



# BAS16DY-Q

High-speed dual switching diode

20 April 2023

Product data sheet

## 1. General description

High-speed switching, electrically isolated dual diode, encapsulated in an ultra small SOT363 Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- High switching speed:  $t_{rr} \leq 4$  ns
- Low capacitance
- Low leakage current
- Reverse voltage:  $V_R \leq 100$  V
- Repetitive peak reverse voltage:  $V_{RRM} \leq 100$  V
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- High-speed switching
- General-purpose switching

## 4. Quick reference data

Table 1. Quick reference data

| Symbol           | Parameter             | Conditions  | Min | Typ | Max | Unit    |
|------------------|-----------------------|---|-----|-----|-----|---------|
| <b>Per diode</b> |                       |   |     |     |     |         |
| $V_R$            | reverse voltage       |   | -   | -   | 100 | V       |
| $I_R$            | reverse current       | $V_R = 80$ V; $T_{amb} = 25$ °C   | -   | -   | 0.5 | $\mu$ A |
| $t_{rr}$         | reverse recovery time | $I_F = 10$ mA; $I_R = 10$ mA; $R_L = 100$ $\Omega$ ;<br>$I_{R(meas)} = 1$ mA; $T_{amb} = 25$ °C | -   | -   | 4   | ns      |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description       | Simplified outline     | Graphic symbol    |
|-----|--------|-------------------|------------------------|-------------------|
| 1   | A1     | anode (diode 1)   | <p>TSSOP6 (SOT363)</p> | <p>aaa-033905</p> |
| 2   | n.c.   | not connected     |                        |                   |
| 3   | K2     | cathode (diode 2) |                        |                   |
| 4   | A2     | anode (diode 2)   |                        |                   |
| 5   | n.c.   | not connected     |                        |                   |
| 6   | K1     | cathode (diode 1) |                        |                   |

## 6. Ordering information

Table 3. Ordering information

| Type number               | Package |   |                        |
|---------------------------|---------|---|------------------------|
|                           | Name    | Description   | Version                |
| <a href="#">BAS16DY-Q</a> | TSSOP6  | plastic, surface-mounted package; 6 leads; 0.65 mm pitch; 2.1 mm x 1.25 mm x 0.95 mm body | <a href="#">SOT363</a> |

## 7. Marking

Table 4. Marking codes

| Type number | Marking code[1] |
|-------------|-----------------|
| BAS16DY-Q   | M3%             |

[1] % = placeholder for manufacturing site code

## 8. Limiting values

Table 5. Limiting values

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

| Symbol            | Parameter                           | Conditions   |         | Min | Max | Unit             |
|-------------------|-------------------------------------|--|---------|-----|-----|------------------|
| <b>Per diode</b>  |                                     |  |         |     |     |                  |
| $V_{RRM}$         | repetitive peak reverse voltage     |  |         | -   | 100 | V                |
| $V_R$             | reverse voltage                     |  |         | -   | 100 | V                |
| $I_F$             | forward current                     |  | [1] [2] | -   | 110 | mA               |
| $I_{FSM}$         | non-repetitive peak forward current | $t_p = 50 \mu\text{s}$ ; square wave; $T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$ |         | -   | 10  | A                |
|                   |                                     | $t_p = 10 \text{ ms}$ ; square wave; $T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$  |         | -   | 1   | A                |
| $I_{FRM}$         | repetitive peak forward current     | $t_p \leq 0.5 \text{ ms}$ ; $\delta \leq 0.25$   |         | -   | 700 | mA               |
| $P_{\text{tot}}$  | total power dissipation             | $T_{\text{amb}} \leq 25 \text{ }^\circ\text{C}$  | [1] [2] | -   | 260 | mW               |
|                   |                                     |  | [2] [3] | -   | 290 | mW               |
| <b>Per device</b> |                                     |  |         |     |     |                  |
| $T_j$             | junction temperature                |  |         | -   | 150 | $^\circ\text{C}$ |
| $T_{\text{amb}}$  | ambient temperature                 |  |         | -55 | 150 | $^\circ\text{C}$ |
| $T_{\text{stg}}$  | storage temperature                 |  |         | -65 | 150 | $^\circ\text{C}$ |

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

[2] Single diode loaded.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1 \text{ cm}^2$ .

