

## 1. General description

Ultrafast power diode in 2-leads TO-220F plastic package.

## 2. Features and benefits

- Low forward voltage drop
- Low leakage current
- Soft reverse recovery characteristics
- High thermal cycling performance

## 3. Applications

- Home appliance power supply
- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)

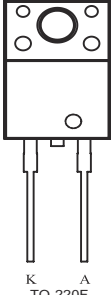

## 4. Quick reference data

Table 1. Quick reference data

| Symbol                         | Parameter                           | Conditions   | Values |      |     | Unit |
|--------------------------------|-------------------------------------|--|--------|------|-----|------|
| <b>Absolute maximum rating</b> |                                     |  |        |      |     |      |
| $V_{RRM}$                      | repetitive peak reverse voltage     |  | 600    |      |     | V    |
| $I_{F(AV)}$                    | average forward current             | $\delta = 0.5$ ; square-wave pulse; $T_h \leq 72$ °C; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> | 9      |      |     | A    |
| $I_{FRM}$                      | repetitive peak forward current     | $\delta = 0.5$ ; $t_p = 25$ $\mu$ s; $T_h \leq 72$ °C; square-wave pulse   | 18     |      |     | A    |
| $I_{FSM}$                      | non-repetitive peak forward current | $t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; <a href="#">Fig. 4</a>  | 120    |      |     | A    |
|                                |                                     | $t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse;  | 132    |      |     | A    |
| Symbol                         | Parameter                           | Conditions   | Min    | Typ  | Max | Unit |
| <b>Static characteristics</b>  |                                     |  |        |      |     |      |
| $V_F$                          | forward voltage                     | $I_F = 8$ A; $T_j = 25$ °C; <a href="#">Fig. 6</a>   | -      | 1.05 | 1.3 | V    |
|                                |                                     | $I_F = 8$ A; $T_j = 150$ °C; <a href="#">Fig. 6</a>  | -      | 0.9  | 1.1 | V    |
| <b>Dynamic characteristics</b> |                                     |  |        |      |     |      |
| $t_{rr}$                       | reverse recovery time               | $I_F = 1$ A; $V_R = 30$ V; $di_F/dt = 100$ A/ $\mu$ s; $T_j = 25$ °C; <a href="#">Fig. 7</a>                                   | -      | 40   | 75  | ns   |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description             | Simplified outline  | Graphic symbol   |
|-----|--------|-------------------------|---|--|
| 1   | K      | cathode                 |  <p style="text-align: center;">K      A<br/>TO-220F</p> |  <p style="text-align: center;">001aaa020</p> |
| 2   | A      | anode                   |   |  |
| mb  | n.c.   | mounting base; isolated |   |  |

## 6. Ordering information

Table 3. Ordering information

| Type number | Package |   |         |
|-------------|---------|---|---------|
|             | Name    | Description   | Version |
| BYV29X-600P | TO-220F | Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220 'full pack' | TO-220F |

