



# PMBT2222AYS-Q

40 V, 600 mA, double NPN switching transistor

16 July 2026

Product data sheet

## 1. General description

Double NPN switching transistor in a very small SOT363-3 (SC-88) Surface-Mounted Device (SMD) plastic package.

Double PNP complement: PMBT2907AYS-Q

## 2. Features and benefits

- Double general-purpose switching transistor
- High current (max. 600 mA)
- Voltage max. 40 V
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- Switching and linear amplification

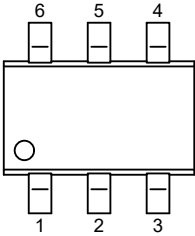
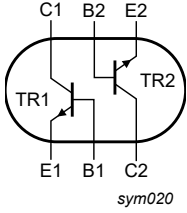
## 4. Quick reference data

Table 1. Quick reference data

| Symbol                | Parameter                 | Conditions                                                                                                                         | Min | Typ | Max | Unit |
|-----------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------|
| <b>Per transistor</b> |                           |                                                                                                                                    |     |     |     |      |
| $V_{CEO}$             | collector-emitter voltage | open base                                                                                                                          | -   | -   | 40  | V    |
| $I_C$                 | collector current         |                                                                                                                                    | -   | -   | 600 | mA   |
| $h_{FE}$              | 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 |      |
|                       |                           | $V_{CE} = 10\text{ V}; I_C = 500\text{ mA}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$ | 40  | -   | -   |      |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description   | Simplified outline                                                                                                                                | Graphic symbol                                                                                    |
|-----|--------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| 1   | E      | emitter TR1   |  <p>Transparent<br/>top view</p> <p><b>TSSOP6 (SOT363-3)</b></p> |  <p>sym020</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  |
| PMBT2222AYS-Q | TSSOP6  | Plastic surface-mounted package; 6 leads | SOT363-3 |

7. Marking

Table 4. Marking codes

| Type number   | Marking code[1] |
|---------------|-----------------|
| PMBT2222AYS-Q | BF%             |

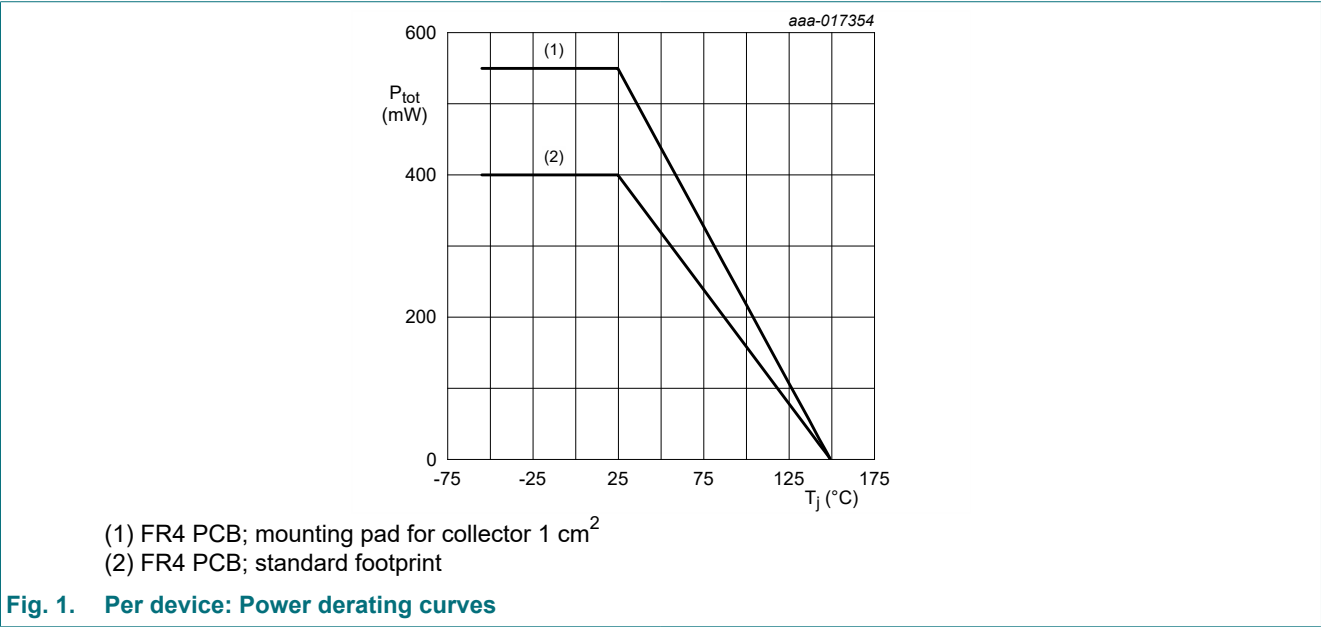
[1] % = placeholder for manufacturing site code

