

## 1. General description

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

## 2. Features and benefits

- Ultra low leakage current
- High junction temperature up to 175 °C
- Low on-state loss
- Fast switching
- Soft recovery characteristic minimizes power consuming oscillations
- High reverse surge capability
- High thermal cycling performance
- Low thermal resistance

## 3. Applications

- Home appliance power supply

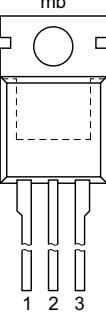
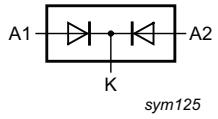
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit	
<b>Absolute maximum rating</b>							
$V_{RRM}$	repetitive peak reverse voltage		200			V	
$I_{O(AV)}$	average output current	$\delta = 0.5$ ; $T_{mb} \leq 149$ °C; Square-wave pulse	20			A	
$I_{RRM}$	repetitive peak reverse current	$\delta = 0.001$ ; $t_p = 2$ µs; per diode	0.2			A	
$V_{ESD}$	electrostatic discharge voltage	HBM; $C = 250$ pF; $R = 1.5$ kΩ; all pins	8			kV	
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; SIN; per diode; <a href="#">Fig. 4</a>	125			A	
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
<b>Static characteristics</b>							
$V_F$	forward voltage	$I_F = 8$ A; $T_j = 150$ °C; <a href="#">Fig. 6</a>		-	0.76	0.85	V
<b>Dynamic characteristics</b>							
$t_{rr}$	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $dI_F/dt = 100$ A/µs; $T_j = 25$ °C; <a href="#">Fig. 7</a>		-	18	25	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		 sym125

## 6. Ordering information

Table 3. Ordering information

Type number	Package		Version
	Name	Description	
BYV32E-200P	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78

## 7. Marking

Table 4. Marking codes

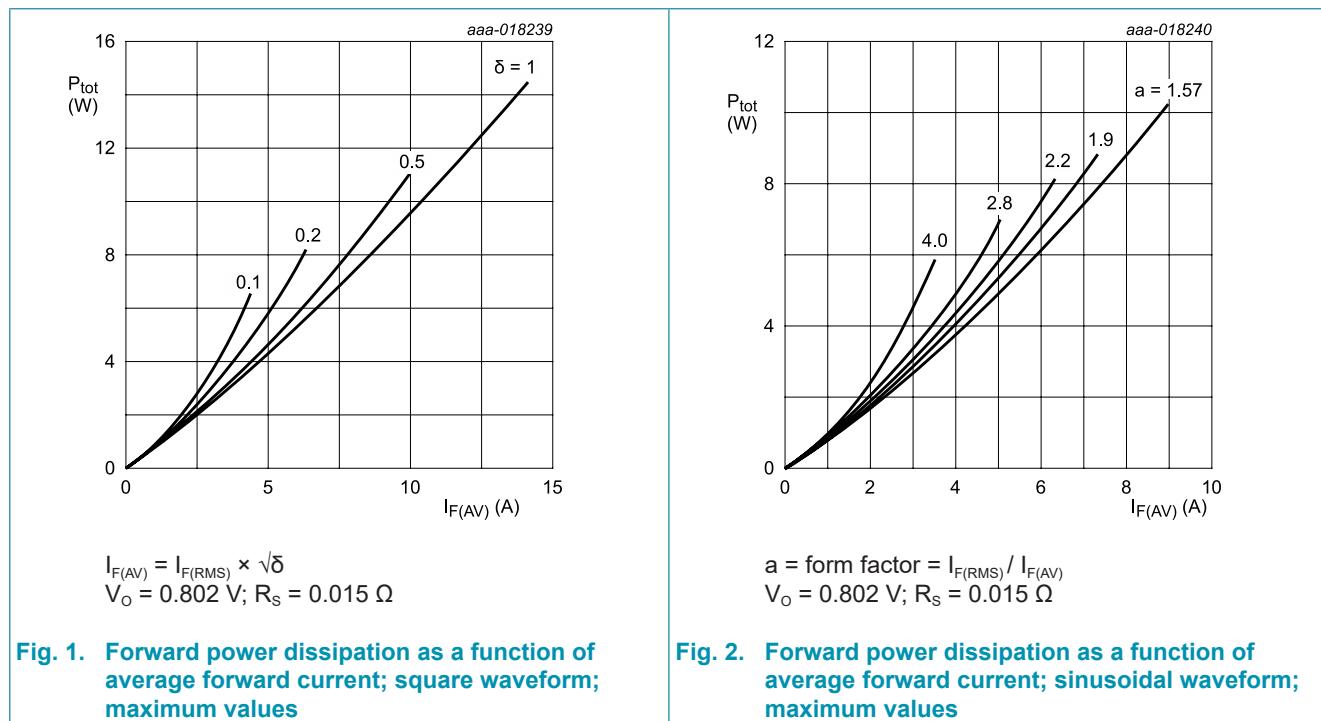
Type number	Marking codes
BYV32E-200P	BYV32E-200P

