
# PMST2907A-Q

## 60 V, 600 mA PNP switching transistor

22 June 2023 **Product data sheet**

## 1. General description

PNP switching transistor in a very small SOT323 (SC-70) Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- General purpose switching transistor
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- Switching and linear amplification

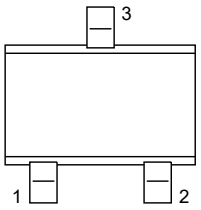
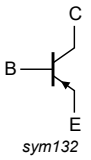
## 4. Quick reference data

**Table 1. Quick reference data**

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

## 5. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | B | base |  |  |
| 2 | E | emitter | | |
| 3 | C | collector | | |



**SC-70 (SOT323)**



*sym132*

# 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| PMST2907A-Q | SC-70 | plastic, surface-mounted package; 3 leads; 1.3 mm pitch; 2 mm x 1.25 mm x 0.95 mm body | SOT323 |

# 7. Marking

**Table 4. Marking codes**

| Type number | Marking code[1] |
|---|---|
| PMST2907A-Q | %2F |

[1] % = placeholder for manufacturing site code

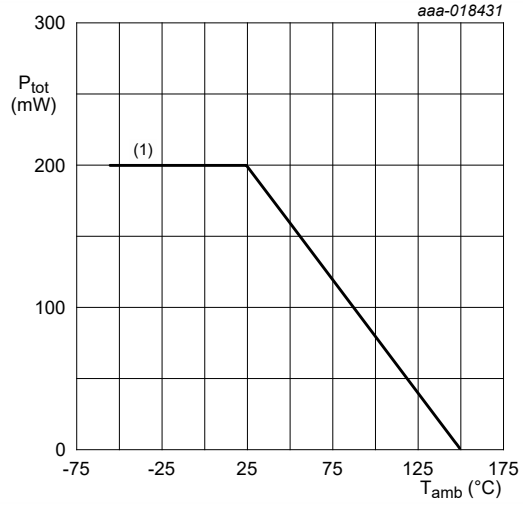
# 8. Limiting values

**Table 5. Limiting values**

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

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CBO}$ | 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; $t_p \leq 1$ ms | | - | -800 | mA |
| $I_{BM}$ | peak base current | | | - | -200 | mA |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C | [1] | - | 200 | mW |

