

BAV170QA

Dual common cathode low-leakage diode

3 May 2016

Product data sheet

1. General description

Dual common cathode low-leakage diode encapsulated in a leadless ultra small DFN1010D-3 (SOT1215) Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

2. Features and benefits

- High switching speed: $t_{rr} = 0.8 \mu\text{s}$
- Low leakage current: $I_R = 3 \text{ pA}$
- Repetitive peak reverse voltage $V_{RRM} \leq 85 \text{ V}$
- Low capacitance $C_d = 2 \text{ pF}$
- Ultra small SMD plastic package
- Low package height of 0.37 mm
- Suitable for Automatic Optical Inspection (AOI) of solder joint
- AEC-Q101 qualified

3. Applications

- Low-leakage current applications
- General-purpose switching

4. Quick reference data

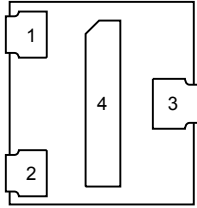
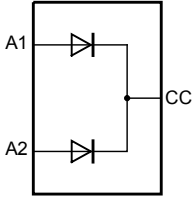
Table 1. Quick reference data

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|------------------|-----------------------|---|-----|-----|-------|-----|---------------|
| Per diode | | | | | | | |
| I_F | forward current | $T_{amb} = 25 \text{ }^\circ\text{C}$; single diode loaded | [1] | - | - | 320 | mA |
| V_R | reverse voltage | $T_j = 25 \text{ }^\circ\text{C}$ | | - | - | 75 | V |
| Per diode | | | | | | | |
| I_R | reverse current | $V_R = 75 \text{ V}$; $T_j = 25 \text{ }^\circ\text{C}$ | | - | 0.003 | 5 | nA |
| t_{rr} | reverse recovery time | $I_F = 10 \text{ mA}$; $I_R = 10 \text{ mA}$; $I_{R(meas)} = 1 \text{ mA}$; $R_L = 100 \text{ } \Omega$; $T_{amb} = 25 \text{ }^\circ\text{C}$ | | - | 0.8 | 3 | μs |

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

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-----------------|--|---|
| 1 | A1 | anode (diode 1) |  <p>Transparent top view DFN1010D-3 (SOT1215)</p> |  <p>aaa-021931</p> |
| 2 | A2 | anode (diode 2) | | |
| 3 | CC | common cathode | | |
| 4 | CC | common cathode | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|------------|--|---------|
| | Name | Description | Version |
| BAV170QA | DFN1010D-3 | DFN1010D-3: plastic thermal enhanced ultra thin small outline package; no leads; 3 terminals; body 1.1 x 1.0 x 0.37 mm | SOT1215 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BAV170QA | Z 011 |

