

ANTREX Electronics

Electronic Components Sourcing Information

Product Reference Information

Part Number:	PBSS5250TH-QR
Manufacturer:	Nexperia USA Inc.
Package:	TO-236-3, SC-59, SOT-23-3
Availability:	Please confirm with sales

Product Page:

<https://antrexco.com/product/details/nexperia-usa-inc/pbss5250th-qr.html>

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Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.



PBSS5250TH-Q

50 V, 2 A PNP low V_{CEsat} (BISS) transistor

15 March 2023

Product data sheet

1. General description

PNP low V_{CEsat} transistor in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability: I_C and I_{CM}
- High collector current gain (h_{FE}) at high I_C
- Higher efficiency leading to less heat generation
- High temperature applications up to 175 °C
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Power management
- DC-to-DC conversion
- Supply line switches
- Battery charger switches
- Peripheral drivers
- Driver in low supply voltage applications (e.g. lamps and LEDs)
- Inductive load driver

4. Quick reference data

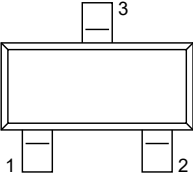
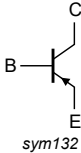
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _{CEO}	collector-emitter voltage	open base		-	-	-50	V
I _C	collector current			-	-	-2	A
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms		-	-	-3	A
R _{CEsat}	collector-emitter saturation resistance	I _C = -2 A; I _B = -200 mA; T _{amb} = 25 °C	[1]	-	-	150	mΩ

[1] Pulse test: t_p ≤ 300 μs; δ ≤ 0.02

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
PBSS5250TH-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]
PBSS5250TH-Q	FH%

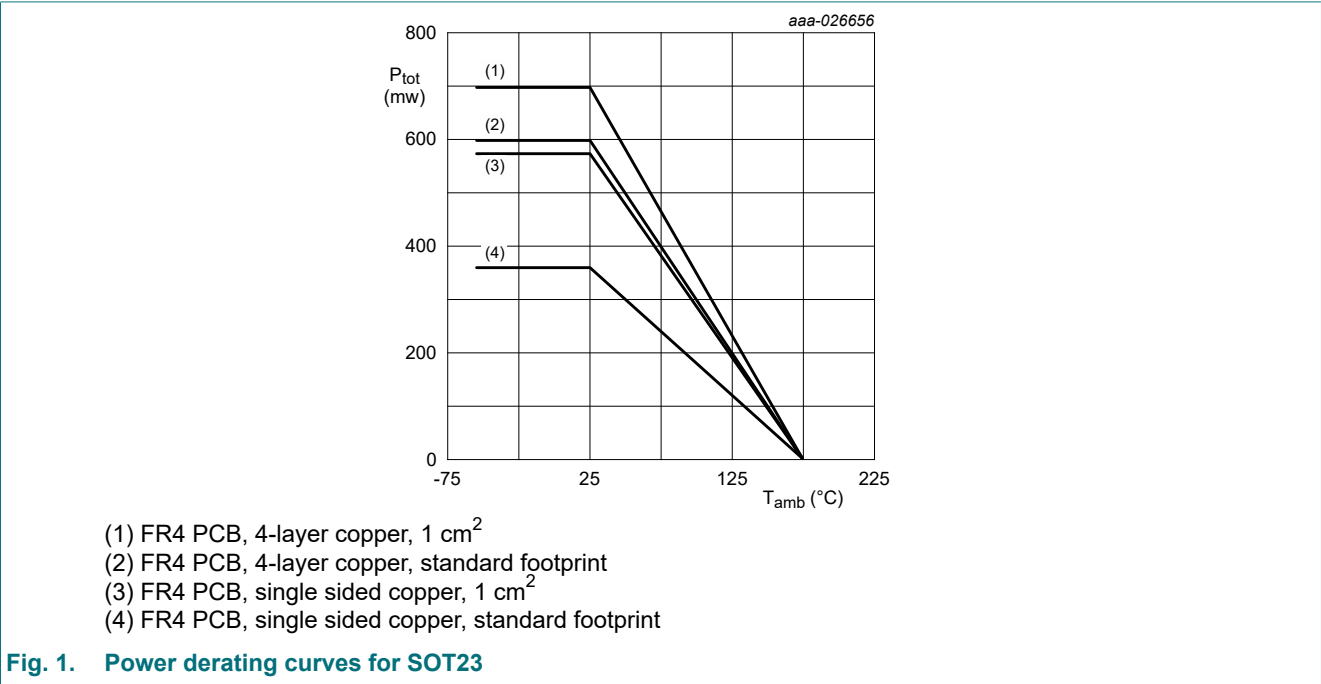
[1] % = placeholder for manufacturing site code

