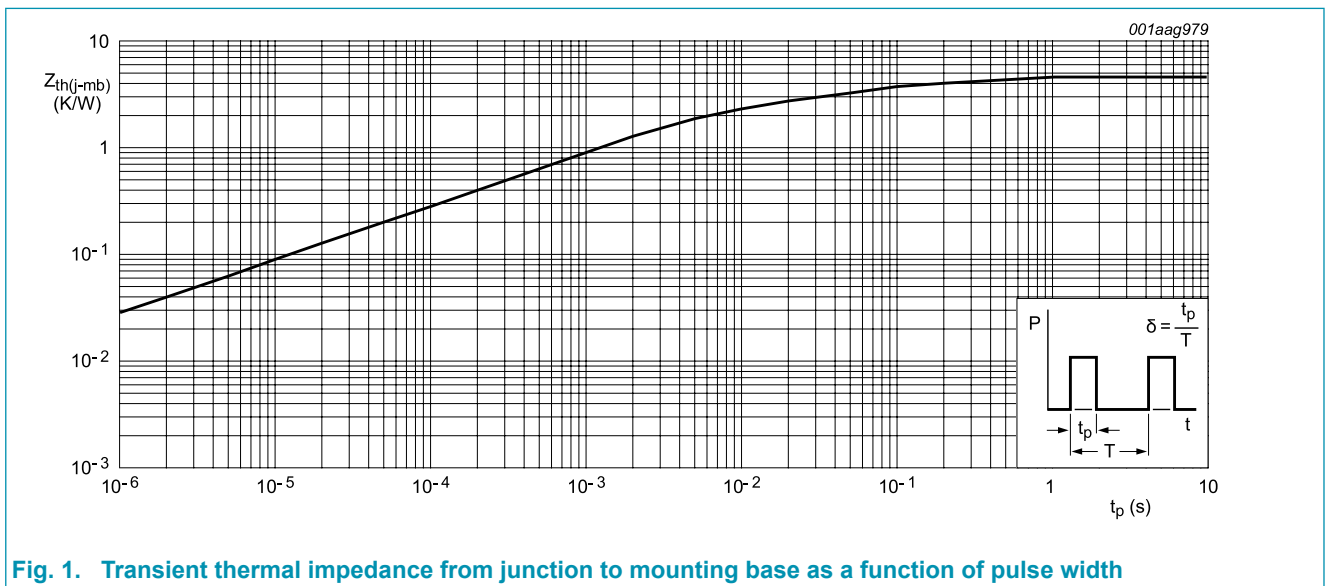
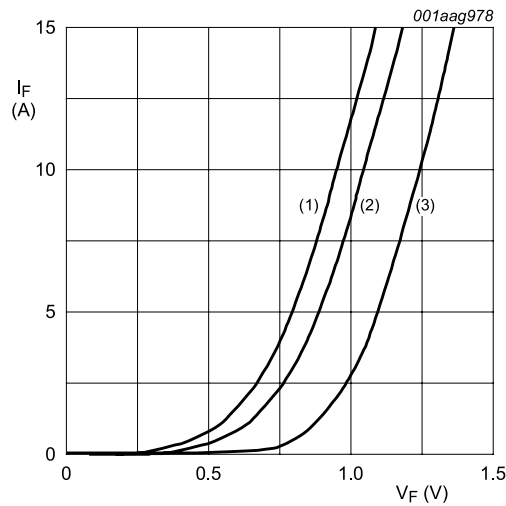


Fig. 1. Transient thermal impedance from junction to mounting base as a function of pulse width

