

## 1. General description

Dual ultrafast power diode in a SOT78 (TO-220AB) plastic package.

## 2. Features and benefits

- Soft recovery characteristic
- Low switching loss
- Fast switching
- High thermal cycling performance
- Low thermal resistance
- Low forward voltage drop

## 3. Applications

- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)
- Output rectifiers in high-frequency switched-mode power supplies

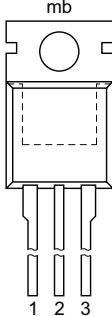
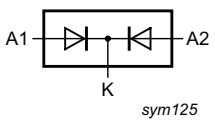
## 4. Quick reference data

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	SQW; $\delta = 0.5$ ; $T_{mb} \leq 115\text{ °C}$ ; both diodes conducting; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a>	20			A
$I_{FRM}$	repetitive peak forward current	SQW; $\delta = 0.5$ ; $t_p = 25\ \mu\text{s}$ ; $T_{mb} \leq 115\text{ °C}$ ; per diode	20			A
$I_{FSM}$	non-repetitive peak forward current	SIN; $t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; per diode	120			A
		SIN; $t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; per diode	132			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 10\text{ A}$ ; $T_j = 150\text{ °C}$ ; <a href="#">Fig. 4</a>	-	0.87	1.05	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}$ ; $V_R = 30\text{ V}$ ; $di_F/dt = 100\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 6</a> ; <a href="#">Fig. 7</a>	-	50	60	ns

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1		
2	K	cathode		
3	A2	anode 2		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYV34-500	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78

## 7. Marking

Table 4. Marking codes

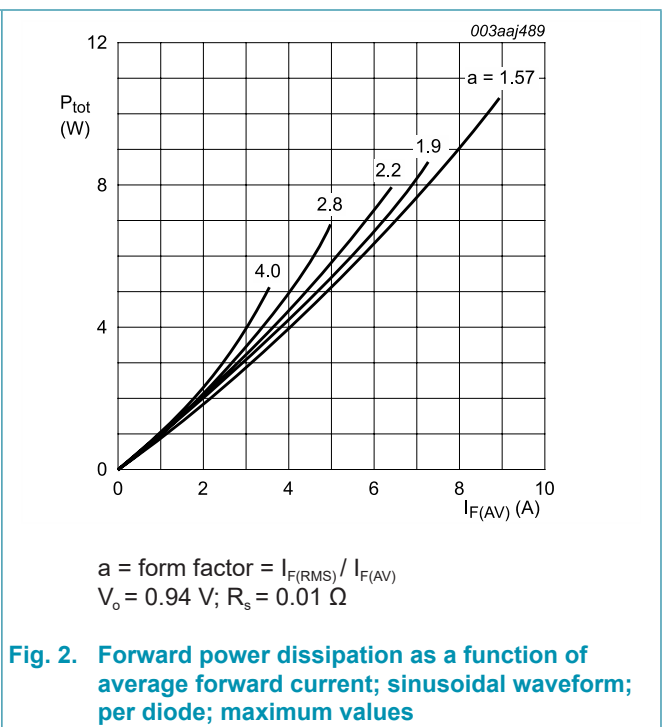
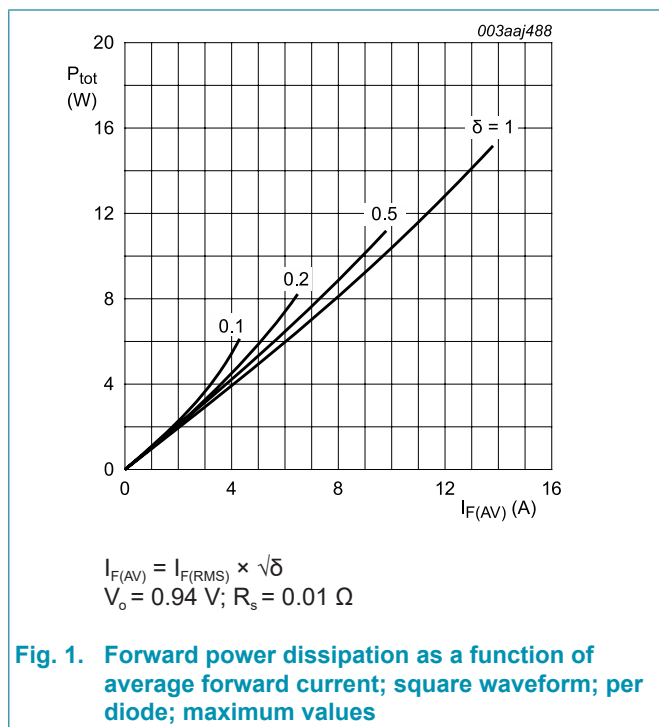
Type number	Marking codes
BYV34-500	BYV34-500

