

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

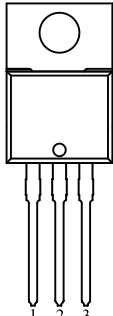
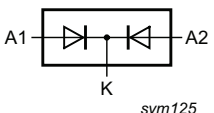
4. Quick reference data

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} ≤ 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} ≤ 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

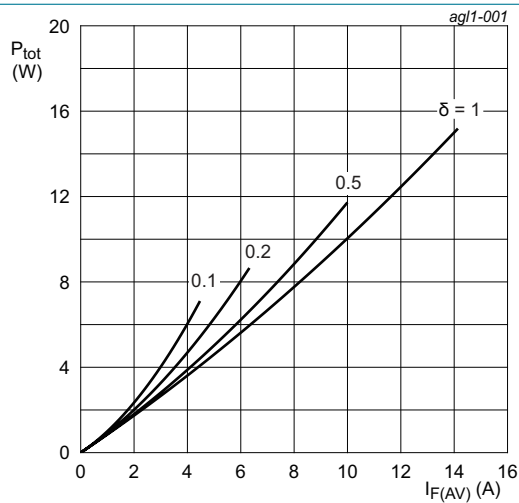
Type number	Marking codes
BYV32E-300P	BYV32E-300P

8. Limiting values

Table 5. Limiting values

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

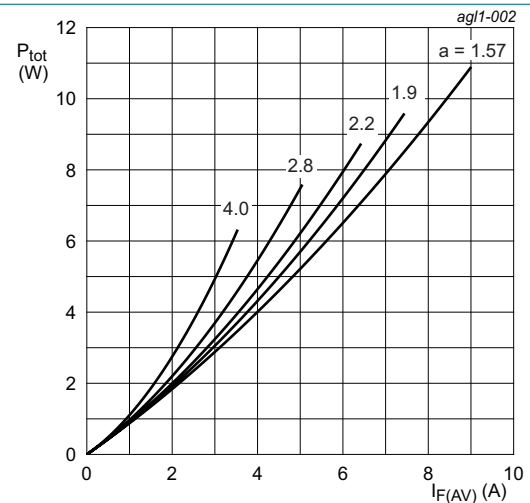
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		300	V
V_{RWM}	crest working reverse voltage		300	V
V_R	reverse voltage	DC	300	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 159\text{ }^{\circ}\text{C}$; per diode; Fig. 1 ; Fig. 2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



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

$$V_o = 0.836\text{ V}; R_s = 0.0168\text{ }\Omega$$

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



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

$$V_o = 0.836\text{ V}; R_s = 0.0168\text{ }\Omega$$

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

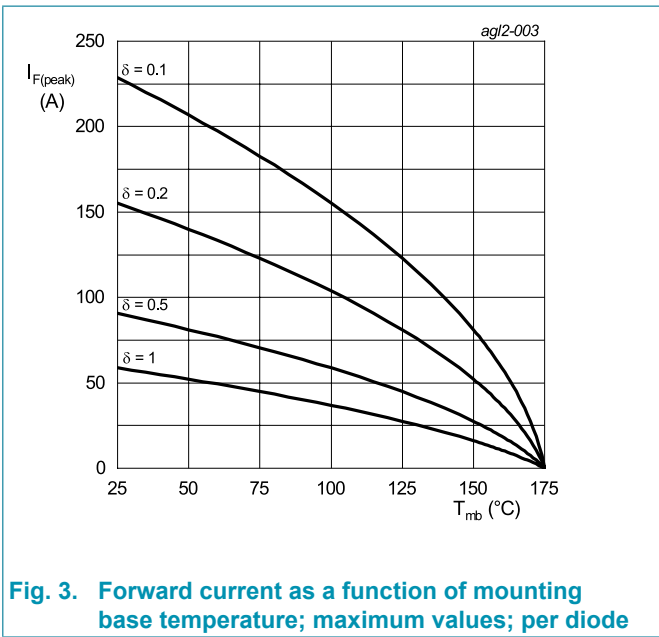


Fig. 3. Forward current as a function of mounting base temperature; maximum values; per diode