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 5\text{ A}; T_j = 150\text{ °C}; \text{Fig. 2}$	-	0.8	0.895	V
		$I_F = 5\text{ A}; T_j = 25\text{ °C}; \text{Fig. 2}$	-	0.95	1.1	V
		$I_F = 10\text{ A}; T_j = 25\text{ °C}; \text{Fig. 2}$	-	1.1	1.25	V
I_R	reverse current	$V_R = 200\text{ V}; T_j = 25\text{ °C}$	-	2	10	μA
		$V_R = 200\text{ V}; T_j = 100\text{ °C}$	-	0.1	0.2	mA
Dynamic characteristics						
Q_r	recovered charge	$I_F = 2\text{ A}; V_R = 30\text{ V}; di_F/dt = 20\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 3}$	-	4	9	nC
t_{rr}	reverse recovery time	ramp recovery; $I_F = 1\text{ A}; V_R = 30\text{ V}; di_F/dt = 100\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 3}$	-	15	25	ns
		step recovery; when switched from $I_F = 0.5\text{ A}$ to $I_R = 1\text{ A}$; measured at $I_R = 0.25\text{ A}$	-	10	20	ns
I_{RM}	peak reverse recovery current	$I_F = 5\text{ A}; V_R = 30\text{ V}; di_F/dt = 50\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 3}$	-	0.5	0.7	A
V_{FR}	forward recovery voltage	$I_F = 1\text{ A}; di_F/dt = 10\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 4}$	-	1	-	V



- (1) $T_j = 150\text{ °C}$; typical values
- (2) $T_j = 150\text{ °C}$; maximum values
- (3) $T_j = 25\text{ °C}$; maximum values

