



# PBSS5240T-Q

40 V, 2 A PNP low V<sub>CEsat</sub> transistor

3 January 2022

Product data sheet

## 1. General description

PNP low V<sub>CEsat</sub> transistor in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

NPN complement: PBSS4240T-Q

## 2. Features and benefits

- Low collector-emitter saturation voltage
- High current capability
- Improved device reliability due to reduced heat generation
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- Supply line switching circuits
- Battery management applications
- DC/DC converter applications
- Strobe flash units
- Heavy duty battery powered equipment (motor and lamp drivers).

## 4. Quick reference data

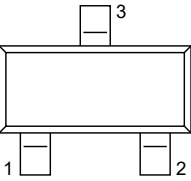
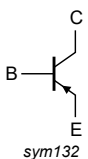
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>CEO</sub>	collector-emitter voltage	open base	-	-	-40	V
I <sub>C</sub>	collector current		-	-	-2	A
I <sub>CM</sub>	peak collector current	single pulse; t <sub>p</sub> ≤ 1 ms	-	-	-3	A
R <sub>CEsat</sub>	collector-emitter saturation resistance	I <sub>C</sub> = -500 mA; I <sub>B</sub> = -50 mA; T <sub>amb</sub> = 25 °C [1]	-	140	220	mΩ

[1] Device mounted on a printed-circuit board, single sided copper, tin plated, standard footprint.

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 <p style="text-align: center;">SOT23</p>	
2	E	emitter		
3	C	collector		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS5240T-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]
PBSS5240T-Q	ZF%

[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	-	-40	V	
$V_{CEO}$	collector-emitter voltage	open base	-	-40	V	
$V_{EBO}$	emitter-base voltage	open collector	-	-5	V	
$I_C$	collector current		-	-2	A	
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1$ ms	-	-3	A	
$I_{BM}$	peak base current		-	-300	mA	
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	300	mW
			[2]	-	480	mW
$T_j$	junction temperature		-	150	°C	
$T_{amb}$	ambient temperature		-65	150	°C	
$T_{stg}$	storage temperature		-65	150	°C	

[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, mounting pad for collector 1 cm<sup>2</sup>.

## 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]	-	-	417	K/W
			[2]	-	-	260	K/W

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

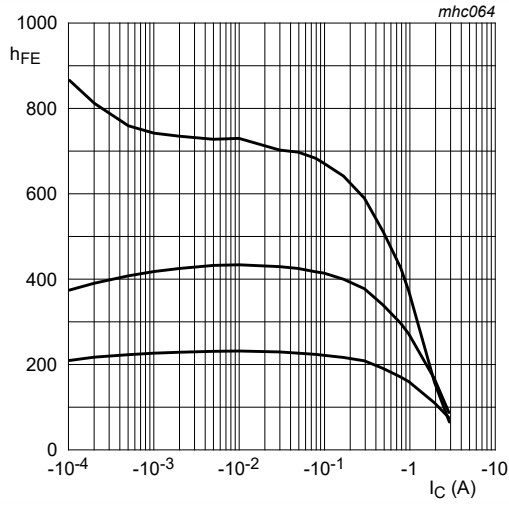
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm<sup>2</sup>.