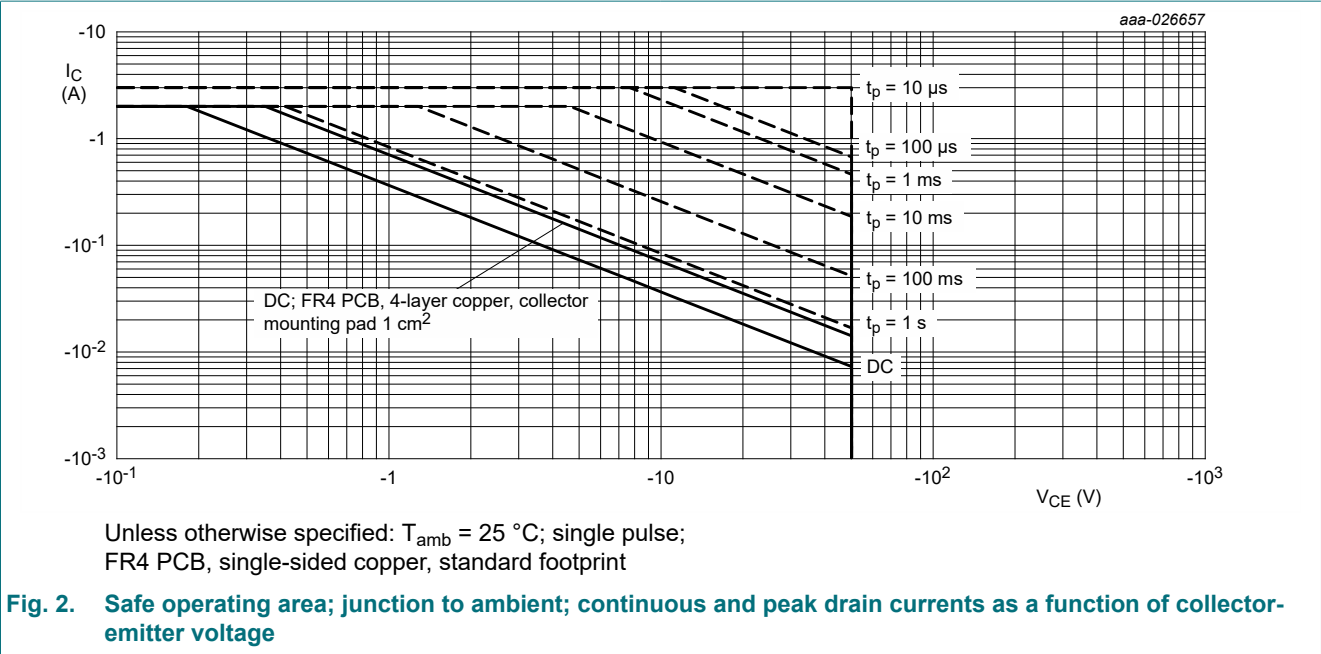
8. Limiting values

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		-	-50	V
V _{CEO}	collector-emitter voltage	open base		-	-50	V
V _{EBO}	emitter-base voltage	open collector		-	-7	V
I _C	collector current			-	-2	A
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms		-	-3	A
I _B	base current			-	-300	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	360	mW
			[2]	-	575	mW
			[3]	-	600	mW
			[4]	-	700	mW
T _j	junction temperature			-	175	°C
T _{amb}	ambient temperature			-55	175	°C
T _{stg}	storage temperature			-65	175	°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 cm².
[3] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and standard footprint.
[4] Device mounted on an FR4 PCB, 4-layer copper, tin-plated, mounting pad for collector 1 cm².