## 8. Limiting values

**Table 5. Limiting values**

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

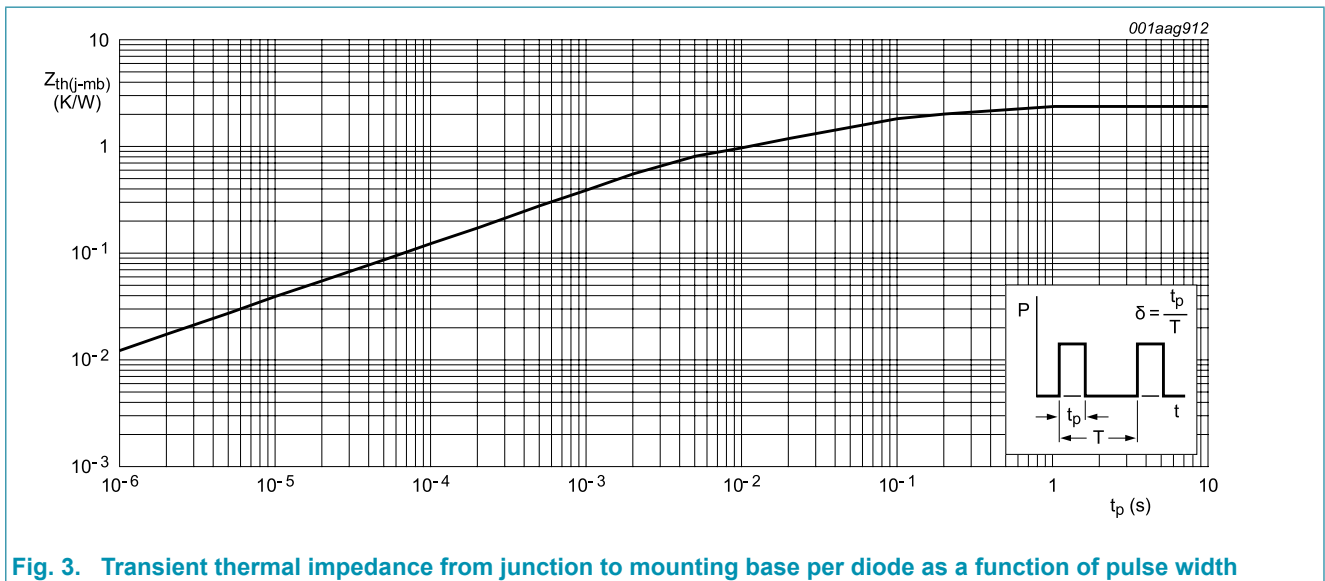
Symbol	Parameter	Conditions	Values	Unit
$V_{RRM}$	repetitive peak reverse voltage		500	V
$V_{RWM}$	crest working reverse voltage		500	V
$V_R$	reverse voltage	$T_{mb} \leq 138\text{ °C}$ ; DC	500	V
$I_{O(AV)}$	average output current	SQW; $\delta = 0.5$ ; $T_{mb} \leq 115\text{ °C}$ ; both diodes conducting; Fig. 1; Fig. 2	20	A
$I_{FRM}$	repetitive peak forward current	SQW; $\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 115\text{ °C}$ ; per diode	20	A
$I_{FSM}$	non-repetitive peak forward current	SIN; $t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; per diode	120	A
		SIN; $t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; per diode	132	A
$T_{stg}$	storage temperature		-40 to 150	°C
$T_j$	junction temperature		150	°C



