



PMBT3904YS-Q

40 V, 200 mA NPN/NPN general-purpose double transistor

16 July 2026

Product data sheet

1. General description

NPN/NPN general-purpose double transistor in a very small SOT363-3 (SC-88) Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- General-purpose double transistor
- Board-space reduction
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- General-purpose switching and amplification

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
V_{CE0}	collector-emitter voltage	open base	-	-	40	V
I_C	collector current		-	-	200	mA
h_{FE}	DC current gain	$V_{CE} = 1\text{ V}$; $I_C = 10\text{ mA}$; $T_{amb} = 25\text{ °C}$	100	180	300	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E1	emitter TR1	Transparent top view TSSOP6 (SOT363-3)	sym020
2	B1	base TR1		
3	C2	collector TR2		
4	E2	emitter TR2		
5	B2	base TR2		
6	C1	collector TR1		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMBT3904YS-Q	TSSOP6	Plastic surface-mounted package; 6 leads	SOT363-3

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PMBT3904YS-Q	BC%

[1] % = placeholder for manufacturing site code

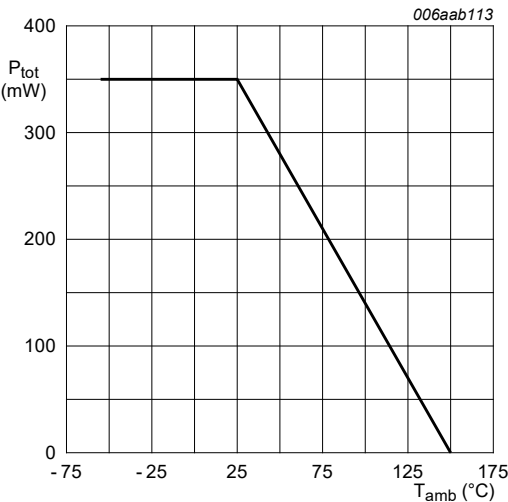
8. Limiting values

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		-	40	V
V _{EBO}	emitter-base voltage	open collector		-	6	V
I _C	collector current			-	200	mA
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms		-	200	mA
I _{BM}	peak base current			-	100	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	230	mW
Per device						
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	350	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.



FR4 PCB, standard footprint

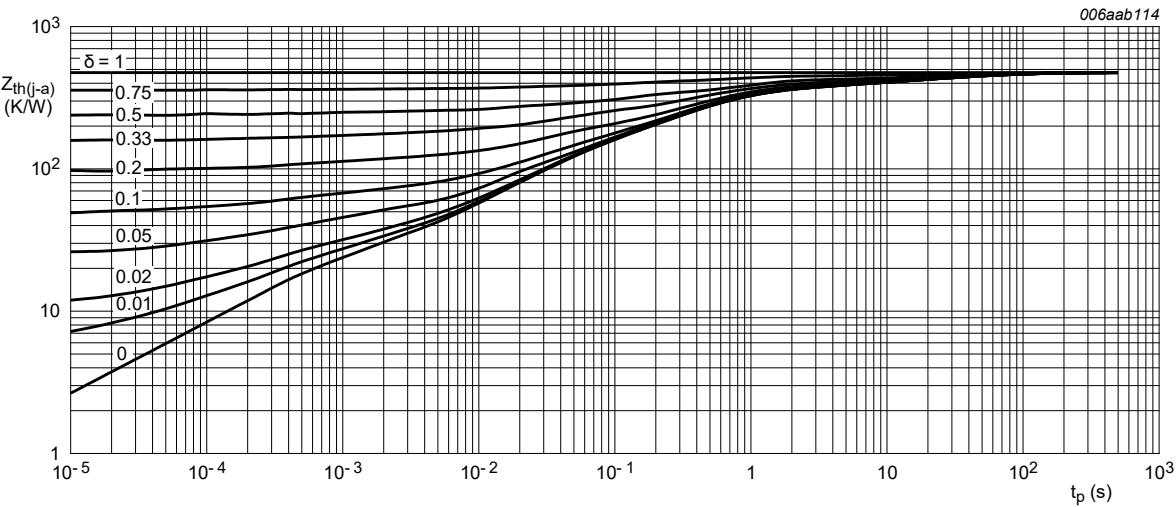
Fig. 1. Per device: Power derating curve

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]	-	-	543	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	290	K/W
Per device							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	357	K/W

[1] Device mounted on anFR4 PCB, single-sided copper, tin-plated and standard footprint.



