



PMBT2907AYS

60V, 600 mA, double PNP switching transistor

26 June 2015

Product data sheet

1. General description

Double PNP switching transistor in a very small SOT363 (TSSOP6) Surface-Mounted Device (SMD) plastic package.

Double NPN complement: PMBT2222AYS

2. Features and benefits

- Double general-purpose switching transistor
- AEC-Q101 qualified

3. Applications

- Switching and linear amplification

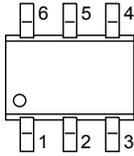
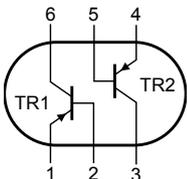
4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------------------|---------------------------|---|-----|-----|------|------|
| Per transistor | | | | | | |
| h_{FE} | DC current gain | $V_{CE} = -10\text{ V}; I_C = -150\text{ mA}; t_p \leq 300\text{ }\mu\text{s};$ $\delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$ | 100 | - | 300 | |
| Per transistor | | | | | | |
| V_{CEO} | collector-emitter voltage | open base | - | - | -60 | V |
| I_C | collector current | | - | - | -600 | mA |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|---------------|--|---|
| 1 | E | emitter TR1 |  <p>TSSOP6 (SOT363)</p> |  <p>sym018</p> |
| 2 | B | base TR1 | | |
| 3 | C | collector TR2 | | |
| 4 | E | emitter TR2 | | |
| 5 | B | base TR2 | | |
| 6 | C | collector TR1 | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|--|---------|
| | Name | Description | Version |
| PMBT2907AYS | TSSOP6 | plastic surface-mounted package; 6 leads | SOT363 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PMBT2907AYS | BH% [1] |

[1] % = placeholder for manufacturing site code

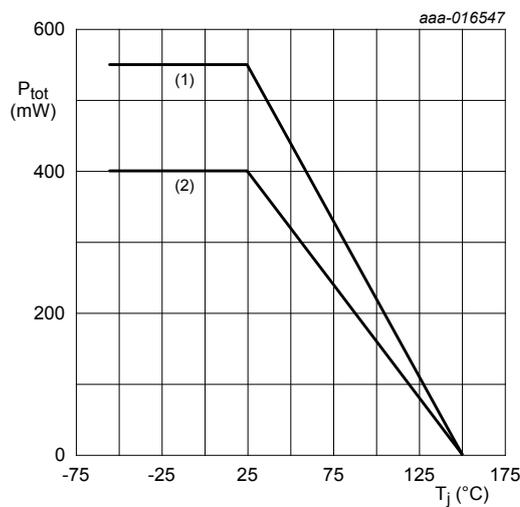
8. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|-----------------------|---------------------------|-------------------------------------|-----|-----|------|------|
| Per transistor | | | | | | |
| V _{CBO} | collector-base voltage | open emitter | | - | -60 | V |
| V _{CEO} | collector-emitter voltage | open base | | - | -60 | V |
| V _{EBO} | emitter-base voltage | open collector | | - | -5 | V |
| I _C | collector current | | | - | -600 | mA |
| I _{CM} | peak collector current | single pulse; t _p ≤ 1 ms | | - | -800 | mA |
| I _{BM} | peak base current | | | - | -200 | mA |
| P _{tot} | total power dissipation | T _{amb} ≤ 25 °C | [1] | - | 250 | mW |
| | | | [2] | - | 300 | mW |
| Per device | | | | | | |
| P _{tot} | total power dissipation | T _{amb} ≤ 25 °C | [1] | - | 400 | mW |
| | | | [2] | - | 550 | 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 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for collector 1 cm²



- (1) FR4 PCB; mounting pad for collector 1 cm²
- (2) FR4 PCB; standard footprint

