BYV32E-300P

Dual ultrafast power diode

Rev.01 13 March 2019 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

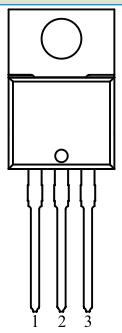
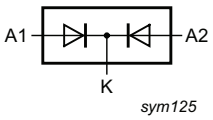
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values				Unit
Absolute maximum rating							
V_{RRM}	repetitive peak reverse voltage		300				V
$I_{F(AV)}$	average forward current	δ = 0.5 ; square-wave pulse; $T_{mb} \leq 159$ °C; per diode; Fig. 1; Fig. 2; Fig. 3	10				A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; $T_{mb} \leq 159$ °C; square-wave pulse; per diode	20				A
I_{FSM}	non-repetitive peak forward current	t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode; Fig. 4	220				A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode	242				A
Symbol	**Parameter**	**Conditions**		**Min**	**Typ**	**Max**	**Unit**
Static characteristics							
V_F	forward voltage	I_F = 10 A; T_j = 25 °C; per diode; Fig. 6		-	-	1.25	V
		I_F = 10 A; T_j = 125 °C; per diode; Fig. 6		-	-	1	V
Dynamic characteristics							
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt = 100 A/µs; T_j = 25 °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		
3	A2	anode		
mb	K	mounting base; connected to cathode		

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

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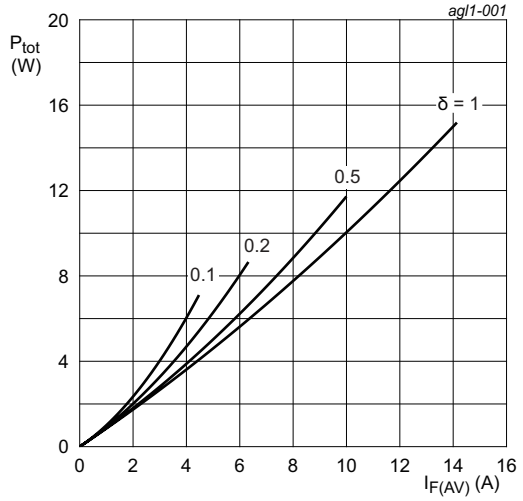
8. Limiting values

Table 5. Limiting values

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

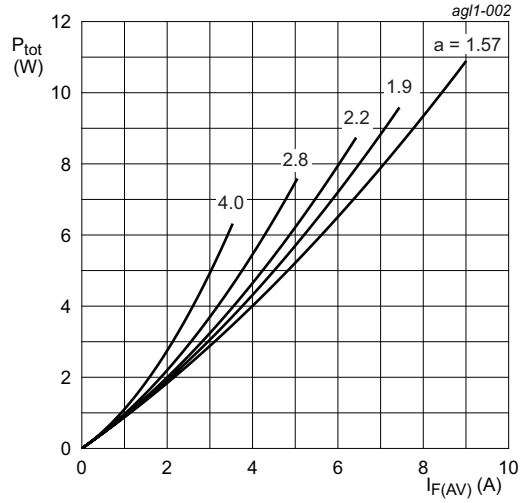
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		300	V
V_{RWM}	crest working reverse voltage		300	V
V_R	reverse voltage	DC	300	V
$I_{F(AV)}$	average forward current	δ = 0.5 ; square-wave pulse; $T_{mb} \leq 159$ °C; per diode; Fig. 1; Fig. 2; Fig. 3	10	A
I_{FRM}	repetitive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



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

V_o = 0.836 V; R_s = 0.0168 Ω

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 Ω

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

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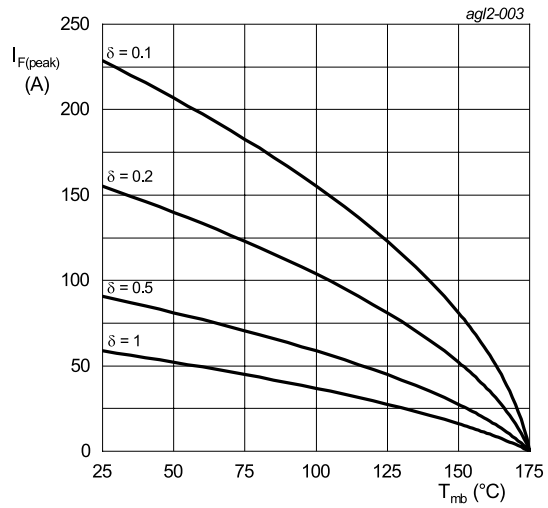

Fig. 3. Forward current as a function of mounting base temperature; maximum values; per diode

