



# PBSS4160U

60 V, 1 A NPN low V<sub>CEsat</sub> transistor

4 August 2025

Product data sheet

## 1. General description

NPN low V<sub>CEsat</sub> transistor in a SOT323 (SC-70) Surface Mounted Device (SMD) plastic package.

PNP complement: PBSS5160U

## 2. Features and benefits

- Low collector-emitter saturation voltage V<sub>CEsat</sub>
- High collector current capability: I<sub>C</sub> and I<sub>CM</sub>
- High collector current gain (h<sub>FE</sub>) at high I<sub>C</sub>
- High efficiency due to less heat generation
- Smaller required Printed-Circuit Board (PCB) area than for conventional transistors
- AEC-Q101 qualified

## 3. Applications

- High voltage DC-to-DC conversion
- High voltage MOSFET gate driving
- High voltage motor control
- High voltage power switches (e.g. motors, fans)
- Automotive applications

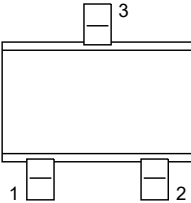
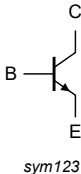
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>CEO</sub>	collector-emitter voltage	open base	-	-	60	V
I <sub>BM</sub>	peak base current	single pulse; t <sub>p</sub> ≤ 1 ms	-	-	1	A
I <sub>CM</sub>	peak collector current		-	-	2	A
R <sub>CEsat</sub>	collector-emitter saturation resistance	I <sub>C</sub> = 1 A; I <sub>B</sub> = 100 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C	-	230	280	mΩ

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 SC-70 (SOT323)	
2	E	emitter		
3	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">PBSS4160U</a>	SC-70	plastic, surface-mounted package; 3 leads; 1.3 mm pitch; 2 mm x 1.25 mm x 0.95 mm body	<a href="#">SOT323</a>

