



PMBT2907A-Q

60 V, 600 mA, PNP switching transistor

6 February 2023

Product data sheet

1. General description

PNP switching transistor in a small SOT23 Surface-Mounted Device (SMD) plastic package.

NPN complement: PMBT2222A-Q

2. Features and benefits

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

3. Applications

- Switching and linear amplification

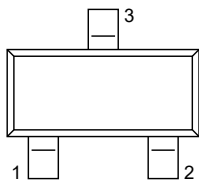
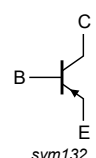
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CE0}	collector-emitter voltage	open base	-	-	-60	V
I_C	collector current		-	-	-600	mA
h_{FE}	DC current gain	$V_{CE} = -10\text{ V}; I_C = -150\text{ mA}; T_{amb} = 25\text{ °C}$	100	-	300	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 SOT23	 sym132
2	E	emitter		
3	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMBT2907A-Q	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PMBT2907A-Q	%2F

[1] % = placeholder for manufacturing site code

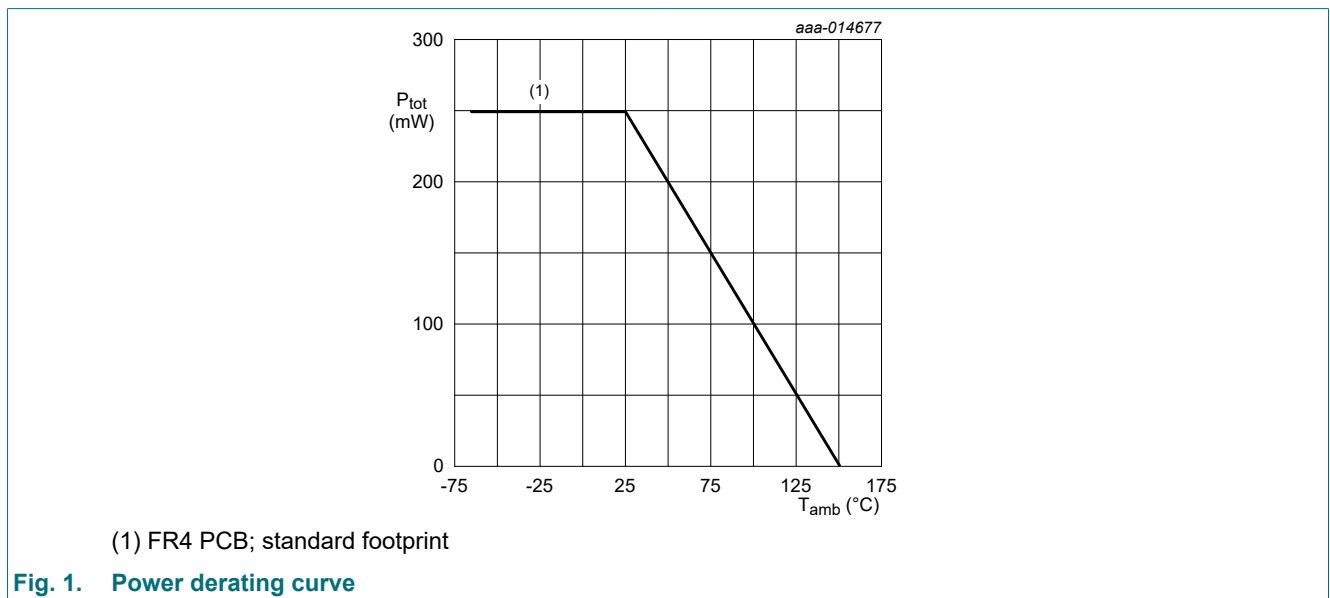
8. Limiting values

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]	250	mW
T_j	junction temperature		-	150	°C
T_{amb}	ambient temperature		-65	150	°C
T_{stg}	storage temperature		-65	150	°C

