



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

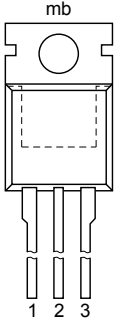
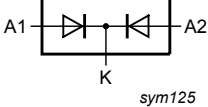
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	-	200	V
$I_{O(AV)}$	average output current	$\delta = 0.5$; $T_{mb} \leq 149\text{ °C}$; Square-wave pulse	-	-	20	A
I_{FSM}	non-repetitive peak forward current	$T_{j(\text{init})} = 25\text{ °C}$; $t_p = 8.3\text{ ms}$; SIN; per diode; Fig. 4	-	-	137	A
I_{RRM}	repetitive peak reverse current	$t_p = 2\text{ }\mu\text{s}$; $\delta = 0.001$; 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	$I_F = 1\text{ A}$; $V_R = 30\text{ V}$; $dI_F/dt = 100\text{ A}/\mu\text{s}$; $T_j = 25\text{ °C}$; Fig. 7	-	18	25	ns
Static characteristics						
V_F	forward voltage	$I_F = 8\text{ A}$; $T_j = 150\text{ °C}$; 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	 TO-220AB (SOT78)	 sym125
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	$\delta = 0.5$; $T_{mb} \leq 149^\circ\text{C}$; Square-wave pulse; Fig. 1; Fig. 2; Fig. 3	-	10	A
$I_{O(AV)}$	average output current	$\delta = 0.5$; $T_{mb} \leq 149^\circ\text{C}$; Square-wave pulse	-	20	A
I_{FSM}	non-repetitive peak forward current	SIN; $t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25^\circ\text{C}$; per diode; Fig. 4	-	125	A
		SIN; $t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25^\circ\text{C}$; 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; $C = 250\text{ pF}$; $R = 1.5\text{ k}\Omega$; all pins	-	8	kV

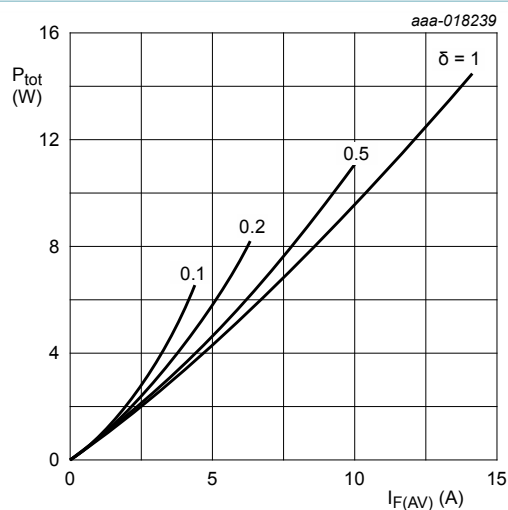


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

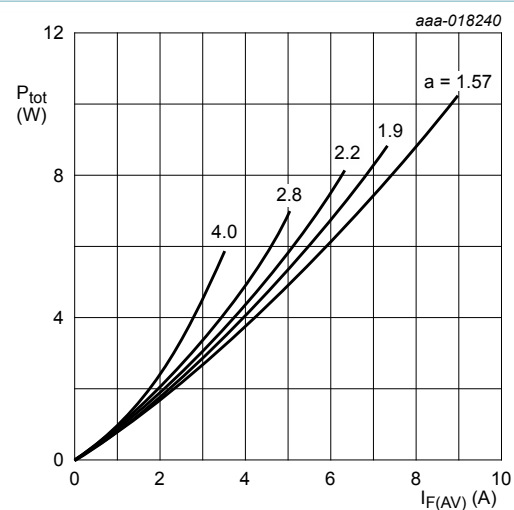


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

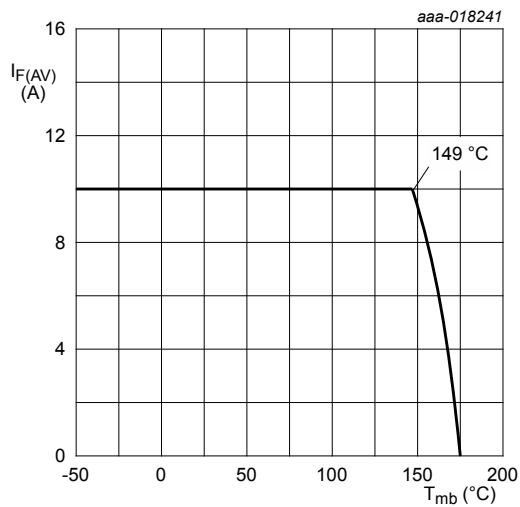


Fig. 3. Forward current as a function of mounting base temperature; maximum values

