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# BAS316

## High-speed switching diode




## 1. General description

High-speed switching diode, encapsulated in a small SOD323 (SC-76) 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

## 3. Applications

- High-speed switching
- General-purpose switching

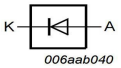
## 4. Quick reference data

**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_R$ | reverse voltage | $T_j$ = 25 °C | | - | - | 100 | V |
| $I_R$ | reverse current | $V_R$ = 80 V; $T_j$ = 25 °C | | - | - | 0.5 | µA |
| $t_{rr}$ | reverse recovery time | $I_F$ = 10 mA; $I_R$ = 10 mA; $R_L$ = 100 Ω; $I_{R(meas)}$ = 1 mA; $T_{amb}$ = 25 °C | | - | - | 4 | ns |

## 5. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | K | cathode |  SOD323 |  006aab040 |
| 2 | A | anode | | |





## 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BAS316 | SOD323 | plastic, surface-mounted package; 2 leads; 1.3 mm pitch; 1.7 mm x 1.25 mm x 0.95 mm body | SOD323 |
| BAS316/DG | SOD323 | plastic, surface-mounted package; 2 leads; 1.3 mm pitch; 1.7 mm x 1.25 mm x 0.95 mm body | SOD323 |

## 7. Marking

**Table 4. Marking codes**

| Type number | Marking code |
|---|---|
| BAS316 | A6 |
| BAS316/DG | KN |

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## 8. Limiting values

**Table 5. Limiting values**

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

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{RRM}$ | repetitive peak reverse voltage | $T_j$ = 25 °C | | - | 100 | V |
| $V_R$ | reverse voltage | | | - | 100 | V |
| $I_F$ | forward current | | [1] | - | 250 | mA |
| $I_{FSM}$ | non-repetitive peak forward current | $t_p$ = 1 µs; square wave; $T_{j(init)}$ = 25 °C | | - | 4 | A |
| | | $t_p$ = 1 ms; square wave; $T_{j(init)}$ = 25 °C | | - | 1 | A |
| | | $t_p$ = 1 s; square wave; $T_{j(init)}$ = 25 °C | | - | 0.5 | A |
| $I_{FRM}$ | repetitive peak forward current | $t_p \leq$ 0.5 ms; δ = 0.25 | | - | 500 | mA |
| $P_{tot}$ | total power dissipation | $T_{sp} \leq$ 90 °C | [1] [2] | - | 400 | mW |
| $T_j$ | junction temperature | | | - | 150 | °C |
| $T_{amb}$ | ambient temperature | | | -65 | 150 | °C |
| $T_{stg}$ | storage temperature | | | -65 | 150 | °C |

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-side copper, tin-plated and standard footprint.
[2] Soldering point of cathode tab.

## 9. Thermal characteristics

**Table 6. Thermal characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | in free air | [1] | - | - | 150 | K/W |

[1] Soldering point of cathode tab.

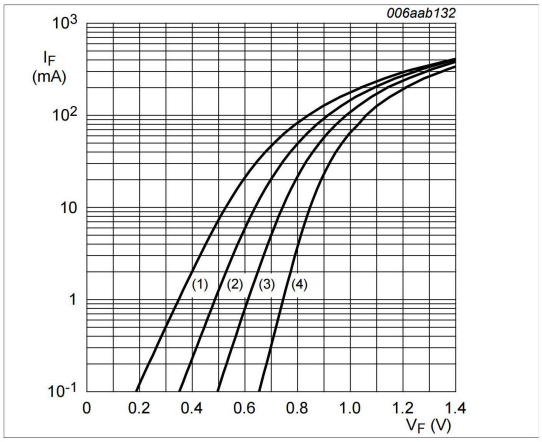
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## 10. Characteristics