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 <sub>CBO</sub> | collector-base voltage    | open emitter                        |     | -   | 75  | V    |
| V <sub>CEO</sub> | collector-emitter voltage | open base                           |     | -   | 40  | V    |
| V <sub>EBO</sub> | emitter-base voltage      | open collector                      |     | -   | 6   | V    |
| I <sub>C</sub>   | collector current         | single pulse; t <sub>p</sub> ≤ 1 ms |     | -   | 600 | mA   |
| I <sub>CM</sub>  | peak collector current    |                                     |     | -   | 800 | mA   |
| I <sub>BM</sub>  | peak base current         |                                     |     | -   | 200 | mA   |
| P <sub>tot</sub> | total power dissipation   | T <sub>amb</sub> ≤ 25 °C            | [1] | -   | 250 | mW   |
|                  |                           |                                     | [2] | -   | 300 | mW   |
| Per device       |                           |                                     |     |     |     |      |
| P <sub>tot</sub> | total power dissipation   | T <sub>amb</sub> ≤ 25 °C            | [1] | -   | 400 | mW   |
|                  |                           |                                     | [2] | -   | 550 | mW   |
| T <sub>j</sub>   | junction temperature      |                                     |     | -   | 150 | °C   |
| T <sub>amb</sub> | ambient temperature       |                                     |     | -55 | 150 | °C   |
| T <sub>stg</sub> | 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 and mounting pad for collector 1 cm<sup>2</sup>.



9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol               | Parameter                                   | Conditions  |     | Min | Typ | Max | Unit |
|----------------------|---------------------------------------------|-------------|-----|-----|-----|-----|------|
| Per transistor       |                                             |             |     |     |     |     |      |
| R <sub>th(j-a)</sub> | thermal resistance from junction to ambient | in free air | [1] | -   | -   | 500 | K/W  |
|                      |                                             |             | [2] | -   | -   | 417 | K/W  |
| Per device           |                                             |             |     |     |     |     |      |
| R <sub>th(j-a)</sub> | 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 PCB; single-sided copper; tin-plated and mounting pad for collector 1 cm<sup>2</sup>.