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PBSS4160U	52%

[1] % = placeholder for manufacturing site code

8. Limiting values

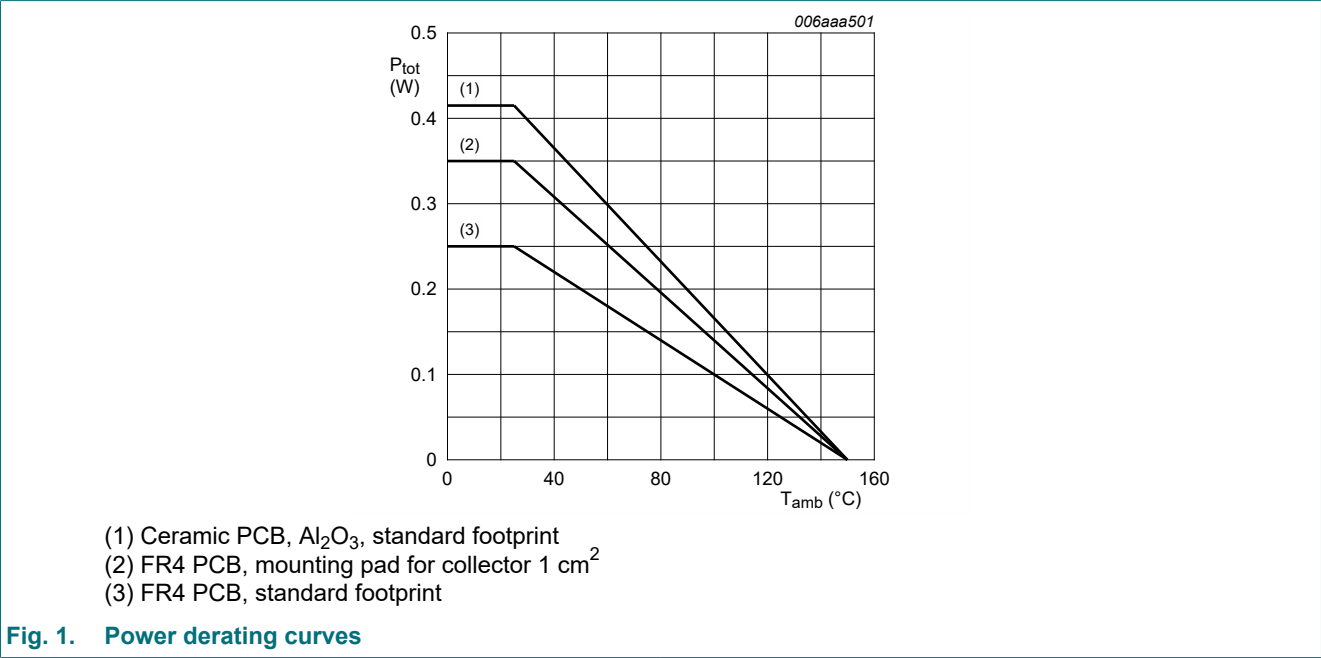
Table 5. Limiting values

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

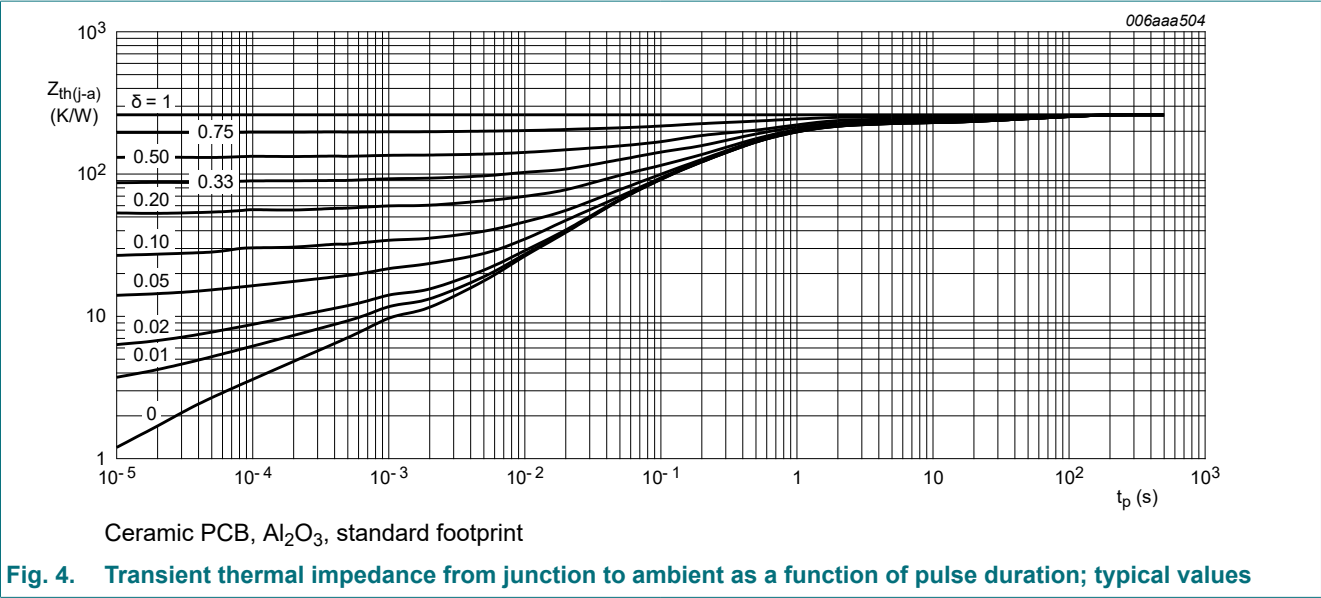
Symbol	Parameter	Conditions		Min	Max	Unit
$V_{CBO}$	collector-base voltage	open emitter		-	80	V
$V_{CEO}$	collector-emitter voltage	open base		-	60	V
$V_{EBO}$	emitter-base voltage	open collector		-	5	V
$I_C$	collector current		[1]	-	750	mA
			[2]	-	930	mA
			[3]	-	1	A
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1$ ms		-	2	A
$I_B$	base current			-	300	mA
$I_{BM}$	peak base current	single pulse; $t_p \leq 1$ ms		-	1	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	250	mW
			[2]	-	350	mW
			[3]	-	415	mW
$T_j$	junction temperature			-	150	°C
$T_{amb}$	ambient temperature			-65	150	°C

Symbol	Parameter	Conditions		Min	Max	Unit
T <sub>stg</sub>	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>.  
[3] Device mounted on a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.







## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I <sub>CBO</sub>	collector-base cut-off current	V <sub>CB</sub> = 60 V; I <sub>E</sub> = 0 A; T <sub>amb</sub> = 25 °C		-	-	100	nA
		V <sub>CB</sub> = 60 V; I <sub>E</sub> = 0 A; T <sub>J</sub> = 150 °C		-	-	50	μA
I <sub>CES</sub>	collector-emitter cut-off current	V <sub>CE</sub> = 60 V; V <sub>BE</sub> = 0 V; T <sub>amb</sub> = 25 °C		-	-	100	nA
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = 5 V; I <sub>C</sub> = 0 A; T <sub>amb</sub> = 25 °C		-	-	100	nA
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 1 mA; T <sub>amb</sub> = 25 °C		250	500	-	
		V <sub>CE</sub> = 5 V; I <sub>C</sub> = 500 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C		200	420	-	
		V <sub>CE</sub> = 5 V; I <sub>C</sub> = 1 A; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C		100	180	-	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = 100 mA; I <sub>B</sub> = 1 mA; T <sub>amb</sub> = 25 °C		-	90	115	mV
		I <sub>C</sub> = 500 mA; I <sub>B</sub> = 50 mA; T <sub>amb</sub> = 25 °C		-	120	150	mV
		I <sub>C</sub> = 1 A; I <sub>B</sub> = 100 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C		-	230	280	mV
R <sub>CEsat</sub>	collector-emitter saturation resistance			-	230	280	mΩ
V <sub>BEsat</sub>	base-emitter saturation voltage	I <sub>C</sub> = 1 A; I <sub>B</sub> = 50 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C		-	0.95	1.1	V
V <sub>BEon</sub>	base-emitter turn-on voltage	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 1 A; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C		-	0.85	0.9	V
t <sub>d</sub>	delay time	I <sub>C</sub> = 0.5 A; I <sub>Bon</sub> = 25 mA; I <sub>Boff</sub> = -25 mA; T <sub>amb</sub> = 25 °C		-	11	-	ns
t <sub>r</sub>	rise time			-	78	-	ns
t <sub>on</sub>	turn-on time			-	90	-	ns
t <sub>s</sub>	storage time			-	340	-	ns
t <sub>f</sub>	fall time			-	160	-	ns
t <sub>off</sub>	turn-off time			-	500	-	ns
f <sub>T</sub>	transition frequency	V <sub>CE</sub> = 10 V; I <sub>C</sub> = 50 mA; f = 100 MHz; T <sub>amb</sub> = 25 °C		150	220	-	MHz

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
C <sub>c</sub>	collector capacitance	V <sub>CB</sub> = 10 V; I <sub>E</sub> = 0 A; i <sub>e</sub> = 0 A; f = 1 MHz; T <sub>amb</sub> = 25 °C	-	5.5	10	pF