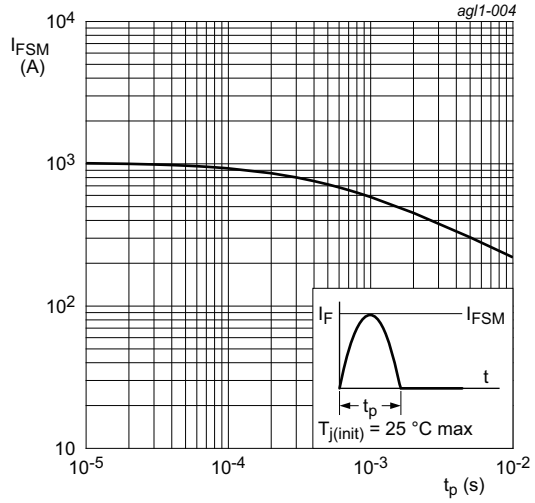

Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

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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; per diode; Fig. 5		-	-	1.4	K/W
		with heatsink compound; both diodes conducting; Fig. 5		-	-	0.75	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

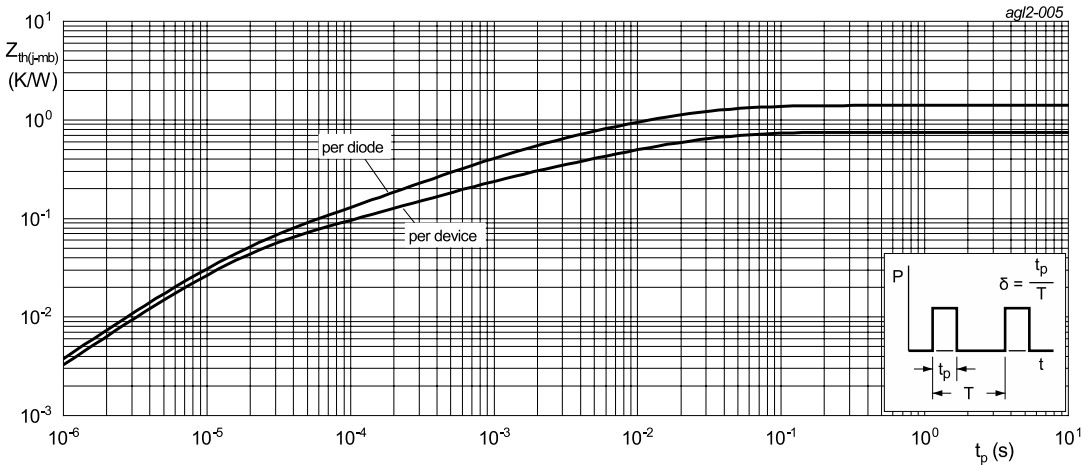

Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

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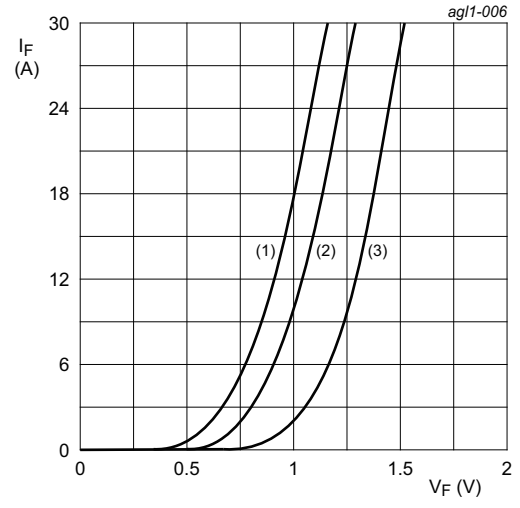
10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V_F	forward current	I_F = 10 A; T_j = 25 °C; per diode; Fig. 6		-	-	1.25	V
		I_F = 10 A; T_j = 125 °C; per diode; Fig. 6		-	-	1	V
I_R	reverse current	V_R = 300 V; T_j = 25 °C; per diode		-	-	20	µA
		V_R = 300 V; T_j = 125 °C; per diode		-	-	300	µA
Dynamic characteristics							
Q_r	reverse charge	I_F = 1 A; V_R = 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; per diode; Fig. 7		-	9	-	nC
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt = 50 A/µs; T_j = 25 °C; per diode; Fig. 7		-	-	35	ns
		I_F = 1 A; V_R = 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; per diode; Fig. 7		-	-	25	ns
		I_F = 10 A; V_R = 200 V; dI_F/dt = 200 A/µs; T_j = 25 °C; per diode; Fig. 7		-	25	-	ns
		I_F = 10 A; V_R = 200 V; dI_F/dt = 200 A/µs; T_j = 125 °C; per diode; Fig. 7		-	33	-	ns
I_{RM}	peak reverse recovery current	I_F = 1 A; V_R = 30 V; dI_F/dt = 50 A/µs; T_j = 25 °C; per diode; Fig. 7		-	0.7	-	A
		I_F = 1 A; V_R = 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; per diode; Fig. 7		-	1.1	-	A
		I_F = 10 A; V_R = 200 V; dI_F/dt = 200 A/µs; T_j = 25 °C; per diode; Fig. 7		-	2.8	-	A
		I_F = 10 A; V_R = 200 V; dI_F/dt = 200 A/µs; T_j = 125 °C; per diode; Fig. 7		-	-	8	A



V_o = 0.836 V; R_s = 0.0168 Ω
(1) T_j = 125 °C; typical values
(2) T_j = 125 °C; maximum values
(3) T_j = 25 °C; maximum values