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




(1) FR4 PCB; standard footprint

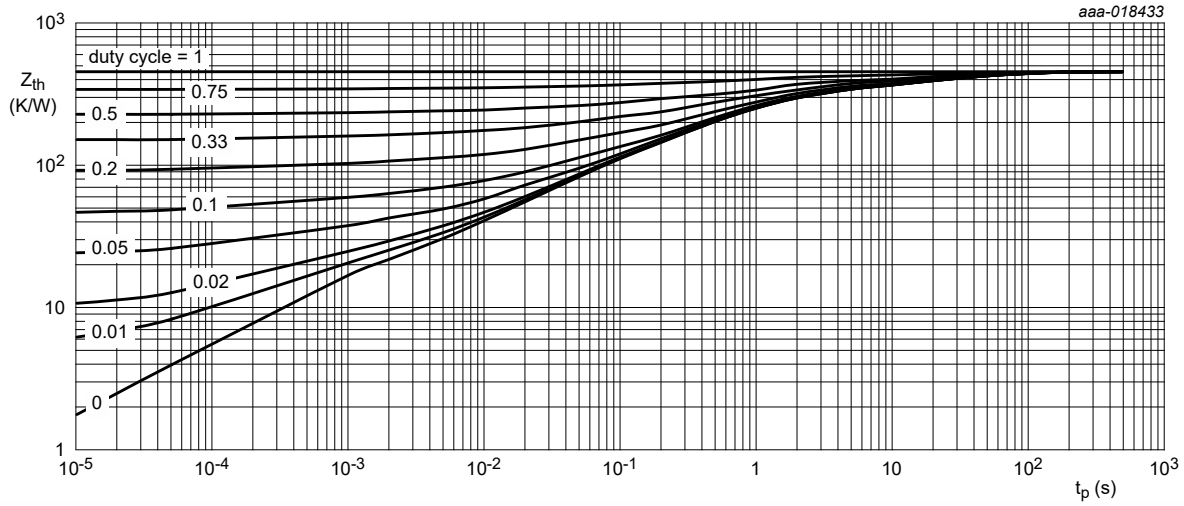
**Fig. 1. Power derating curve**

# 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] | - | - | 625 | K/W |

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



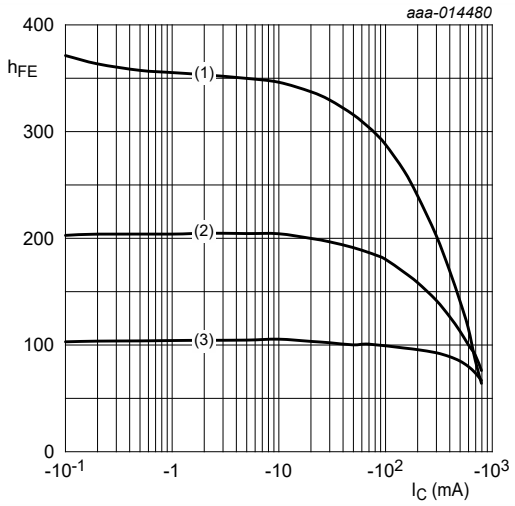

Mounted on FR4 PCB; standard footprint

**Fig. 2. Transient thermal impedance as a function of pulse time; typical values**

## 10. Characteristics

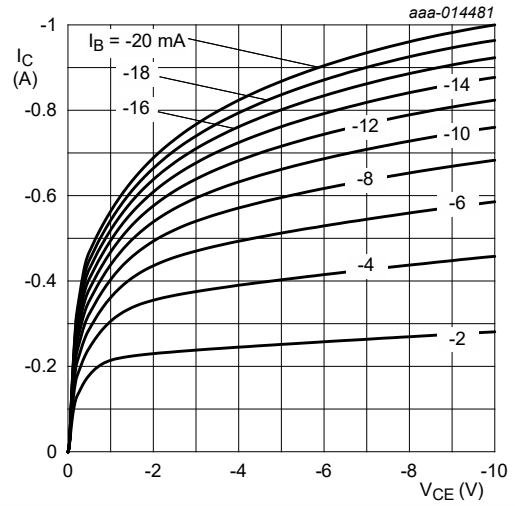
**Table 7. Characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_{CBO}$ | 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 | $V_{EB}$ = -3 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; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_{amb}$ = 25 °C | | 100 | - | - | |
| | | $V_{CE}$ = -10 V; $I_C$ = -150 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_{amb}$ = 25 °C | | 100 | - | 300 | |
| | | $V_{CE}$ = -10 V; $I_C$ = -500 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_{amb}$ = 25 °C | | 50 | - | - | |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C$ = -150 mA; $I_B$ = -15 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_{amb}$ = 25 °C | | - | - | -400 | mV |
| | | $I_C$ = -500 mA; $I_B$ = -50 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_{amb}$ = 25 °C | | - | - | -1.6 | V |
| $V_{BEsat}$ | base-emitter saturation voltage | $I_C$ = -150 mA; $I_B$ = -15 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_{amb}$ = 25 °C | | - | - | -1.3 | V |
| | | $I_C$ = -500 mA; $I_B$ = -50 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 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 | | - | - | 15 | ns |
| $t_r$ | rise time | | | - | - | 35 | ns |
| $t_{on}$ | turn-on time | | | - | - | 45 | ns |
| $t_s$ | storage time | | | - | - | 250 | ns |
| $t_f$ | fall time | | | - | - | 50 | ns |
| $t_{off}$ | turn-off time | | | - | - | 300 | 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 | pF |
| $C_e$ | 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; Pulse test: $t_p \leq$ 300 µs; $\delta \leq$ 0.02 | | 200 | - | - | MHz |



