



BYV32E-200P

Dual ultrafast power diode

14 May 2015

Product data sheet

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

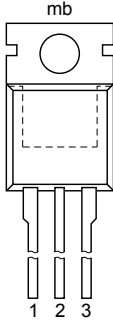
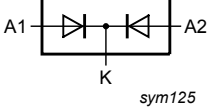
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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_{FSM}	non-repetitive peak forward current	$T_{j(\text{init})} = 25$ °C; $t_p = 8.3$ ms; SIN; per diode; Fig. 4	-	-	137	A
I_{RRM}	repetitive peak reverse current	$t_p = 2$ μ s; $\delta = 0.001$; per diode	-	-	0.2	A
V_{ESD}	electrostatic discharge voltage	HBM; C = 250 pF; R = 1.5 k Ω ; all pins	-	-	8	kV
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. 7	-	18	25	ns
Static characteristics						
V_F	forward voltage	$I_F = 8$ A; $T_j = 150$ °C; Fig. 6	-	0.76	0.85	V



5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1	 <p>TO-220AB (SOT78)</p>	
2	K	cathode		
3	A2	anode 2		

6. Ordering information

Table 3. Ordering information

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

7. Marking

Table 4. Marking codes

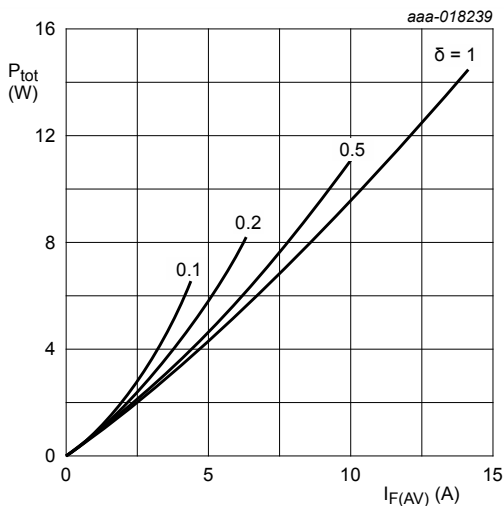
Type number	Marking code
BYV32E-200P	BYV32E-200P

8. Limiting values

Table 5. Limiting values

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

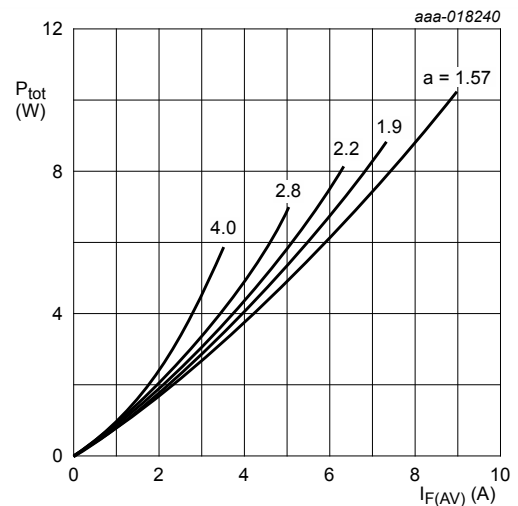
Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	200	V
V_{RWM}	crest working reverse voltage		-	200	V
V_R	reverse voltage	DC	-	200	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 149\text{ }^\circ\text{C}$; Square-wave pulse; Fig. 1; Fig. 2; Fig. 3	-	10	A
$I_{O(AV)}$	average output current	$\delta = 0.5$; $T_{mb} \leq 149\text{ }^\circ\text{C}$; Square-wave pulse	-	20	A
I_{FSM}	non-repetitive peak forward current	SIN; $t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; per diode; Fig. 4	-	125	A
		SIN; $t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; per diode; Fig. 4	-	137	A
I_{RRM}	repetitive peak reverse current	$\delta = 0.001$; $t_p = 2\text{ }\mu\text{s}$; per diode	-	0.2	A
I_{RSM}	non-repetitive peak reverse current	$t_p = 100\text{ }\mu\text{s}$; per diode	-	0.2	A
T_{stg}	storage temperature		-65	175	$^\circ\text{C}$
T_j	junction temperature		-	175	$^\circ\text{C}$
V_{ESD}	electrostatic discharge voltage	HBM; C = 250 pF; R = 1.5 k Ω ; all pins	-	8	kV



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

$$V_o = 0.802\text{ V}; R_s = 0.015\text{ }\Omega$$

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



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

$$V_o = 0.802\text{ V}; R_s = 0.015\text{ }\Omega$$

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

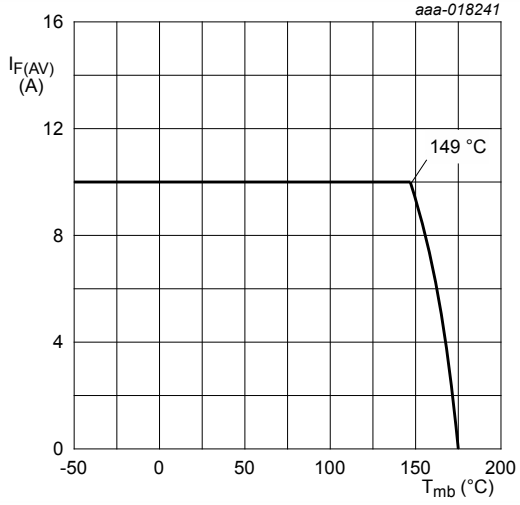


Fig. 3. Forward current as a function of mounting base temperature; maximum values

