**Product data sheet** 

# 1. General description

Dual ultrafast power diode in a TO220 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
- Secondary rectification

### 4. Quick reference data

#### Table 1. Quick reference data

Symbol	Parameter	Conditions		Va	lues		Unit
Absolute	maximum rating						
$V_{RRM}$	repetitive peak reverse voltage			3	300		V
$I_{F(AV)}$	average forward current	$\delta$ = 0.5 ; square-wave pulse; T <sub>mb</sub> ≤ 159 °C; per diode; Fig. 1; Fig. 2; Fig. 3		10			А
I <sub>FRM</sub>	repetitive peak forward current	$\delta$ = 0.5 ; t <sub>p</sub> = 25 μs; T <sub>mb</sub> ≤ 159 °C; square-wave pulse; per diode		20			А
I <sub>FSM</sub>	non-repetitive peak forward current	$t_p$ = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode; Fig. 4		220			А
		$t_p$ = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode	242			А	
Symbol	Parameter	Conditions		Min	Тур	Max	Unit
Static ch	aracteristics			'			
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 10 A; T <sub>j</sub> = 25 °C; per diode; <u>Fig. 6</u>		-	-	1.25	V
		I <sub>F</sub> = 10 A; T <sub>j</sub> = 125 °C; per diode; <u>Fig. 6</u>		-	-	1	V
Dynamic	characteristics		1				
t <sub>rr</sub>	reverse recovery time	$I_F = 1 \text{ A}$ ; $V_R = 30 \text{ V}$ ; $dI_F/dt = 100 \text{ A/µs}$ ; $T_j = 25 \text{ °C}$ ; per diode; Fig. 7		-	-	25	ns

# 5. Pinning information

#### **Table 2. Pinning information**

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode		
2	K	cathode		A1
3	A2	anode		K
mb	К	mounting base; connected to cathode		sym125

# 6. Ordering information

**Table 3. Ordering information** 

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BYV32E-300P	TO220	BYV32E-300PQ	Tube	50	TO220E	26-May-2017

# 7. Marking

### **Table 4. Marking codes**

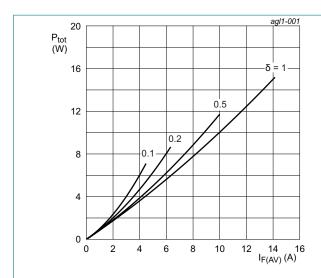
Type number	Marking codes
BYV32E-300P	BYV32E-300P

# 8. Limiting values

#### **Table 5. Limiting values**

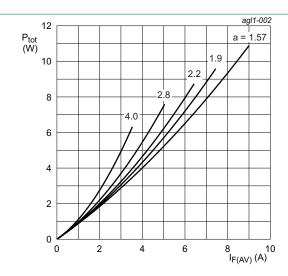
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Values	Unit
$V_{RRM}$	repetitive peak reverse voltage		300	V
$V_{RWM}$	crest working reverse voltage		300	V
$V_R$	reverse voltage	DC	300	V
$I_{F(AV)}$	average forward current	$δ = 0.5$ ; square-wave pulse; $T_{mb} \le 159$ °C; per diode; Fig. 1; Fig. 2; Fig. 3	10	А
I <sub>FRM</sub>	repetitive peak forward current	$\delta$ = 0.5 ; t <sub>p</sub> = 25 μs; T <sub>mb</sub> ≤ 159 °C; square-wave pulse; per diode	20	А
I <sub>O(AV)</sub>	average output current	$\delta$ = 0.5 ; T <sub>mb</sub> ≤ 157 °C; square-wave pulse; both diodes conducting	20	А
I <sub>FSM</sub>	non-repetitive peak forward current	$t_p$ = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode; Fig. 4	220	А
		$t_p$ = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode	242	А
$T_{\text{stg}}$	storage temperature		-65 to 175	°C
T <sub>j</sub>	junction temperature		175	°C



 $\begin{aligned} I_{F(AV)} &= I_{F(RMS)} \times \sqrt{\delta} \\ V_o &= 0.836 \text{ V; } R_s = 0.0168 \text{ } \Omega \end{aligned}$ 

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



a = form factor =  $I_{F(RMS)}/I_{F(AV)}$  $V_o$  = 0.836 V;  $R_s$  = 0.0168  $\Omega$ 

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

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### **Dual ultrafast power diode**

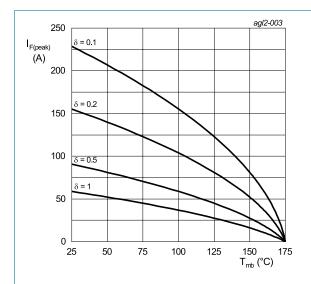


Fig. 3. Forward current as a function of mounting base temperature; maximum values; per diode

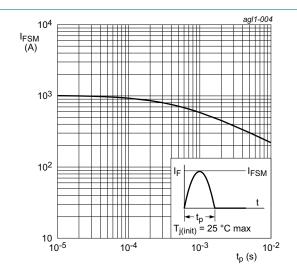


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

### 9. Thermal characteristics

**Table 6. Thermal characteristics** 

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
R <sub>th(j-mb)</sub>	thermal resistance from junction to	with heatsink compound; per diode; Fig. 5	-	-	1.4	K/W
	mounting base	with heatsink compound; both diodes conducting; Fig. 5	-	-	0.75	K/W
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient free air	in free air	-	60	-	K/W