## 10. Characteristics

Table 7. Characteristics

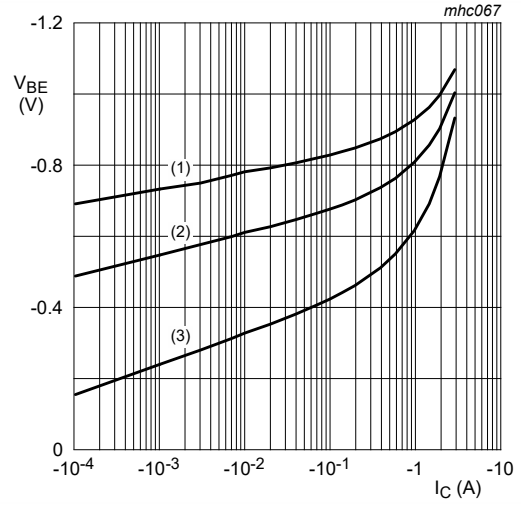
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = -100 \mu\text{A}; I_E = 0 \text{ A}$		-40	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = -10 \text{ mA}; I_B = 0 \text{ A}$		-40	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage (collector open)	$I_E = -100 \mu\text{A}; I_C = 0 \text{ A}$		-5	-	-	V
$I_{CBO}$	collector-base cut-off current	$V_{CB} = -30 \text{ V}; I_E = 0 \text{ A}; T_{amb} = 25 \text{ }^\circ\text{C}$		-	-	-100	nA
		$V_{CB} = -30 \text{ V}; I_E = 0 \text{ A}; T_j = 150 \text{ }^\circ\text{C}$		-	-	-50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = -4 \text{ V}; I_C = 0 \text{ A}; T_{amb} = 25 \text{ }^\circ\text{C}$		-	-	-100	nA
$h_{FE}$	DC current gain	$V_{CE} = -2 \text{ V}; I_C = -100 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$		300	450	-	
		$V_{CE} = -2 \text{ V}; I_C = -500 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$		260	350	-	
		$V_{CE} = -2 \text{ V}; I_C = -1 \text{ A}; T_{amb} = 25 \text{ }^\circ\text{C}$		210	290	-	
		$V_{CE} = -2 \text{ V}; I_C = -2 \text{ A}; T_{amb} = 25 \text{ }^\circ\text{C}$		100	180	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -100 \text{ mA}; I_B = -1 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$		-	-55	-100	mV
		$I_C = -500 \text{ mA}; I_B = -50 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$		-	-70	-110	mV
		$I_C = -750 \text{ mA}; I_B = -15 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$		-	-140	-225	mV
		$I_C = -1 \text{ A}; I_B = -50 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$		-	-140	-225	mV
		$I_C = -2 \text{ A}; I_B = -200 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$		-	-240	-350	mV
$R_{CEsat}$	collector-emitter saturation resistance	$I_C = -500 \text{ mA}; I_B = -50 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$	[1]	-	140	220	m $\Omega$
$V_{BEsat}$	base-emitter saturation voltage	$I_C = -2 \text{ A}; I_B = -200 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$		-	-	-1.1	V
$V_{BEon}$	base-emitter turn-on voltage	$V_{CE} = -2 \text{ V}; I_C = -100 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$		-	-	-0.75	V
$f_T$	transition frequency	$V_{CE} = -10 \text{ V}; I_C = -100 \text{ mA}; f = 100 \text{ MHz}; T_{amb} = 25 \text{ }^\circ\text{C}$		100	200	-	MHz
$C_C$	collector capacitance	$V_{CB} = -10 \text{ V}; I_E = 0 \text{ A}; i_e = 0 \text{ A}; f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^\circ\text{C}$		-	23	28	pF

[1] Device mounted on a printed-circuit board, single sided copper, tin plated, standard footprint.



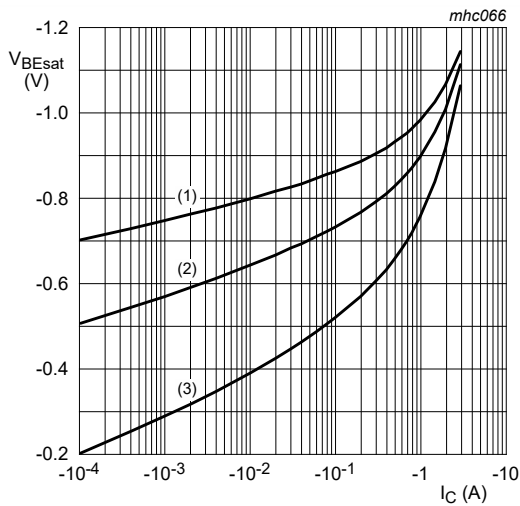
$V_{CE} = -2$  V  
 (1)  $T_{amb} = 150$  °C  
 (2)  $T_{amb} = 25$  °C  
 (3)  $T_{amb} = -55$  °C

**Fig. 1. DC current gain as a function of collector current; typical values**



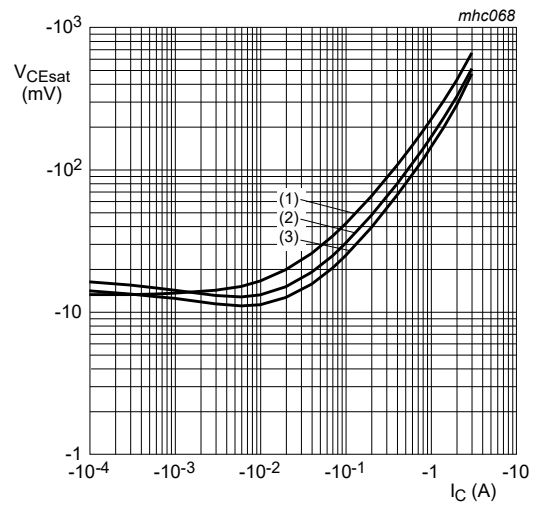
$V_{CE} = -2$  V  
 (1)  $T_{amb} = -55$  °C  
 (2)  $T_{amb} = 25$  °C  
 (3)  $T_{amb} = 150$  °C