### 9. Thermal characteristics

Table 6. Thermal characteristics

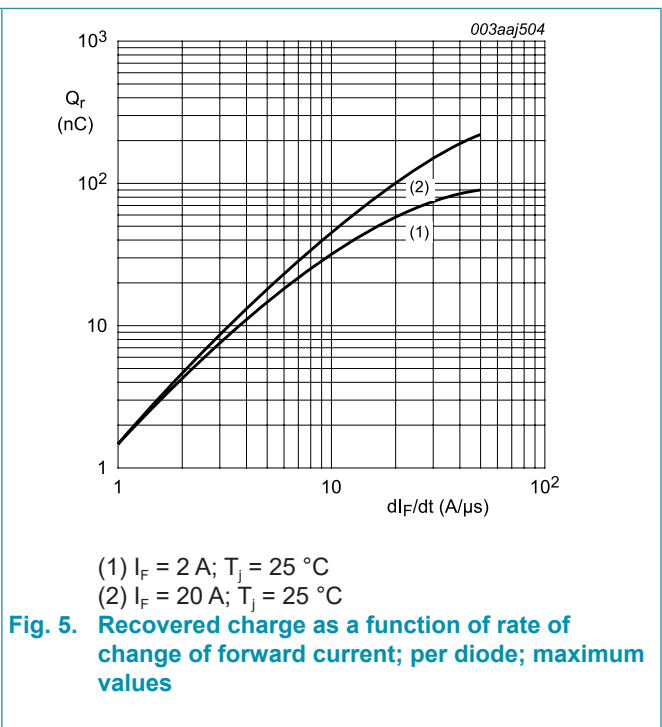
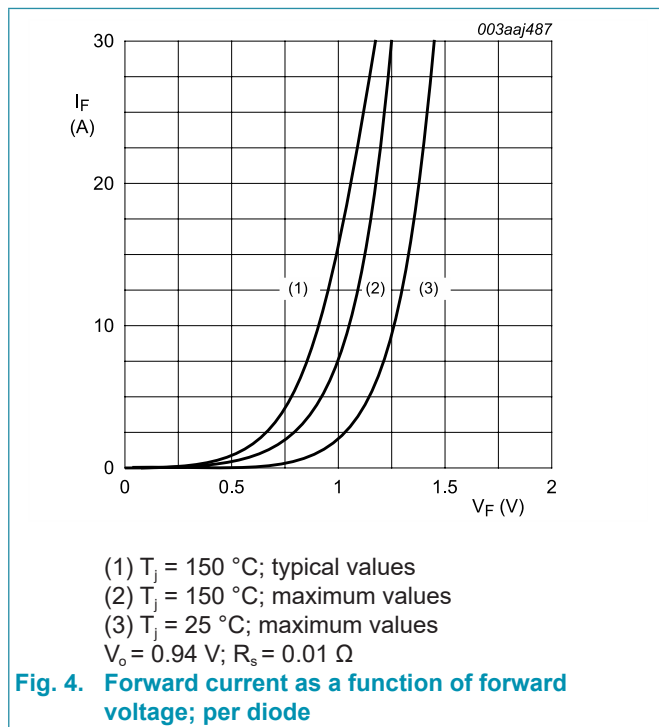
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound; both diodes conducting	-	-	1.6	K/W
		with heatsink compound; per diode; <a href="#">Fig. 3</a>	-	-	2.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient		-	60	-	K/W



### 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 20 A; T <sub>J</sub> = 25 °C; <a href="#">Fig. 4</a>	-	1.1	1.35	V
		I <sub>F</sub> = 10 A; T <sub>J</sub> = 150 °C; <a href="#">Fig. 4</a>	-	0.87	1.05	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 500 V; T <sub>J</sub> = 25 °C	-	10	50	μA
		V <sub>R</sub> = 500 V; T <sub>J</sub> = 100 °C	-	0.2	0.6	mA
<b>Dynamic characteristics</b>						
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 2 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 20 A/μs; <a href="#">Fig. 5</a> ; <a href="#">Fig. 6</a>	-	50	50	nC
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs; T <sub>J</sub> = 25 °C; <a href="#">Fig. 6</a> ; <a href="#">Fig. 7</a>	-	50	60	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 10 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 50 A/μs; T <sub>J</sub> = 100 °C; <a href="#">Fig. 6</a> ; <a href="#">Fig. 8</a>	-	4	5	A
V <sub>FRM</sub>	forward recovery voltage	I <sub>F</sub> = 10 A; dI <sub>F</sub> /dt = 100 A/μs; T <sub>J</sub> = 25 °C; <a href="#">Fig. 9</a>	-	2.5	-	V