**Table 7. Characteristics**

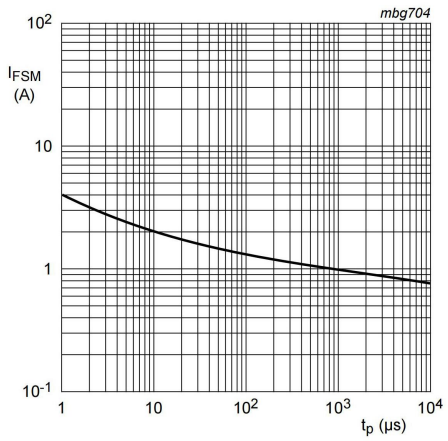
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_F$ | forward voltage | $I_F$ = 1 mA | [1] | - | - | 715 | mV |
| | | $I_F$ = 10 mA | [1] | - | - | 855 | mV |
| | | $I_F$ = 50 mA | [1] | - | - | 1 | V |
| | | $I_F$ = 150 mA | [1] | - | - | 1.25 | V |
| $I_R$ | reverse current | $V_R$ = 25 V; $T_j$ = 25 °C | | - | - | 30 | nA |
| | | $V_R$ = 80 V; $T_j$ = 25 °C | | - | - | 0.5 | µA |
| | | $V_R$ = 25 V; $T_j$ = 150 °C | | - | - | 30 | µA |
| | | $V_R$ = 80 V; $T_j$ = 150 °C | | - | - | 50 | µA |
| $C_d$ | diode capacitance | $V_R$ = 0 V; f = 1 MHz; $T_j$ = 25 °C | | - | - | 1.5 | pF |
| $t_{rr}$ | reverse recovery time | $I_F$ = 10 mA; $I_R$ = 10 mA; $R_L$ = 100 Ω; $I_{R(meas)}$ = 1 mA; $T_{amb}$ = 25 °C | | - | - | 4 | ns |
| $V_{FRM}$ | peak forward recovery voltage | $I_F$ = 10 mA; $t_r$ = 20 ns | | - | - | 1.75 | V |

[1] Pulsed test: $t_p \leq 300$ µs; $\delta \leq 0.02$




(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 85 °C
(3) $T_{amb}$ = 25 °C
(4) $T_{amb}$ = -40 °C

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

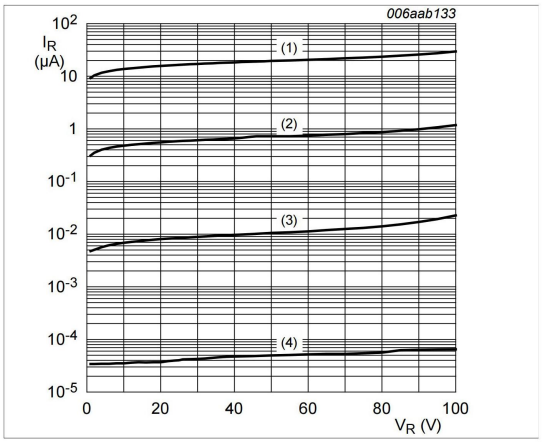



Based on square wave currents.
$T_{j(init)}$ = 25 °C

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

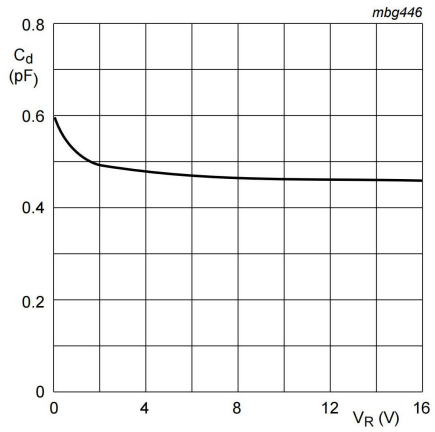
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(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 85 °C
(3) $T_{amb}$ = 25 °C
(4) $T_{amb}$ = -40 °C

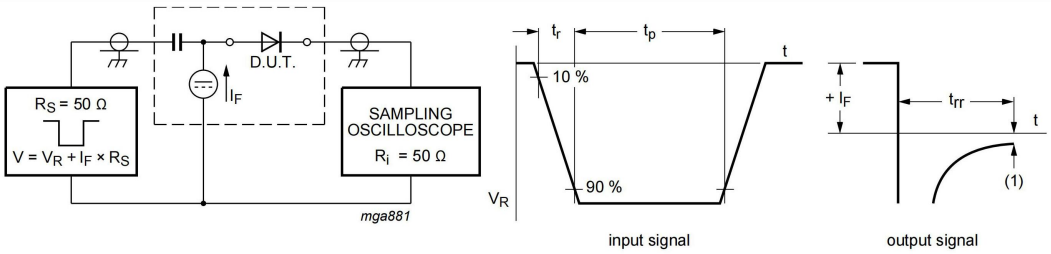
**Fig. 3. Reverse current as a function of reverse voltage; typical values**




