

1. General description

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

2. Features and benefits

- Soft recovery characteristic minimizes power consuming oscillations
- Very low on-state losses
- Fast switching
- High thermal cycling performance
- Low thermal resistance
- Low forward voltage drop

3. Applications

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

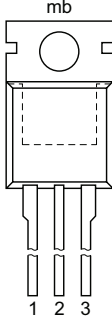
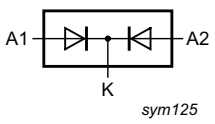
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
Absolute maximum rating						
V_{RRM}	repetitive peak reverse voltage		400			V
$I_{O(AV)}$	average output current	SQW; $\delta = 0.5$; $T_{mb} \leq 115$ °C; both diodes conducting; Fig. 1 ; Fig. 2	20			A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25$ μ s; $T_{mb} \leq 115$ °C; per diode	20			A
I_{FSM}	non-repetitive peak forward current	SIN; $t_p = 10$ ms; $T_{j(init)} = 25$ °C; per diode	120			A
		SIN; $t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; per diode	132			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 10$ A; $T_j = 150$ °C; Fig. 4	-	0.87	1.05	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $di_F/dt = 100$ A/ μ s; $T_j = 25$ °C; Fig. 6 ; Fig. 7	-	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
BYV34-400	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78

7. Marking

Table 4. Marking codes

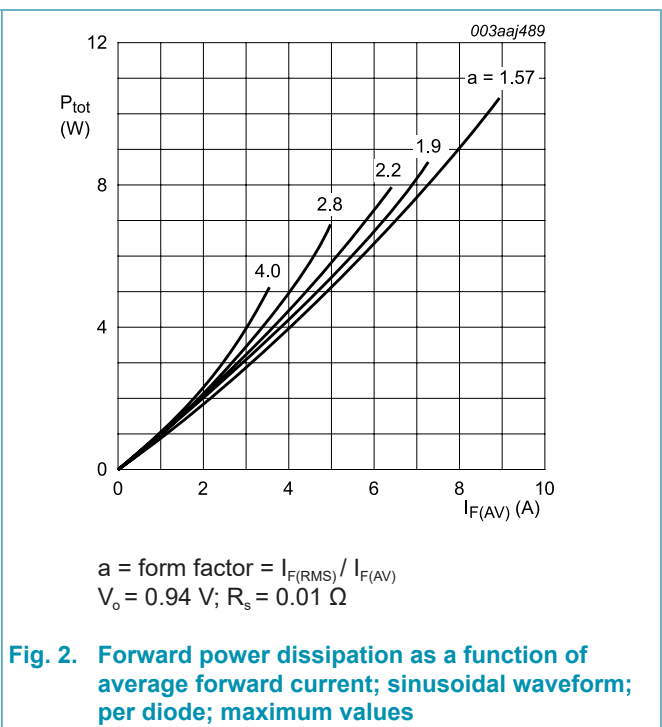
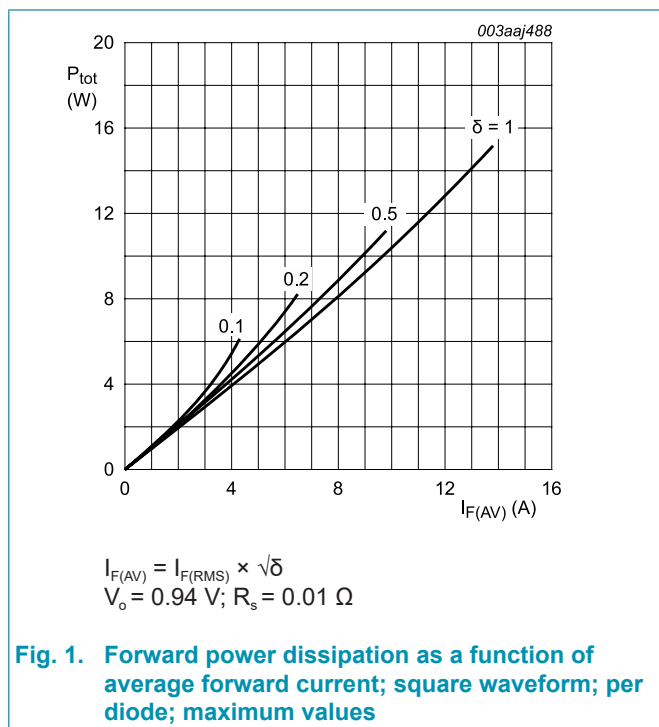
Type number	Marking codes
BYV34-400	BYV34-400