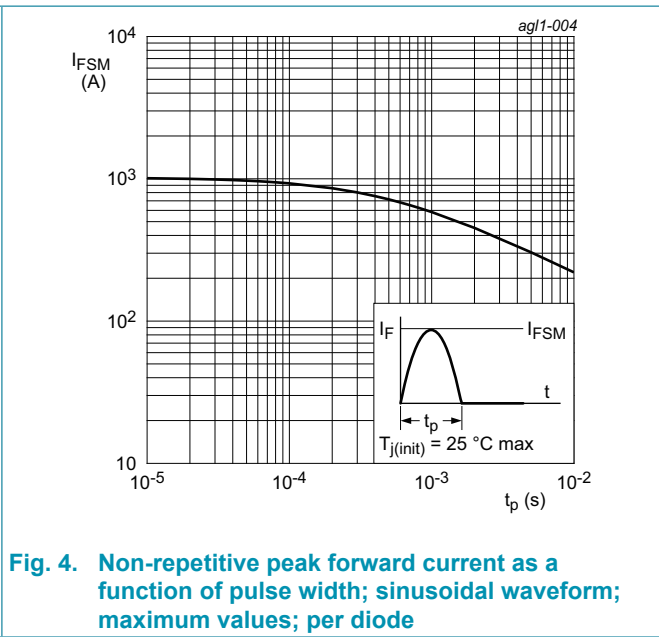


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	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

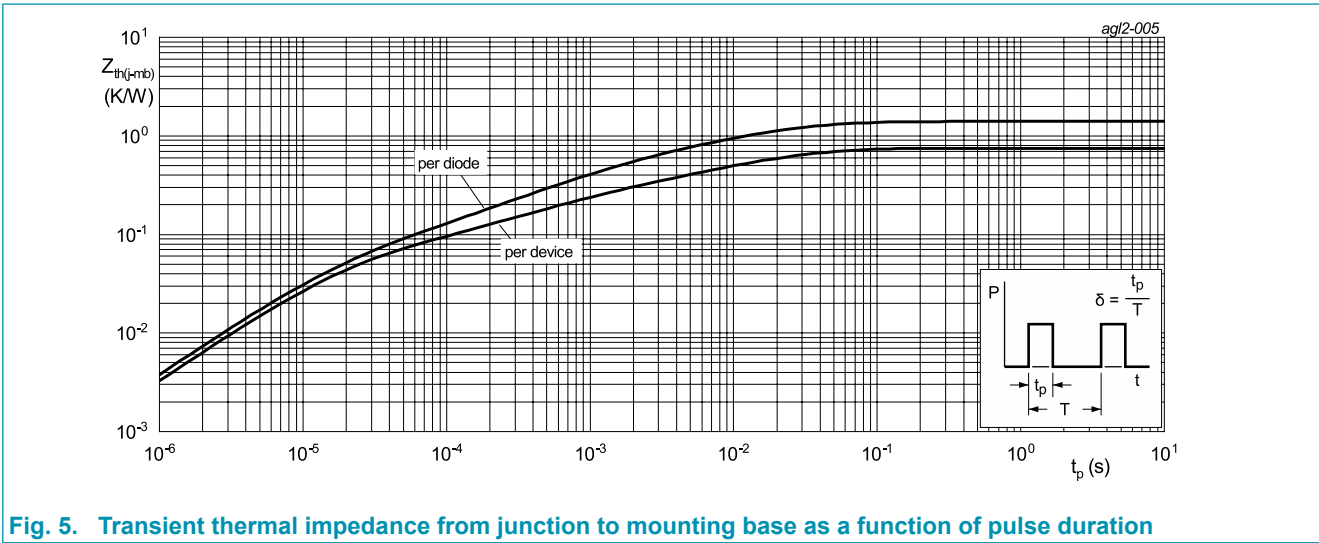
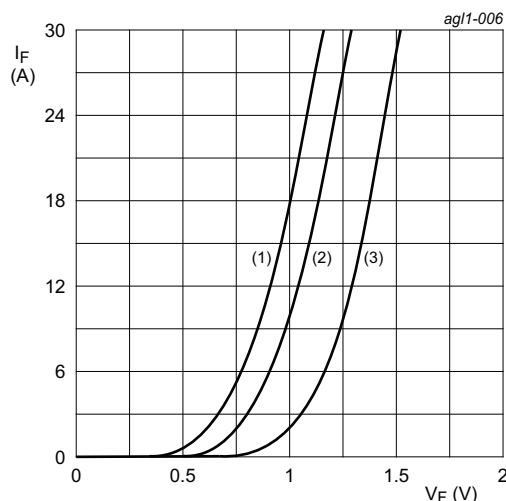