## 9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol         | Parameter  | Conditions  |     | Min | Typ | Max | Unit |
|----------------|--|-------------|-----|-----|-----|-----|------|
| $R_{th(j-a)}$  | thermal resistance from junction to ambient      | in free air | [1] | -   | -   | 480 | K/W  |
|                |  |             | [2] | -   | -   | 430 | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             | [3] | -   | -   | 185 | K/W  |

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

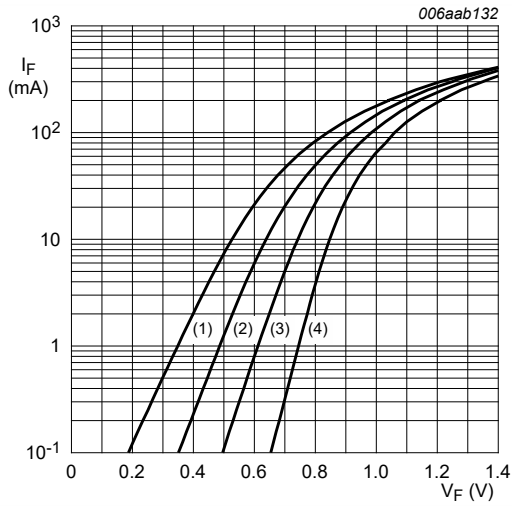
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1cm<sup>2</sup>.

[3] Soldering points at pins 3 and 6.

## 10. Characteristics

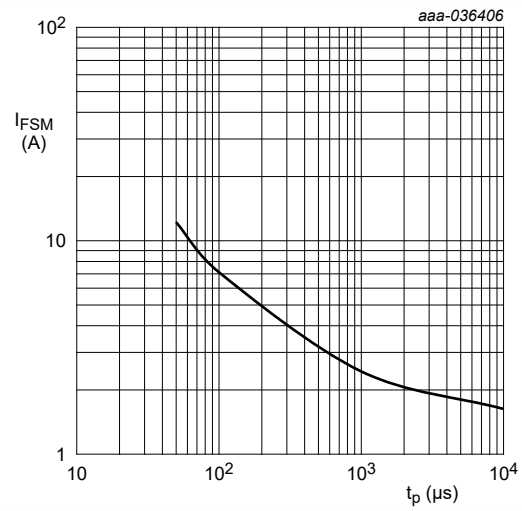
Table 7. Characteristics

| Symbol           | Parameter                     | Conditions   |  | Min | Typ | Max  | Unit          |
|------------------|-------------------------------|--|--|-----|-----|------|---------------|
| <b>Per diode</b> |                               |  |  |     |     |      |               |
| $V_F$            | forward voltage               | $I_F = 1 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02;$<br>pulsed; $T_{amb} = 25 \text{ }^\circ\text{C}$                 |  | -   | -   | 715  | mV            |
|                  |                               | $I_F = 10 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02;$<br>pulsed; $T_{amb} = 25 \text{ }^\circ\text{C}$                |  | -   | -   | 855  | mV            |
|                  |                               | $I_F = 50 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02;$<br>pulsed; $T_{amb} = 25 \text{ }^\circ\text{C}$                |  | -   | -   | 1    | V             |
|                  |                               | $I_F = 150 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02;$<br>pulsed; $T_{amb} = 25 \text{ }^\circ\text{C}$               |  | -   | -   | 1.25 | V             |
| $I_R$            | reverse current               | $V_R = 25 \text{ V}; T_{amb} = 25 \text{ }^\circ\text{C}$  |  | -   | -   | 30   | nA            |
|                  |                               | $V_R = 80 \text{ V}; T_{amb} = 25 \text{ }^\circ\text{C}$  |  | -   | -   | 0.5  | $\mu\text{A}$ |
|                  |                               | $V_R = 25 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$   |  | -   | -   | 30   | $\mu\text{A}$ |
|                  |                               | $V_R = 80 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$   |  | -   | -   | 50   | $\mu\text{A}$ |
| $C_d$            | diode capacitance             | $V_R = 0 \text{ V}; f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^\circ\text{C}$  |  | -   | -   | 1.5  | pF            |
| $t_{rr}$         | reverse recovery time         | $I_F = 10 \text{ mA}; I_R = 10 \text{ mA}; R_L = 100 \Omega;$<br>$I_{R(meas)} = 1 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$ |  | -   | -   | 4    | ns            |
| $V_{FRM}$        | peak forward recovery voltage | $I_F = 10 \text{ mA}; t_r = 20 \text{ ns}; T_{amb} = 25 \text{ }^\circ\text{C}$  |  | -   | -   | 1.75 | V             |