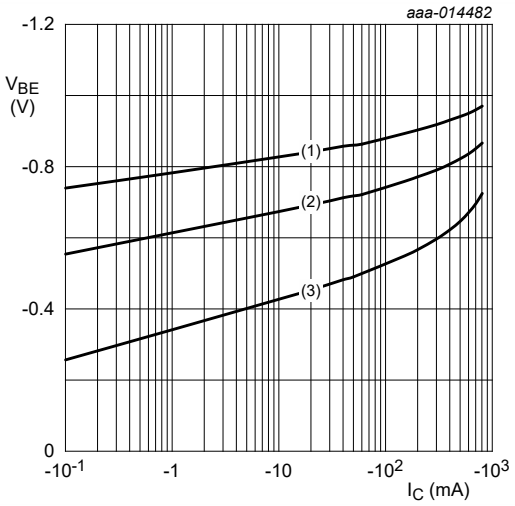

$V_{CE}$ = -10 V
(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = −55 °C

**Fig. 3. DC current gain as a function of collector current; typical values**



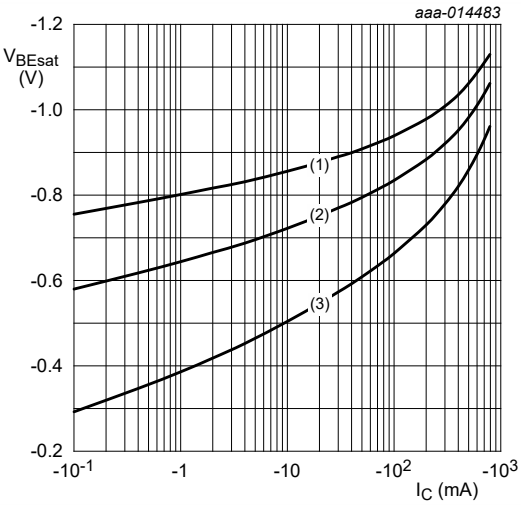

$T_{amb}$ = 25 °C

**Fig. 4. Collector current as a function of collector-emitter voltage; typical values**



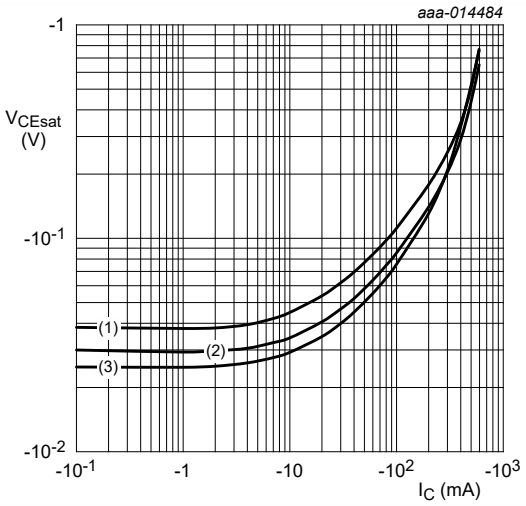

$V_{CE}$ = -10 V
(1) $T_{amb}$ = −55 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = 150 °C

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



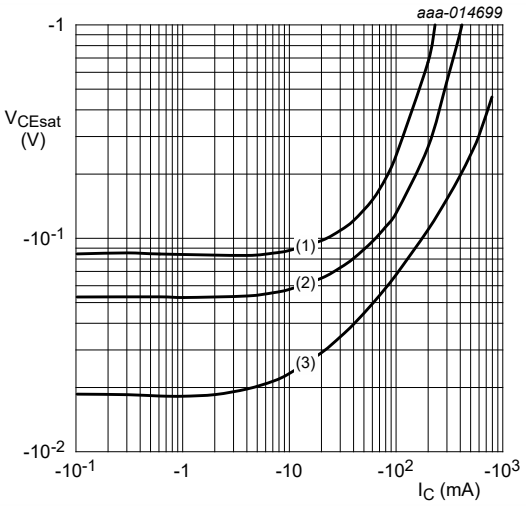

$I_C/I_B$ = 10
(1) $T_{amb}$ = −55 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = 150 °C