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		400	V
V_{RWM}	crest working reverse voltage		400	V
V_R	reverse voltage	$T_{mb} \leq 138\text{ °C}$; DC	400	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	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 115\text{ °C}$; 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; Fig. 3	-	-	2.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient		-	60	-	K/W

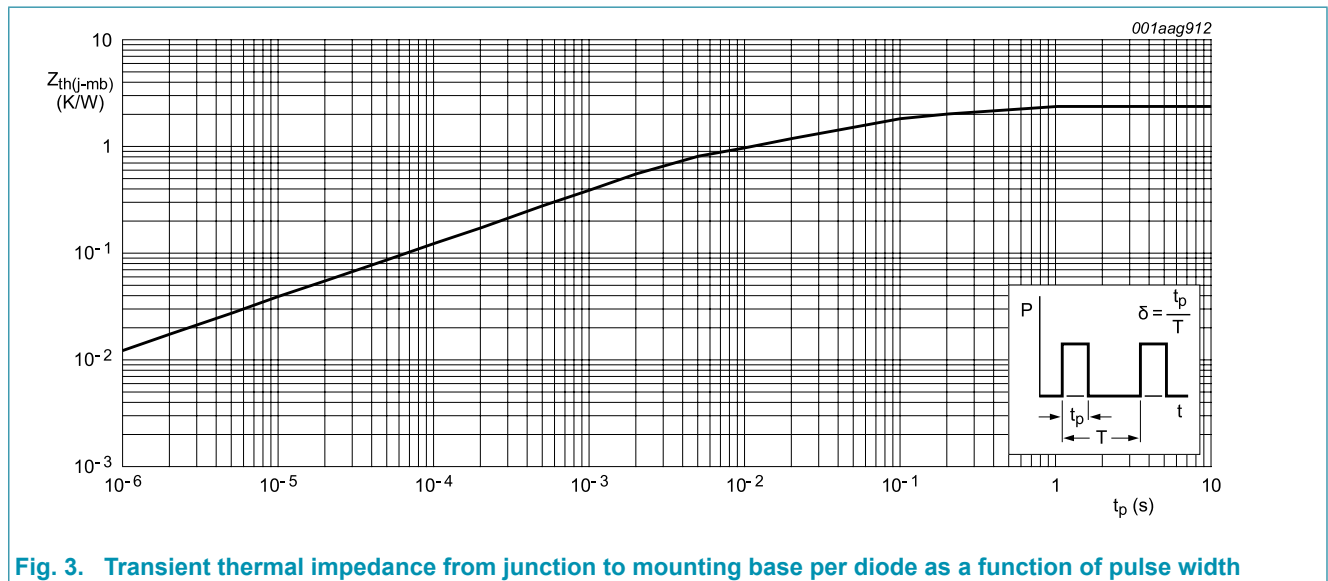
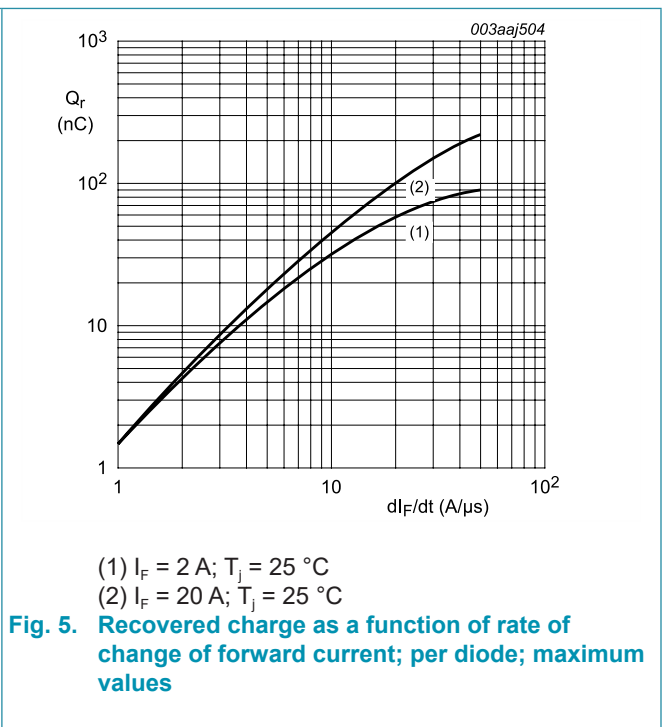
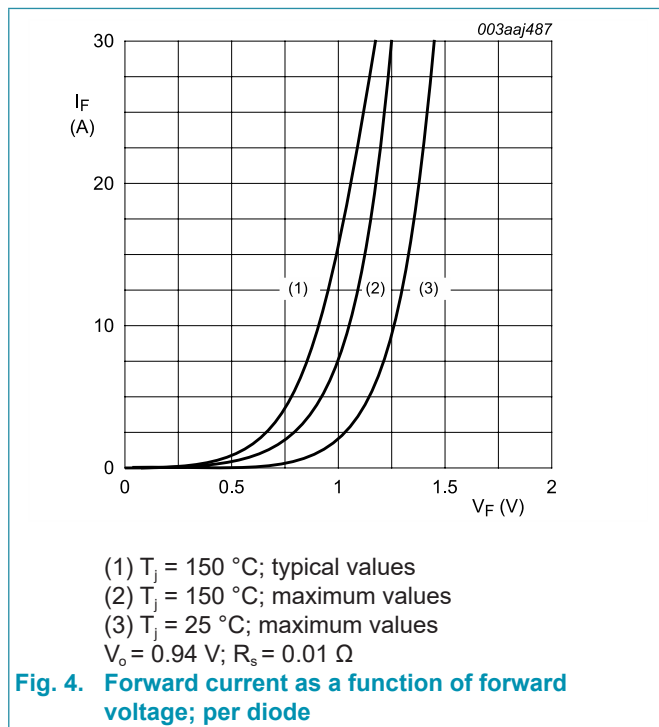