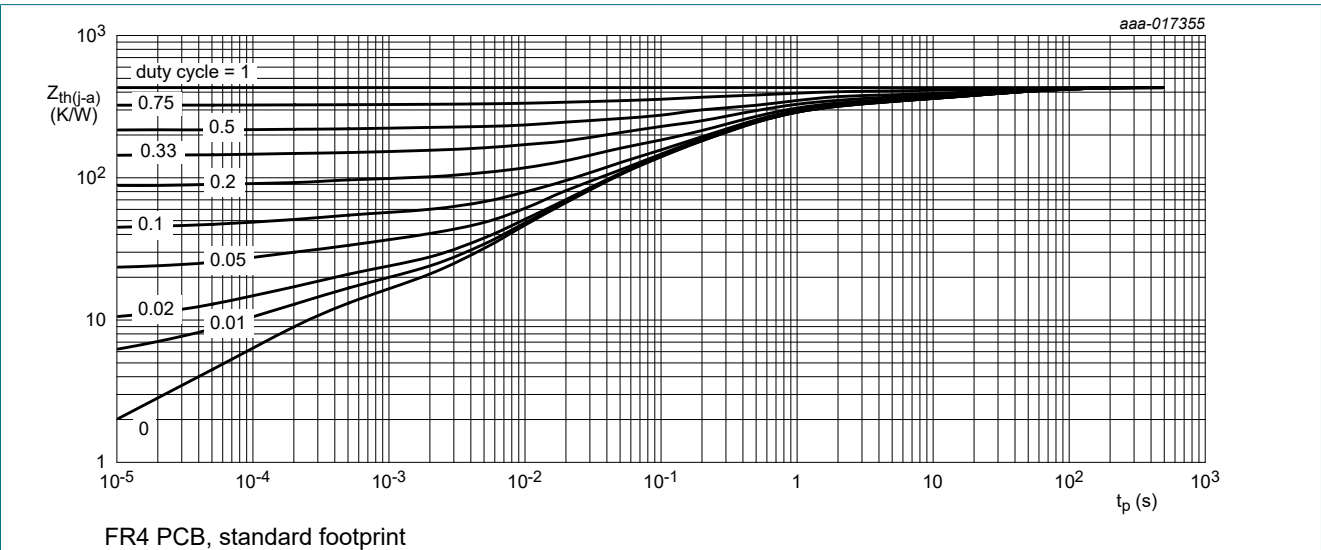


Fig. 2. Per transistor: Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

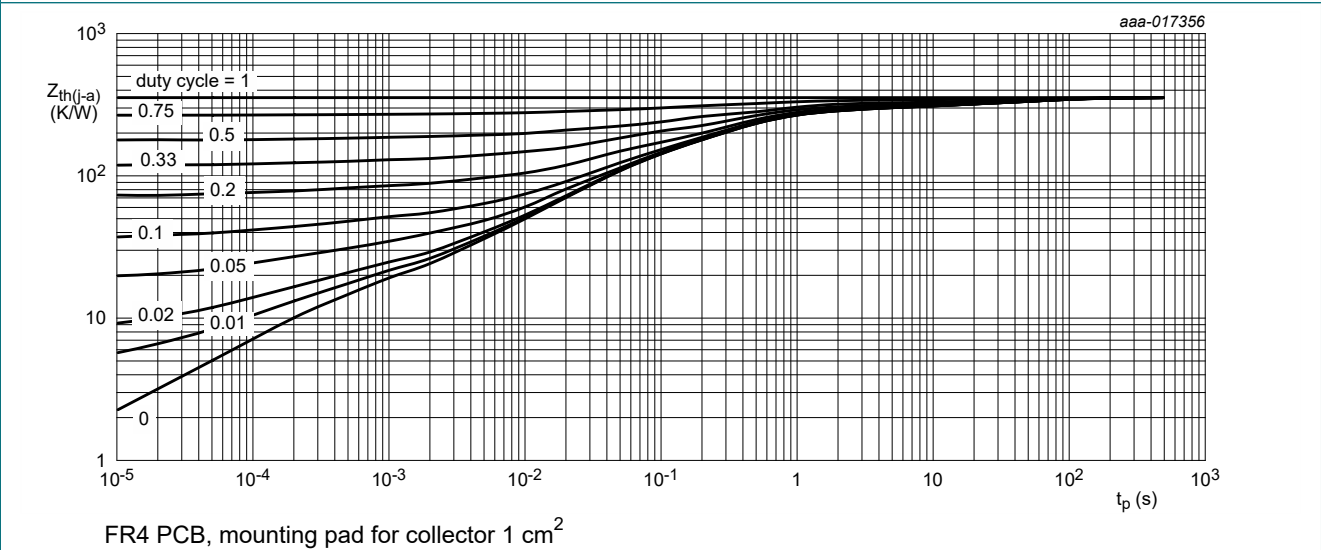


Fig. 3. Per Transistor: Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

| Symbol             | Parameter                            | Conditions                                                                                                   |  | Min | Typ | Max | Unit |
|--------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------|--|-----|-----|-----|------|
| Per transistor     |                                      |                                                                                                              |  |     |     |     |      |
| I <sub>CBO</sub>   | collector-base cut-off current       | V <sub>CB</sub> = 60 V; I <sub>E</sub> = 0 A; T <sub>amb</sub> = 25 °C                                       |  | -   | -   | 10  | nA   |
|                    |                                      | V <sub>CB</sub> = 60 V; I <sub>E</sub> = 0 A; T <sub>j</sub> = 125 °C                                        |  | -   | -   | 10  | µA   |
| I <sub>EBO</sub>   | emitter-base cut-off current         | V <sub>EB</sub> = 5 V; I <sub>C</sub> = 0 A; T <sub>amb</sub> = 25 °C                                        |  | -   | -   | 10  | nA   |
| h <sub>FE</sub>    | DC current gain                      | V <sub>CE</sub> = 10 V; I <sub>C</sub> = 0.1 mA; T <sub>amb</sub> = 25 °C                                    |  | 35  | -   | -   |      |
|                    |                                      | V <sub>CE</sub> = 10 V; I <sub>C</sub> = 1 mA; T <sub>amb</sub> = 25 °C                                      |  | 50  | -   | -   |      |
|                    |                                      | V <sub>CE</sub> = 10 V; I <sub>C</sub> = 10 mA; T <sub>amb</sub> = 25 °C                                     |  | 75  | -   | -   |      |
|                    |                                      | V <sub>CE</sub> = 10 V; I <sub>C</sub> = 150 mA; t <sub>p</sub> ≤ 300 µs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C |  | 100 | -   | 300 |      |
|                    |                                      | V <sub>CE</sub> = 1 V; I <sub>C</sub> = 150 mA; t <sub>p</sub> ≤ 300 µs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C  |  | 50  | -   | -   |      |
|                    |                                      | V <sub>CE</sub> = 10 V; I <sub>C</sub> = 500 mA; t <sub>p</sub> ≤ 300 µs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C |  | 40  | -   | -   |      |
| V <sub>CEsat</sub> | collector-emitter saturation voltage | I <sub>C</sub> = 150 mA; I <sub>B</sub> = 15 mA; t <sub>p</sub> ≤ 300 µs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C |  | -   | -   | 300 | mV   |