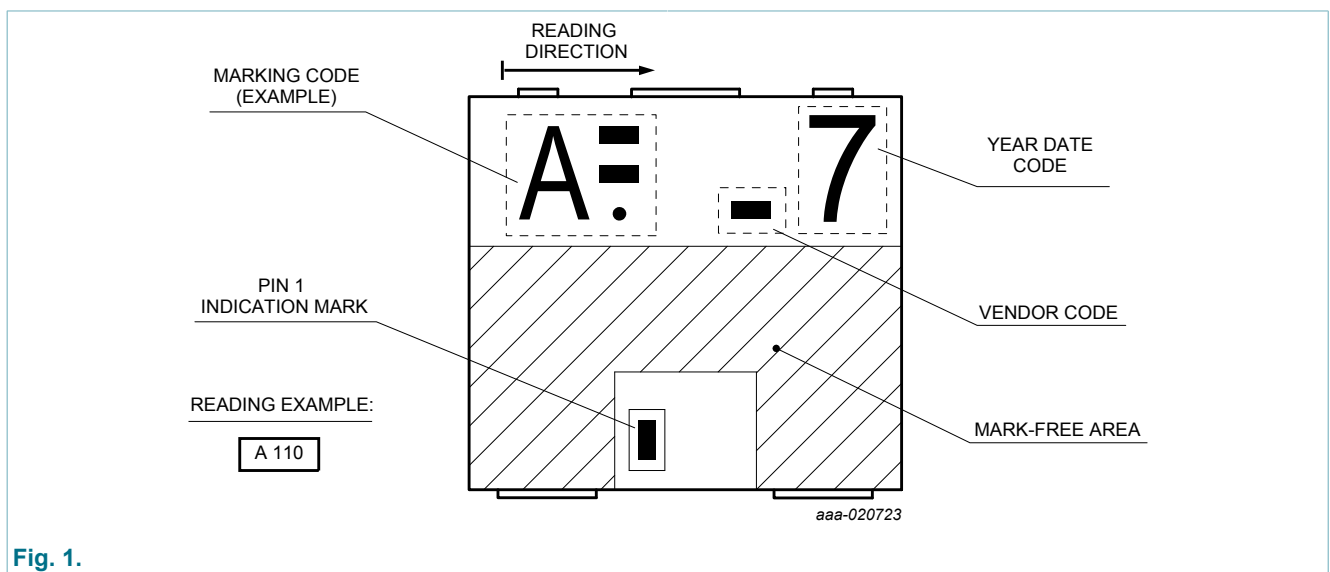


Fig. 1.

