



THE DATASHEET OF BAT54GWJ





BAT54GW

30 V, 200 mA Schottky barrier diodes

24 November 2016

Product data sheet

1. General description

Planar Schottky barrier diode with an integrated guard ring for stress protection, encapsulated in an SOD123 small Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Low forward voltage: $V_F \leq 400$ mV
- Low leakage current: $I_R \leq 2$ μ A
- Reverse voltage $V_R \leq 30$ V
- Low capacitance
- Small SMD plastic package
- AEC-Q101 qualified

3. Applications

- Ultra high-speed switching
- Line termination

4. Quick reference data



Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------|-----------------|--|-----|-----|-----|---------|
| I_F | forward current | $T_j = 25$ °C | - | - | 200 | mA |
| V_F | forward voltage | $I_F = 10$ mA; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_j = 25$ °C | - | - | 400 | mV |
| I_R | reverse current | $V_R = 25$ V; pulsed; $T_j = 25$ °C | [1] | - | 2 | μ A |
| V_R | reverse voltage | $T_j = 25$ °C | - | - | 30 | V |

[1] Very short test pulse to prevent junction self-heating.

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|------------------------|---|---|
| 1 | K | cathode ^[1] |  SOD123 |  sym001 |
| 2 | A | anode | | |

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|--|---------|
| | Name | Description | Version |
| BAT54GW | SOD123 | Plastic surface-mounted package; 2 leads | SOD123 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BAT54GW | G9 |

8. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|------------------|-------------------------------------|---|-----|-----|-----|------|
| V_R | reverse voltage | $T_j = 25\text{ °C}$ | | - | 30 | V |
| I_F | forward current | | | - | 200 | mA |
| I_{FRM} | repetitive peak forward current | $t_p \leq 1\text{ s}; \delta \leq 0.5$ | | - | 300 | mA |
| I_{FSM} | non-repetitive peak forward current | $t_p < 10\text{ ms}; T_{j(\text{init})} = 25\text{ °C}; \text{square wave}$ | | - | 600 | mA |
| P_{tot} | total power dissipation | $T_{\text{amb}} \leq 25\text{ °C}$ | [1] | - | 357 | mW |
| | | | [2] | - | 600 | mW |
| T_j | junction temperature | | | - | 150 | °C |
| T_{amb} | ambient temperature | | | -55 | 150 | °C |
| T_{stg} | storage temperature | | | -65 | 150 | °C |

[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 1 cm^2 .

9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|-----------------------|--|-------------|-----|-----|-----|-----|------|
| $R_{\text{th}(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] | - | - | 350 | K/W |
| | | | [2] | - | - | 210 | K/W |
| $R_{\text{th}(j-sp)}$ | thermal resistance from junction to solder point | | [3] | - | - | 58 | 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 1 cm^2 .

[3] Soldering point of cathode tab.