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

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



$V_o = 0.836\text{ V}$; $R_s = 0.0168\text{ }\Omega$

(1) $T_j = 125\text{ °C}$; typical values

(2) $T_j = 125\text{ °C}$; maximum values

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

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

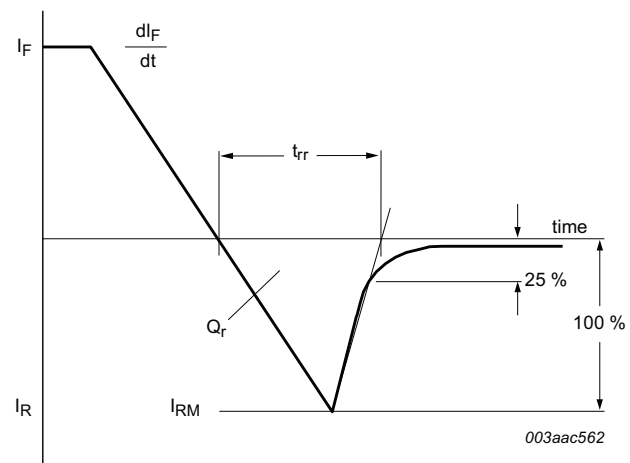
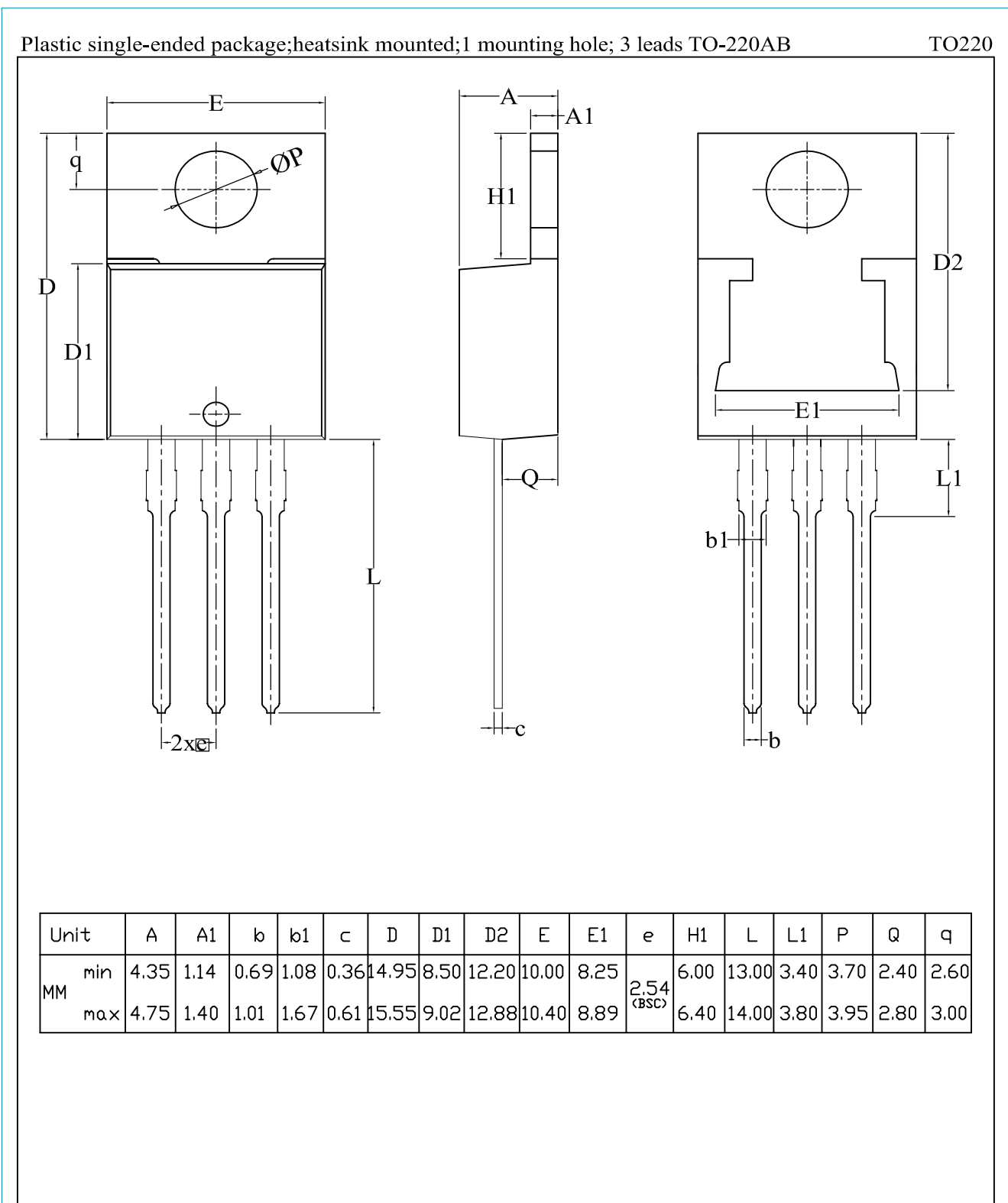


Fig. 7. Reverse recovery definitions; ramp recovery

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

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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