Fig. 2. Forward current as a function of forward voltage

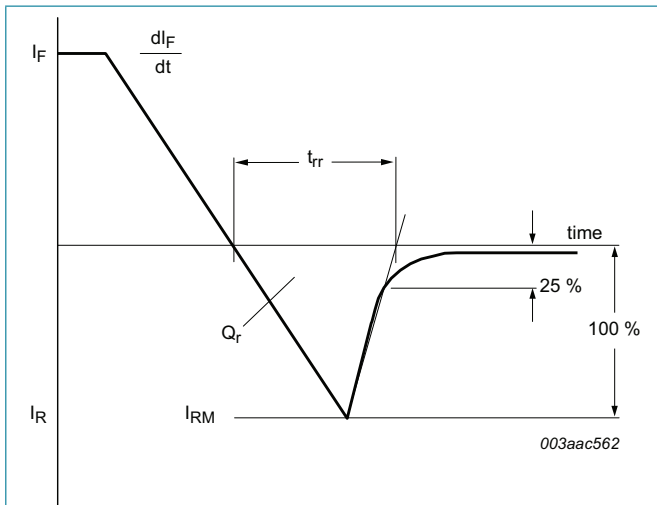


Fig. 3. Reverse recovery definitions; ramp recovery

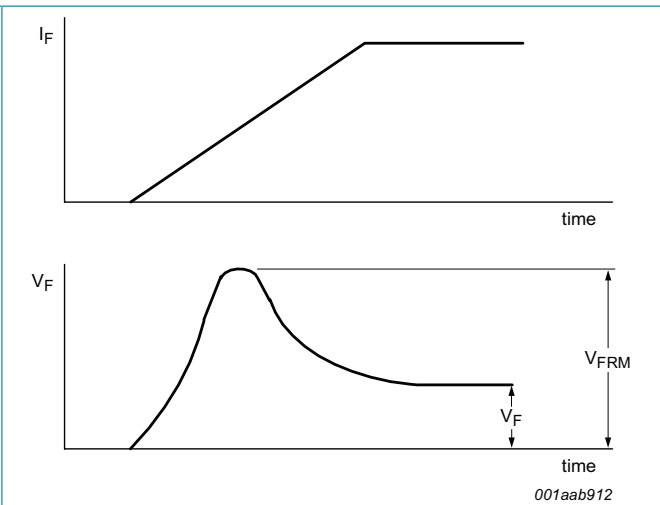
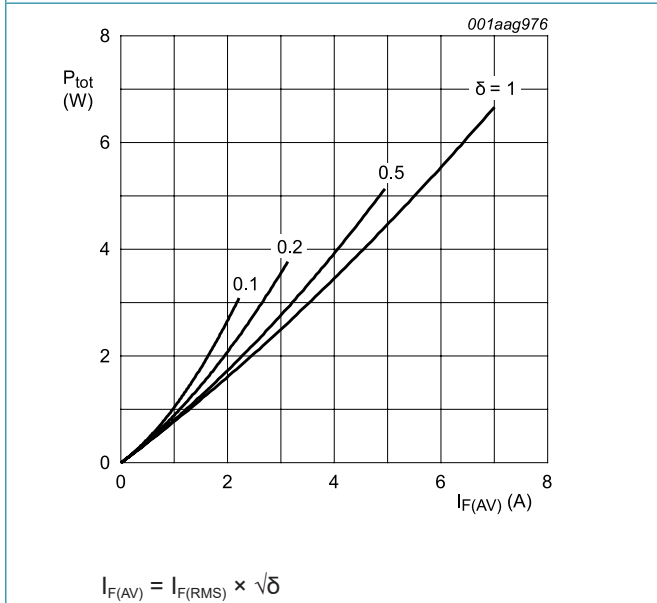
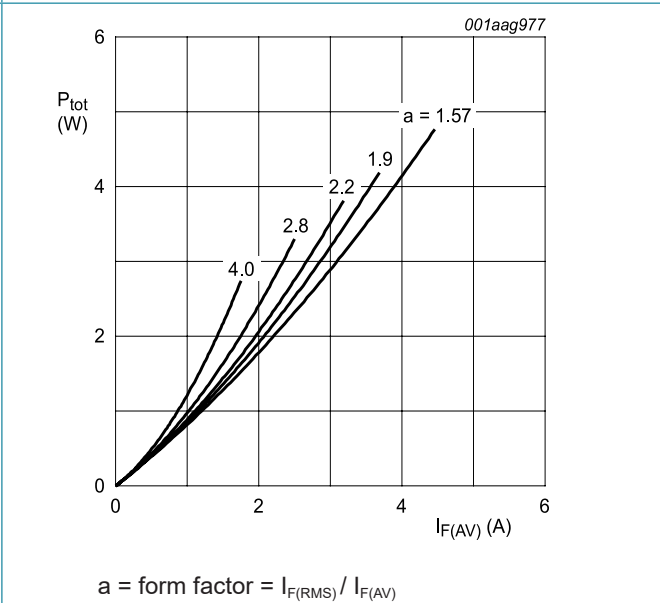


Fig. 4. Forward recovery definitions



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

Fig. 5. Forward power dissipation as a function of average forward current; square waveform; maximum values; per diode