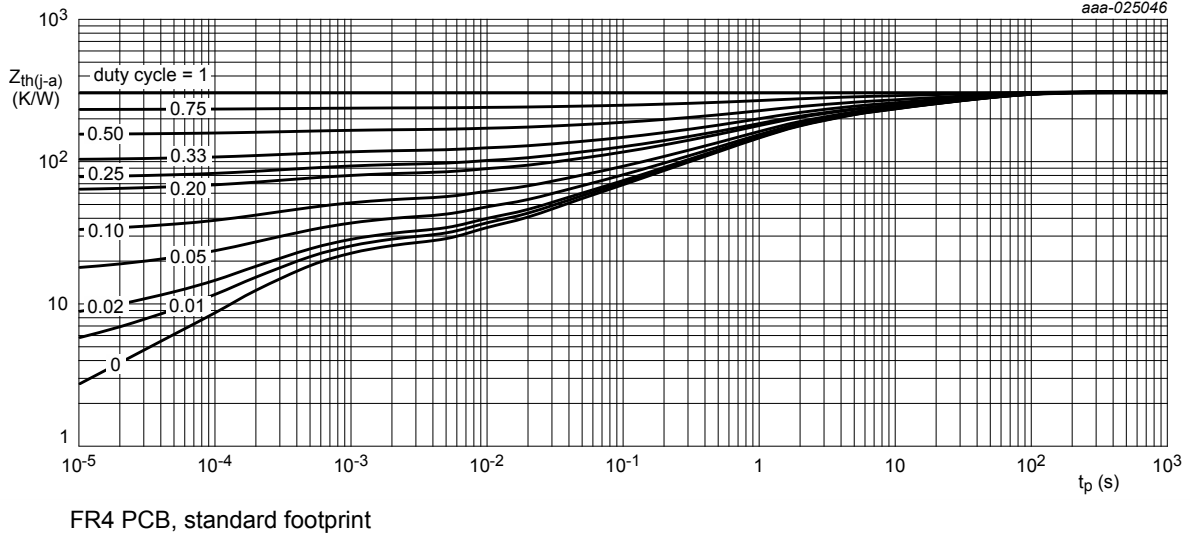


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

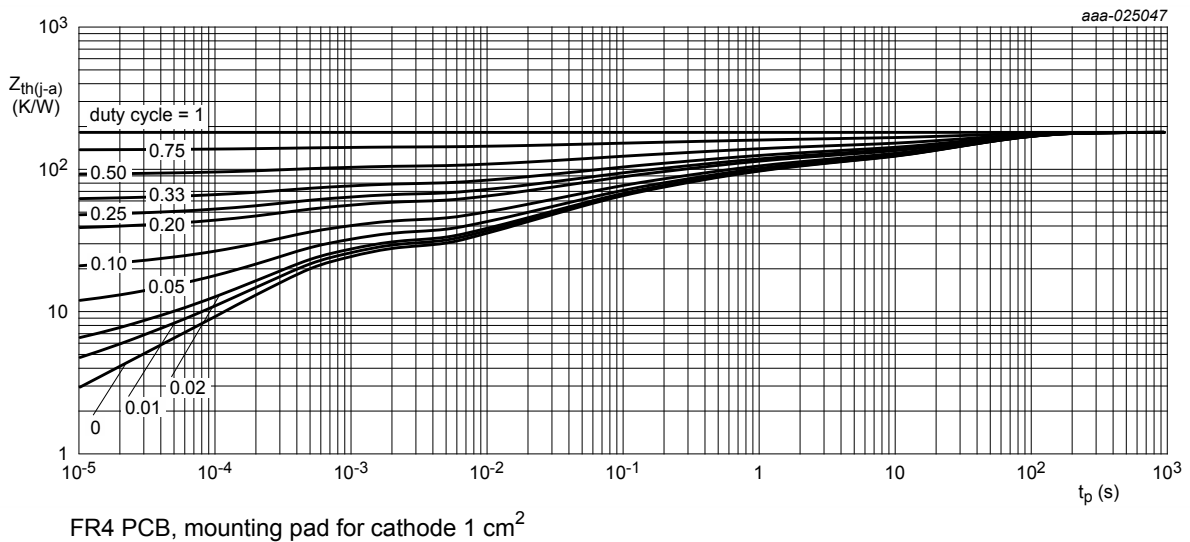


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------|---------------------------|---|-----|-----|-----|---------------|
| $V_{(BR)R}$ | reverse breakdown voltage | $I_R = 1 \text{ mA}$; $t_p \leq 300 \text{ } \mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ } ^\circ\text{C}$ | 30 | - | - | V |
| V_F | forward voltage | $I_F = 0.1 \text{ mA}$; $t_p \leq 300 \text{ } \mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ } ^\circ\text{C}$ | - | - | 240 | mV |
| | | $I_F = 1 \text{ mA}$; $t_p \leq 300 \text{ } \mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ } ^\circ\text{C}$ | - | - | 320 | mV |
| | | $I_F = 10 \text{ mA}$; $t_p \leq 300 \text{ } \mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ } ^\circ\text{C}$ | - | - | 400 | mV |
| | | $I_F = 30 \text{ mA}$; $t_p \leq 300 \text{ } \mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ } ^\circ\text{C}$ | - | - | 500 | mV |
| | | $I_F = 100 \text{ mA}$; $t_p \leq 300 \text{ } \mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ } ^\circ\text{C}$ | - | - | 800 | mV |
| I_R | reverse current | $V_R = 25 \text{ V}$; pulsed; $T_j = 25 \text{ } ^\circ\text{C}$ | [1] | - | 2 | μA |
| C_d | diode capacitance | $V_R = 1 \text{ V}$; $f = 1 \text{ MHz}$; $T_j = 25 \text{ } ^\circ\text{C}$ | - | - | 10 | pF |

[1] Very short test pulse to prevent junction self-heating.