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

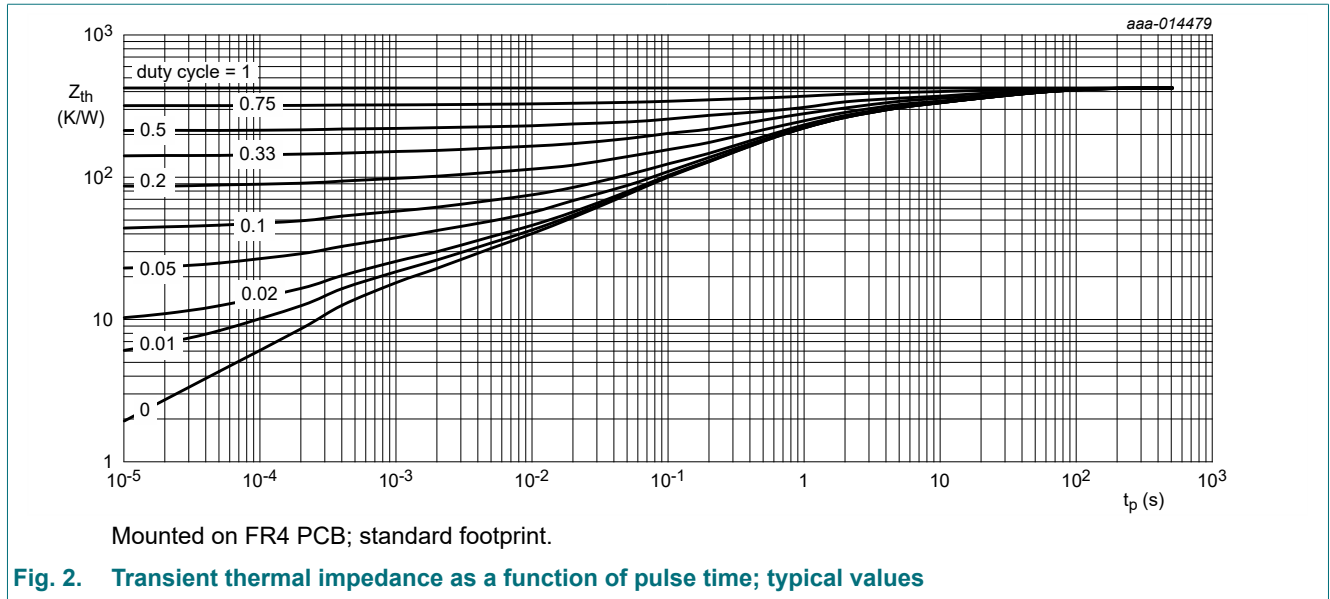


9. Thermal characteristics

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]	-	-	500	K/W

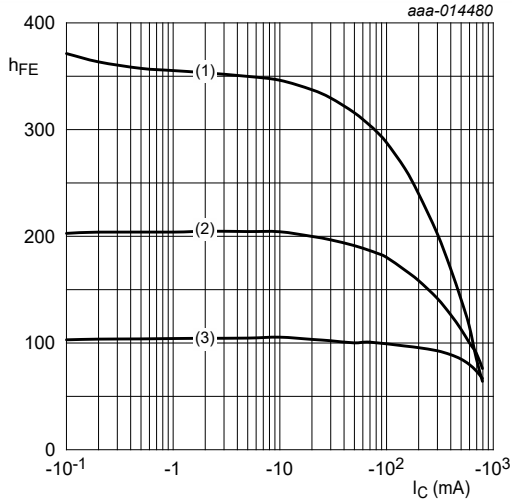
[1] Transistor mounted on an FR4 printed-circuit board, single-sided copper, tin-plated and standard footprint.