## 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	DC	200	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 149$ °C; Square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	10	A
$I_{O(AV)}$	average output current	$\delta = 0.5$ ; $T_{mb} \leq 149$ °C; Square-wave pulse	20	A
$I_{FSM}$	non-repetitive peak forward current	SIN; $t_p = 10$ ms; $T_{j(init)} = 25$ °C; per diode; <a href="#">Fig. 4</a>	125	A
		SIN; $t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; per diode	137	A
$I_{RRM}$	repetitive peak reverse current	$\delta = 0.001$ ; $t_p = 2$ µs; per diode	0.2	A
$I_{RSM}$	non-repetitive peak reverse current	$t_p = 100$ µs; per diode	0.2	A
$T_{stg}$	storage temperature		-65 to 175	°C
$T_j$	junction temperature		175	°C
<b>Electrostatic discharge</b>				
$V_{ESD}$	electrostatic discharge voltage	HBM; $C = 250$ pF; $R = 1.5$ kΩ; all pins	8	kV



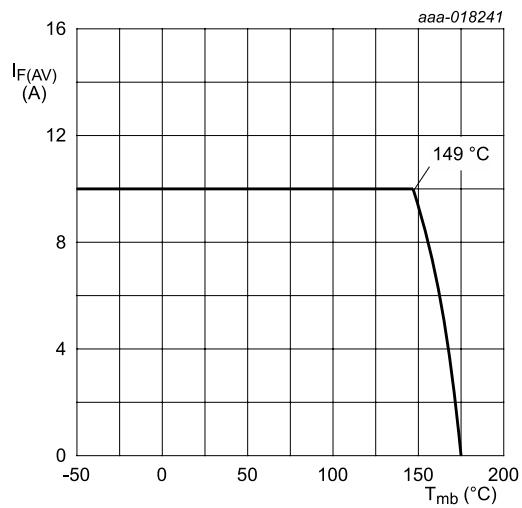


Fig. 3. Forward current as a function of mounting base temperature; maximum values

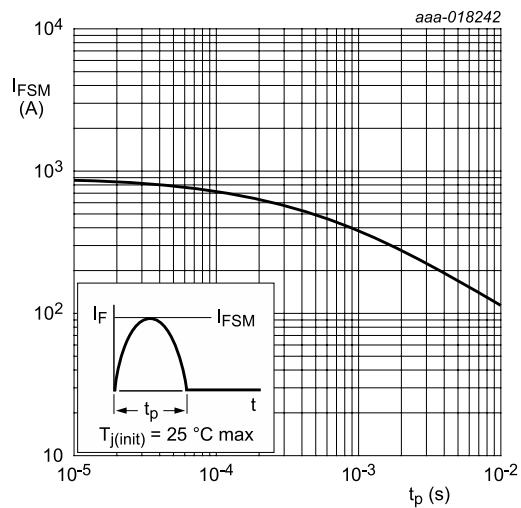


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j\text{-}mb)}$	thermal resistance from junction to mounting base	with heatsink compound; both diodes conducting		-	-	1.4	K/W
		with heatsink compound; per diode; Fig. 5		-	-	2.4	K/W
$R_{th(j\text{-}a)}$	thermal resistance from junction to ambient	in free air		-	60	-	K/W