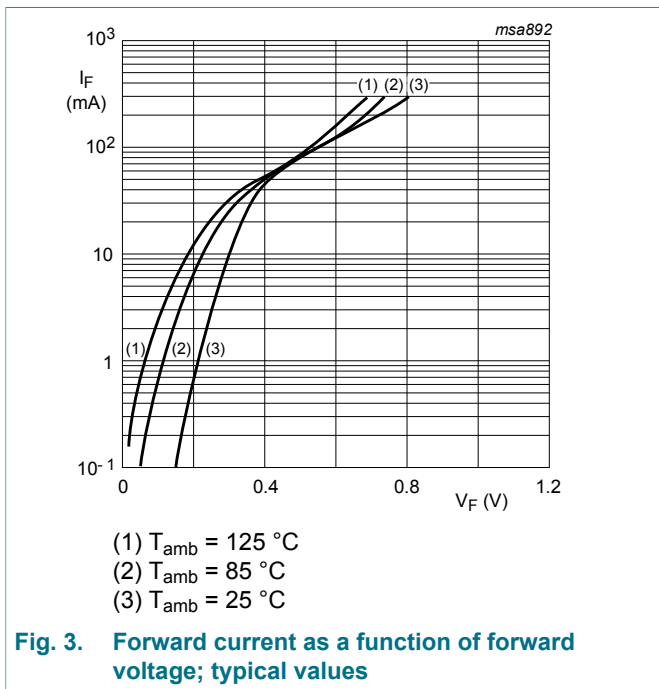


Fig. 3. Forward current as a function of forward voltage; typical values

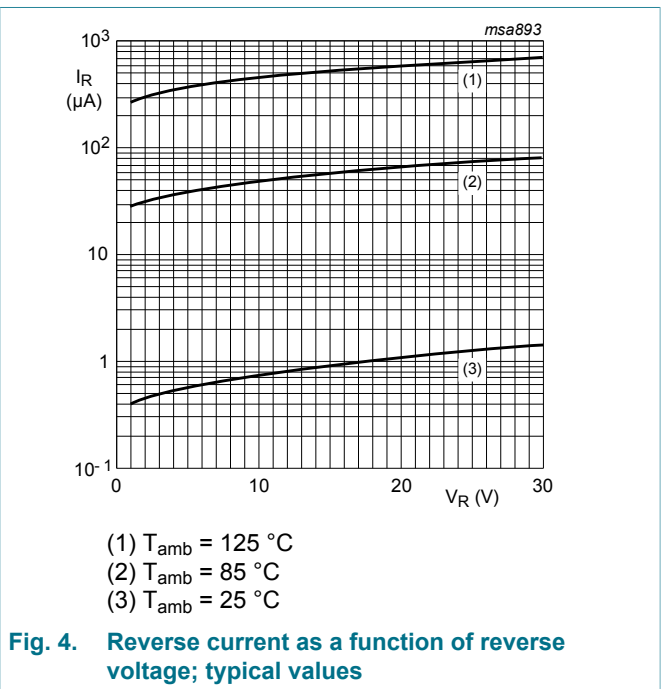
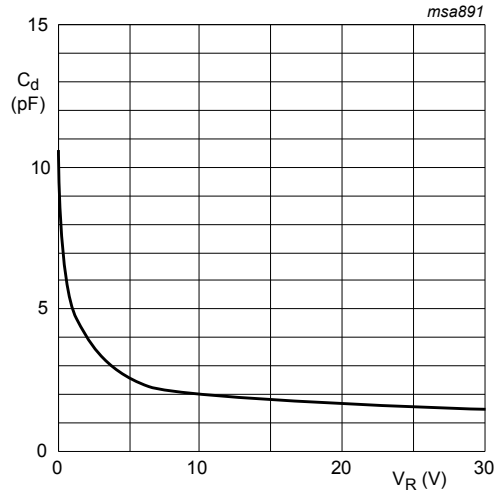