FR4 PCB, standard footprint

Fig. 2. 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} = 30 V; I _E = 0 A; T _{amb} = 25 °C		-	-	50	nA
I _{EBO}	emitter-base cut-off current	V _{EB} = 6 V; I _C = 0 A; T _{amb} = 25 °C		-	-	50	nA
h _{FE}	DC current gain	V _{CE} = 1 V; I _C = 0.1 mA; T _{amb} = 25 °C		60	180	-	
		V _{CE} = 1 V; I _C = 1 mA; T _{amb} = 25 °C		80	180	-	
		V _{CE} = 1 V; I _C = 10 mA; T _{amb} = 25 °C		100	180	300	
		V _{CE} = 1 V; I _C = 50 mA; T _{amb} = 25 °C		60	105	-	
		V _{CE} = 1 V; I _C = 100 mA; T _{amb} = 25 °C		30	50	-	
V _{CEsat}	collector-emitter saturation voltage	I _C = 10 mA; I _B = 1 mA; T _{amb} = 25 °C		-	75	200	mV
		I _C = 50 mA; I _B = 5 mA; T _{amb} = 25 °C		-	120	300	mV
V _{BEsat}	base-emitter saturation voltage	I _C = 10 mA; I _B = 1 mA; T _{amb} = 25 °C		650	750	850	mV
		I _C = 50 mA; I _B = 5 mA		-	850	950	mV
t _d	delay time	I _C = 10 mA; I _{Bon} = 1 mA; I _{Boff} = -1 mA; V _{CC} = 3 V; T _{amb} = 25 °C		-	-	35	ns
t _r	rise time			-	-	35	ns
t _{on}	turn-on time			-	-	70	ns
t _s	storage time			-	-	200	ns
t _f	fall time			-	-	50	ns
t _{off}	turn-off time			-	-	250	ns
C _c	collector capacitance	V _{CB} = 5 V; I _E = 0 A; i _e = 0 A; f = 1 MHz		-	-	4	pF
C _e	emitter capacitance	V _{EB} = 0.5 V; I _C = 0 A; i _c = 0 A; T _{amb} = 25 °C		-	-	8	pF
f _T	transition frequency	V _{CE} = 20 V; I _C = 10 mA; f = 100 MHz; T _{amb} = 25 °C		300	-	-	MHz
NF	noise figure	V _{CE} = 5 V; I _C = 100 µA; R _S = 1 kΩ; f = 10 Hz to 15.7 kHz; T _{amb} = 25 °C		-	-	5	dB

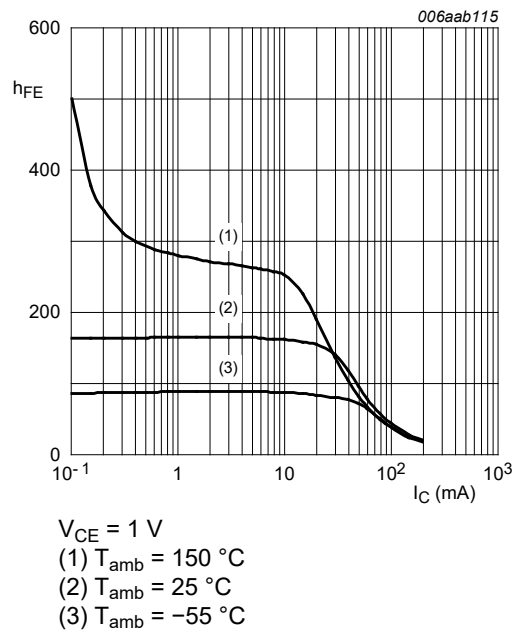


Fig. 3. DC current gain as a function of collector current; typical values

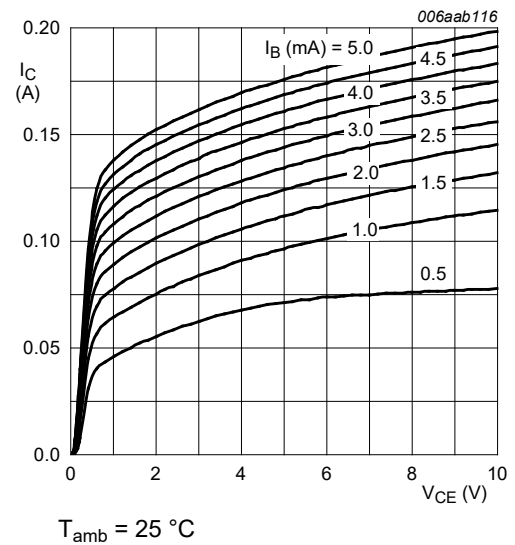


Fig. 4. Collector current as a function of collector-emitter voltage; typical values