10. Characteristics

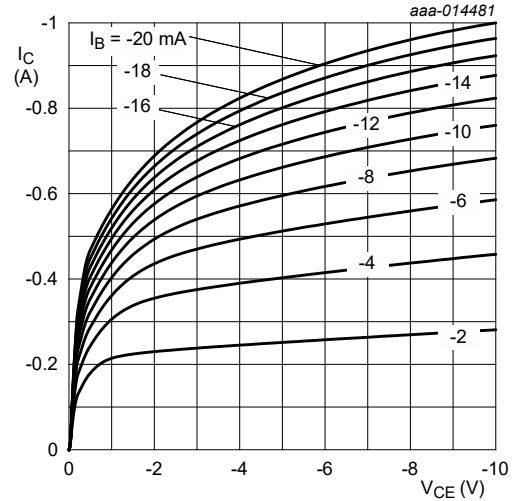
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
I_{CBO}	collector-base cut-off current	$V_{CB} = -50\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ °C}$	-	-	-10	nA	
		$V_{CB} = -50\text{ V}; I_E = 0\text{ A}; T_j = 125\text{ °C}$	-	-	-10	μA	
I_{EBO}	emitter-base cut-off current	$V_{EB} = -5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ °C}$	-	-	-50	nA	
h_{FE}	DC current gain	$V_{CE} = -10\text{ V}; I_C = -0.1\text{ mA}; T_{amb} = 25\text{ °C}$	75	-	-		
		$V_{CE} = -10\text{ V}; I_C = -1\text{ mA}; T_{amb} = 25\text{ °C}$	100	-	-		
		$V_{CE} = -10\text{ V}; I_C = -10\text{ mA}; T_{amb} = 25\text{ °C}$	100	-	-		
		$V_{CE} = -10\text{ V}; I_C = -150\text{ mA}; T_{amb} = 25\text{ °C}$	100	-	300		
		$V_{CE} = -10\text{ V}; I_C = -500\text{ mA}; T_{amb} = 25\text{ °C}$	50	-	-		
V_{CEsat}	collector-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA}; T_{amb} = 25\text{ °C}$	-	-	-400	mV	
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}; T_{amb} = 25\text{ °C}$	-	-	-1.6	V	
V_{BEsat}	base-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA}; T_{amb} = 25\text{ °C}$	-	-	-1.3	V	
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}; T_{amb} = 25\text{ °C}$	-	-	-2.6	V	
t_d	delay time	$I_C = -150\text{ mA}; I_{B(on)} = -15\text{ mA};$ $I_{B(off)} = 15\text{ mA}; T_{amb} = 25\text{ °C}$	-	-	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		$V_{CB} = -10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A};$ $f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$	-	-	8	pF
C_e	emitter capacitance		$V_{EB} = -2\text{ V}; I_C = 0\text{ A}; i_c = 0\text{ A}; f = 1\text{ MHz};$ $T_{amb} = 25\text{ °C}$	-	-	30	pF
f_T	transition frequency	$V_{CE} = -20\text{ V}; I_C = -50\text{ mA}; f = 100\text{ MHz};$ $T_{amb} = 25\text{ °C}$	200	-	-	MHz	



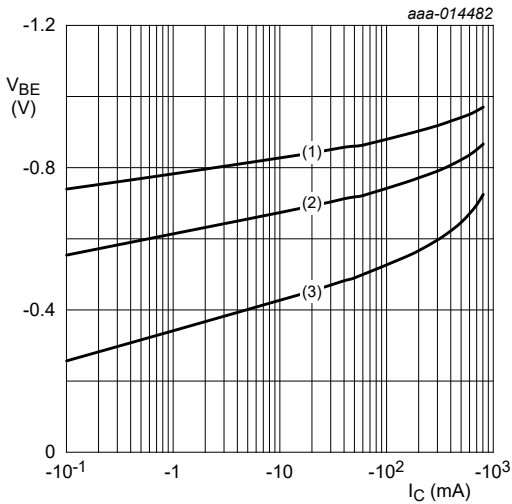
$V_{CE} = -10\text{ V}$
 (1) $T_{amb} = 150^\circ\text{C}$
 (2) $T_{amb} = 25^\circ\text{C}$
 (3) $T_{amb} = -55^\circ\text{C}$