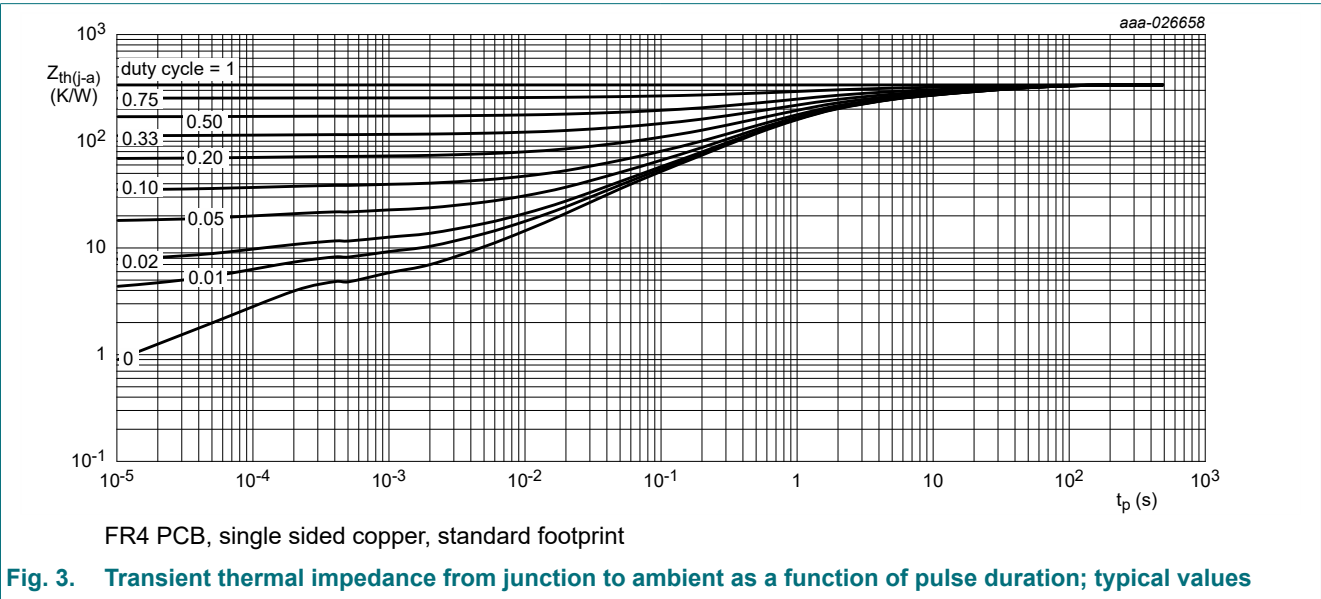


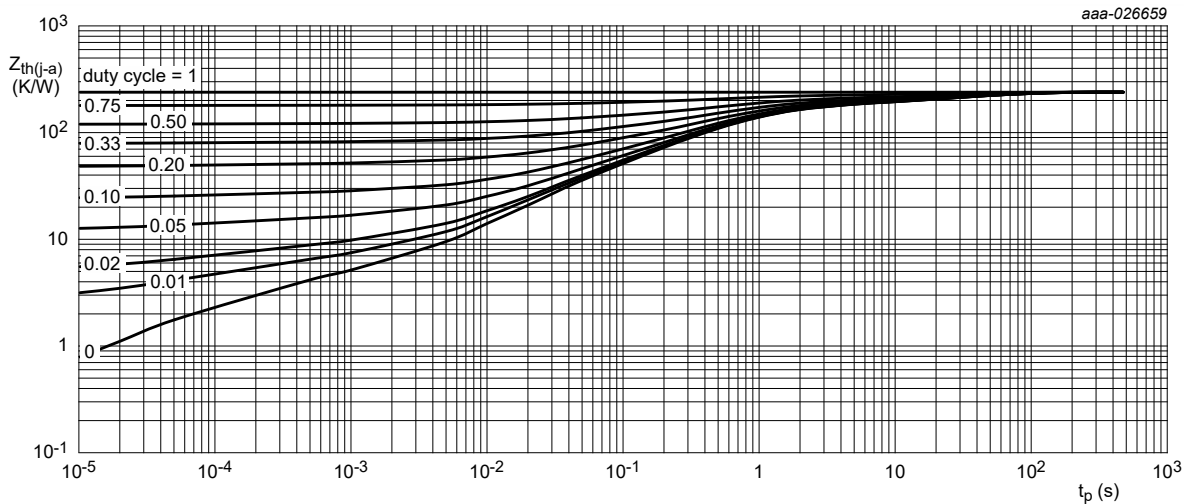
9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{\text{th(j-a)}}$	thermal resistance from junction to ambient	in free air	[1]	-	-	417	K/W
			[2]	-	-	261	K/W
			[3]	-	-	250	K/W
			[4]	-	-	215	K/W
$R_{\text{th(j-sp)}}$	thermal resistance from junction to solder point			-	75	-	K/W

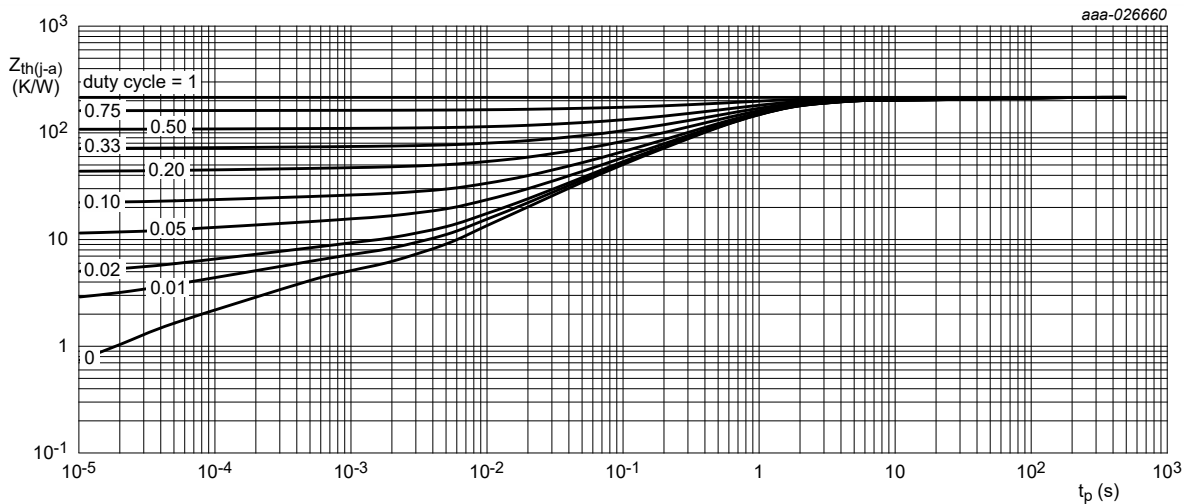
- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector $1\ \text{cm}^2$.
[3] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and standard footprint.
[4] Device mounted on an FR4 PCB, 4-layer copper, tin-plated, mounting pad for collector $1\ \text{cm}^2$.