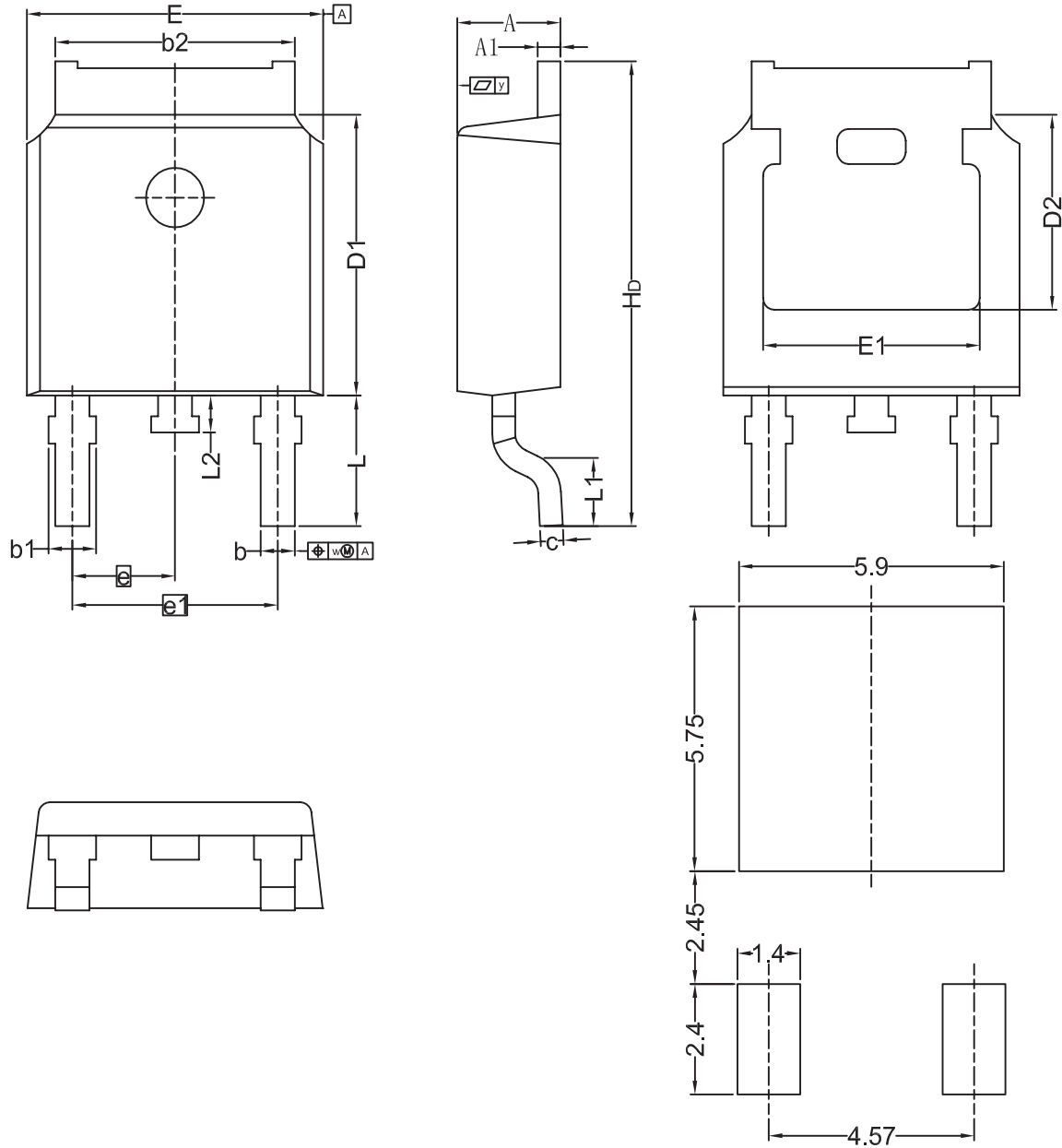
$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$

Fig. 6. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values; per diode

11. Package outline

Plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)

TO252



Recommended Footprint

Unit	A	A1	b	b1	b2	c	D1	D2	E	E1	e	e1	H _D	L	L1	L2	w	y
min	2.22	0.46	0.71	0.72	5.00	0.20	5.98	4.00	6.47	4.45	2.285	4.57	9.60	2.90 (Ref.)	0.50	0.50	0.20	
nom																		
max	2.38	0.93	0.89	1.10	5.46	0.56	6.22	---	6.73	---			10.40	---	0.90			0.20

12. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYQ28ED-200 v.5	20180224	Product data sheet	-	BYQ28_SER_E_ED_4
Modifications: Change from NXP version to WeEn version				
BYQ28_SER_E_ED_4	20071205	Product data sheet	-	BYQ28E_SERIES_3
Modifications: <ul style="list-style-type: none"> • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Limiting values table: some parameter descriptions amended to conform to latest standards; IFRM conditions amended; VESD row added. • Characteristics: Qrr changed to Qr 'recovered charge'; trr1 and trr2 changed to trr with 'ramp recovery' and 'step recovery' added to conditions. 				
BYQ28E_SERIES_3	19981001	Product specification	-	BYQ28E_SERIES_2
BYQ28E_SERIES_2	19980701	Product specification	-	BYQ28E_SERIES_1; BYQ28EB_SERIES_1
BYQ28E_SERIES_1; BYQ28EB_SERIES_1	19960801	Product specification	-	-

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.
Product [short] data sheet	Production	This document contains the product specification.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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