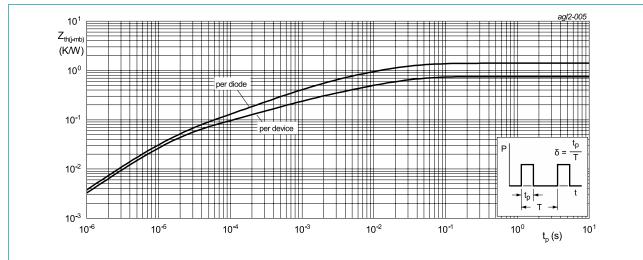
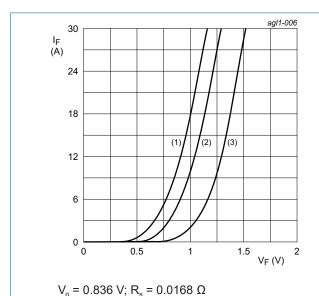


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

## 10. Characteristics

Table 7 Characteristics

Symbol	Parameter	Conditions	Mir	т Тур	Max	Unit
Static cha	aracteristics					
V <sub>F</sub> forward	forward current	I <sub>F</sub> = 10 A; T <sub>j</sub> = 25 °C; per diode; <u>Fig. 6</u>	-	-	1.25	V
		I <sub>F</sub> = 10 A; T <sub>j</sub> = 125 °C; per diode; <u>Fig. 6</u>	-	-	1	V
I <sub>R</sub>	reverse current	$V_R = 300 \text{ V}; T_j = 25 ^{\circ}\text{C}; \text{ per diode}$	-	-	20	μA
		V <sub>R</sub> = 300 V; T <sub>j</sub> = 125 °C; per diode	-	-	300	μA
Dynamic	characteristics					
$Q_r$	reverse charge	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A/}\mu\text{s};$ $T_j = 25 \text{ °C}; \text{ per diode}; Fig. 7$	-	9	-	nC
t <sub>rr</sub>	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 50 \text{ A}/\mu\text{s};$ $T_j = 25 \text{ °C}; \text{ per diode}; Fig. 7$	-	-	35	ns
		$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A/}\mu\text{s};$ $T_j = 25 \text{ °C}; \text{ per diode}; Fig. 7$	-	-	25	ns
		$I_F = 10 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s};$ $T_j = 25 \text{ °C}; \text{ per diode}; Fig. 7$	-	25	-	ns
		$I_F = 10 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s};$ $T_j = 125 \text{ °C}; per diode; Fig. 7$	-	33	-	ns
I <sub>RM</sub>	peak reverse recovery current	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 50 \text{ A/}\mu\text{s};$ $T_j = 25 \text{ °C}; \text{ per diode}; Fig. 7$	-	0.7	-	А
		$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A/}\mu\text{s};$ $T_j = 25 \text{ °C}; \text{ per diode}; Fig. 7$	-	1.1	-	А
		$I_F = 10 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s};$ $T_j = 25 ^{\circ}\text{C}; \text{ per diode}; \underline{\text{Fig. 7}}$	-	2.8	-	А
		$I_F = 10 \text{ A}$ ; $V_R = 200 \text{ V}$ ; $dI_F/dt = 200 \text{ A}/\mu\text{s}$ ; $T_i = 125 \text{ °C}$ ; per diode; $Fig. 7$	-	-	8	А



(1) T<sub>j</sub> = 125 °C; typical values (2) T<sub>j</sub> = 125 °C; maximum values (3) T<sub>i</sub> = 25 °C; maximum values

Fig. 6. Forward current as a function of forward voltage; per diode

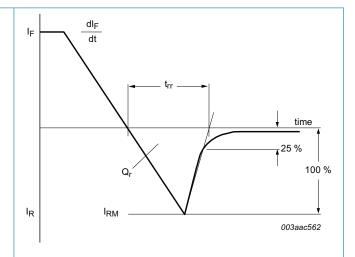
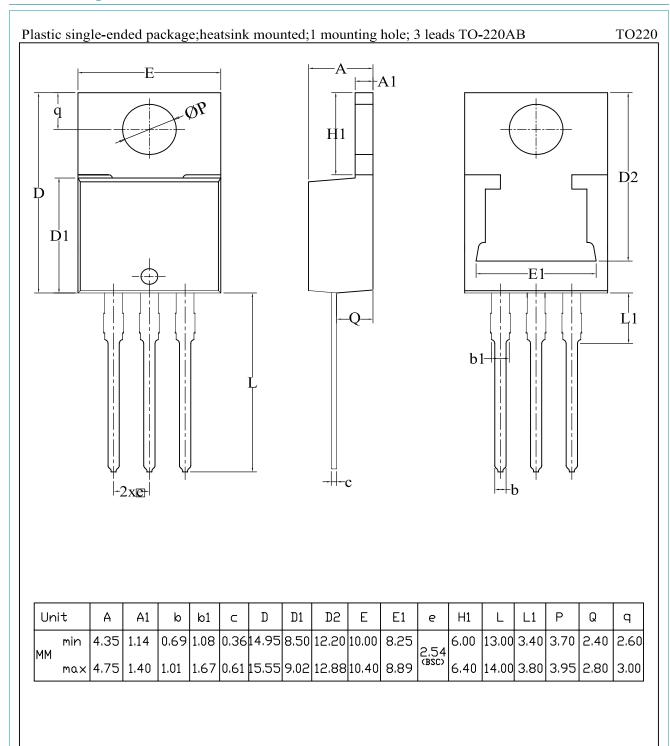


Fig. 7. Reverse recovery definitions; ramp recovery

# 11. Package outline



### 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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