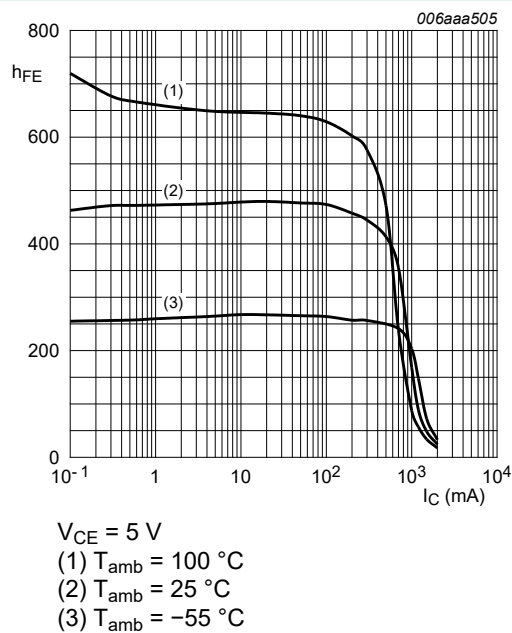


Fig. 5. DC current gain as a function of collector current; typical values

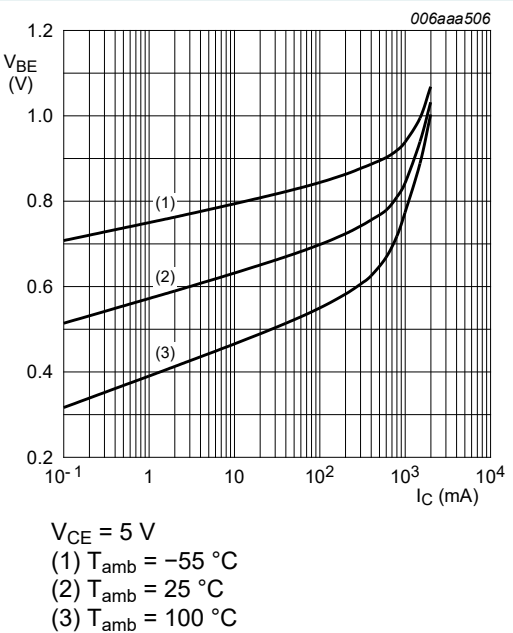


Fig. 6. Base-emitter voltage as a function of collector current; typical values

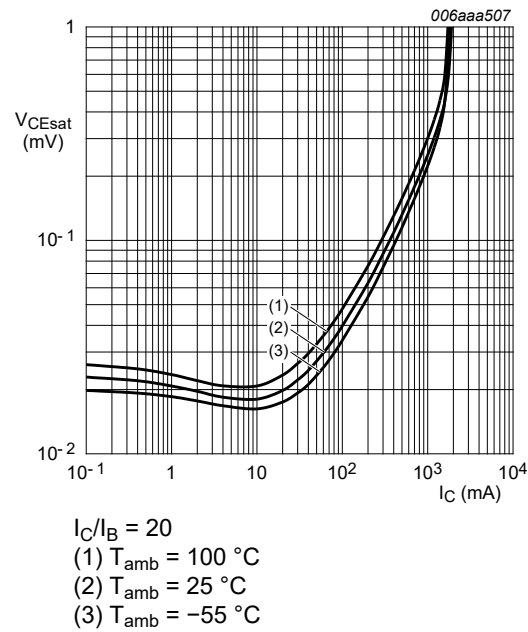


Fig. 7. Collector-emitter saturation voltage as a function of collector current; typical values

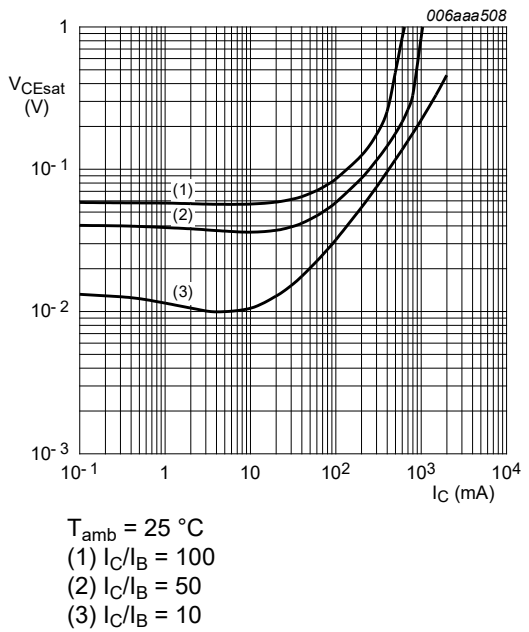


Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values

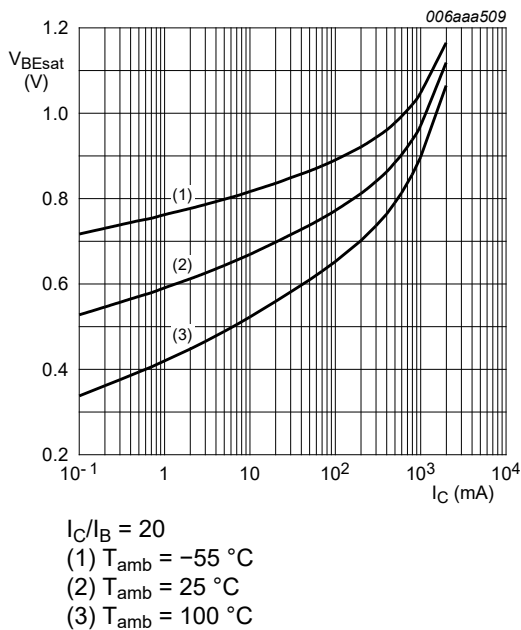


Fig. 9. Base-emitter saturation voltage as a function of collector current; typical values