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



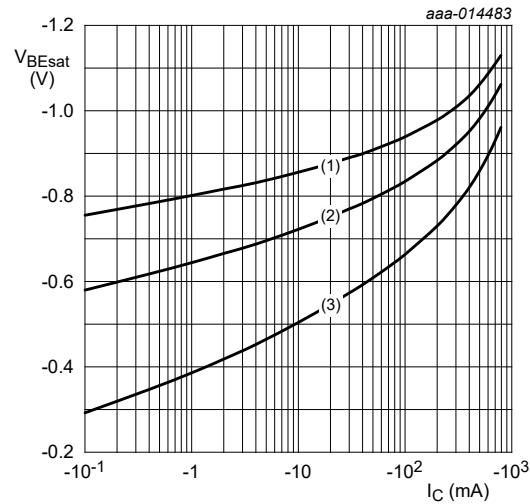
$T_{amb} = 25^\circ\text{C}$

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



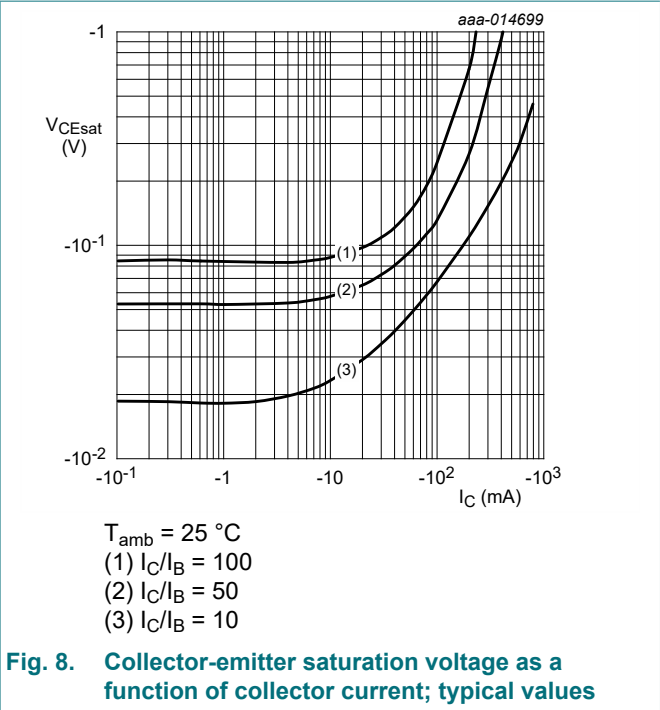
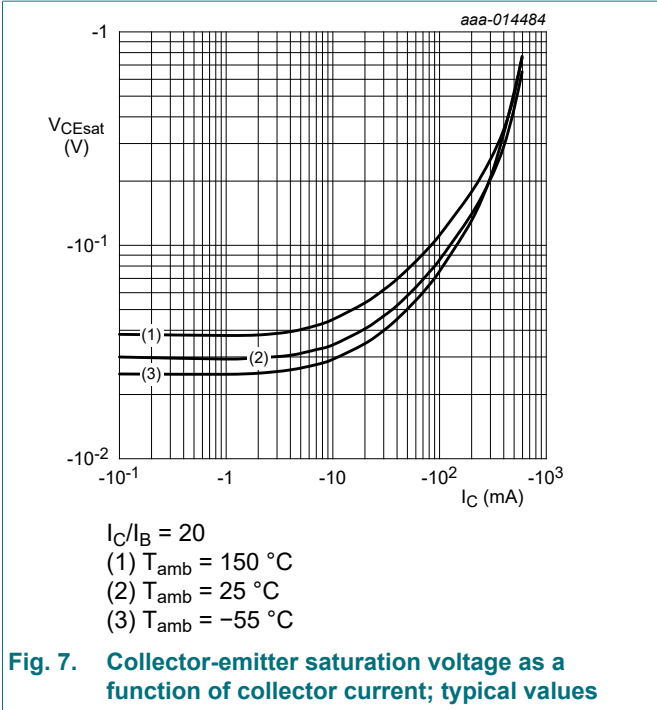
$V_{CE} = -10\text{ V}$
 (1) $T_{amb} = -55^\circ\text{C}$
 (2) $T_{amb} = 25^\circ\text{C}$
 (3) $T_{amb} = 150^\circ\text{C}$