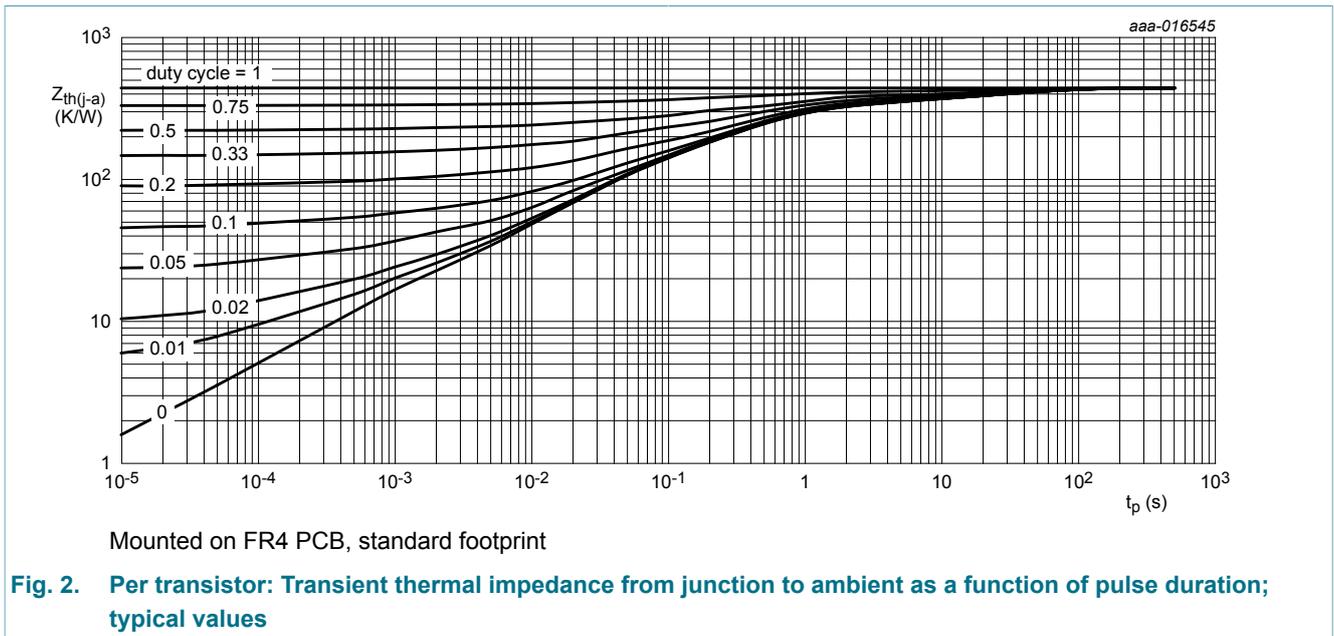
Fig. 1. Per device: Power derating curves SOT363 (SC-88)

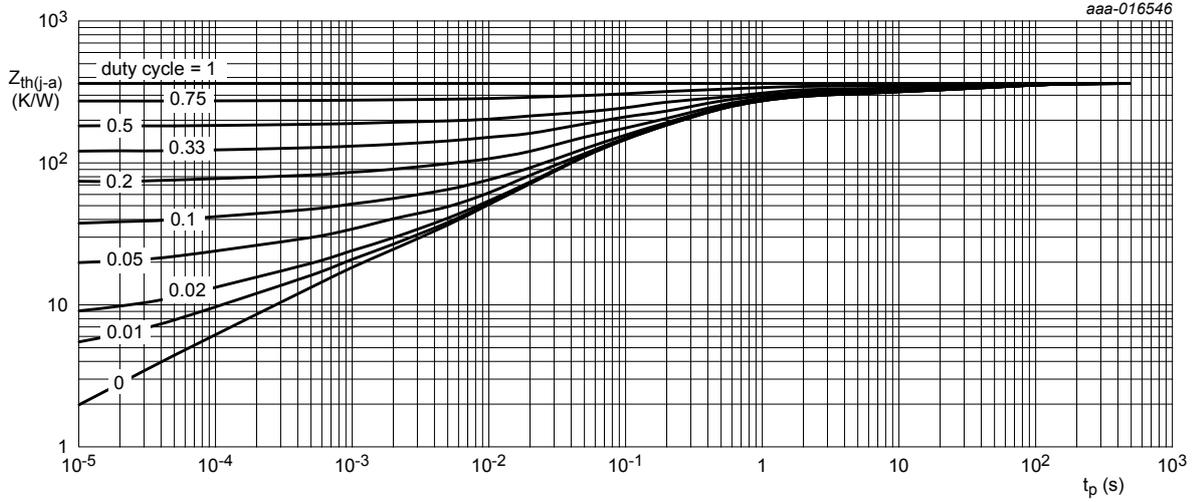
9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|-----------------------|---|-------------|-----|-----|-----|-----|------|
| Per transistor | | | | | | | |
| R _{th(j-a)} | thermal resistance from junction to ambient | in free air | [1] | - | - | 500 | K/W |
| | | | [2] | - | - | 417 | K/W |
| Per device | | | | | | | |
| R _{th(j-a)} | thermal resistance from junction to ambient | in free air | [1] | - | - | 313 | K/W |
| | | | [2] | - | - | 227 | K/W |

- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint
- [2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for collector 1 cm²





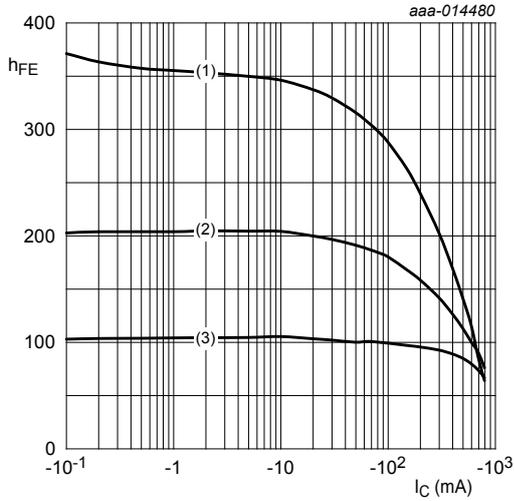
FR4 PCB, mounting pad for collector 1 cm²

Fig. 3. Per Transistor: Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

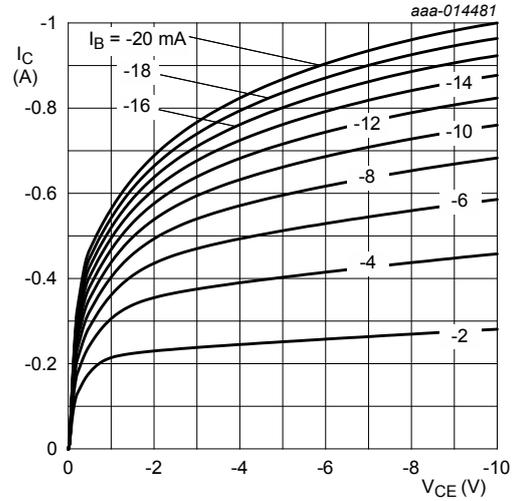
Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------------------|--------------------------------------|--|---|-----|------|------|
| Per transistor | | | | | | |
| I _{CBO} | collector-base cut-off current | V _{CB} = -50 V; I _E = 0 A; T _{amb} = 25 °C | - | - | -10 | nA |
| | | V _{CB} = -50 V; I _E = 0 A; T _j = 125 °C | - | - | -10 | μA |
| I _{EBO} | emitter-base cut-off current | V _{EB} = -5 V; I _C = 0 A; T _{amb} = 25 °C | - | - | -50 | nA |
| h _{FE} | DC current gain | V _{CE} = -10 V; I _C = -0.1 mA; T _{amb} = 25 °C | 75 | - | - | |
| | | V _{CE} = -10 V; I _C = -1 mA; T _{amb} = 25 °C | 100 | - | - | |
| | | V _{CE} = -10 V; I _C = -10 mA; T _{amb} = 25 °C | 100 | - | - | |
| | | V _{CE} = -10 V; I _C = -150 mA; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | 100 | - | 300 | |
| | | V _{CE} = -10 V; I _C = -500 mA; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | 50 | - | - | |
| V _{CEsat} | collector-emitter saturation voltage | I _C = -150 mA; I _B = -15 mA; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | - | - | -400 | mV |
| | | I _C = -500 mA; I _B = -50 mA; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | - | - | -1.6 | V |
| V _{BEsat} | base-emitter saturation voltage | I _C = -150 mA; I _B = -15 mA; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | - | - | -1.3 | V |
| | | I _C = -500 mA; I _B = -50 mA; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | - | - | -2.6 | V |
| t _d | delay time | I _C = -150 mA; I _{Bon} = -15 mA; I _{Boff} = 15 mA; T _{amb} = 25 °C | - | - | 12 | ns |
| t _r | rise time | | - | - | 30 | ns |
| t _{on} | turn-on time | | - | - | 40 | ns |
| t _s | storage time | | - | - | 300 | ns |
| t _f | fall time | | - | - | 65 | ns |
| t _{off} | turn-off time | | - | - | 365 | ns |
| C _C | collector capacitance | | V _{CB} = -10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C | - | - | 8 |
| C _E | emitter capacitance | V _{EB} = -2 V; I _C = 0 A; i _c = 0 A; f = 1 MHz; T _{amb} = 25 °C | - | - | 30 | pF |
| f _T | transition frequency | V _{CE} = -20 V; I _C = -50 mA; f = 100 MHz; T _{amb} = 25 °C | 200 | - | - | MHz |