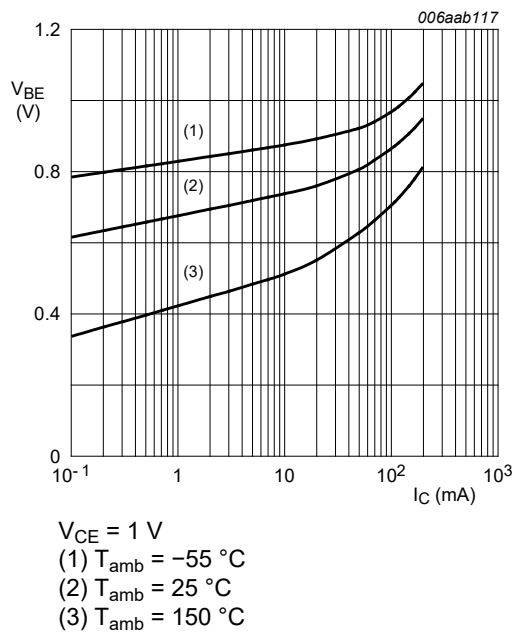


Fig. 5. Base-emitter voltage as a function of collector current; typical values

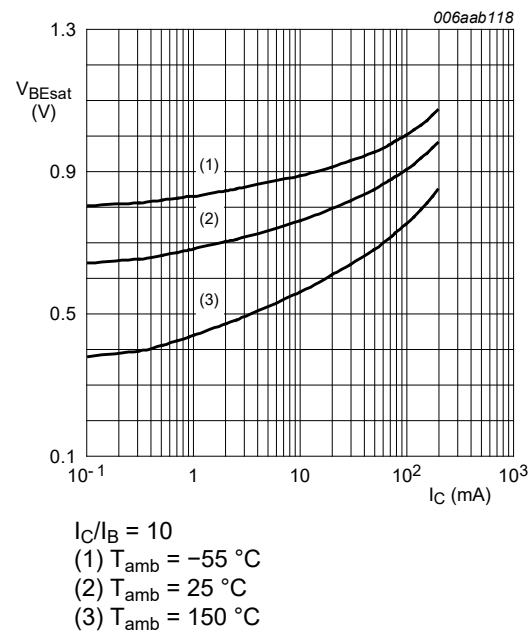
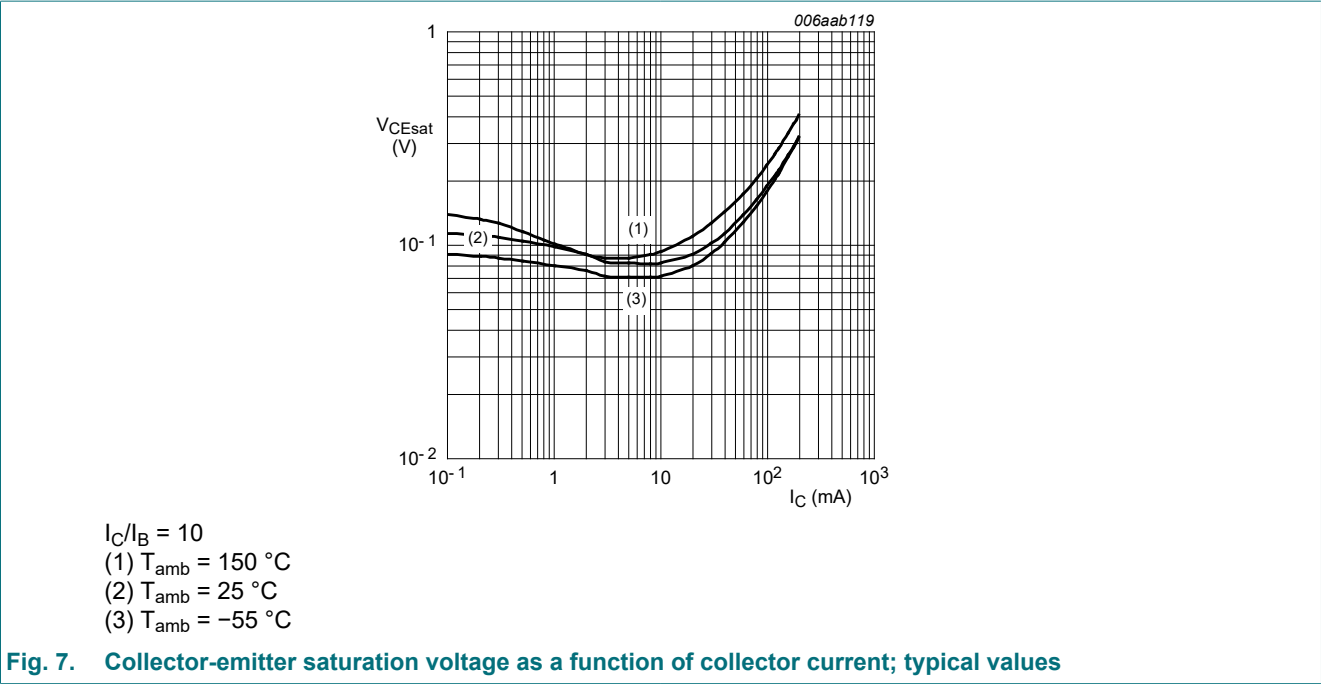