## 7. Marking

Table 4. Marking codes

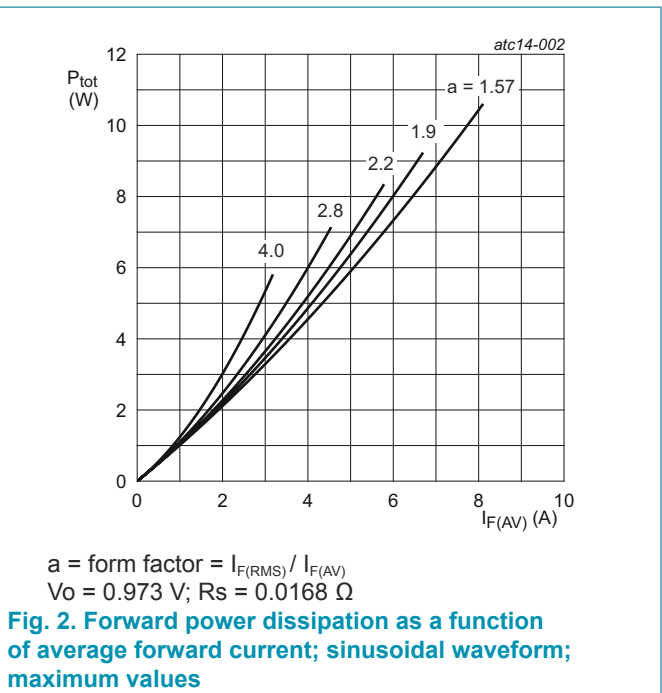
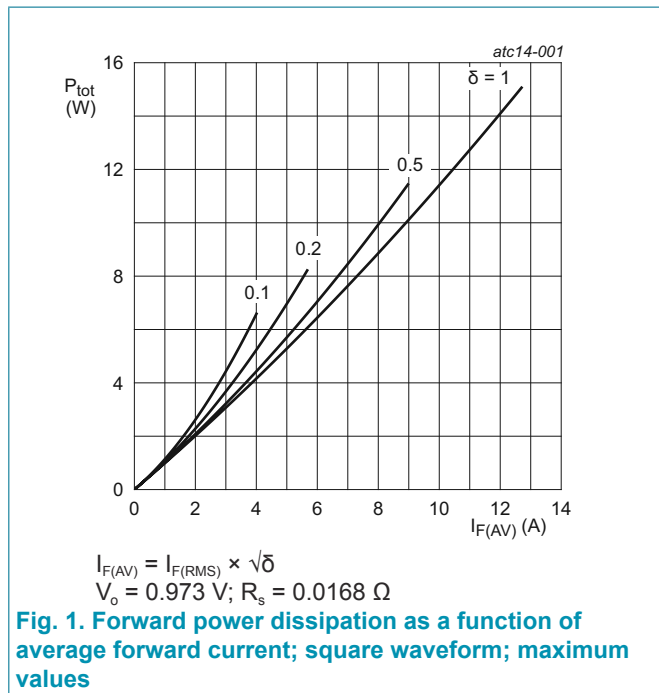
| Type number | Marking codes |
|-------------|---------------|
| BYV29X-600P | BYV29X-600P   |

## 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     |   | 600        | V    |
| $V_{RWM}$   | crest working reverse voltage       |   | 600        | V    |
| $V_R$       | reverse voltage                     | DC  | 600        | V    |
| $I_{F(AV)}$ | average forward current             | $\delta = 0.5$ ; square-wave pulse; $T_h \leq 72$ °C;<br><a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> | 9          | A    |
| $I_{FRM}$   | repetitive peak forward current     | $\delta = 0.5$ ; $t_p = 25$ $\mu$ s; $T_h \leq 72$ °C;<br>square-wave pulse   | 18         | A    |
| $I_{FSM}$   | non-repetitive peak forward current | $t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse;<br><a href="#">Fig. 4</a>  | 120        | A    |
|             |                                     | $t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse;   | 132        | A    |
| $T_{stg}$   | storage temperature                 |   | -55 to 175 | °C   |
| $T_j$       | junction temperature                |   | 175        | °C   |