Fig. 4. Reverse current as a function of reverse voltage; typical values



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

Fig. 5. Diode capacitance as a function of reverse voltage; typical values

11. Test information

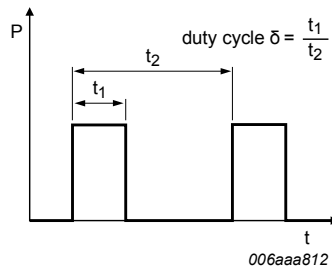


Fig. 6. Duty cycle definition

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

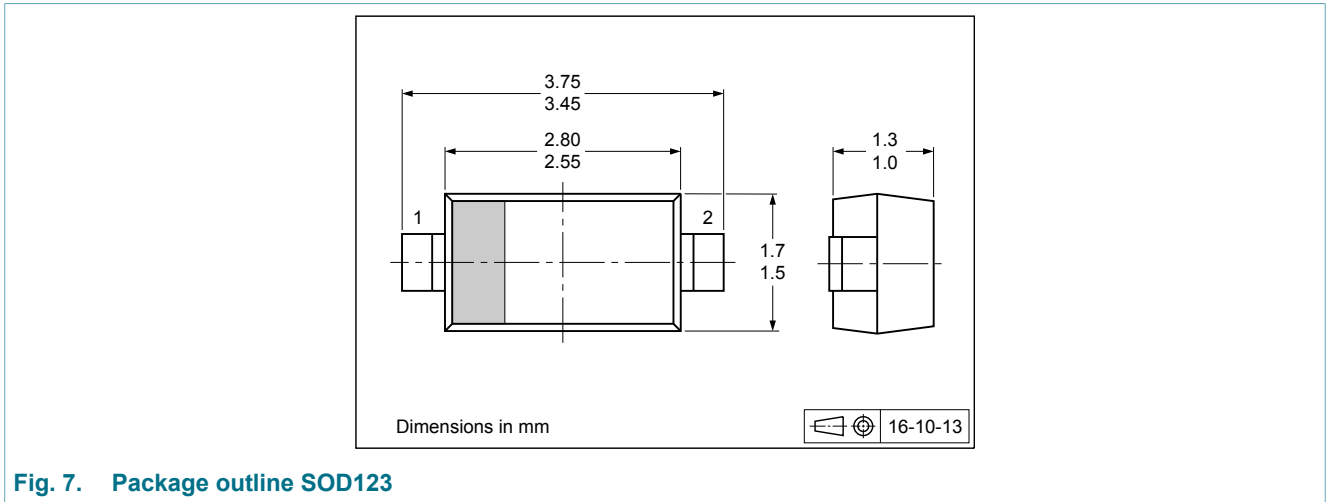


Fig. 7. Package outline SOD123

13. Soldering