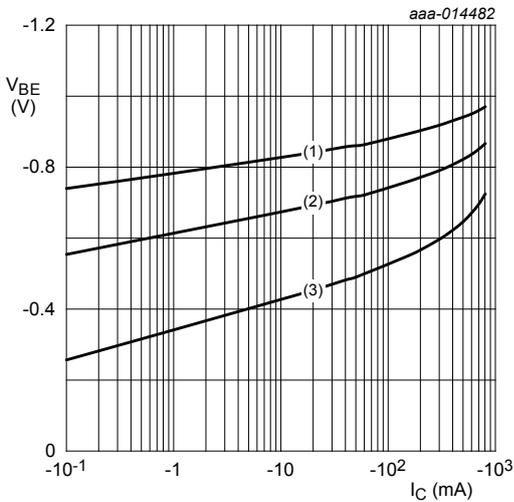
$V_{CE} = -10\text{ V}$
 (1) $T_{amb} = 150\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = -55\text{ }^\circ\text{C}$

Fig. 4. DC current gain as a function of collector current; typical values



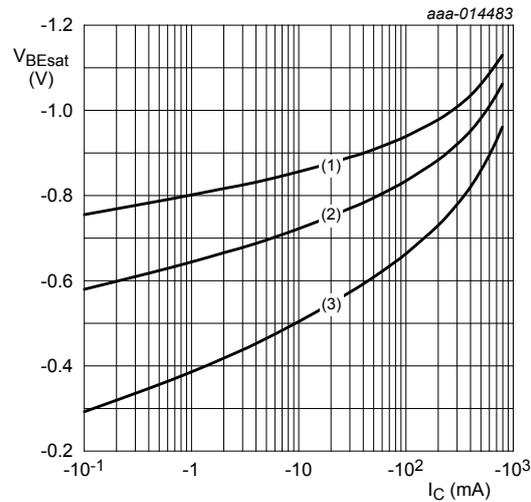
$T_{amb} = 25\text{ }^\circ\text{C}$

Fig. 5. Collector current as a function of collector-emitter voltage; typical values



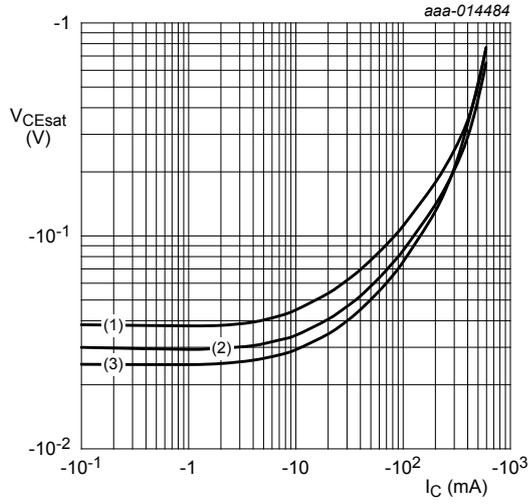
$V_{CE} = -10\text{ V}$
 (1) $T_{amb} = -55\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = 150\text{ }^\circ\text{C}$

Fig. 6. Base-emitter voltage as a function of collector current; typical values



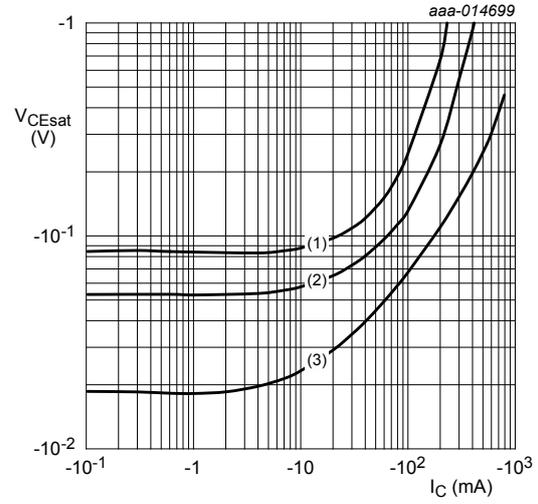
$I_C/I_B = 10$
 (1) $T_{amb} = -55\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = 150\text{ }^\circ\text{C}$