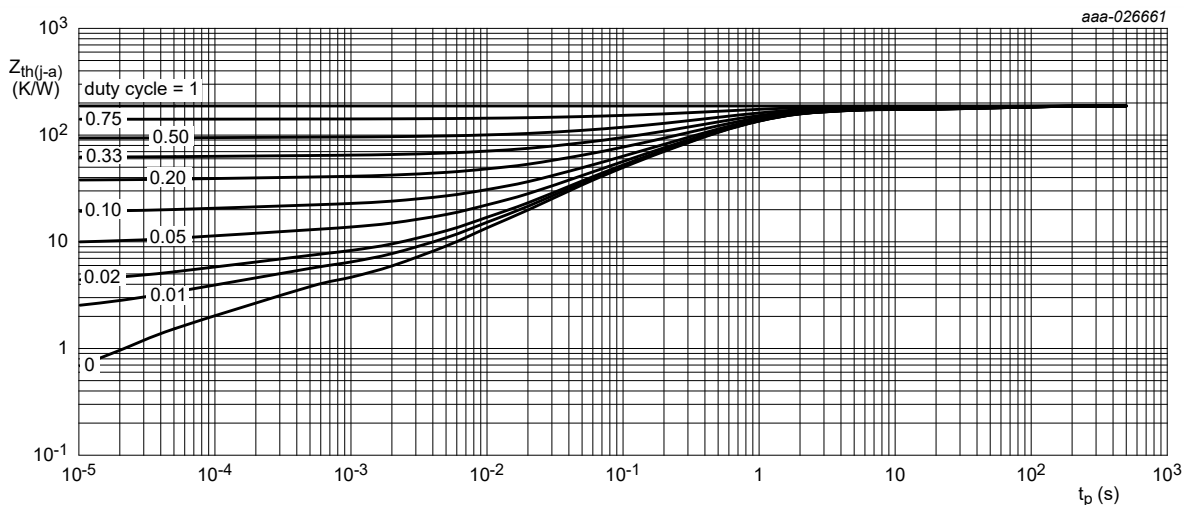
FR4 PCB, single sided copper, mounting pad for drain 1 cm²

Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, 4-layer copper, standard footprint

Fig. 5. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, 4-layer copper, mounting pad for collector 1 cm²

Fig. 6. 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
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = -100\text{ }\mu\text{A}$; $I_E = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		-50	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = -10\text{ mA}$; $I_B = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		-50	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage (collector open)	$I_C = 0\text{ mA}$; $I_E = -100\text{ }\mu\text{A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		-7	-	-	V
I_{CBO}	collector-base cut-off current	$V_{CB} = -50\text{ V}$; $I_E = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	-100	nA
		$V_{CB} = -50\text{ V}$; $I_E = 0\text{ A}$; $T_j = 150\text{ }^{\circ}\text{C}$		-	-	-5	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = -5\text{ V}$; $I_C = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	-100	nA
h_{FE}	DC current gain	$V_{CE} = -2\text{ V}$; $I_C = -100\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	200	-	-	
		$V_{CE} = -2\text{ V}$; $I_C = -500\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	200	-	-	
		$V_{CE} = -2\text{ V}$; $I_C = -1\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	200	-	-	
		$V_{CE} = -2\text{ V}$; $I_C = -2\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	130	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -500\text{ mA}$; $I_B = -50\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	-90	mV
		$I_C = -1\text{ A}$; $I_B = -50\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	-180	mV
		$I_C = -2\text{ A}$; $I_B = -200\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	-300	mV
R_{CEsat}	collector-emitter saturation resistance		[1]	-	-	150	m Ω
V_{BEsat}	base-emitter saturation voltage	$I_C = -2\text{ A}$; $I_B = -100\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	-1.1	V
V_{BE}	base-emitter voltage	$V_{CE} = -2\text{ V}$; $I_C = -1\text{ A}$	[1]	-	-	-1.2	V
f_T	transition frequency	$V_{CE} = -5\text{ V}$; $I_C = -100\text{ mA}$; $f = 100\text{ MHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		100	-	-	MHz
C_c	collector capacitance	$V_{CB} = -10\text{ V}$; $I_E = 0\text{ A}$; $i_e = 0\text{ A}$; $f = 1\text{ MHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	35	pF