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

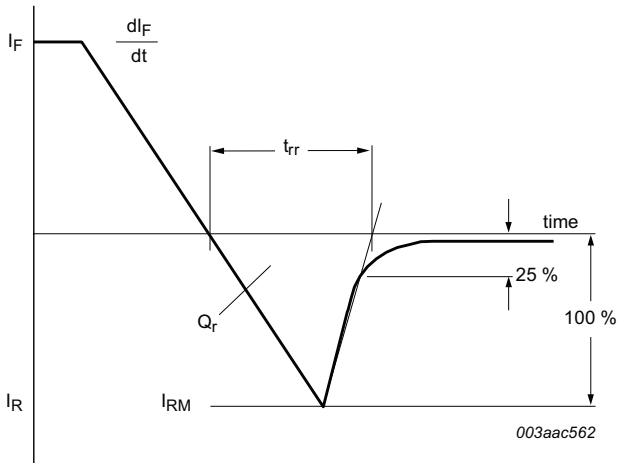


Fig. 7. Reverse recovery definitions; ramp recovery

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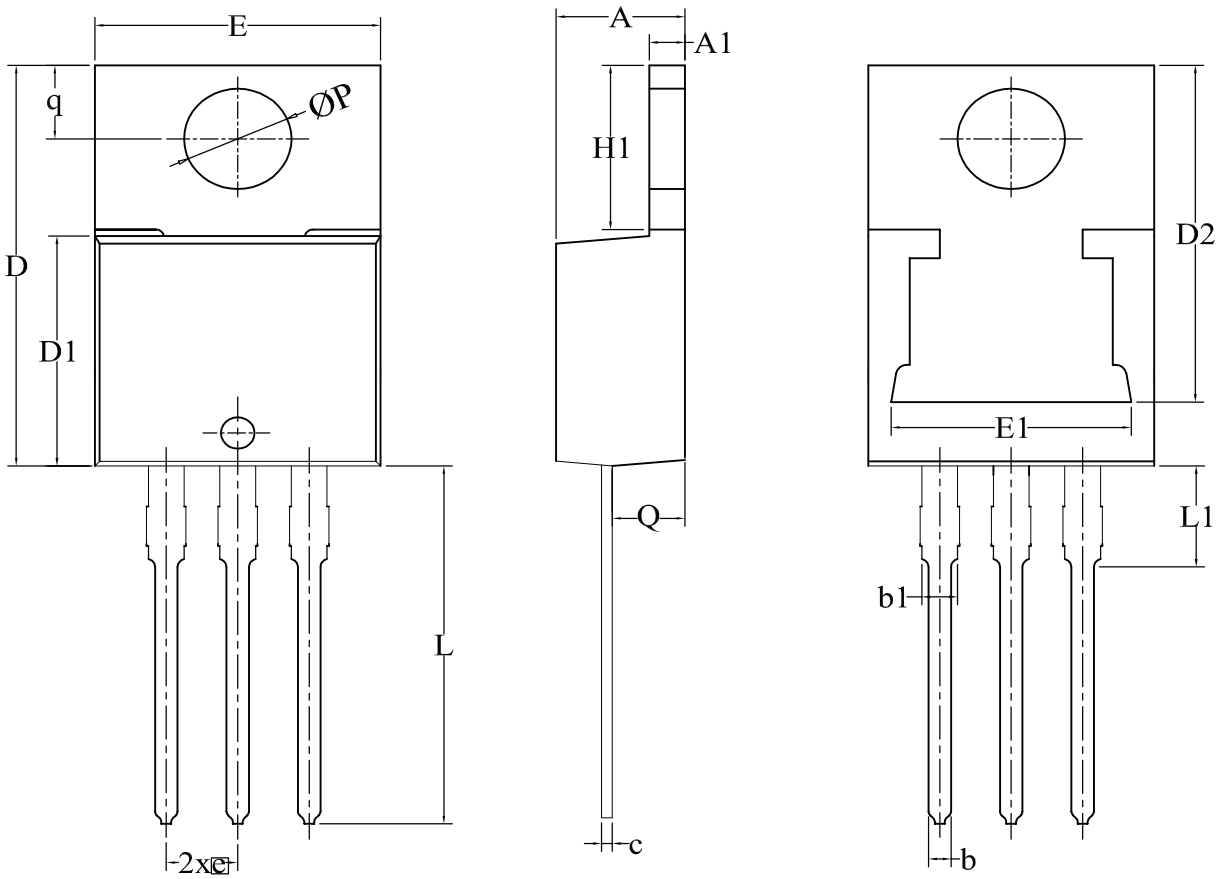
11. Package outline

Plastic single-ended package;heatsink mounted;1 mounting hole; 3 leads TO-220AB TO220



Unit		A	A1	b	b1	c	D	D1	D2	E	E1	e	H1	L	L1	P	Q	q
MM	min	4.35	1.14	0.69	1.08	0.36	14.95	8.50	12.20	10.00	8.25	2.54 (BSC)	6.00	13.00	3.40	3.70	2.40	2.60
	max	4.75	1.40	1.01	1.67	0.61	15.55	9.02	12.88	10.40	8.89		6.40	14.00	3.80	3.95	2.80	3.00

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