|                    |                                      | I <sub>C</sub> = 500 mA; I <sub>B</sub> = 50 mA; t <sub>p</sub> ≤ 300 µs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C |  | -   | -   | 1   | V    |
| V <sub>BEsat</sub> | base-emitter saturation voltage      | I <sub>C</sub> = 150 mA; I <sub>B</sub> = 15 mA; t <sub>p</sub> ≤ 300 µs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C |  | 0.6 | -   | 1.2 | V    |
|                    |                                      | I <sub>C</sub> = 500 mA; I <sub>B</sub> = 50 mA; t <sub>p</sub> ≤ 300 µs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C |  | -   | -   | 2   | V    |
| t <sub>d</sub>     | delay time                           | I <sub>C</sub> = 150 mA; I <sub>Bon</sub> = 15 mA; I <sub>Boff</sub> = -15 mA; T <sub>amb</sub> = 25 °C      |  | -   | -   | 10  | ns   |
| t <sub>r</sub>     | rise time                            |                                                                                                              |  | -   | -   | 25  | ns   |
| t <sub>on</sub>    | turn-on time                         |                                                                                                              |  | -   | -   | 35  | ns   |
| t <sub>s</sub>     | storage time                         |                                                                                                              |  | -   | -   | 200 | ns   |
| t <sub>f</sub>     | fall time                            |                                                                                                              |  | -   | -   | 60  | ns   |
| t <sub>off</sub>   | turn-off time                        |                                                                                                              |  | -   | -   | 250 | ns   |
| C <sub>c</sub>     | collector capacitance                | V <sub>CB</sub> = 10 V; I <sub>E</sub> = 0 A; i <sub>e</sub> = 0 A; f = 1 MHz; T <sub>amb</sub> = 25 °C      |  | -   | -   | 8   | pF   |
| C <sub>e</sub>     | emitter capacitance                  | V <sub>EB</sub> = 500 mV; I <sub>C</sub> = 0 A; f = 1 MHz; T <sub>amb</sub> = 25 °C                          |  | -   | -   | 25  | pF   |
| f <sub>T</sub>     | transition frequency                 | V <sub>CE</sub> = 20 V; I <sub>C</sub> = 20 mA; f = 100 MHz; T <sub>amb</sub> = 25 °C                        |  | 300 | -   | -   | MHz  |
| NF                 | noise figure                         | V <sub>CE</sub> = 5 V; I <sub>C</sub> = 100 µA; R <sub>S</sub> = 1 kΩ; f = 1 kHz                             |  | -   | -   | 4   | dB   |