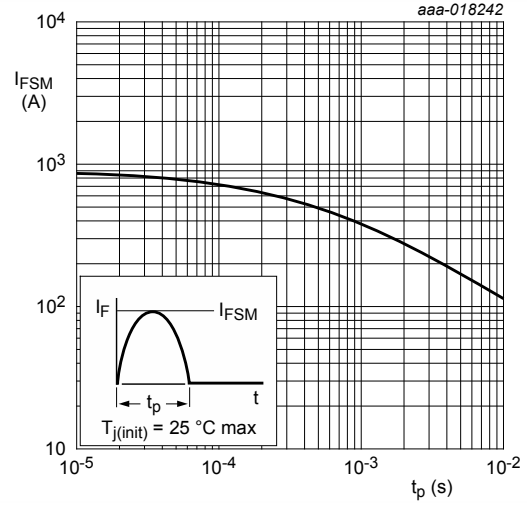


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	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
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W

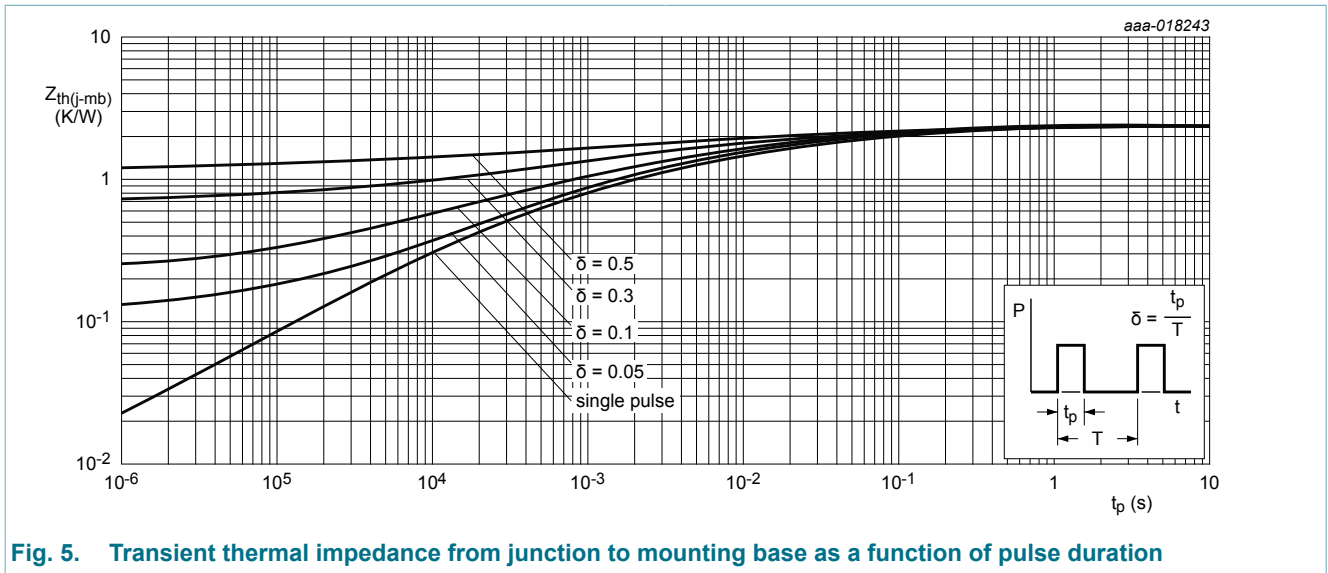
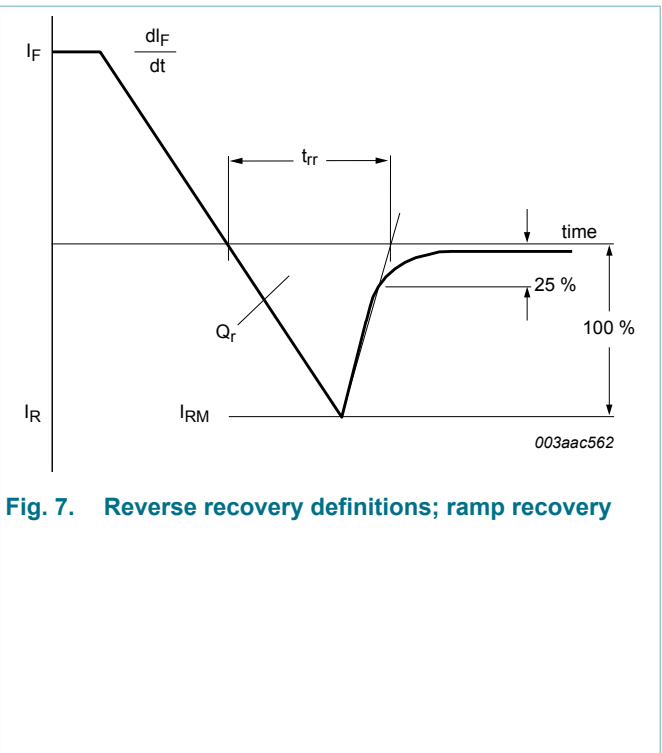
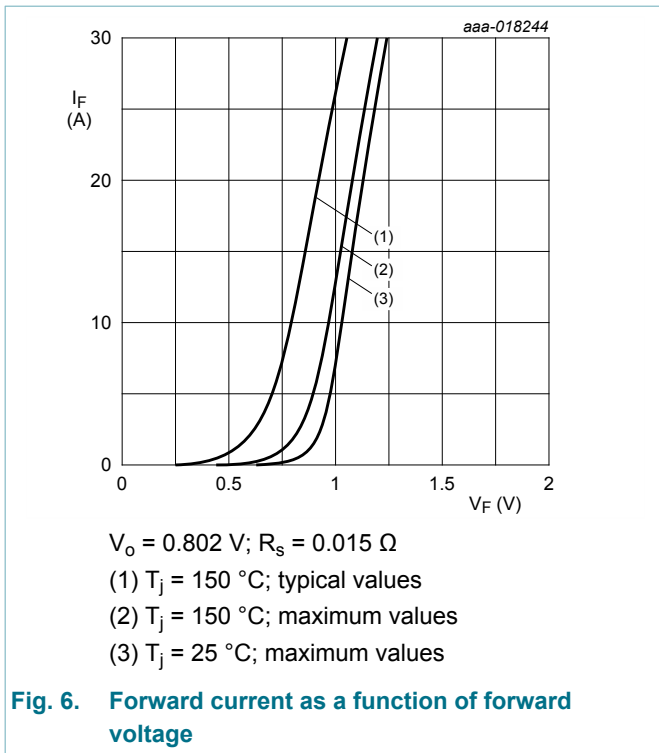