Fig. 7. Base-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 20$
 (1) $T_{amb} = 150\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values



$T_{amb} = 25\text{ °C}$
 (1) $I_C/I_B = 100$
 (2) $I_C/I_B = 50$
 (3) $I_C/I_B = 10$

Fig. 9. Collector-emitter saturation voltage as a function of collector current; typical values

11. Test information

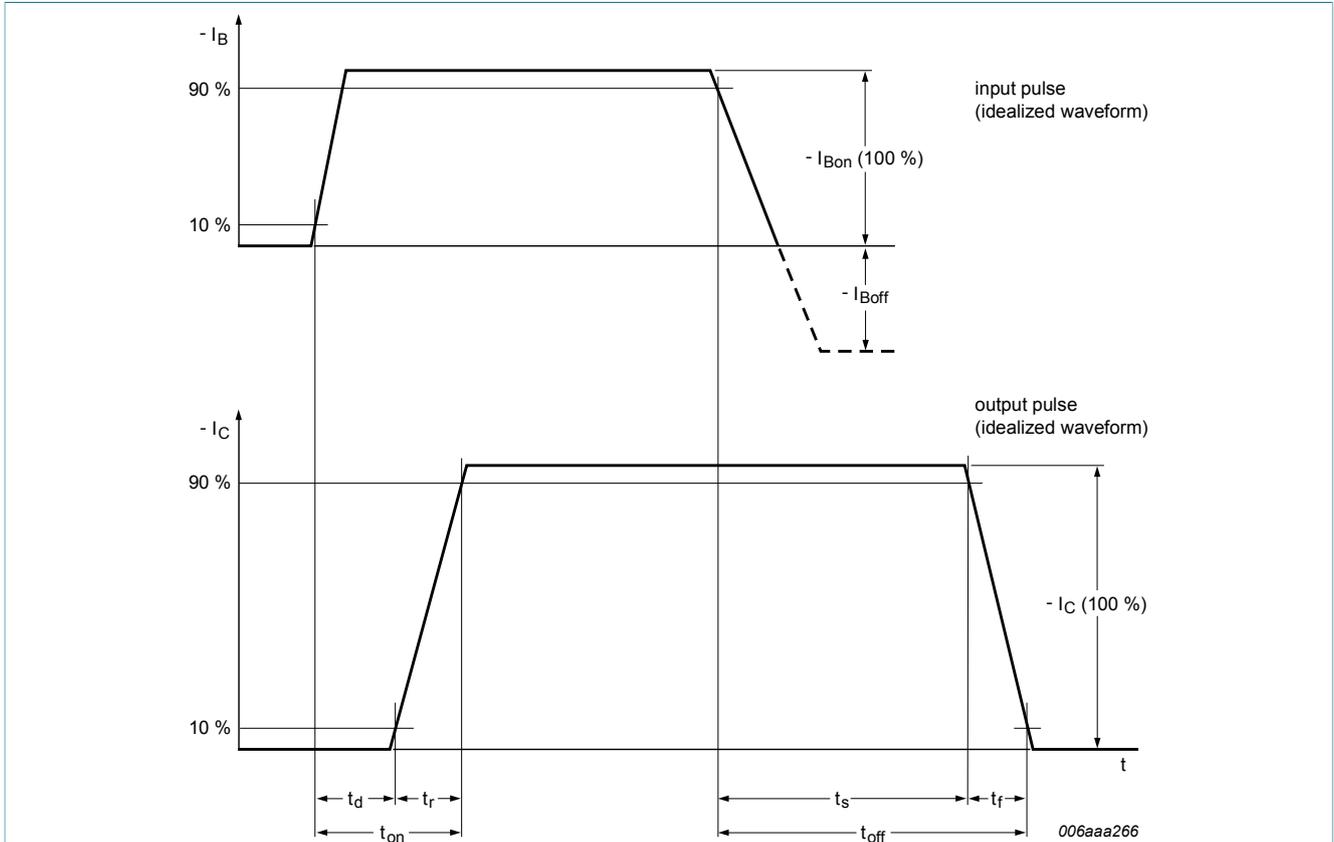


Fig. 10. BISS transistor switching time definition

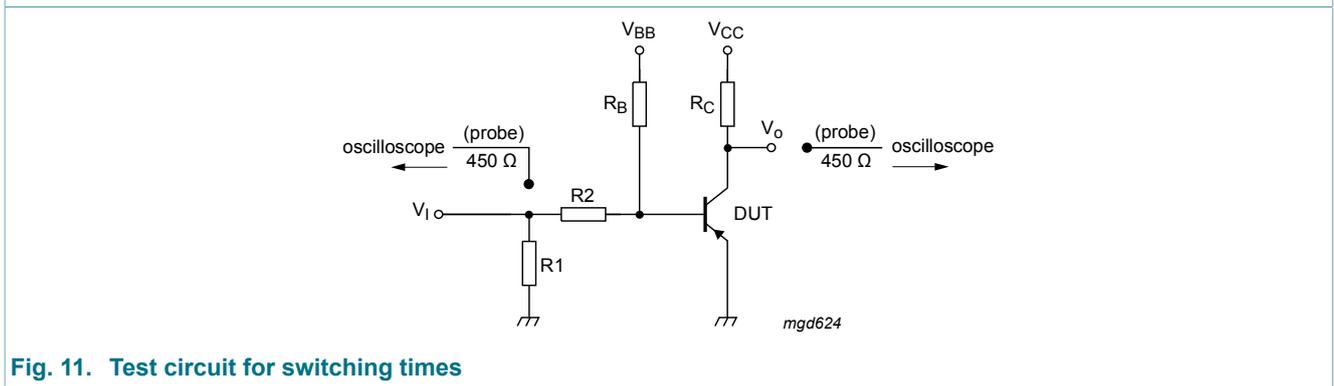


Fig. 11. Test circuit for switching times

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

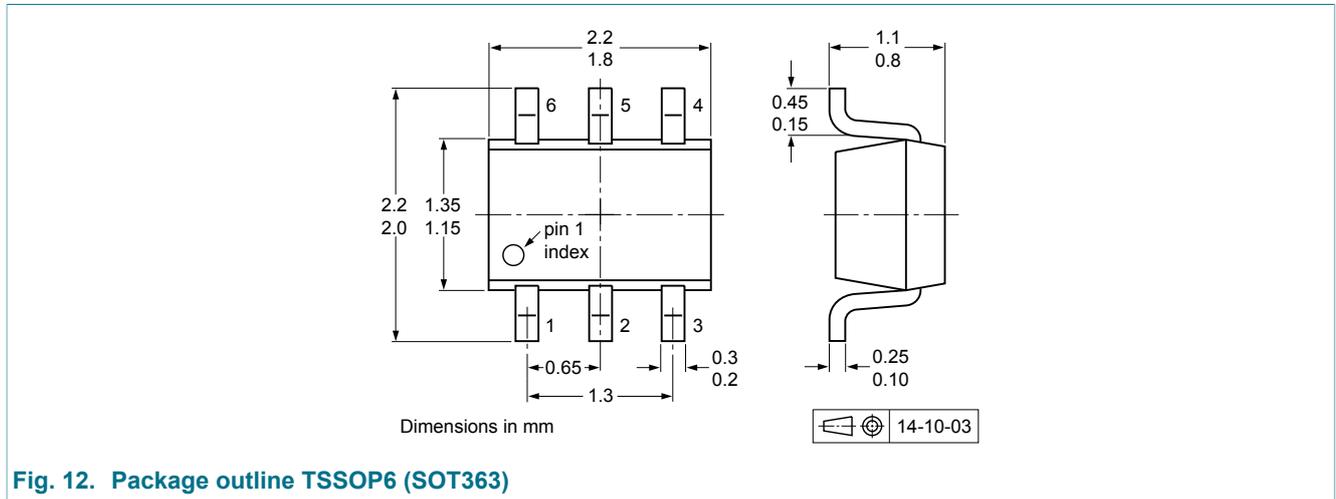


Fig. 12. Package outline TSSOP6 (SOT363)