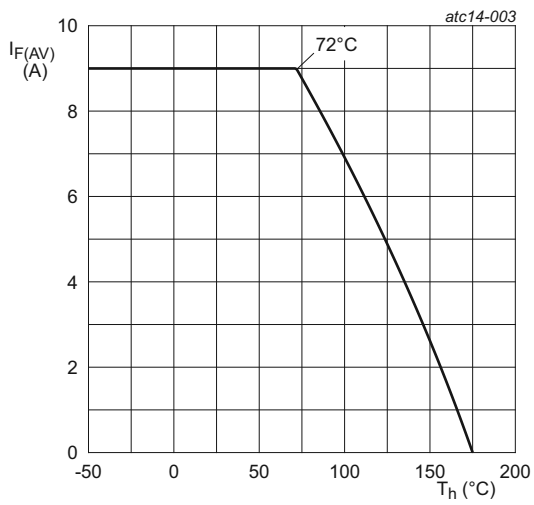


Fig. 3. Forward current as a function of heatsink temperature; maximum values

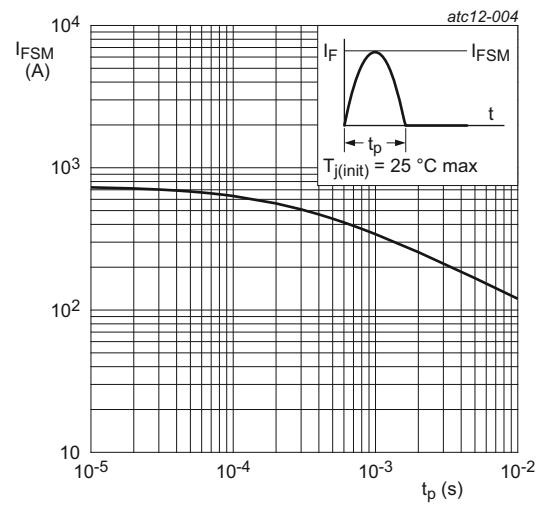


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

## 9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol        | Parameter  | Conditions             | Min | Typ | Max | Unit |
|---------------|--|------------------------|-----|-----|-----|------|
| $R_{th(j-h)}$ | thermal resistance from junction to heatsink         | <a href="#">Fig. 5</a> | -   | -   | 9   | K/W  |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient free air | in free air            | -   | 60  | -   | K/W  |

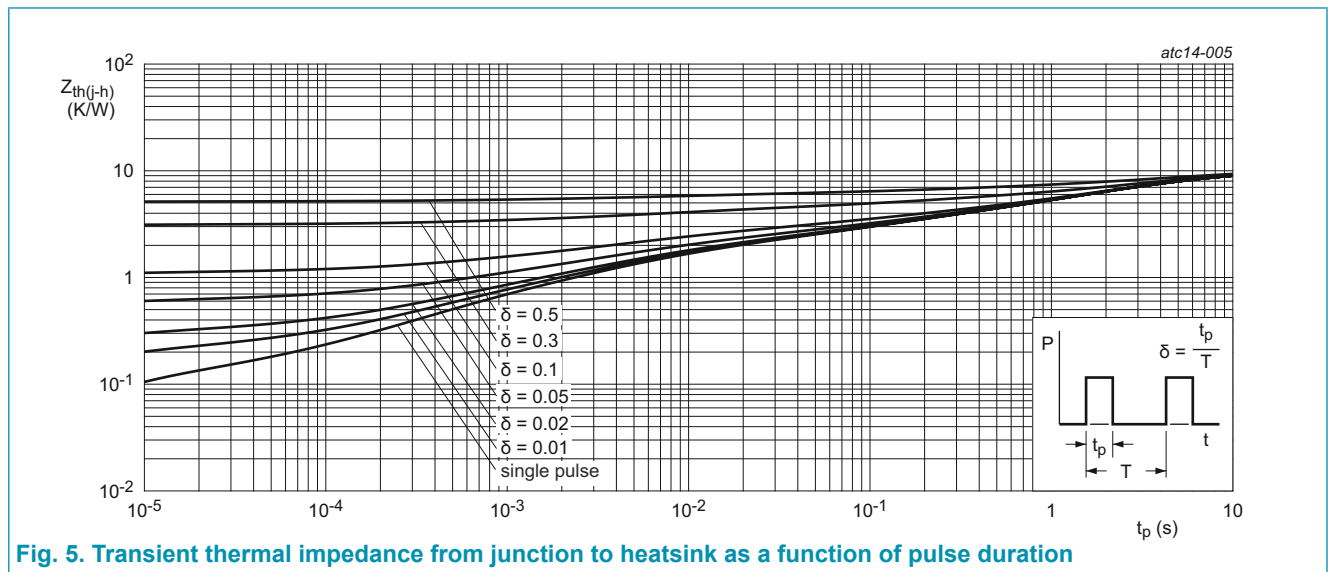


Fig. 5. Transient thermal impedance from junction to heatsink as a function of pulse duration