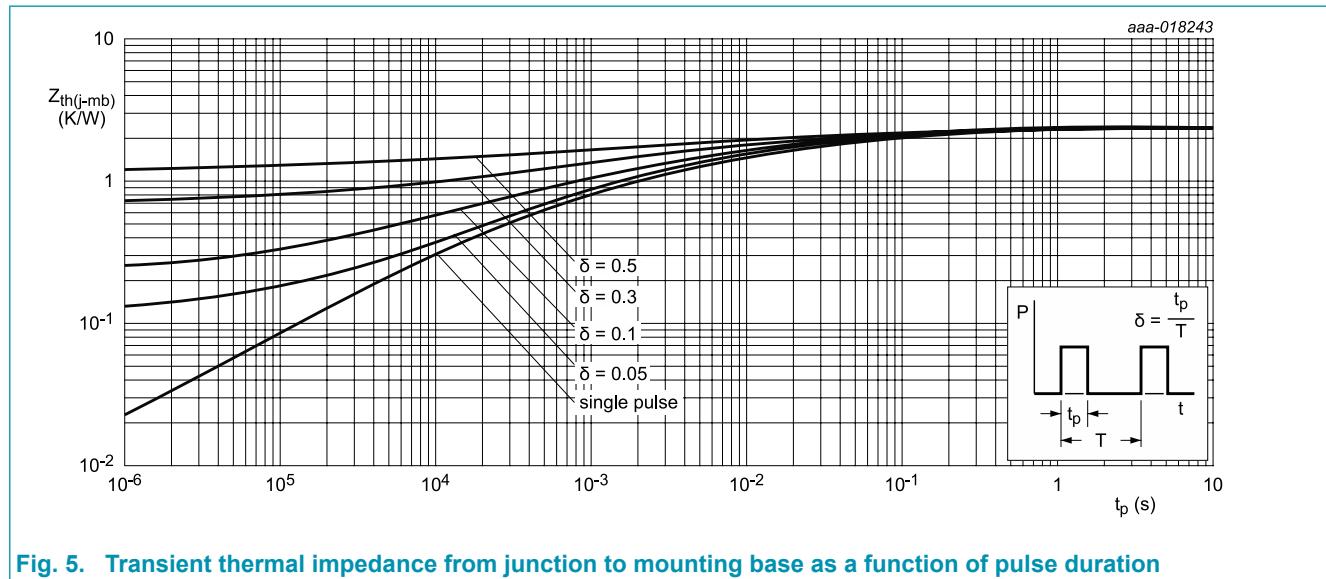
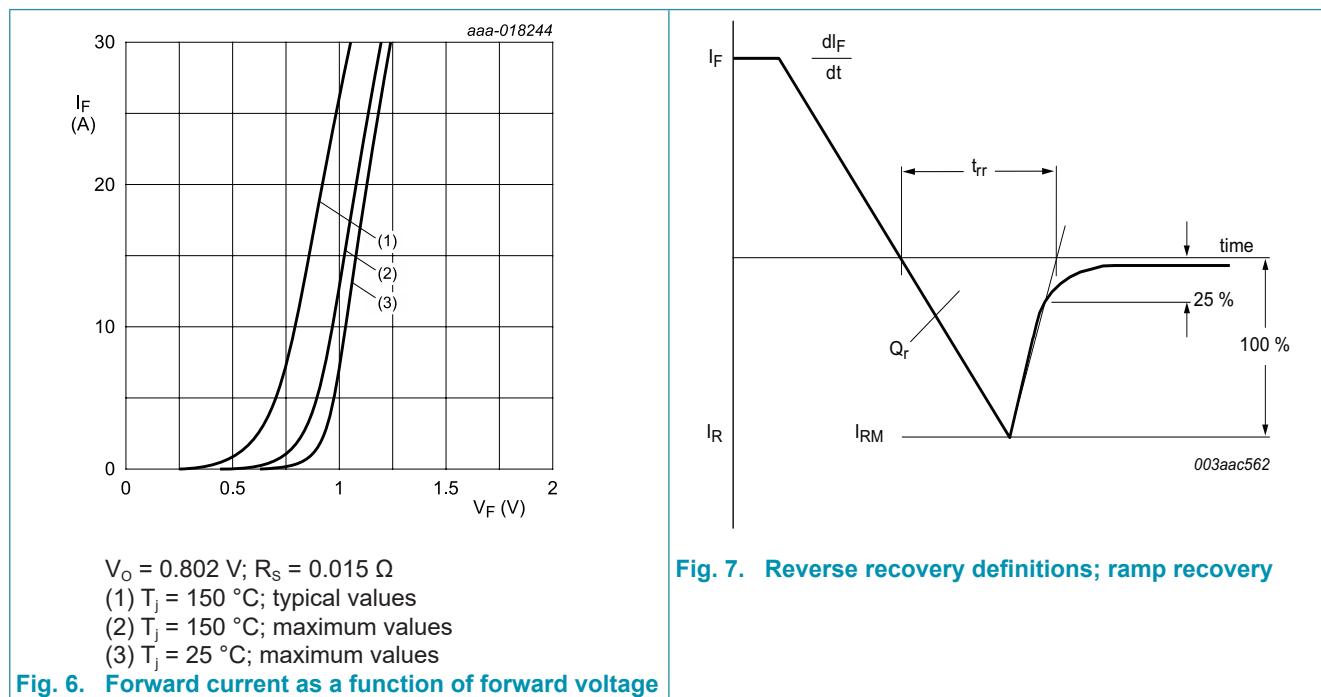