Fig. 6. Base-emitter saturation voltage as a function of collector current; typical values



11. Test information

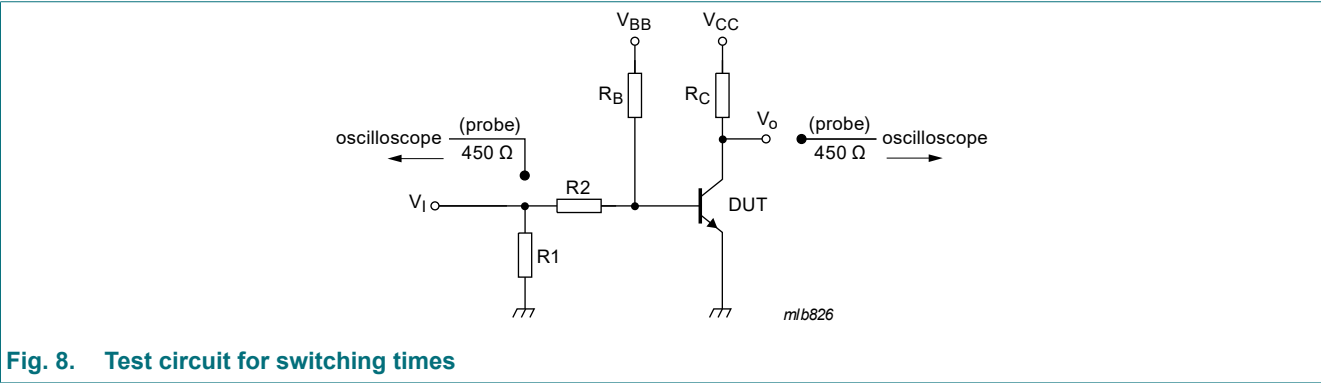
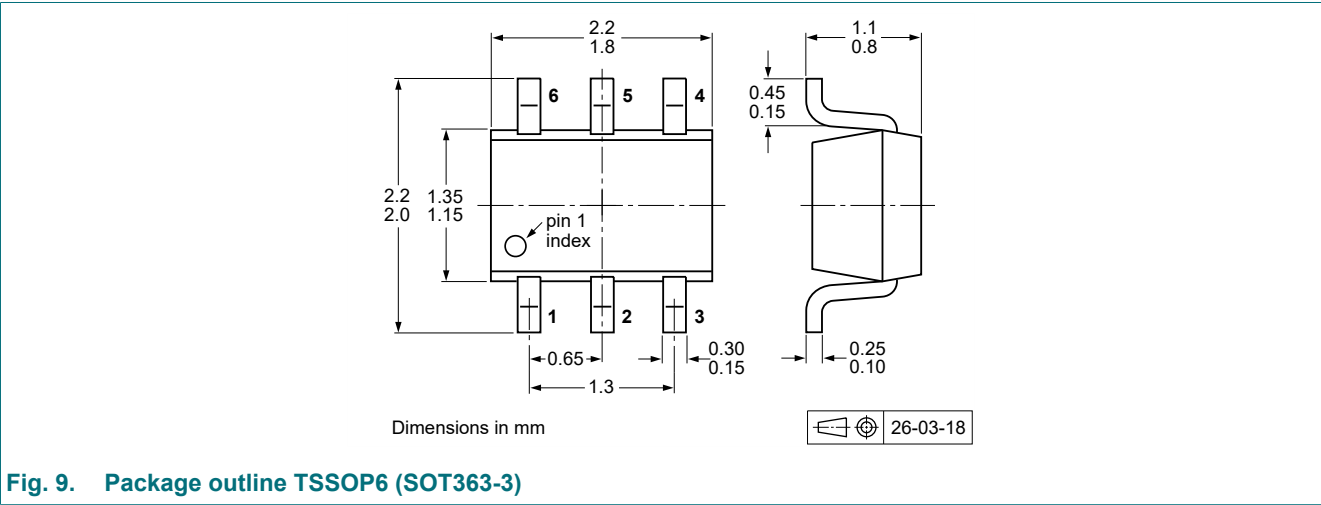