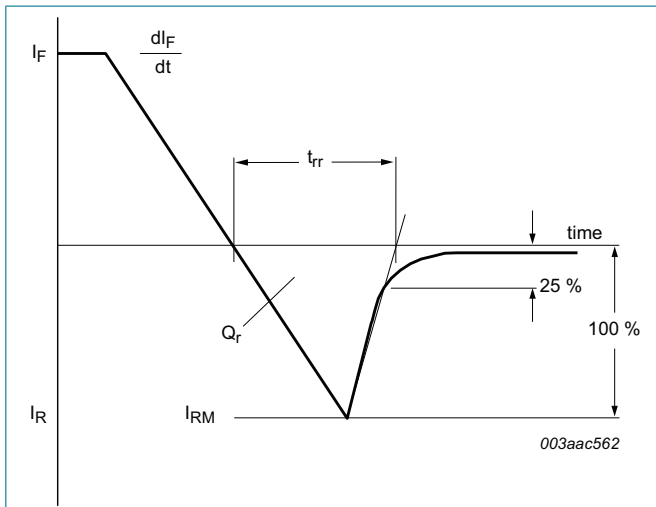
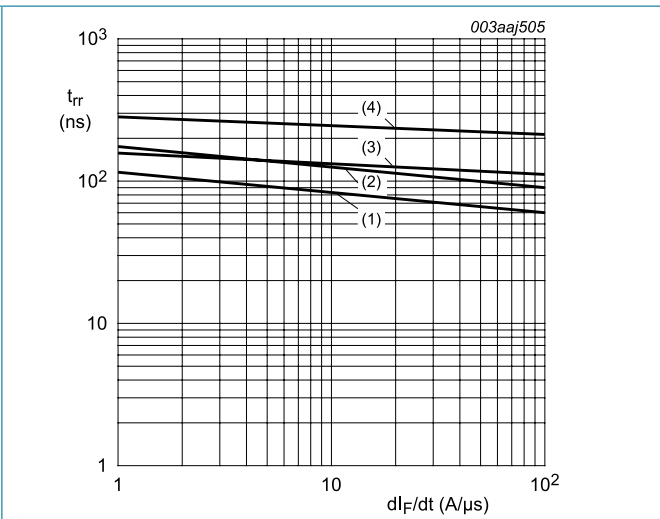
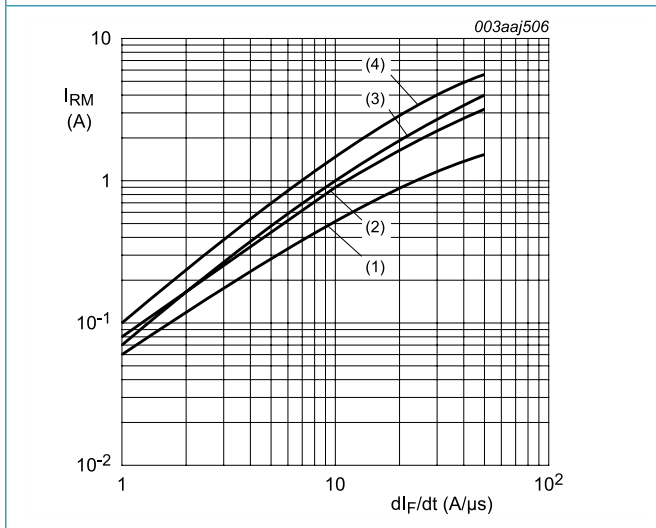


Fig. 6. Reverse recovery definitions; ramp recovery



- (1)  $I_F = 1 \text{ A}; T_j = 25 \text{ }^\circ\text{C}$
- (2)  $I_F = 1 \text{ A}; T_j = 100 \text{ }^\circ\text{C}$
- (3)  $I_F = 20 \text{ A}; T_j = 25 \text{ }^\circ\text{C}$
- (4)  $I_F = 20 \text{ A}; T_j = 100 \text{ }^\circ\text{C}$