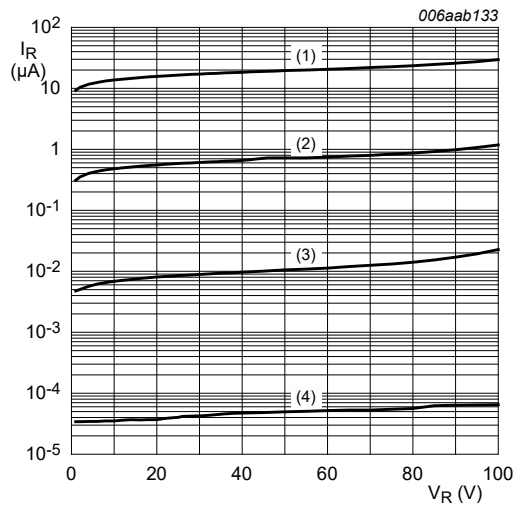
- (1)  $T_{amb} = 150\text{ }^\circ\text{C}$
- (2)  $T_{amb} = 85\text{ }^\circ\text{C}$
- (3)  $T_{amb} = 25\text{ }^\circ\text{C}$
- (4)  $T_{amb} = -40\text{ }^\circ\text{C}$

**Fig. 1. Forward current as a function of forward voltage; typical values**



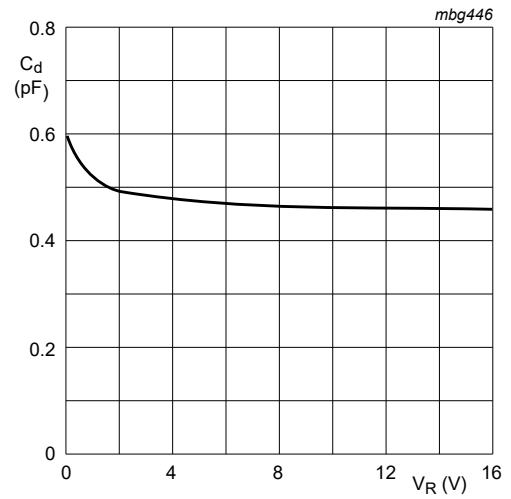
Based on square wave currents.  
 $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$

**Fig. 2. Non-repetitive peak forward current as a function of pulse duration; typical values**



- (1)  $T_{amb} = 150\text{ }^\circ\text{C}$
- (2)  $T_{amb} = 85\text{ }^\circ\text{C}$
- (3)  $T_{amb} = 25\text{ }^\circ\text{C}$
- (4)  $T_{amb} = -40\text{ }^\circ\text{C}$

**Fig. 3. Reverse current as a function of reverse voltage; typical values**



$f = 1\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$

**Fig. 4. Diode capacitance as a function of reverse voltage; typical values**

## 11. Test information

### Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - *Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

## 12. Package outline

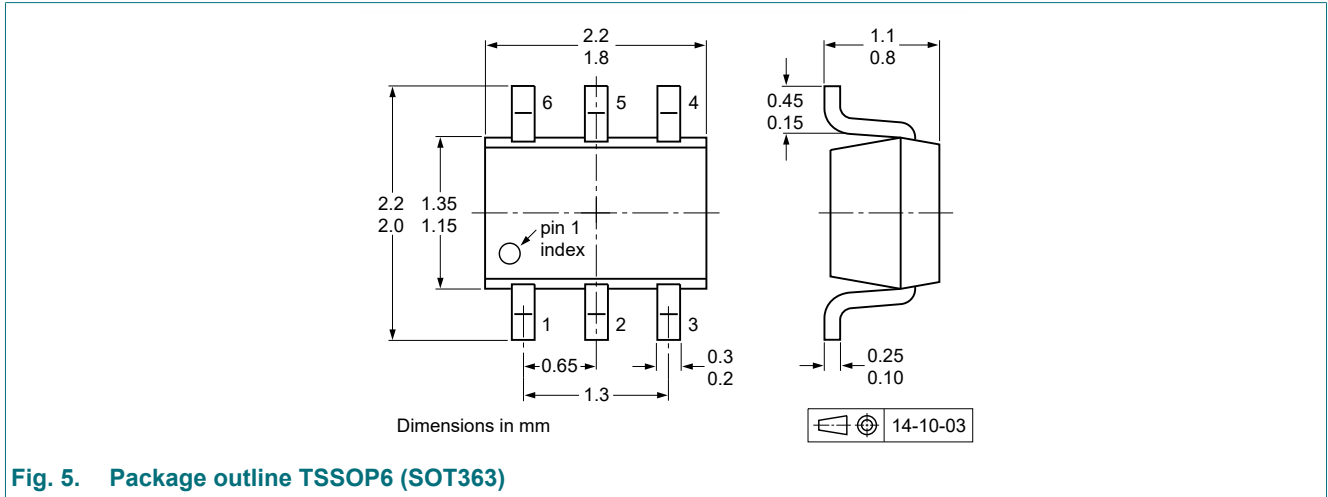


Fig. 5. Package outline TSSOP6 (SOT363)