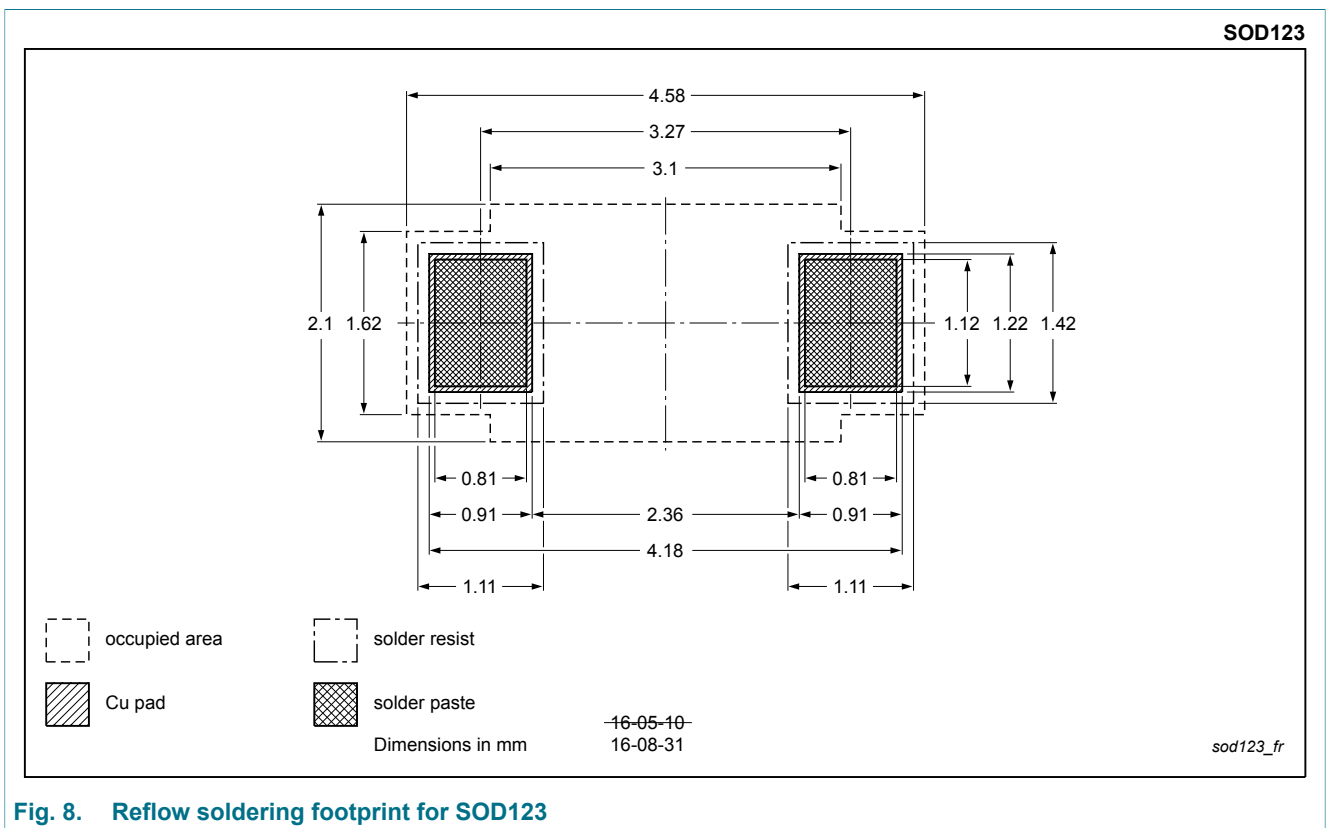


Fig. 8. Reflow soldering footprint for SOD123

SOD123

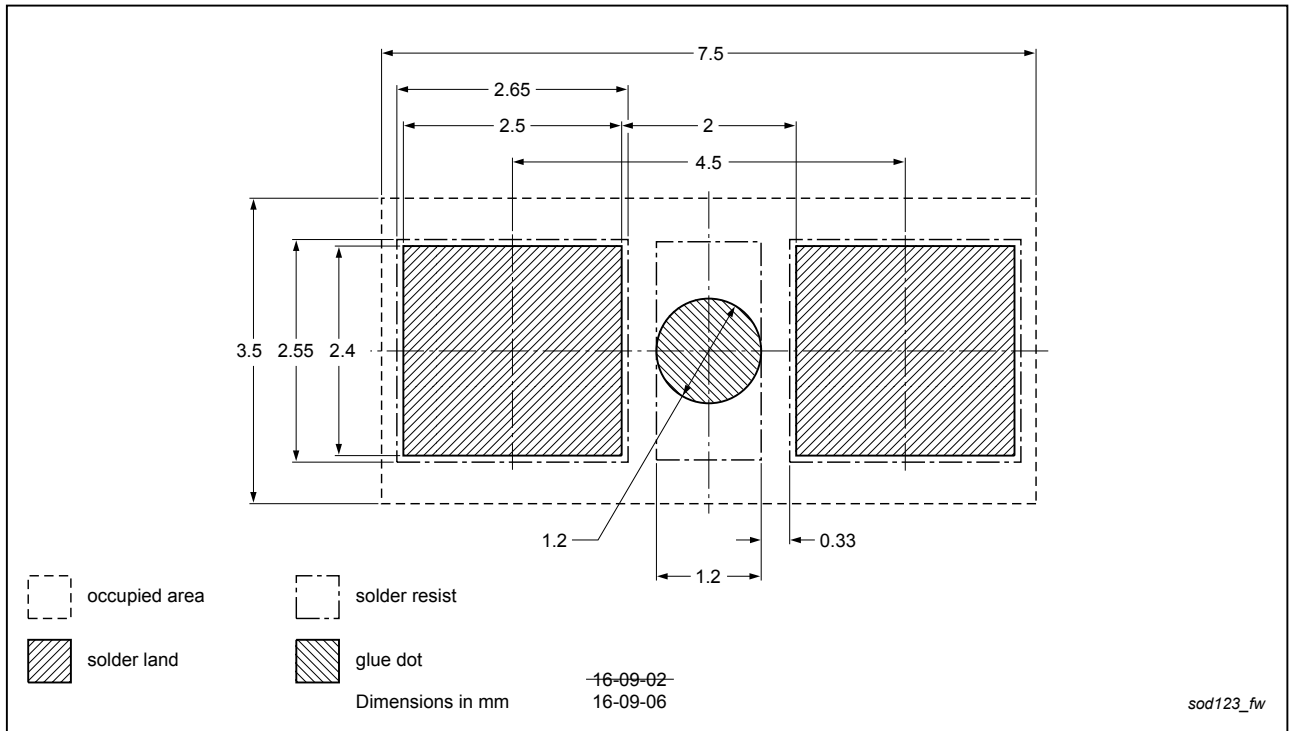


Fig. 9. Wave soldering footprint for SOD123

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------|--------------|--------------------|---------------|------------|
| BAT54GW v.1 | 20161124 | 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. |

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