**Fig. 2. Base-emitter voltage as a function of collector current; typical values**



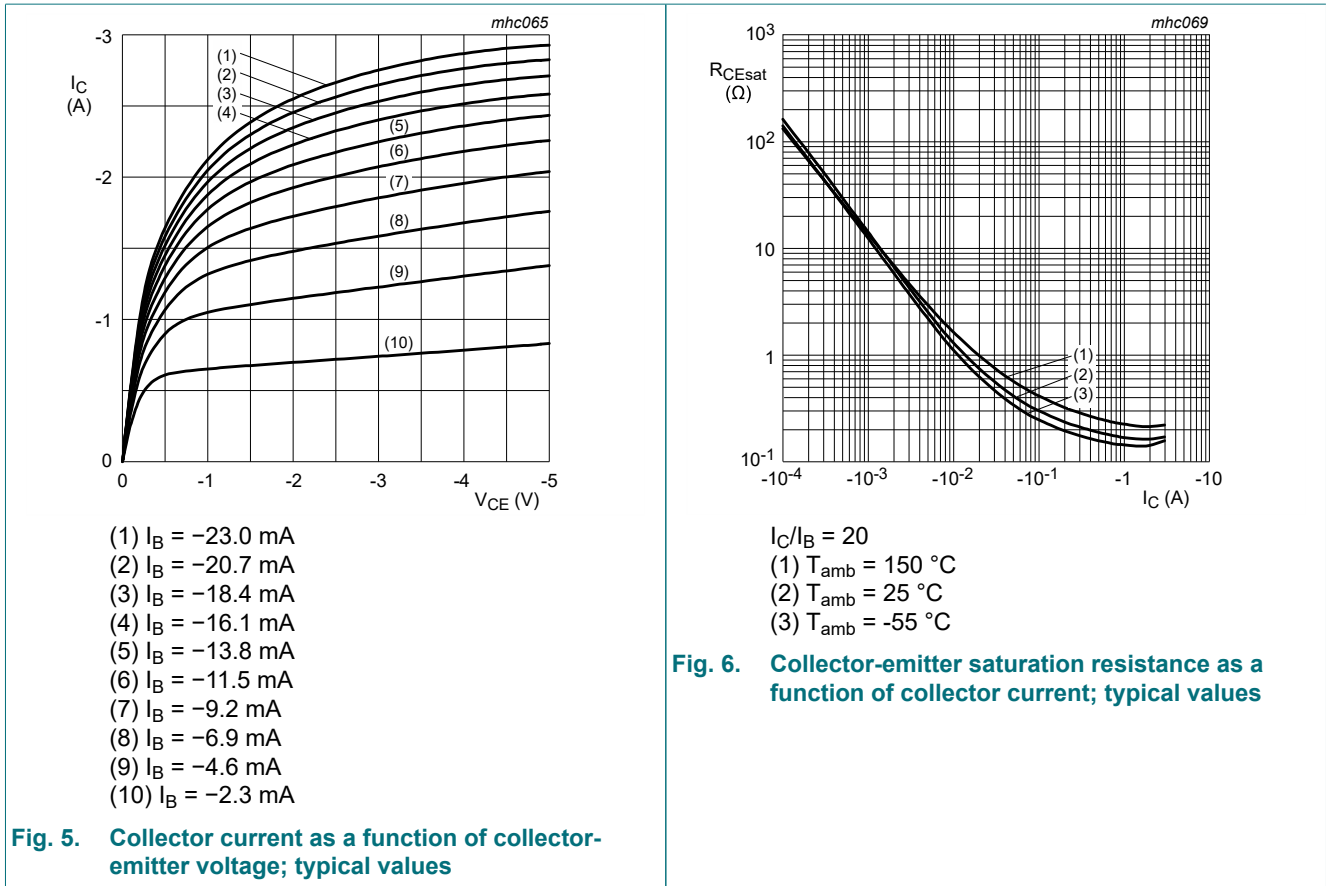
$I_C/I_B = 20$   
 (1)  $T_{amb} = -55$  °C  
 (2)  $T_{amb} = 25$  °C  
 (3)  $T_{amb} = 150$  °C