[1] Pulse test: $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$

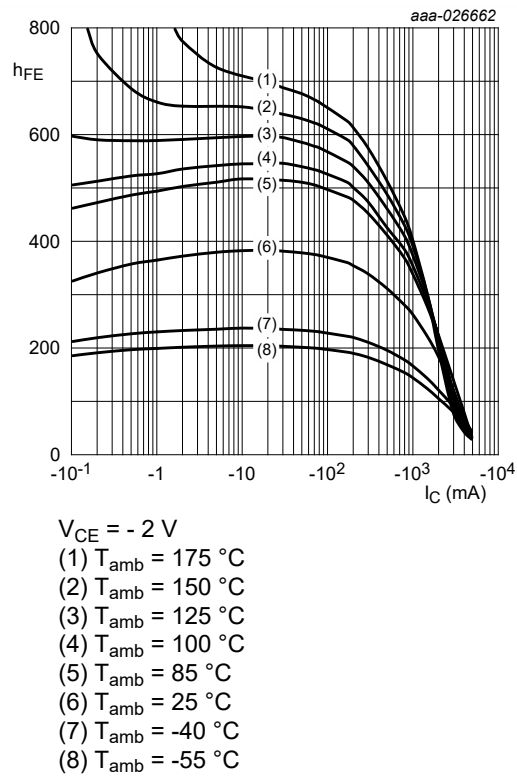


Fig. 7. DC current gain as a function of collector current; typical values

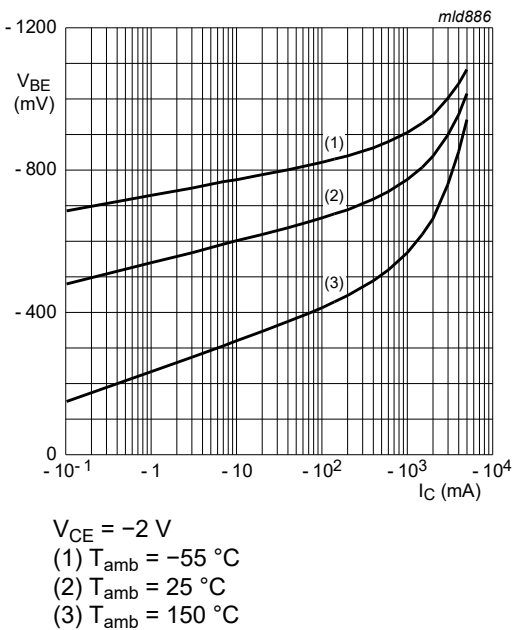


Fig. 8. Base-emitter voltage as a function of collector current; typical values

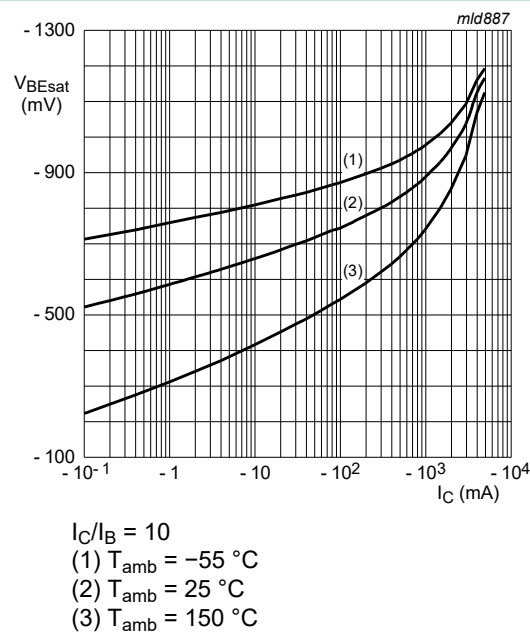


Fig. 9. Base-emitter saturation voltage as a function of collector current; typical values

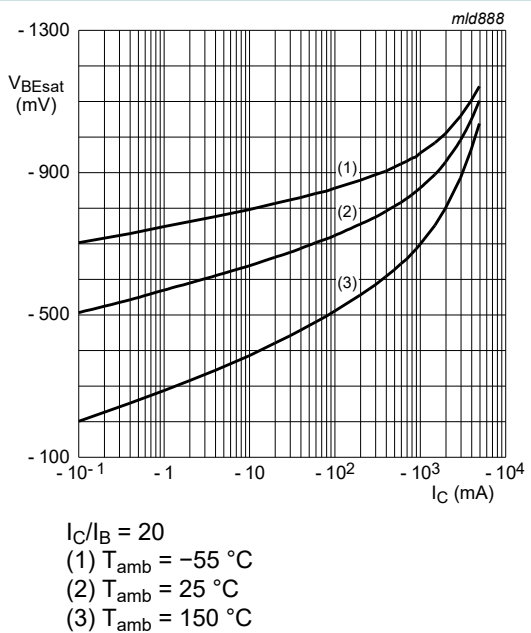


Fig. 10. Base-emitter saturation voltage as a function of collector current; typical values

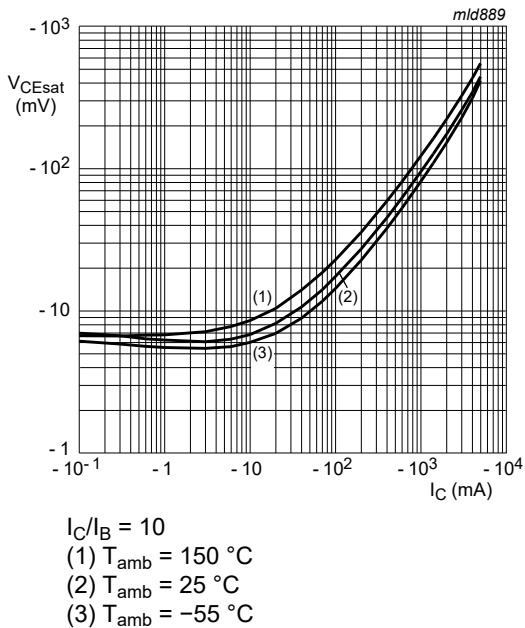


Fig. 11. Collector-emitter saturation voltage as a function of collector current; typical values