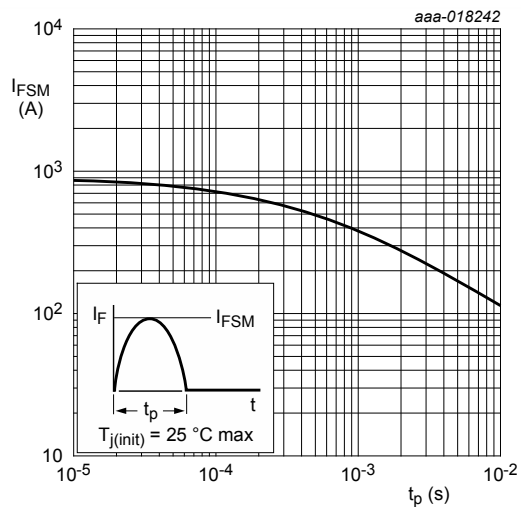


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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

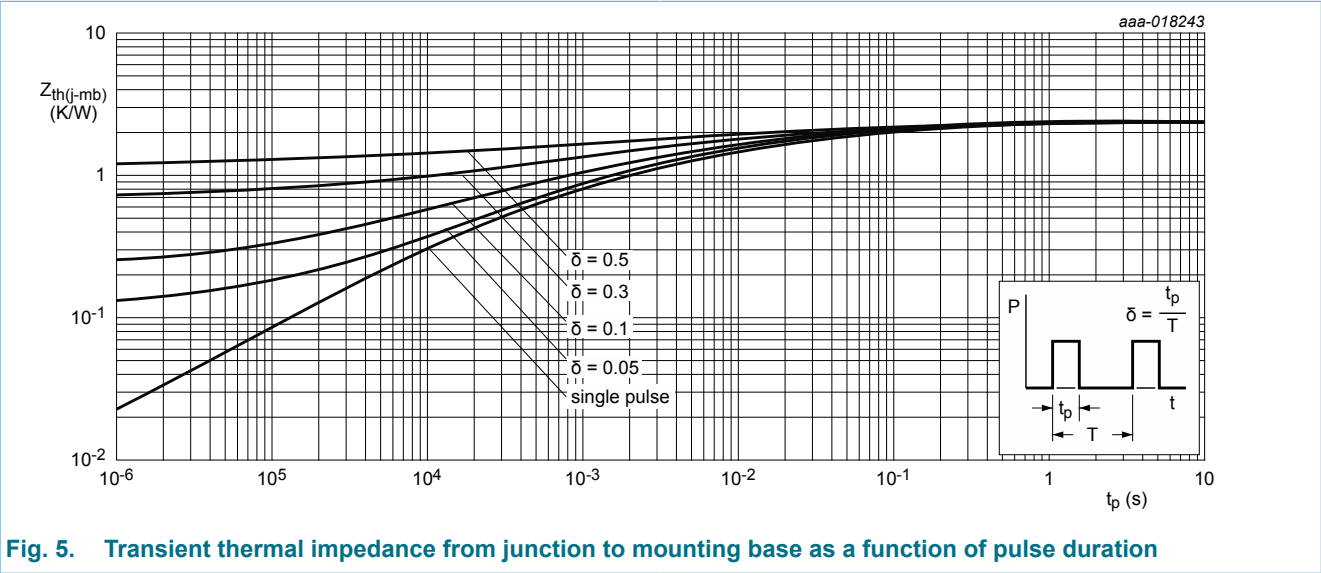
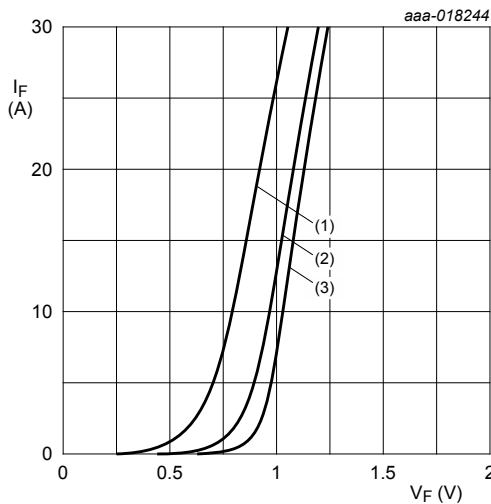