Fig. 7. Reverse recovery time as a function of rate of change of forward current; per diode; maximum values



- (1)  $I_F = 1 \text{ A}; T_j = 25 \text{ }^\circ\text{C}$
- (2)  $I_F = 1 \text{ A}; T_j = 100 \text{ }^\circ\text{C}$
- (3)  $I_F = 20 \text{ A}; T_j = 25 \text{ }^\circ\text{C}$
- (4)  $I_F = 20 \text{ A}; T_j = 100 \text{ }^\circ\text{C}$

Fig. 8. Peak reverse recovery current as a function of rate of change of forward current; per diode; maximum values

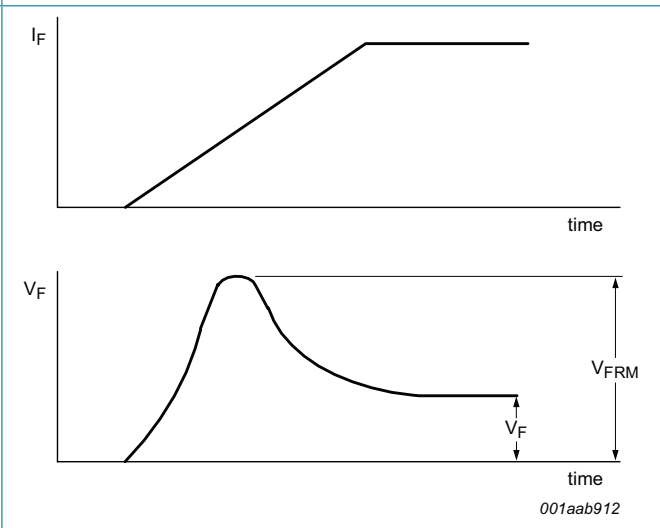
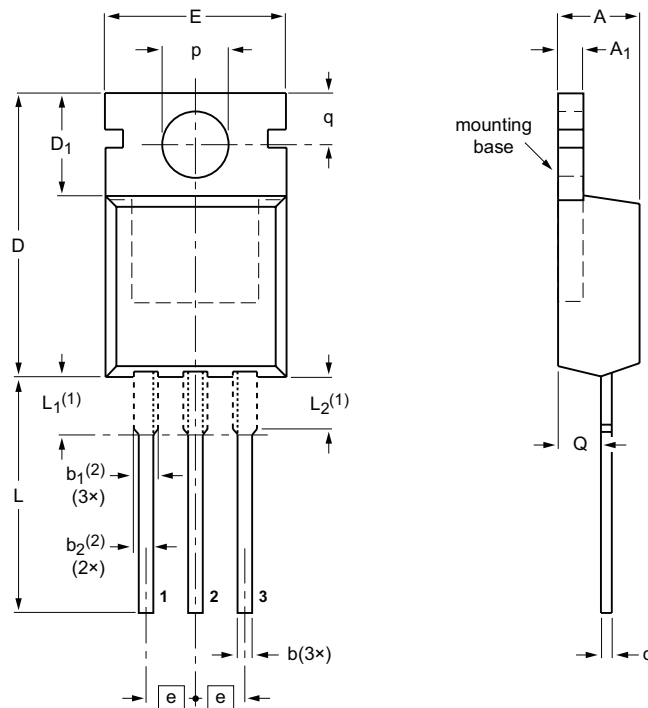


Fig. 9. Forward recovery definitions

### 11. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB

SOT78



**DIMENSIONS (mm are the original dimensions)**

UNIT	A	A <sub>1</sub>	b	b <sub>1</sub> (2)	b <sub>2</sub> (2)	c	D	D <sub>1</sub>	E	e	L	L <sub>1</sub> (1)	L <sub>2</sub> (1) max.	p	q	Q
mm	4.7 4.1	1.40 1.25	0.9 0.6	1.6 1.0	1.3 1.0	0.7 0.4	16.0 15.2	6.6 5.9	10.3 9.7	2.54	15.0 12.8	3.30 2.79	3.0	3.8 3.5	3.0 2.7	2.6 2.2

**Notes**

- Lead shoulder designs may vary.
- Dimension includes excess dambar.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT78		3-lead TO-220AB	SC-46		08-04-23 08-06-13

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

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