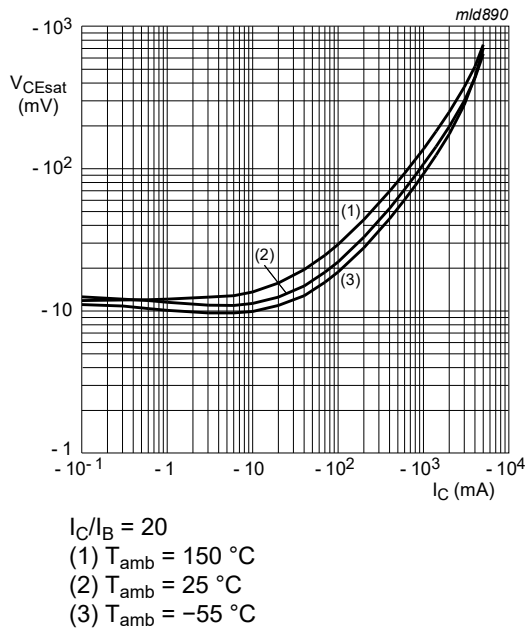


Fig. 12. Collector-emitter saturation voltage as a function of collector current; typical values

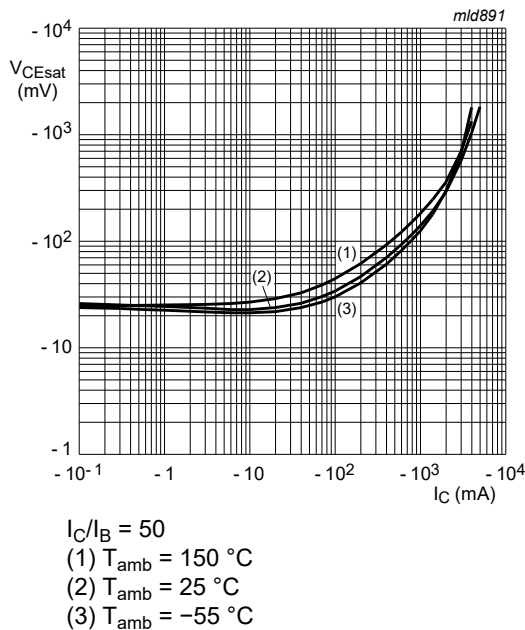


Fig. 13. Collector-emitter saturation voltage as a function of collector current; typical values

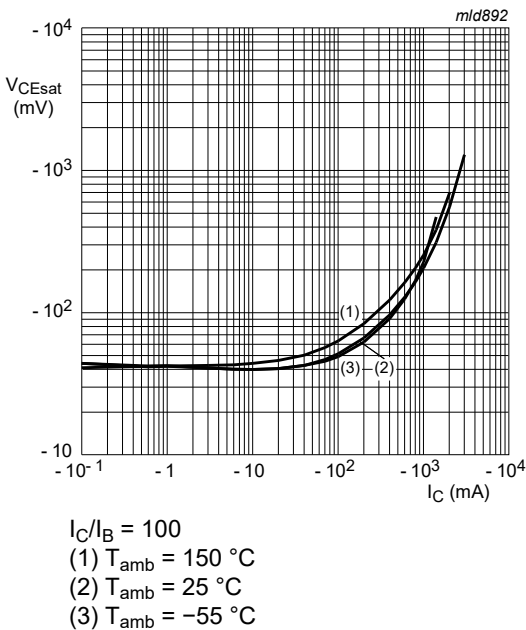
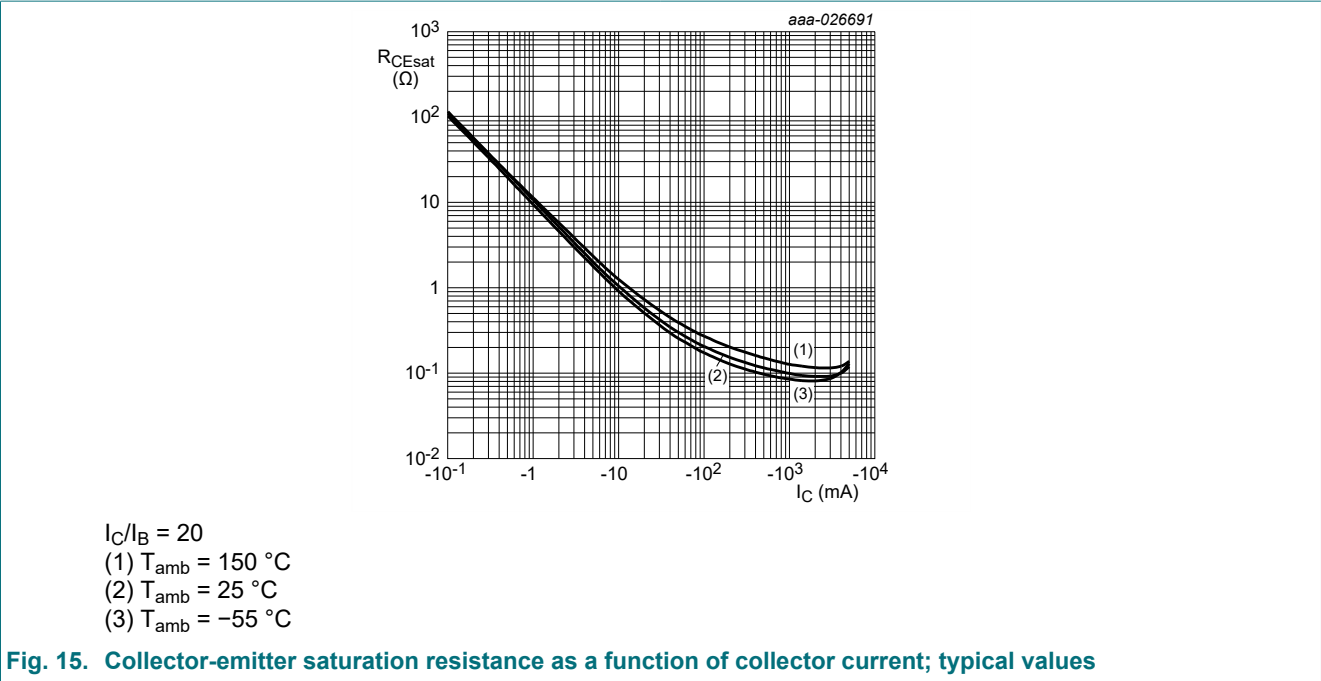