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

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



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

(1) $T_j = 150 \text{ }^\circ\text{C}$; typical values

(2) $T_j = 150 \text{ }^\circ\text{C}$; maximum values

(3) $T_j = 25 \text{ }^\circ\text{C}$; maximum values

Fig. 6. Forward current as a function of forward voltage

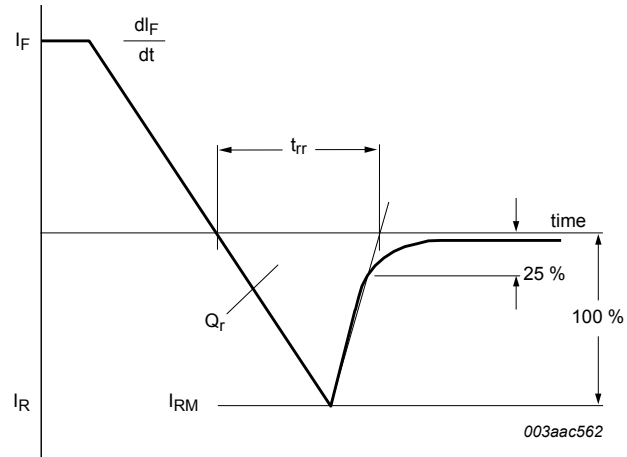


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

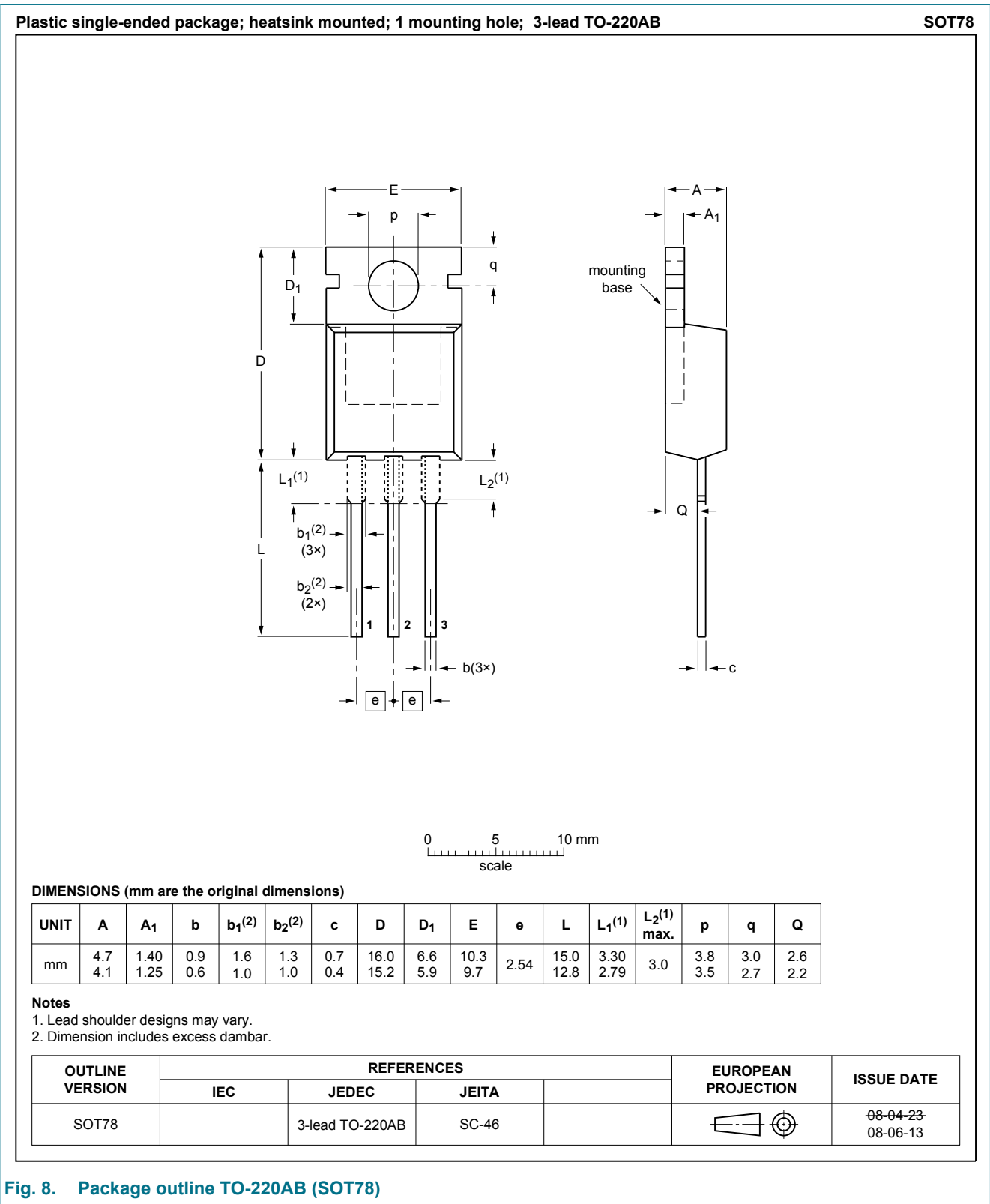


Fig. 8. Package outline TO-220AB (SOT78)

12. Legal information

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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.
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