## 10. Isolation characteristics

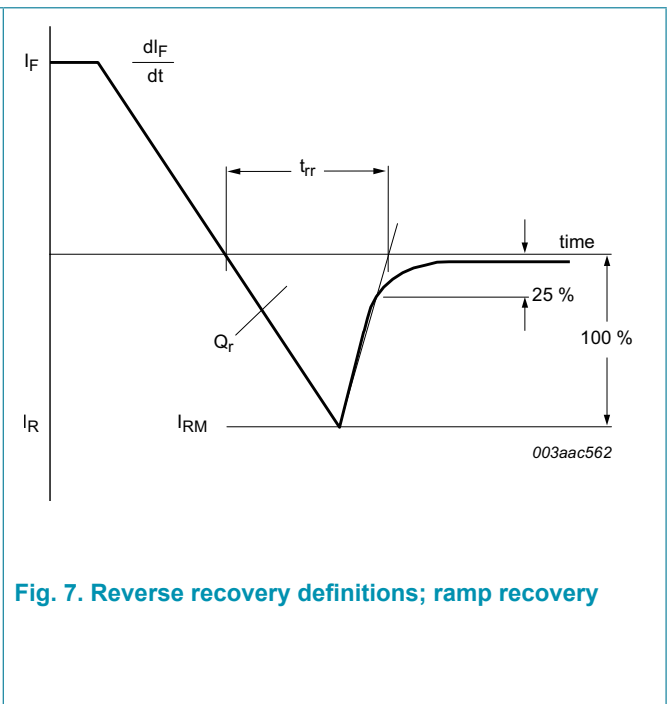
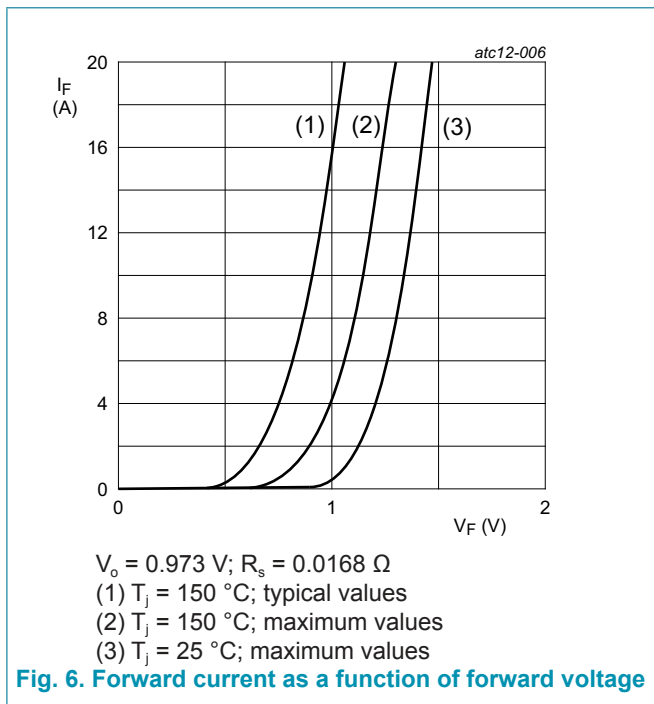
Table 6. Isolation characteristics

| Symbol          | Parameter             | Conditions  | Min | Typ | Max  | Unit |
|-----------------|-----------------------|---|-----|-----|------|------|
| $V_{isol(RMS)}$ | RMS isolation voltage | 50 Hz $\leq$ f $\leq$ 60 Hz; RH $\leq$ 65 %; from all pins to external heatsink; sinusoidal waveform; clean and dust free | -   | -   | 2500 | V    |
| $C_{isol}$      | isolation capacitance | from cathode to external heatsink   | -   | 10  | -    | PF   |