f = 1 MHz; $T_{amb}$ = 25 °C

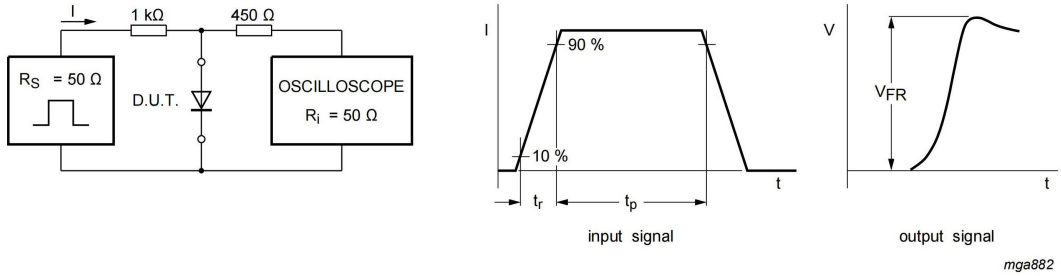
**Fig. 4. Diode capacitance as a function of reverse voltage; typical values**

## 11. Test information




(1) $I_R$ = 1 mA
Input signal: reverse pulse rise time $t_r$ = 0.6 ns; reverse voltage pulse duration $t_p$ = 100 ns; duty cycle δ = 0.05
Oscilloscope: rise time $t_r$ = 0.35 ns

**Fig. 5. Reverse recovery time test circuit and waveforms**




Input signal: forward pulse rise time $t_r$ = 20 ns; forward current pulse duration $t_p \geq$ 100 ns; duty cycle $\delta \leq$ 0.005

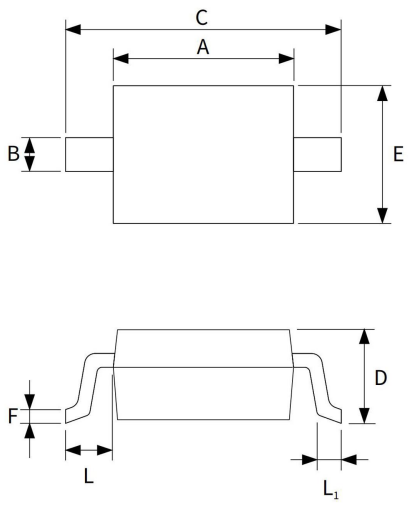
**Fig. 6. Forward recovery voltage test circuit and waveforms**

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## Ordering Information

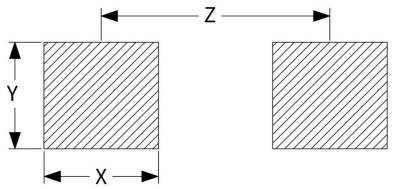
| PACKAGE | PACKAGE CODE | UNIT WEIGHT(g) | REEL(pcs) | BOX(pcs) | CARTON(pcs) | DELIVERY MODE |
|---|---|---|---|---|---|---|
| SOD-323 | R1 | 0.0048 | 3000 | 30000 | 240000 | 7'' |

## Package Outline Dimensions (SOD-323)




| Symbol | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 1.60 | 1.80 | 0.063 | 0.071 |
| B | 0.25 | 0.40 | 0.010 | 0.016 |
| C | 2.30 | 2.80 | 0.091 | 0.110 |
| D | 0.80 | 1.10 | 0.031 | 0.043 |
| $D_1$ | 0.80 | 0.90 | 0.031 | 0.035 |
| E | 1.20 | 1.40 | 0.047 | 0.055 |
| F | 0.08 | 0.18 | 0.003 | 0.007 |
| L | 0.475REF | | 0.019REF | |
| $L_1$ | 0.25 | 0.40 | 0.010 | 0.016 |
| H | - | 0.14 | - | 0.006 |

## Suggested Pad Layout




| Symbol | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| X | 0.65 | 0.75 | 0.026 | 0.030 |
| Y | 0.65 | 0.75 | 0.026 | 0.030 |
| Z | 2.10 | 2.20 | 0.084 | 0.088 |