**Fig. 3. 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. 4. Collector-emitter saturation voltage as a function of collector current; typical values**



## 11. Test information

### 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

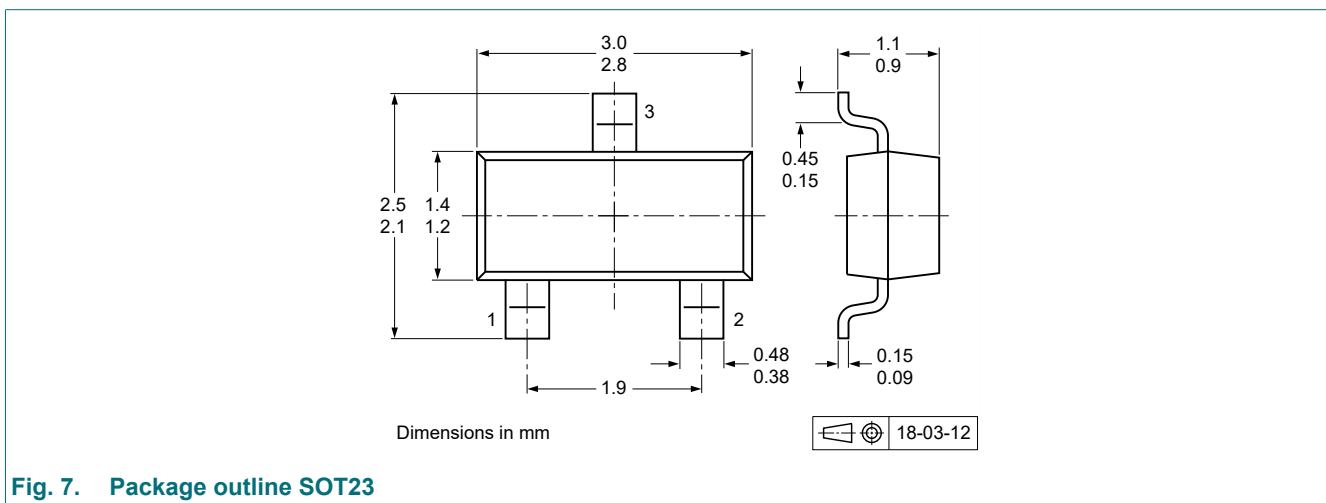


Fig. 7. Package outline SOT23