13. Soldering

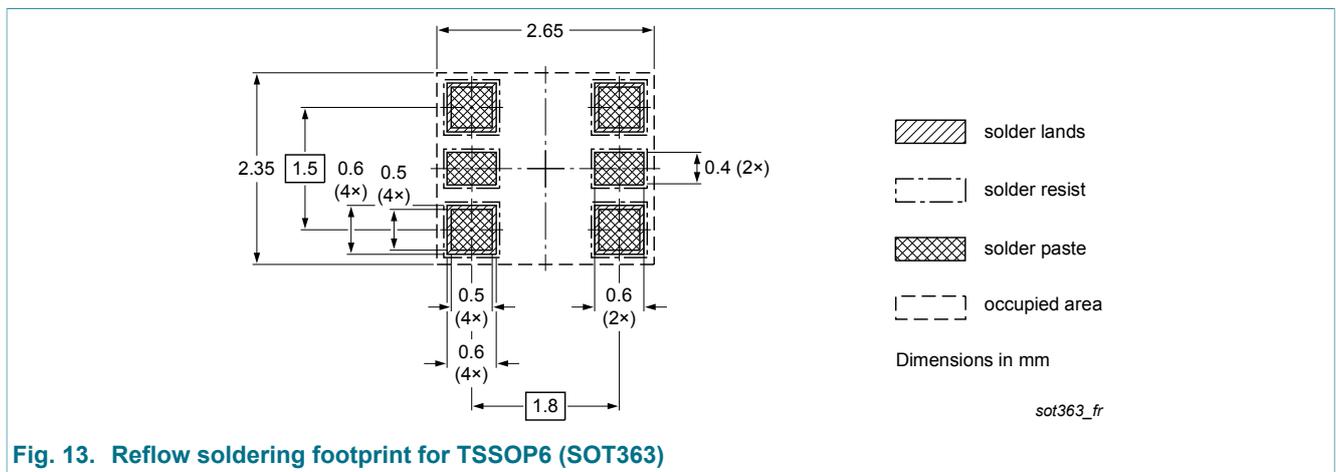


Fig. 13. Reflow soldering footprint for TSSOP6 (SOT363)

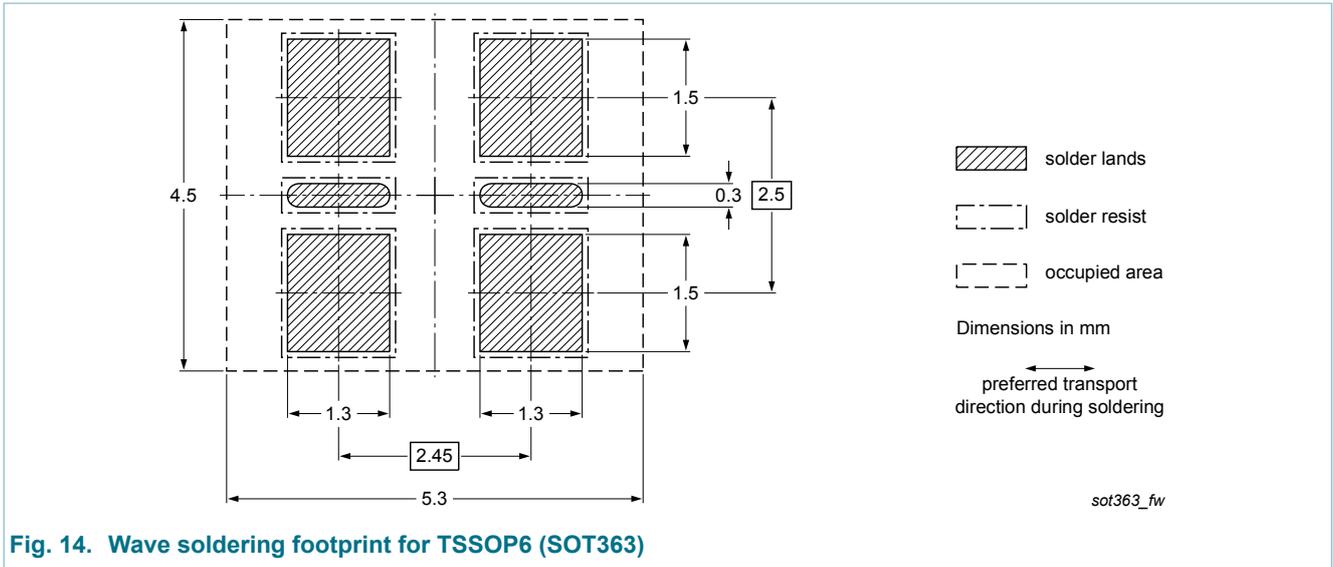


Fig. 14. Wave soldering footprint for TSSOP6 (SOT363)

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|-----------------|--------------|--------------------|---------------|------------|
| PMBT2907AYS v.1 | 20150626 | 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. |

- [1] Please consult the most recently issued document before initiating or completing a design.
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