Fig. 14. Collector-emitter saturation voltage as a function of collector current; typical values

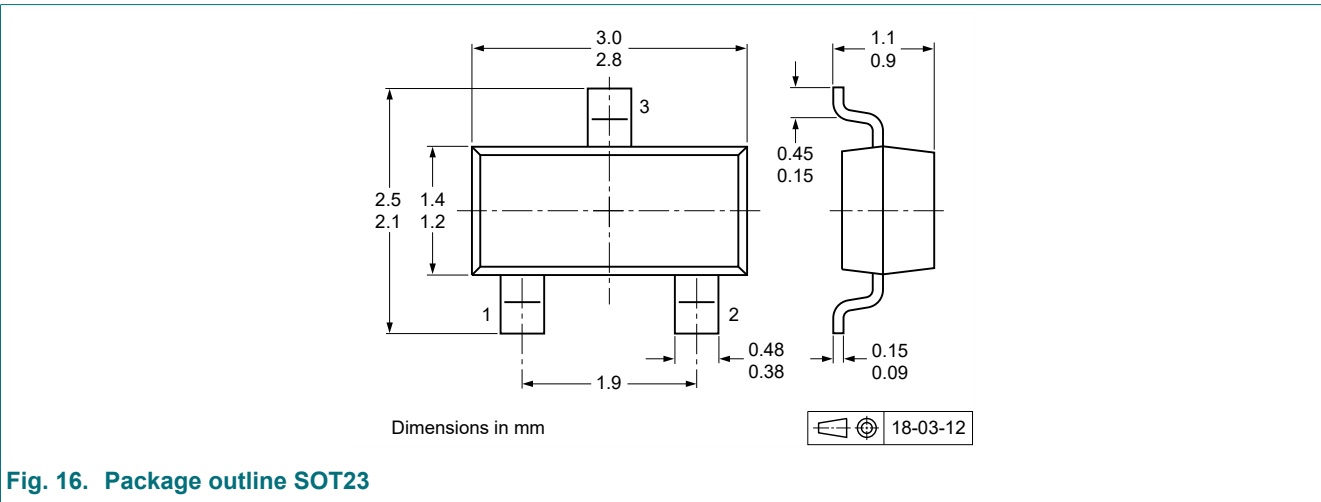


11. Test information

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



13. Soldering

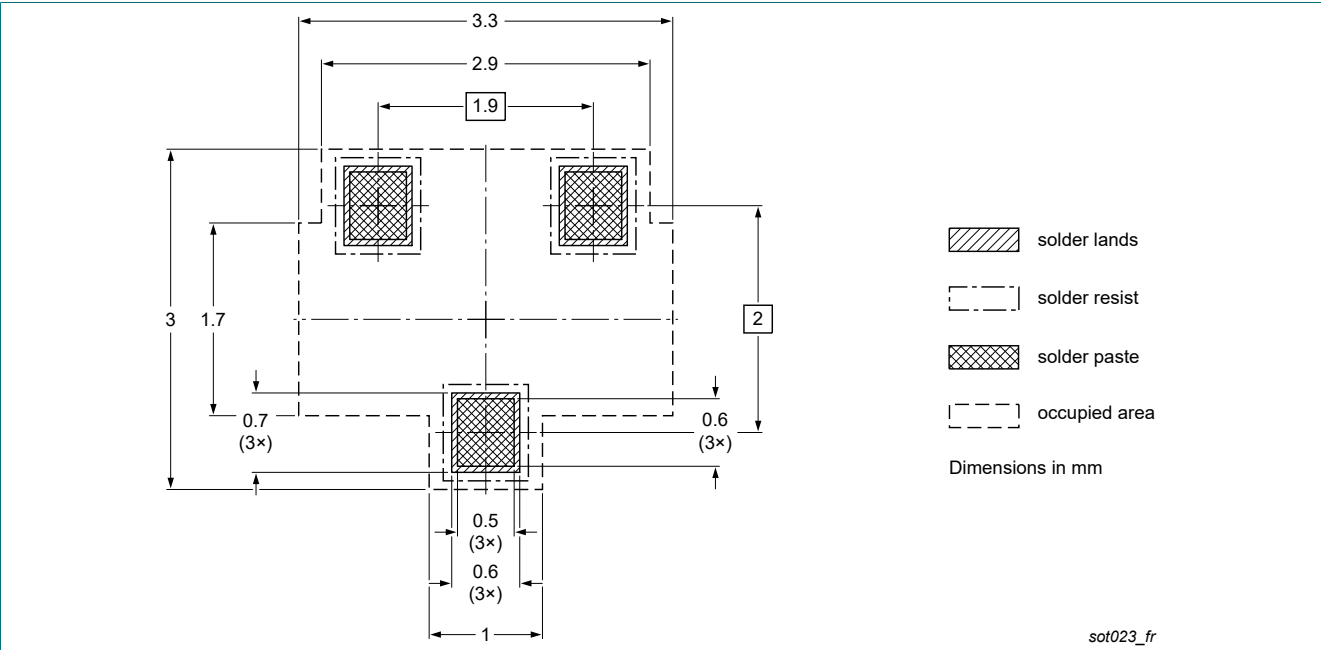


Fig. 17. Reflow soldering footprint for SOT23

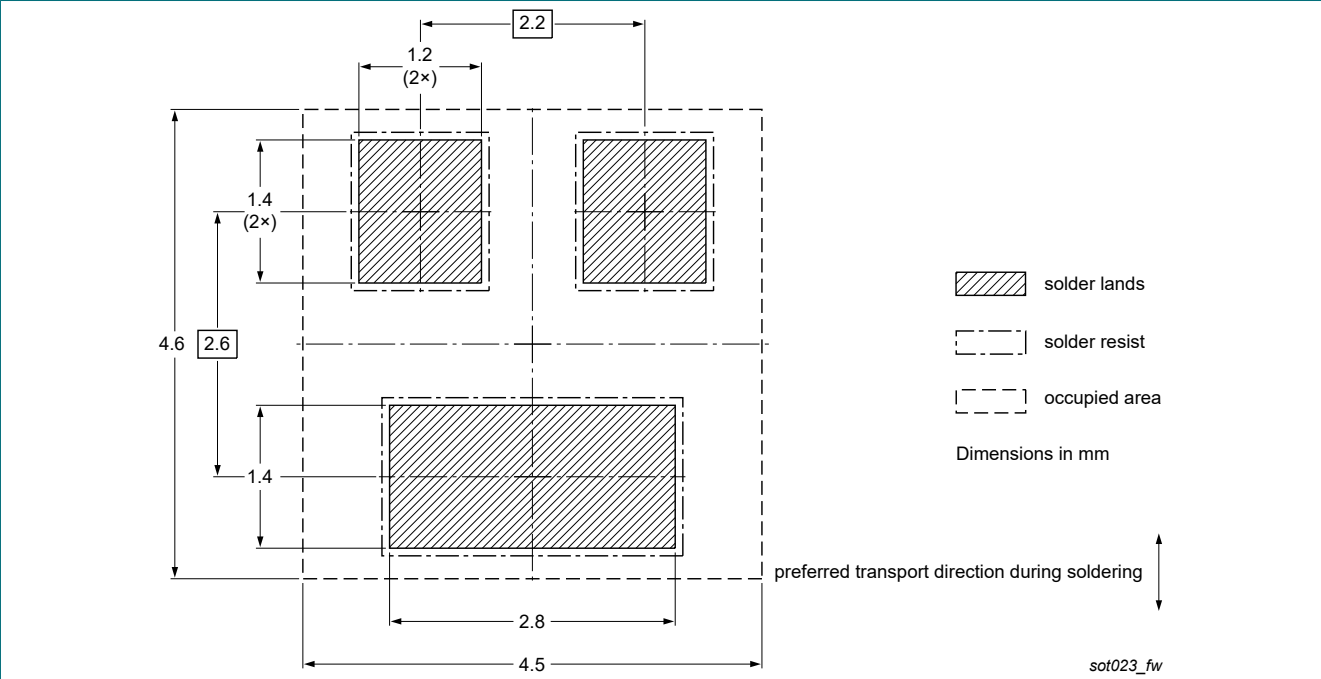


Fig. 18. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS5250TH-Q v.1	20230315	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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Contents

1. General description..... 1

2. Features and benefits..... 1

3. Applications..... 1

4. Quick reference data..... 1

5. Pinning information.....2

6. Ordering information.....2

7. Marking.....2

8. Limiting values..... 3

9. Thermal characteristics..... 4

10. Characteristics..... 6

11. Test information..... 9

12. Package outline..... 9

13. Soldering..... 10

14. Revision history..... 11

15. Legal information.....12

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