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

## 10. Characteristics

Table 7. Characteristics

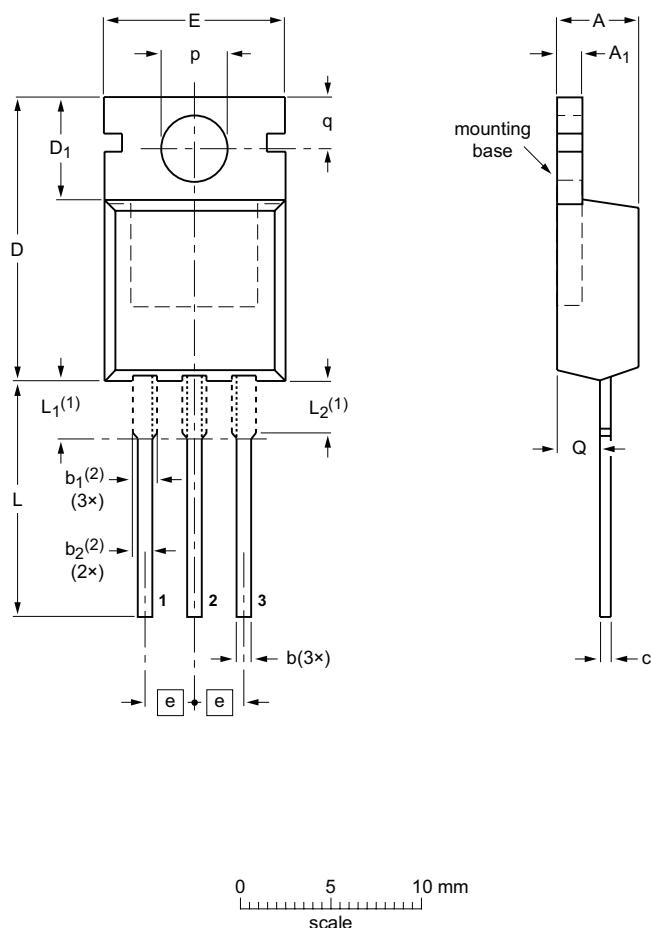
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<b>Static characteristics</b>							
$V_F$	forward voltage	$I_F = 8 \text{ A}; T_j = 150 \text{ }^\circ\text{C}$ ; Fig. 6		-	0.76	0.85	V
		$I_F = 20 \text{ A}; T_j = 25 \text{ }^\circ\text{C}$ ; Fig. 6		-	1.06	1.15	V
		$I_F = 10 \text{ A}; T_j = 25 \text{ }^\circ\text{C}$ ; Fig. 6		-	0.95	-	V
$I_R$	reverse current	$V_R = 200 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$		-	0.3	5	$\mu\text{A}$
		$V_R = 200 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$		-	70	250	$\mu\text{A}$
<b>Dynamic characteristics</b>							
$Q_r$	recovered charge	$I_F = 2 \text{ A}; V_R = 30 \text{ V}; \frac{dI_F}{dt} = 20 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}$ ; Fig. 7		-	13.5	-	nC
		$I_F = 1 \text{ A}; V_R = 30 \text{ V}; \frac{dI_F}{dt} = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}$ ; Fig. 7		-	14.5	-	nC
$t_{rr}$	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; \frac{dI_F}{dt} = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}$ ; Fig. 7		-	18	25	ns
$I_{RM}$	peak reverse recovery current	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; \frac{dI_F}{dt} = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}$		-	1.7	-	A



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

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