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




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

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




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

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

# 11. Test information

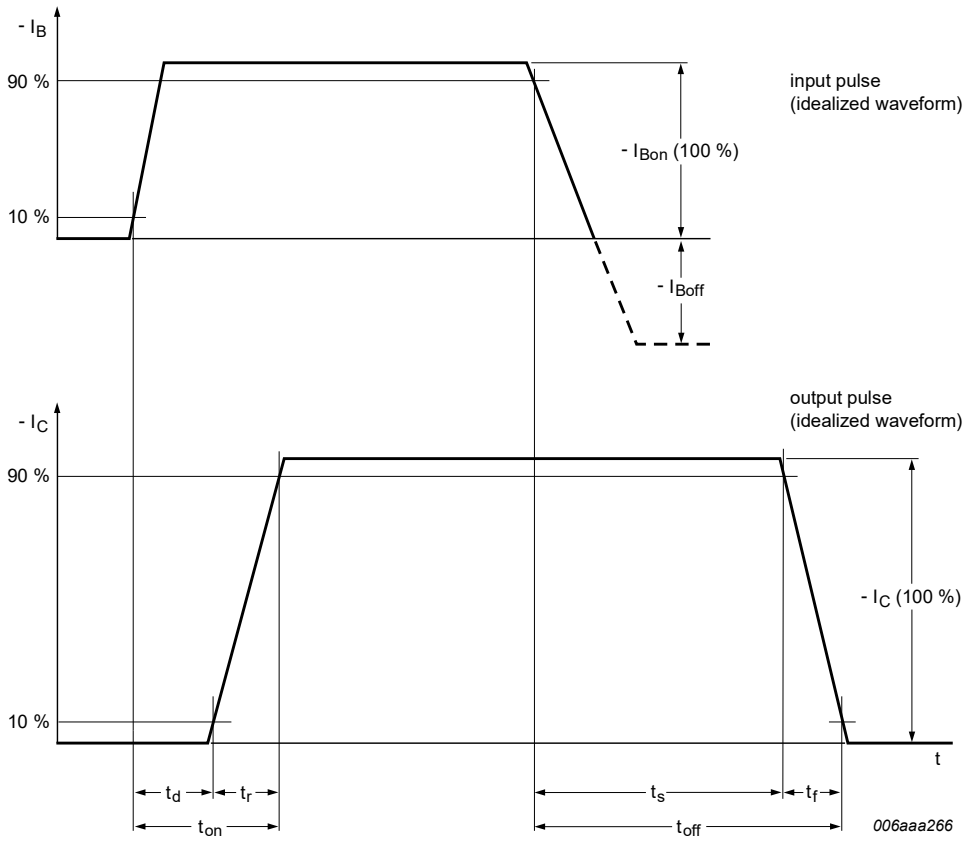



**Fig. 9. Transistor switching time definition**

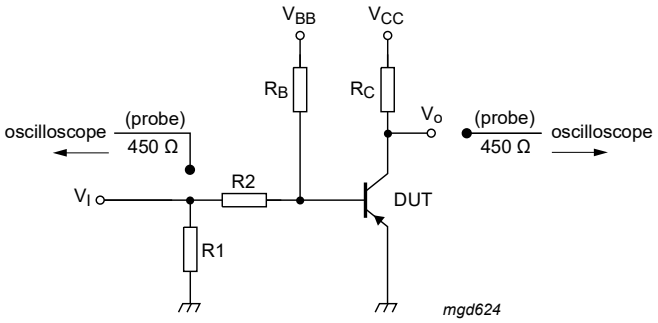



**Fig. 10. Test circuit for switching times**

## 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

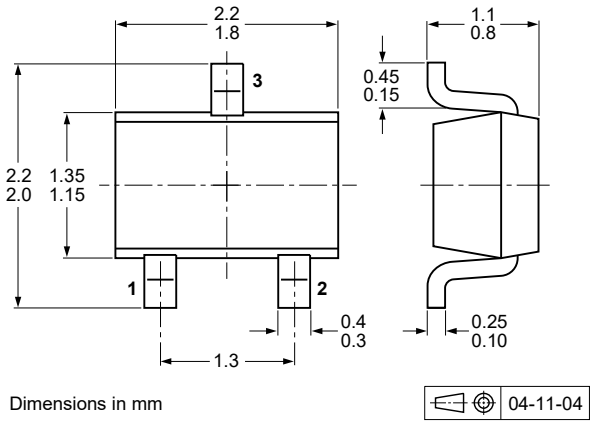