### 11. Characteristics

Table 7. Characteristics

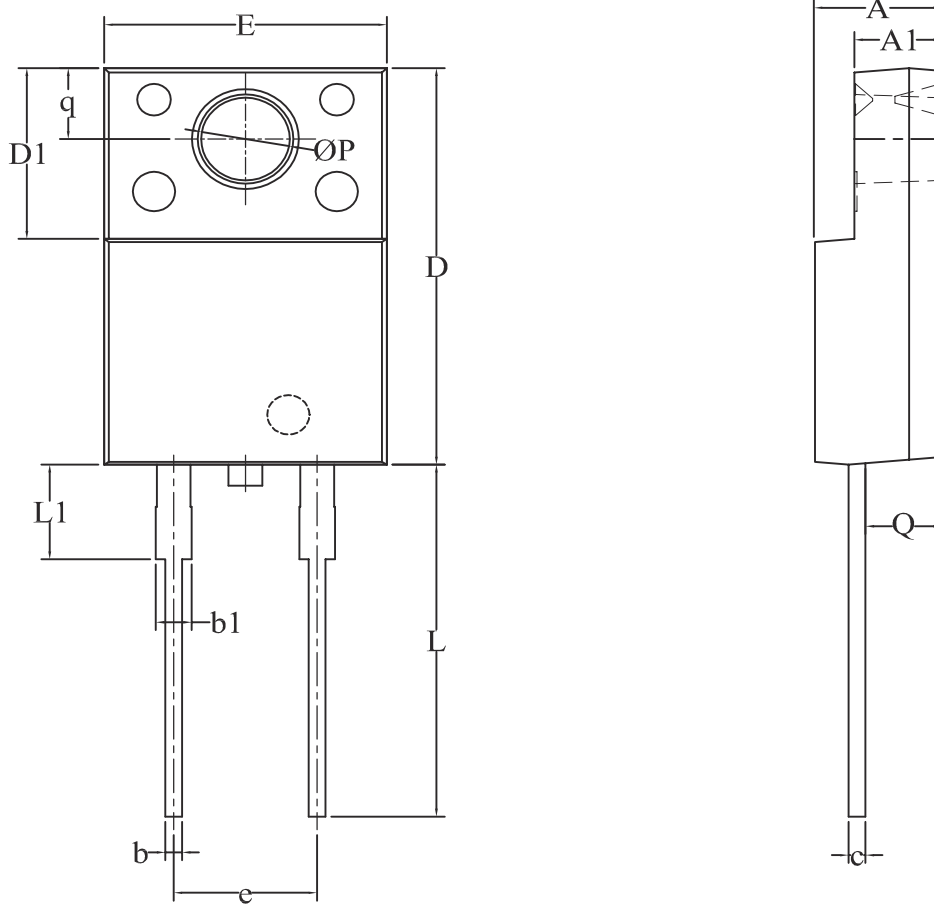
| Symbol                         | Parameter                     | Conditions  | Min | Typ  | Max | Unit |
|--------------------------------|-------------------------------|---|-----|------|-----|------|
| <b>Static characteristics</b>  |                               |   |     |      |     |      |
| V <sub>F</sub>                 | forward current               | I <sub>F</sub> = 8 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>  | -   | 1.05 | 1.3 | V    |
|                                |                               | I <sub>F</sub> = 8 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 6</a>   | -   | 0.9  | 1.1 | V    |
| I <sub>R</sub>                 | reverse current               | V <sub>R</sub> = 600 V; T <sub>j</sub> = 25 °C  | -   | -    | 10  | μA   |
|                                |                               | V <sub>R</sub> = 600 V; T <sub>j</sub> = 150 °C   | -   | -    | 0.4 | mA   |
| <b>Dynamic characteristics</b> |                               |   |     |      |     |      |
| Q <sub>r</sub>                 | reverse charge                | I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a> | -   | 55   | -   | nC   |
| t <sub>rr</sub>                | reverse recovery time         | I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a> | -   | 40   | 75  | ns   |
| I <sub>RM</sub>                | peak reverse recovery current | I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 50 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>  | -   | 1.9  | -   | A    |
|                                |                               | I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a> | -   | 2.8  | -   | A    |



## 12. Package outline

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2 leads TO-220 'full pack'

TO220F-2L



| Unit | A   | A1   | b    | b1   | c    | D    | D1    | E    | e     | L             | L1   | P    | Q    | q    |
|------|-----|------|------|------|------|------|-------|------|-------|---------------|------|------|------|------|
| MM   | min | 4.40 | 3.00 | 0.50 | 1.10 | 0.50 | 14.90 | 6.30 | 9.85  | 12.85         | 4.35 | 3.00 | 2.50 | 2.55 |
|      | max | 4.70 | 3.20 | 0.80 | 1.40 | 0.80 | 15.30 | 6.70 | 10.25 | 5.08<br>(BSC) | 4.85 | 3.30 | 2.80 | 2.85 |

## 13. 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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