8. Limiting values

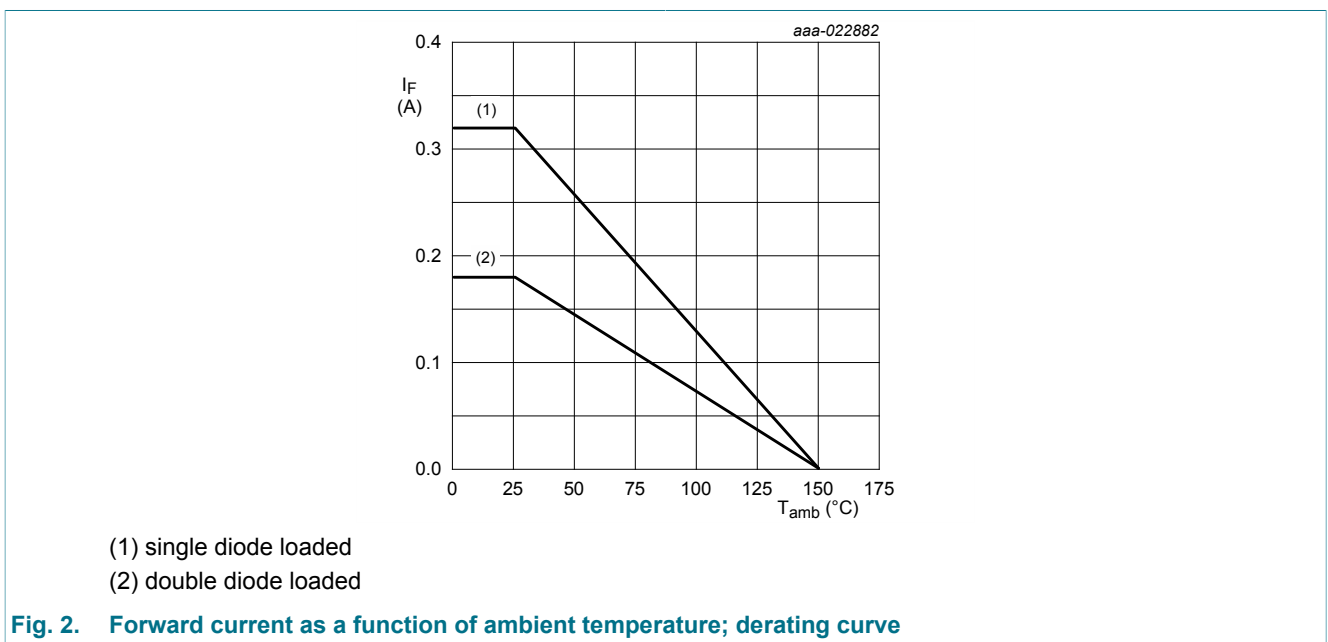
Table 5. Limiting values

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

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|-------------------------------------|-------------------------------------|---|-----|-----|-----|------|
| Per diode | | | | | | |
| V_R | reverse voltage | $T_j = 25\text{ °C}$ | | - | 75 | V |
| V_{RRM} | repetitive peak reverse voltage | | | - | 85 | V |
| I_F | forward current | $T_{amb} = 25\text{ °C}$; single diode loaded | [1] | - | 320 | mA |
| | | $T_{amb} = 25\text{ °C}$; double diode loaded | [1] | - | 180 | mA |
| I_{FRM} | repetitive peak forward current | $t_p \leq 0.5\text{ ms}$; $\delta \leq 0.25$; $T_j = 25\text{ °C}$ | | - | 1 | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 100\text{ }\mu\text{s}$; $T_{j(init)} = 25\text{ °C}$; square wave | | - | 4 | A |
| | | $t_p = 1\text{ ms}$; $T_{j(init)} = 25\text{ °C}$; square wave | | - | 1.5 | A |
| | | $t_p = 1\text{ s}$; $T_{j(init)} = 25\text{ °C}$; square wave | | - | 0.5 | A |
| Per device; one diode loaded | | | | | | |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$ | [1] | - | 325 | mW |
| | | | [2] | - | 540 | 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 Printed-Circuit Board (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 cm².

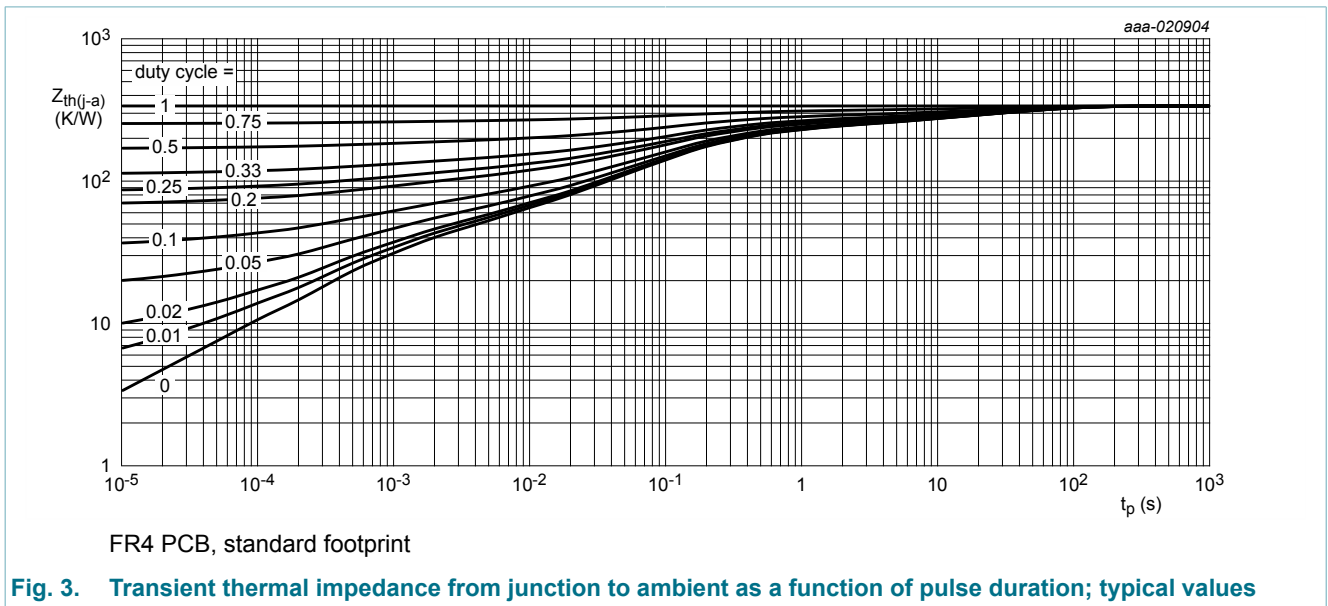


9. Thermal characteristics

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] | - | - | 385 | K/W |
| | | | [2] | - | - | 230 | K/W |
| R _{th(j-sp)} | thermal resistance from junction to solder point | | [3] | - | - | 50 | 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 cm².
- [3] Soldering point of cathode tab.