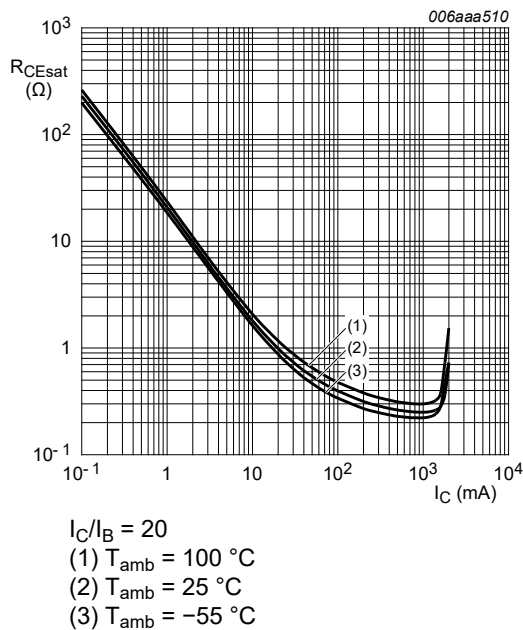


Fig. 10. Collector-emitter saturation resistance as a function of collector current; typical values

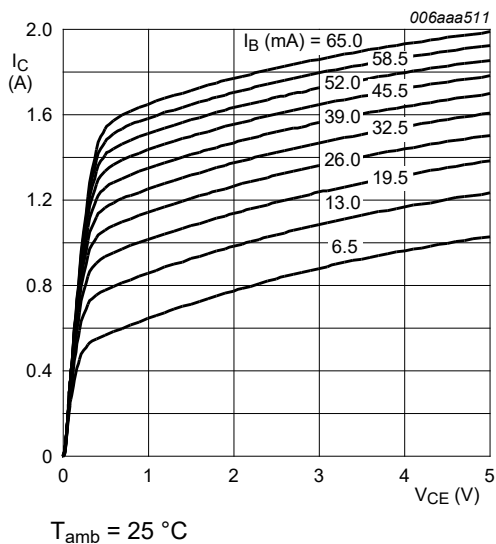


Fig. 11. Collector current as a function of collector-emitter voltage; typical values

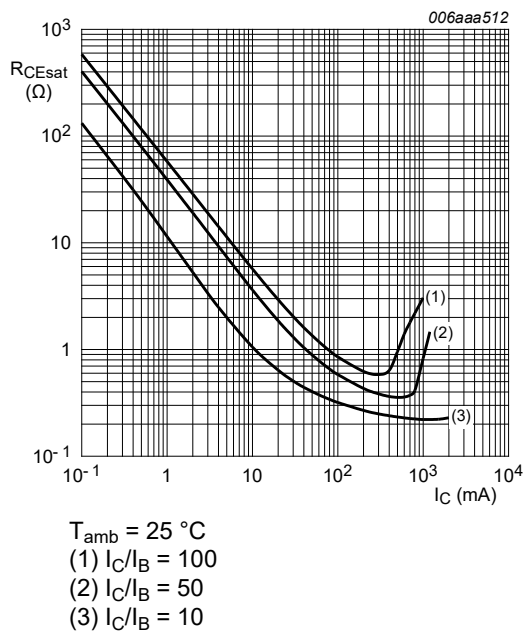


Fig. 12. Collector-emitter saturation resistance as a function of collector current; typical values