**Fig. 11. Package outline SC-70 (SOT323)**

## 13. Soldering

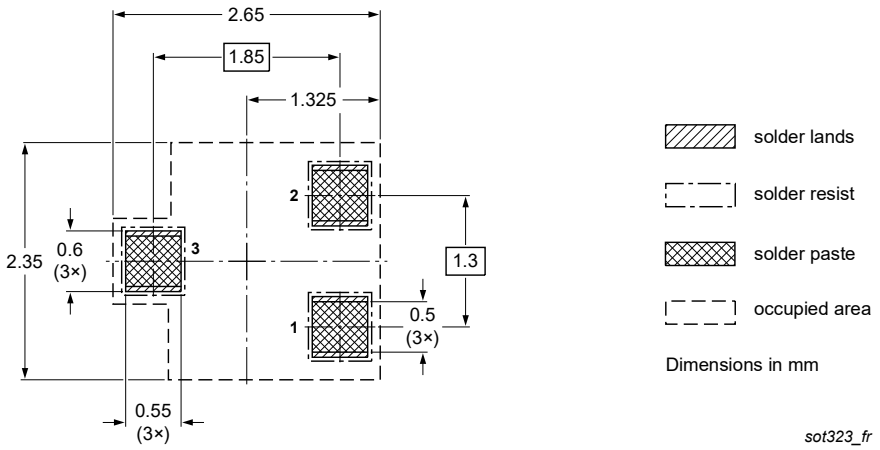



**Fig. 12. Reflow soldering footprint for SC-70 (SOT323)**

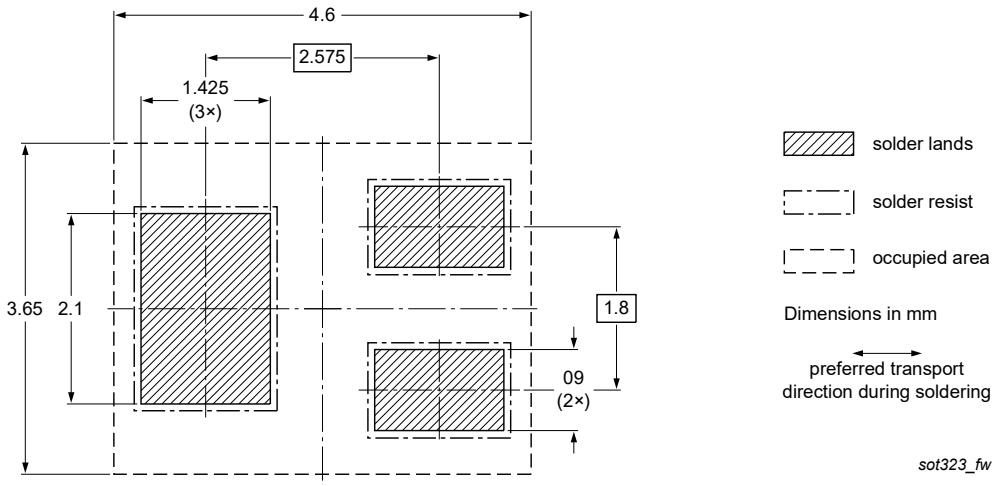



**Fig. 13. Wave soldering footprint for SC-70 (SOT323)**

# 14. Revision history

**Table 8. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| PMST2907A-Q v.1 | 20230622 | 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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[2] The term 'short data sheet' is explained in section "Definitions".
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