## 13. Soldering

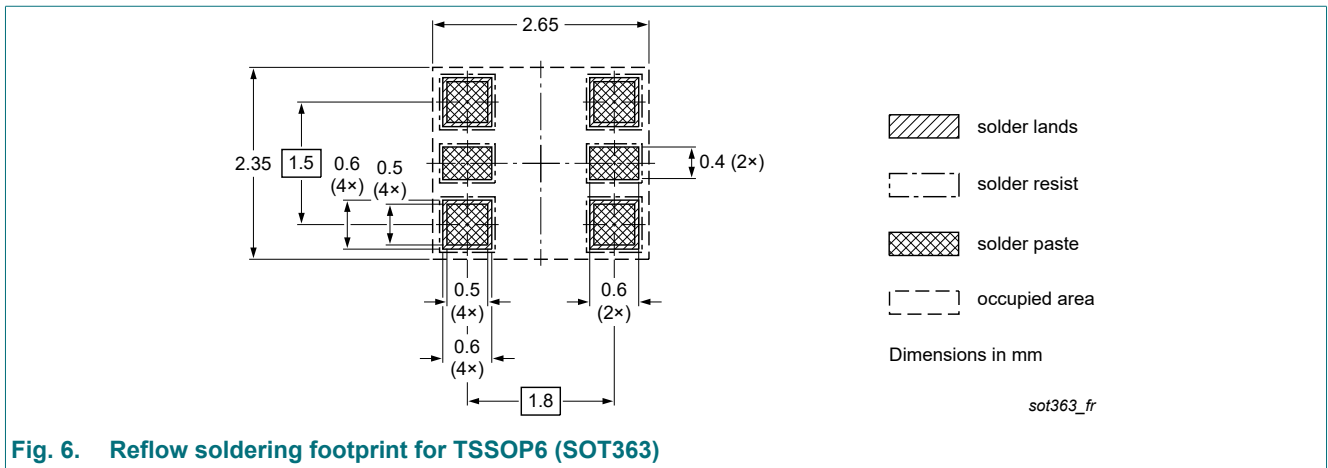
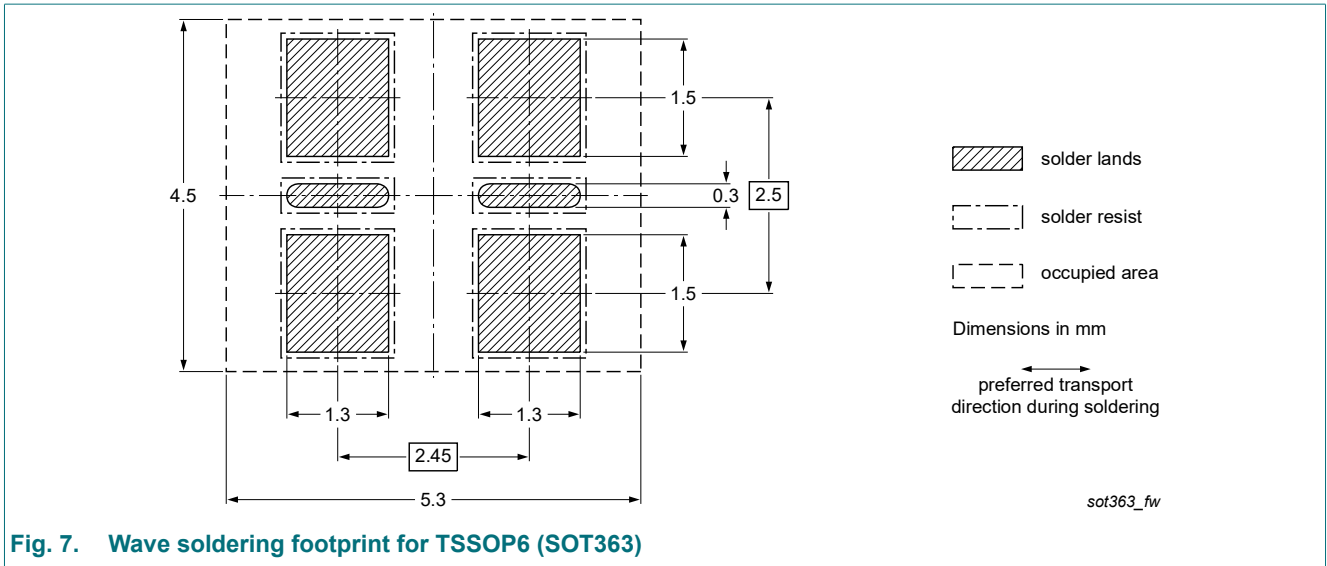


Fig. 6. Reflow soldering footprint for TSSOP6 (SOT363)



## 14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status  | Change notice | Supersedes |
|---------------|--------------|--------------------|---------------|------------|
| BAS16DY-Q v.1 | 20230420     | Product data sheet | -             | -          |

## 15. 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.
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