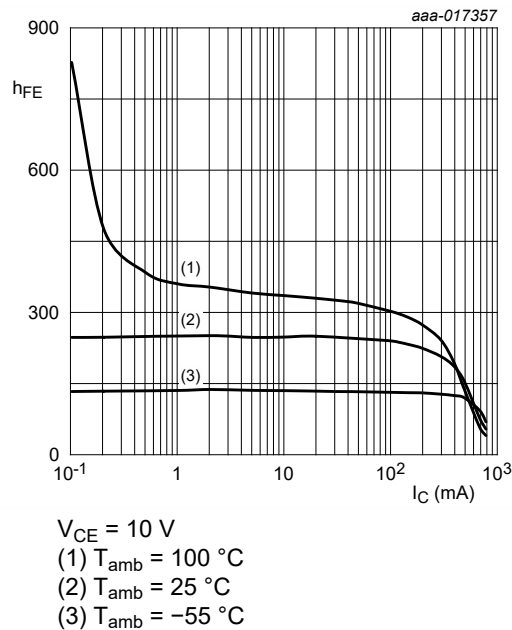


Fig. 4. DC current gain as a function of collector current; typical values

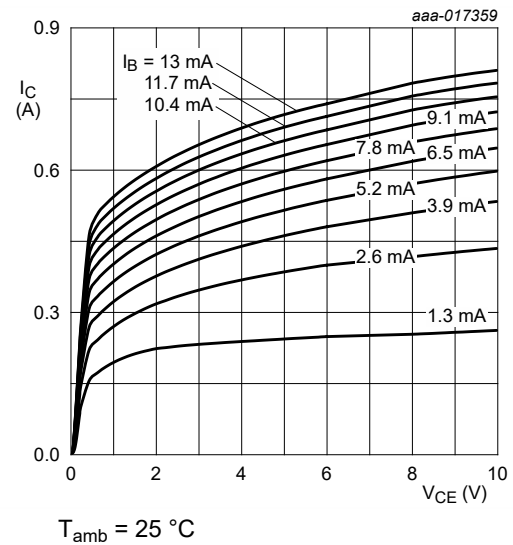


Fig. 5. Collector current as a function of collector-emitter voltage; typical values