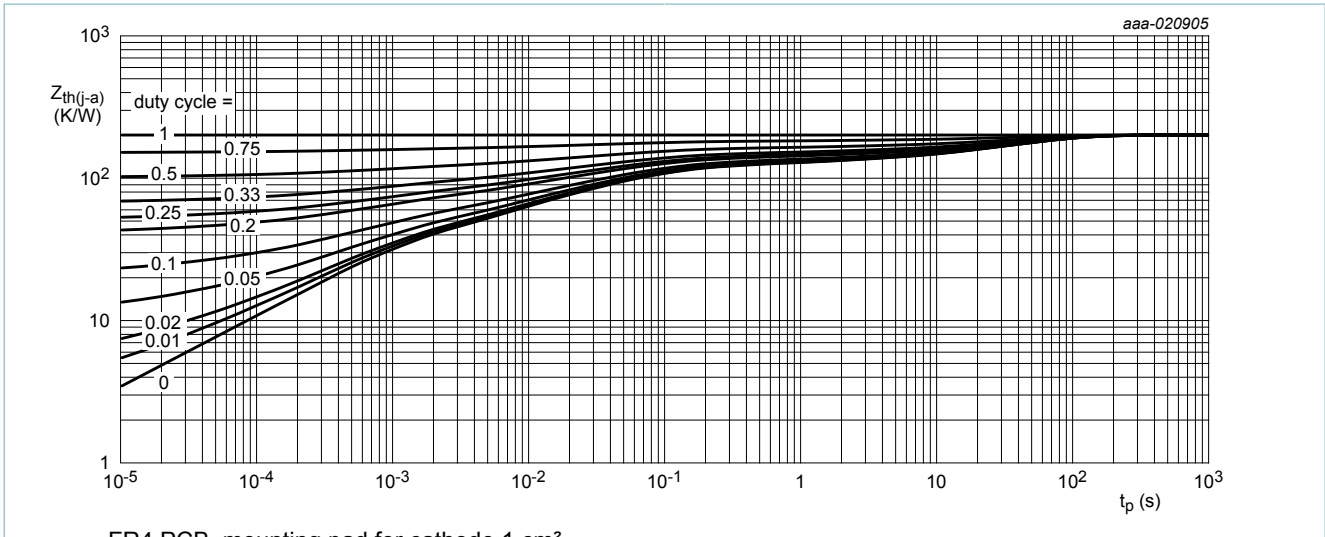
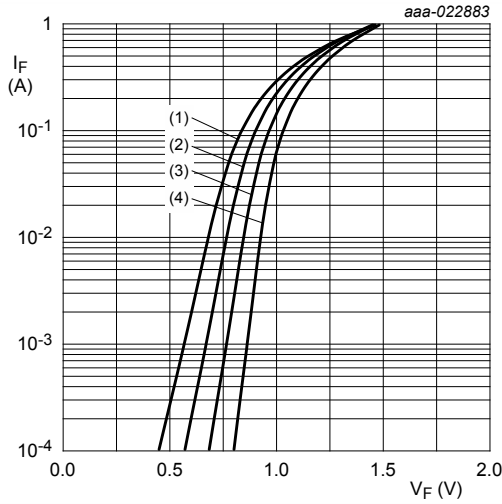


Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

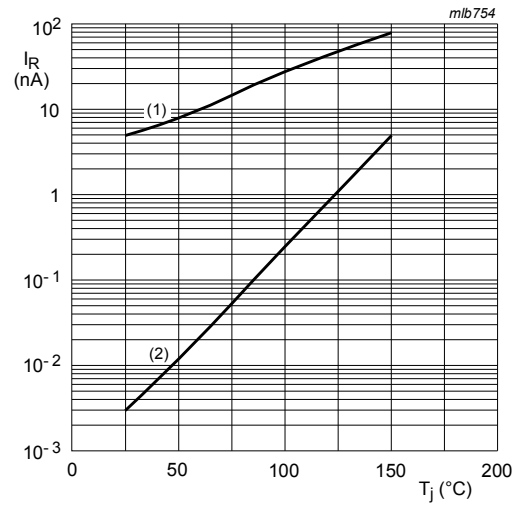
Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|-----------------------|--|-----|-------|------|---------------|
| Per diode | | | | | | |
| V_F | forward voltage | $I_F = 1 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$ | - | - | 0.9 | V |
| | | $I_F = 10 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$ | - | - | 1 | V |
| | | $I_F = 50 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$ | - | - | 1.1 | V |
| | | $I_F = 150 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$ | - | - | 1.25 | V |
| I_R | reverse current | $V_R = 75 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$ | - | 0.003 | 5 | nA |
| | | $V_R = 75 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$ | - | 3 | 80 | nA |
| C_d | diode capacitance | $V_R = 0 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$ | - | 2 | - | pF |
| t_{rr} | reverse recovery time | $I_F = 10 \text{ mA}; I_R = 10 \text{ mA}; I_{R(\text{meas})} = 1 \text{ mA}; R_L = 100 \text{ } \Omega; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ | - | 0.8 | 3 | μs |



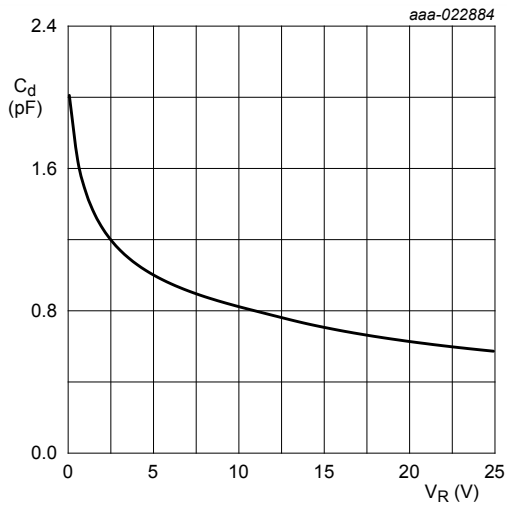
- (1) $T_j = 150\text{ }^\circ\text{C}$
- (2) $T_j = 85\text{ }^\circ\text{C}$
- (3) $T_j = 25\text{ }^\circ\text{C}$
- (4) $T_j = -40\text{ }^\circ\text{C}$

Fig. 5. Forward current as a function of forward voltage; typical values



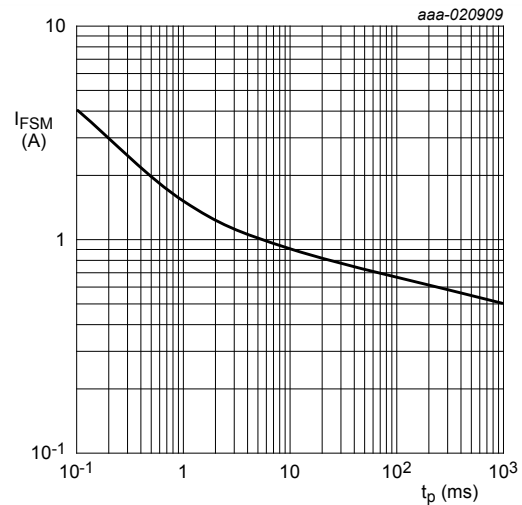
- $V_R = 75\text{ V}$
- (1) Maximum values
 - (2) Typical values