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

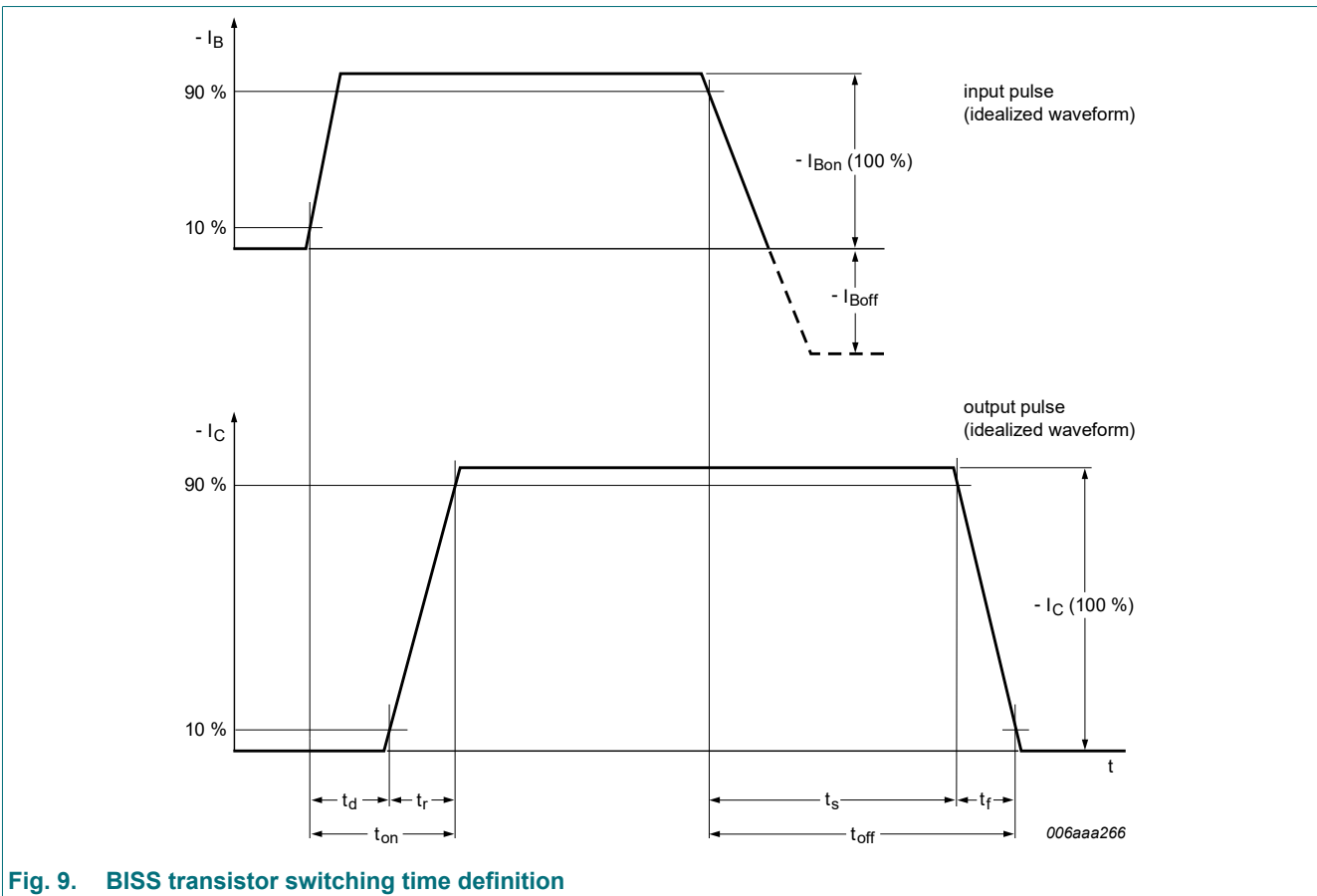


$I_C/I_B = 10$
 (1) $T_{amb} = -55^\circ\text{C}$
 (2) $T_{amb} = 25^\circ\text{C}$
 (3) $T_{amb} = 150^\circ\text{C}$

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



11. Test information



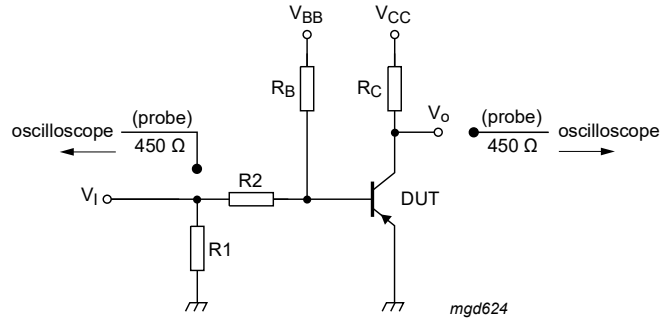


Fig. 10. Test circuit for switching times

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

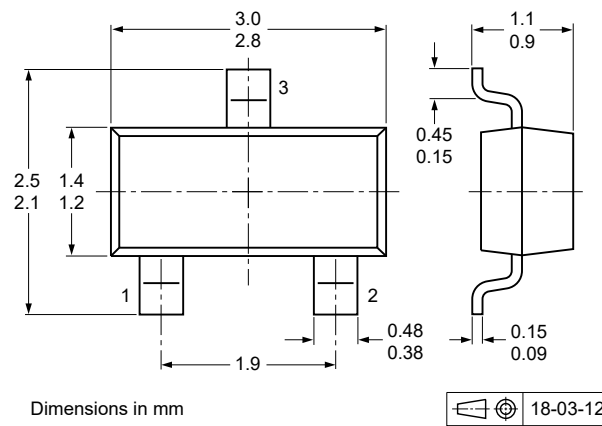


Fig. 11. Package outline SOT23

13. Soldering



Fig. 12. Reflow soldering footprint for SOT23



Fig. 13. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBT2907A-Q v.1	20230206	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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