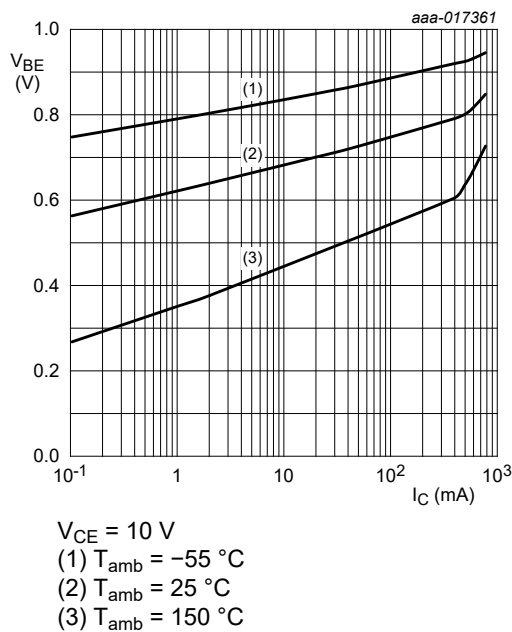


Fig. 6. Base-emitter voltage as a function of collector current; typical values

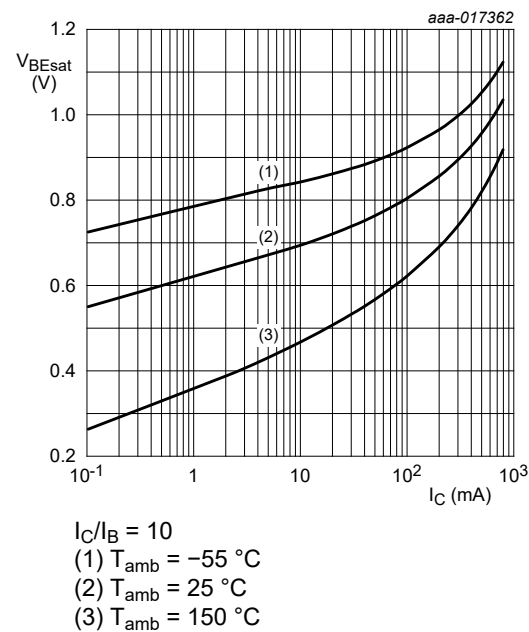
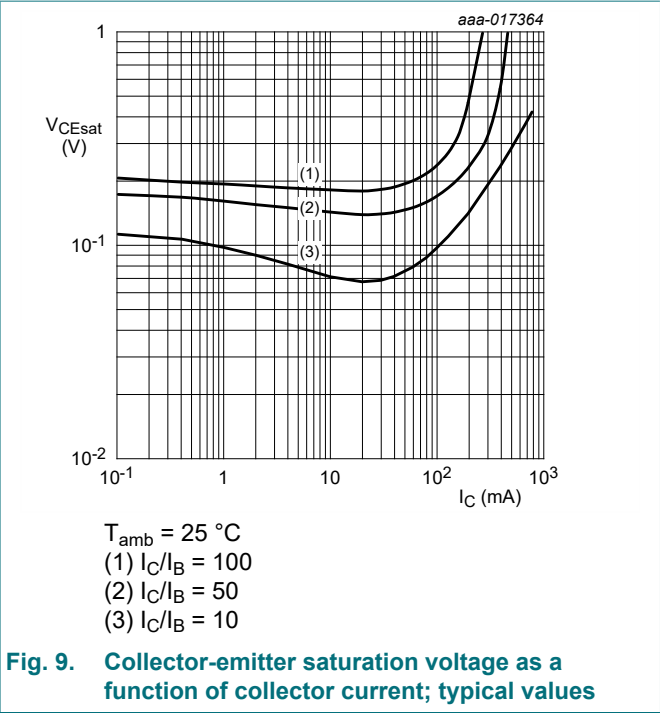
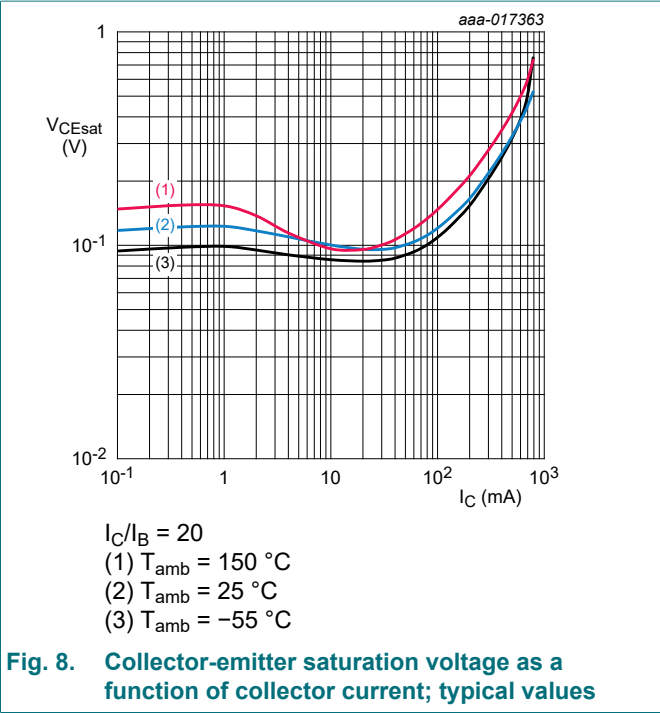


Fig. 7. Base-emitter saturation voltage as a function of collector current; typical values