### 13. Soldering

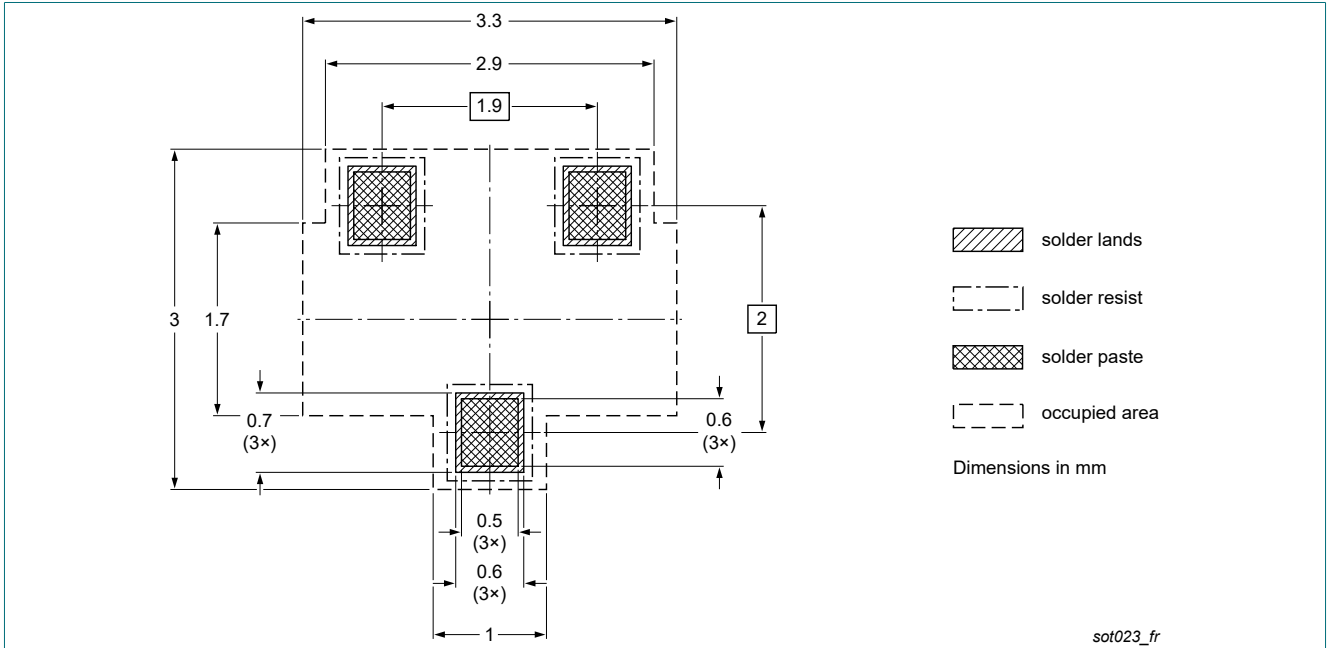


Fig. 8. Reflow soldering footprint for SOT23

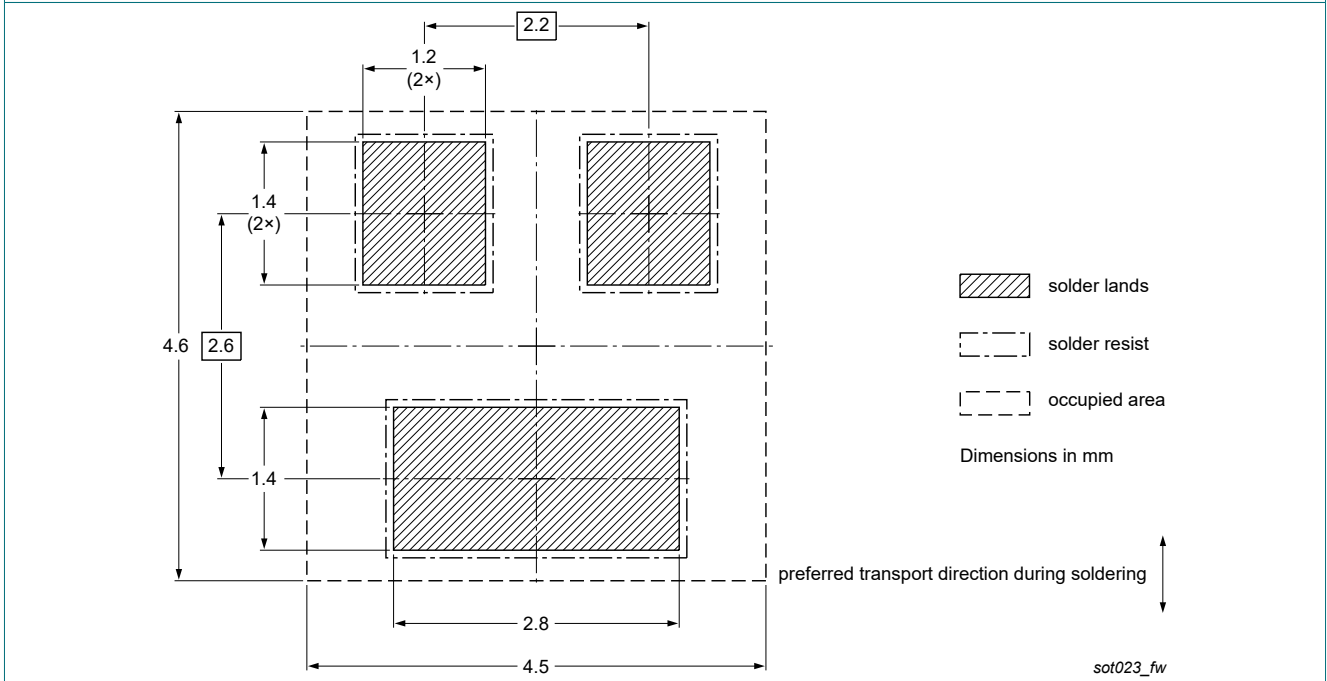


Fig. 9. Wave soldering footprint for SOT23

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS5240T-Q v.1	20220103	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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