Fig. 3. Transient thermal impedance from junction to mounting base per diode as a function of pulse width

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V _F	forward voltage	I _F = 20 A; T _J = 25 °C; Fig. 4	-	1.1	1.35	V
		I _F = 10 A; T _J = 150 °C; Fig. 4	-	0.87	1.05	V
I _R	reverse current	V _R = 400 V; T _J = 25 °C	-	10	50	μA
		V _R = 400 V; T _J = 100 °C	-	0.2	0.6	mA
Dynamic characteristics						
Q _r	recovered charge	I _F = 2 A; V _R = 30 V; dI _F /dt = 20 A/μs; Fig. 5 ; Fig. 6	-	50	50	nC
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/μs; T _J = 25 °C; Fig. 6 ; Fig. 7	-	50	60	ns
I _{RM}	peak reverse recovery current	I _F = 10 A; V _R = 30 V; dI _F /dt = 50 A/μs; T _J = 100 °C; Fig. 6 ; Fig. 8	-	4	5	A
V _{FRM}	forward recovery voltage	I _F = 10 A; dI _F /dt = 100 A/μs; T _J = 25 °C; Fig. 9	-	2.5	-	V



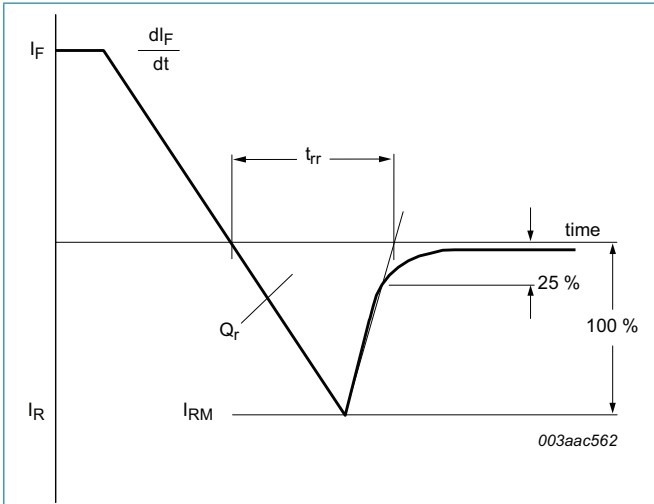
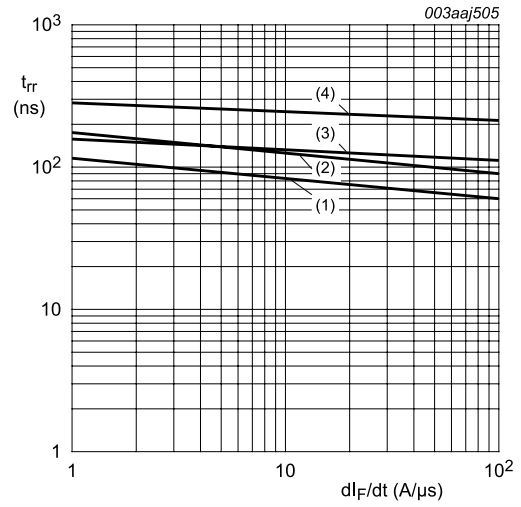
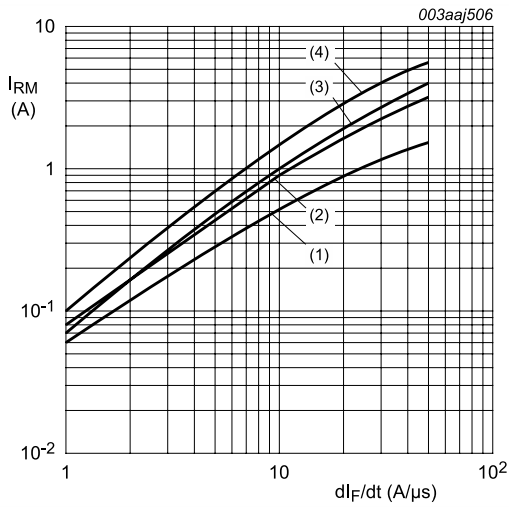