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

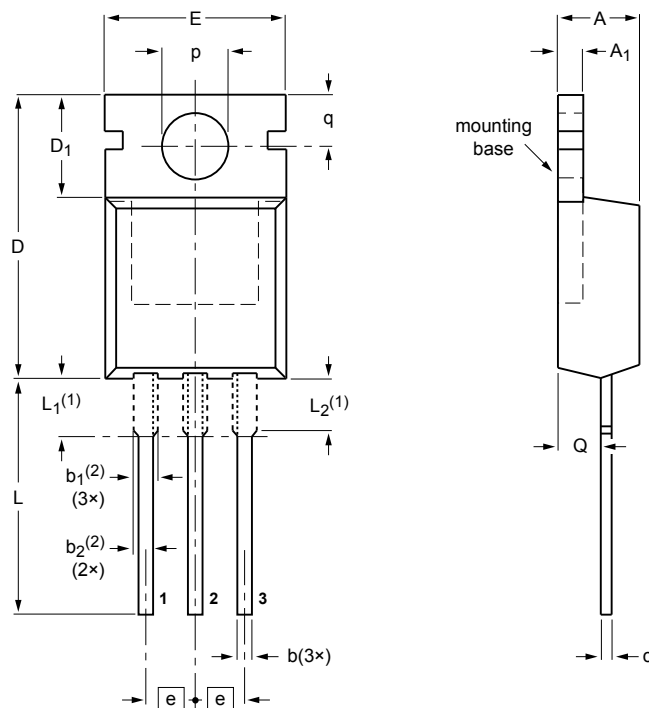
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Dynamic characteristics						
Q _r	recovered charge	I _F = 2 A; V _R = 30 V; dI _F /dt = 20 A/μs; T _j = 25 °C; Fig. 7	-	13.5	-	nC
		I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/μs; T _j = 25 °C; Fig. 7	-	14.5	-	nC
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/μs; T _j = 25 °C; Fig. 7	-	18	25	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	-	1.7	-	A
Static characteristics						
V _F	forward voltage	I _F = 20 A; T _j = 25 °C; Fig. 6	-	1.06	1.15	V
		I _F = 8 A; T _j = 150 °C; Fig. 6	-	0.76	0.85	V
		I _F = 10 A; T _j = 25 °C; Fig. 6	-	0.95	-	V
I _R	reverse current	V _R = 200 V; T _j = 25 °C	-	0.3	5	μA
		V _R = 200 V; T _j = 150 °C	-	70	250	μA



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

- 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

Fig. 8. Package outline TO-220AB (SOT78)

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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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
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