11. Test information

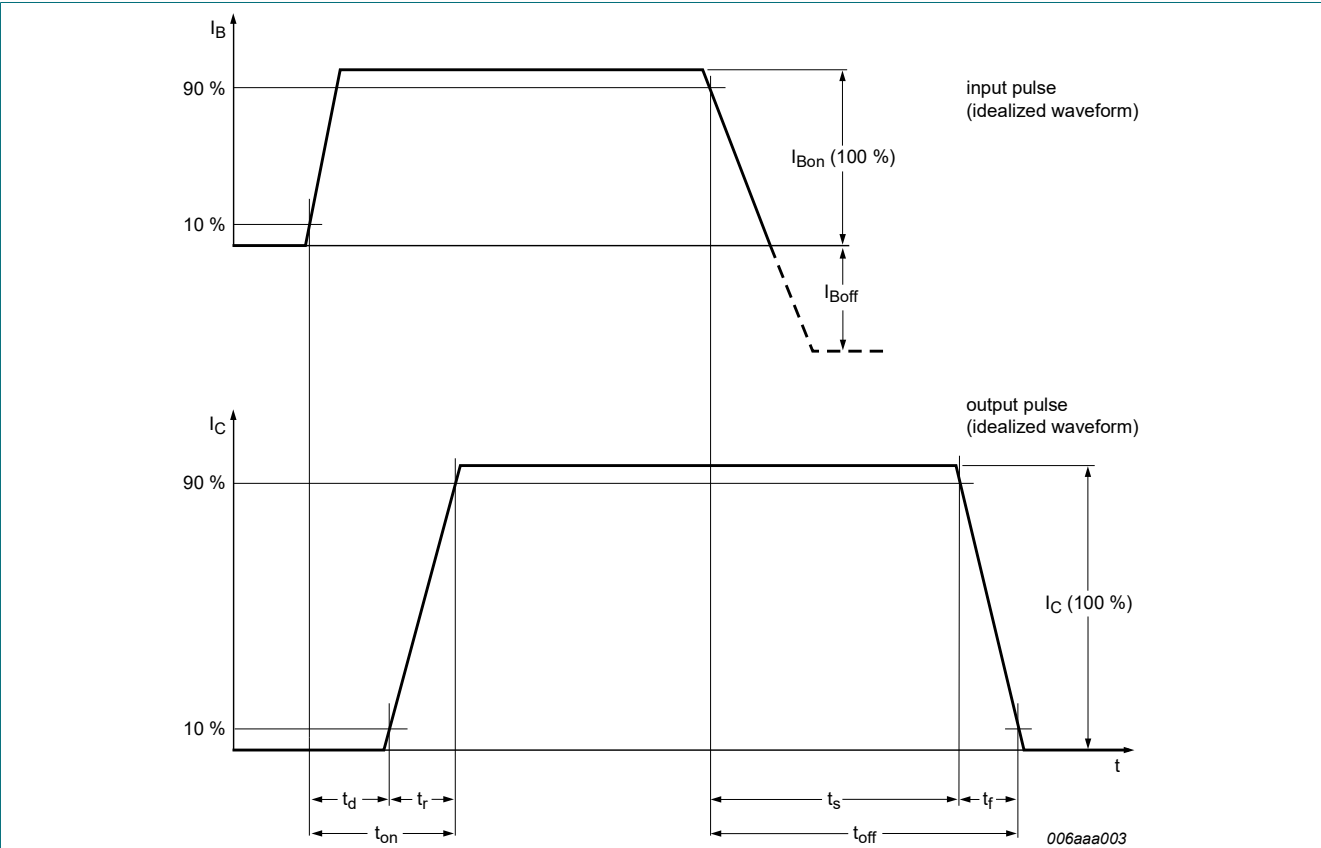


Fig. 10. Switching time definition

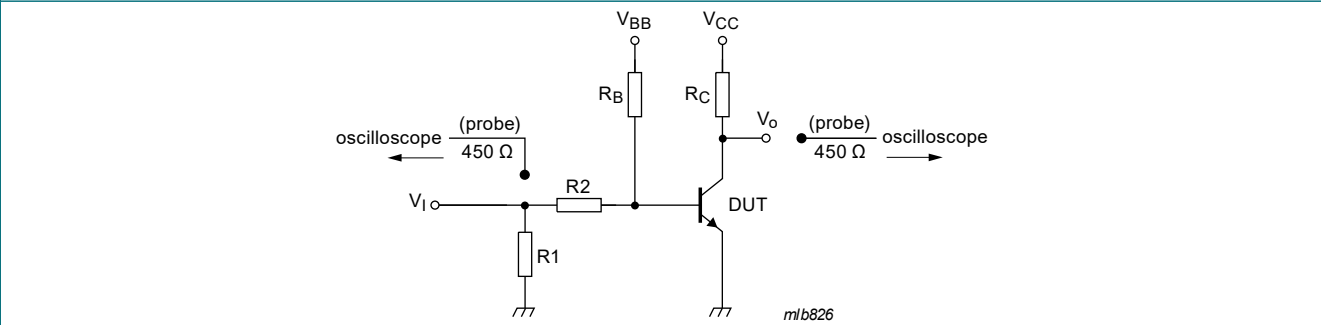
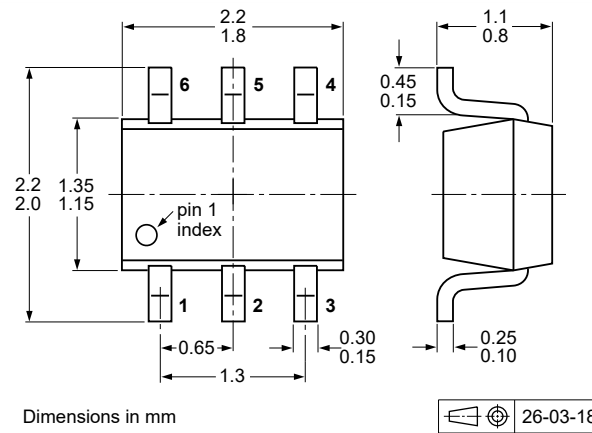