Fig. 6. Reverse recovery definitions; ramp recovery



- (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

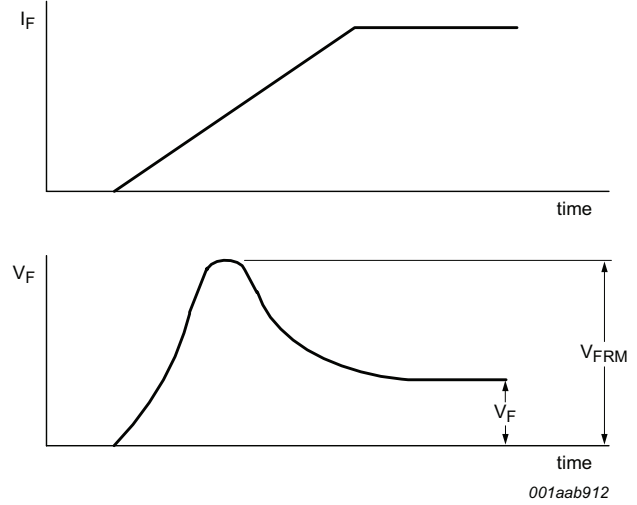
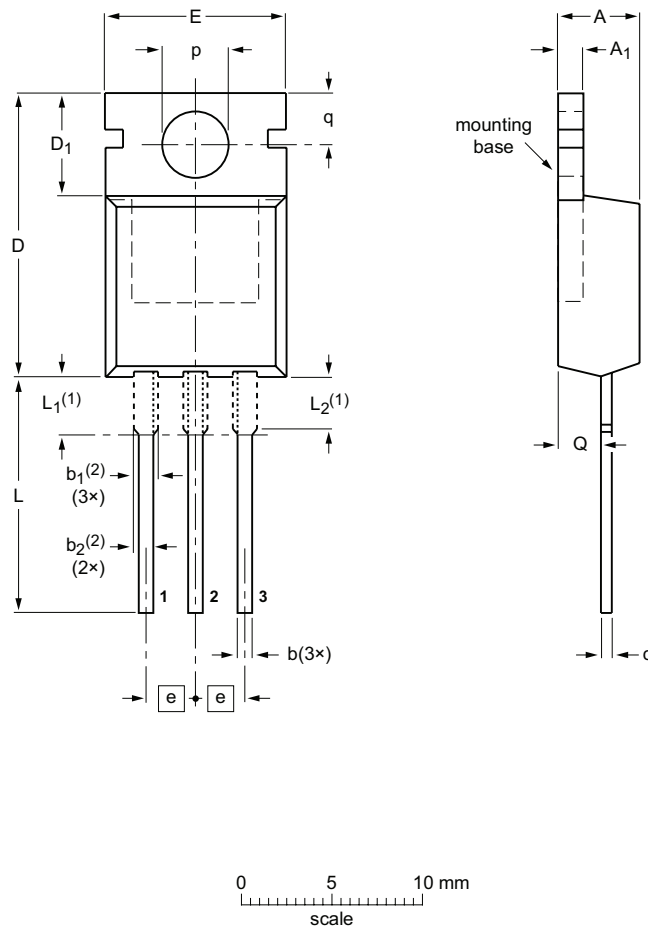


Fig. 9. Forward recovery definitions

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 ₁	b	b ₁ (²)	b ₂ (²)	c	D	D ₁	E	e	L	L ₁ (¹)	L ₂ (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

- 1. Lead shoulder designs may vary.
- 2. 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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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