Fig. 8. Test circuit for switching times

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



13. Soldering

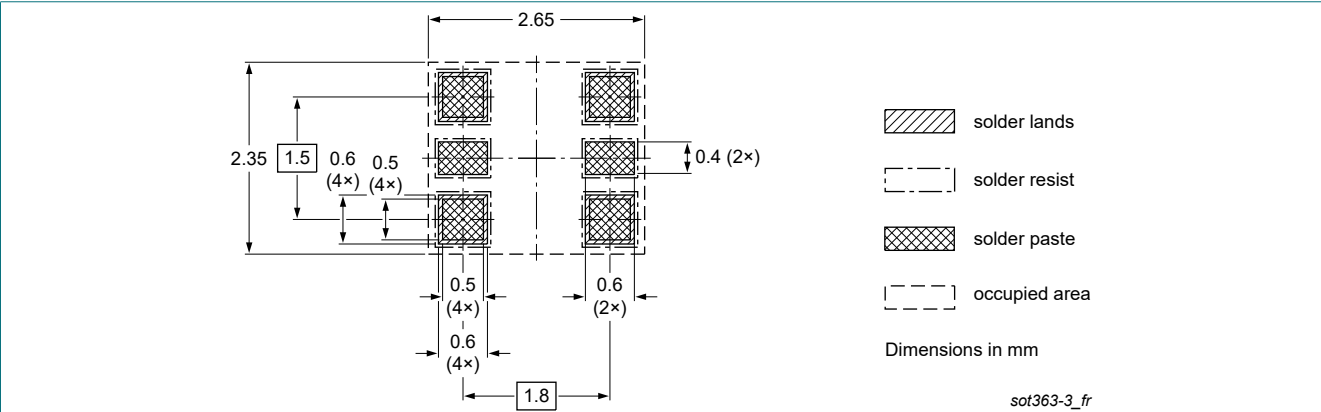


Fig. 10. Reflow soldering footprint for TSSOP6 (SOT363-3)

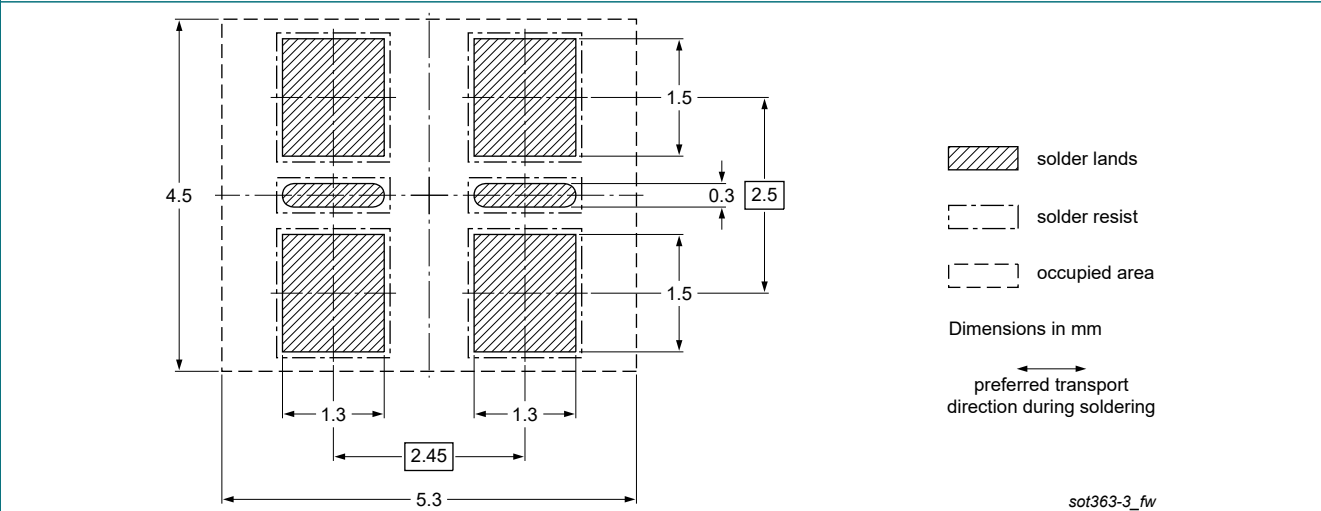


Fig. 11. Wave soldering footprint for TSSOP6 (SOT363-3)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBT3904YS-Q v.2	20260716	Product data sheet	-	PMBT3904YS-Q v.1
Modifications:	• Package changed from SOT363 to SOT363-3			
PMBT3904YS-Q v.1	20220428	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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