Fig. 6. Reverse current as a function of junction temperature



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

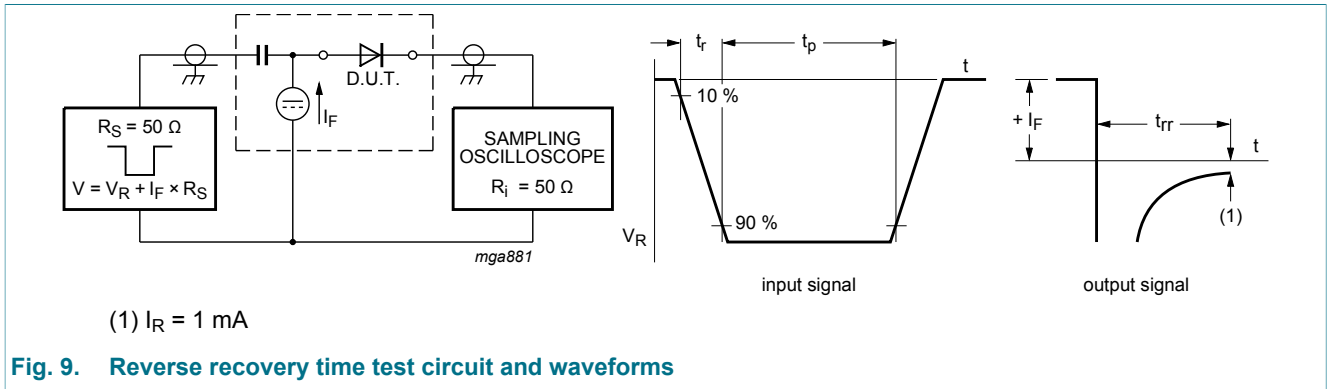
Fig. 7. Diode capacitance as a function of reverse voltage; typical values



Based on square wave currents.
 $T_{amb} = 25\text{ }^\circ\text{C}$

Fig. 8. Non-repetitive forward current as a function of pulse duration; maximum values

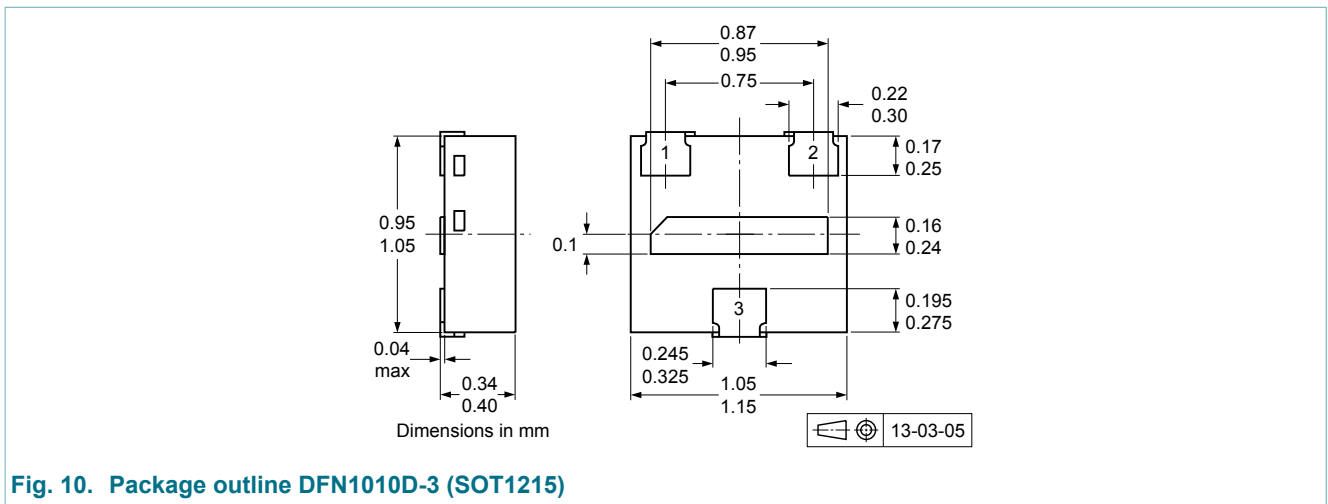
11. Test information



11.1 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



14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------|--------------|--------------------|---------------|------------|
| BAV170QA v.1 | 20160503 | Product data sheet | - | - |

15. Legal information

15.1 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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