Fig. 11. Test circuit for switching times

Quality information

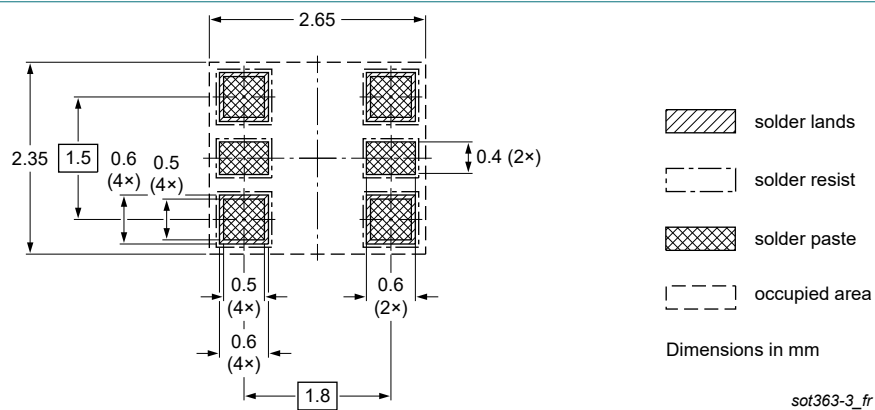
This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

## 12. Package outline

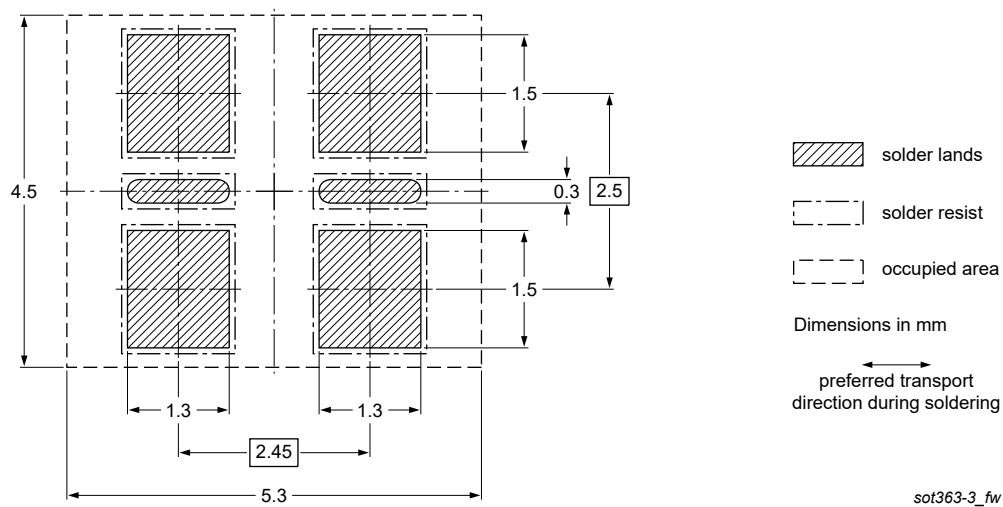


**Fig. 12. Package outline TSSOP6 (SOT363-3)**

## 13. Soldering



**Fig. 13. Reflow soldering footprint for TSSOP6 (SOT363-3)**



**Fig. 14. Wave soldering footprint for TSSOP6 (SOT363-3)**

14. Revision history

Table 8. Revision history

| Data sheet ID     | Release date                              | Data sheet status  | Change notice | Supersedes        |
|-------------------|-------------------------------------------|--------------------|---------------|-------------------|
| PMBT2222AYS-Q v.2 | 20260716                                  | Product data sheet | -             | PMBT2222AYS-Q v.1 |
| Modifications:    | • Package changed from SOT363 to SOT363-3 |                    |               |                   |
| PMBT2222AYS-Q v.1 | 20230828                                  | 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.
- [2] The term 'short data sheet' is explained in section "Definitions".
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