11. Test information

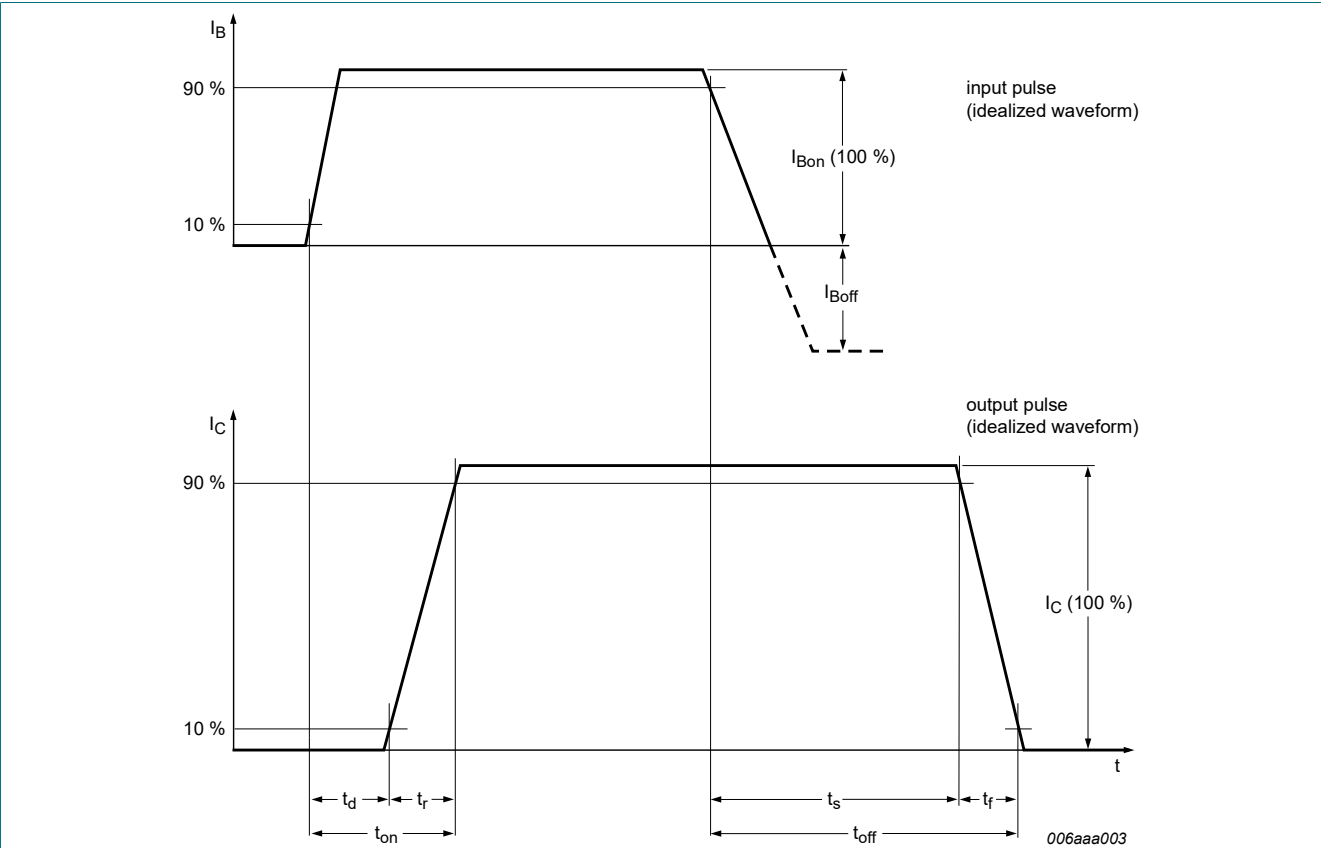


Fig. 13. Transistor switching time definition

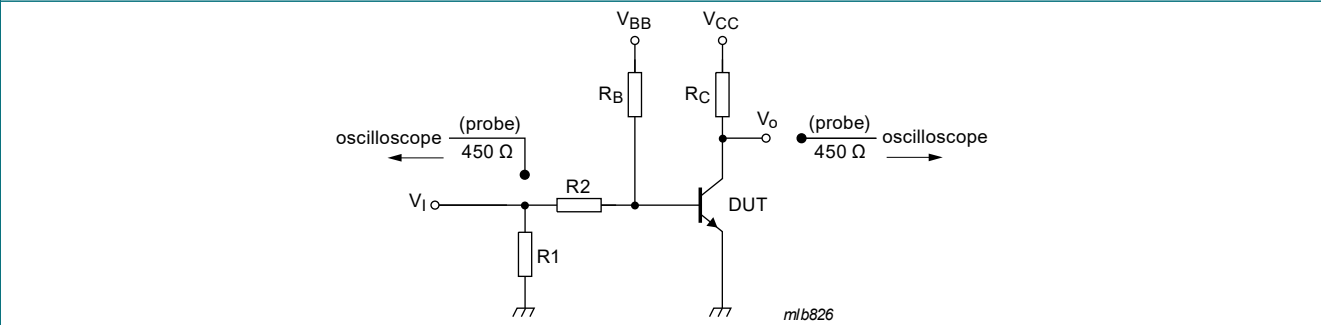
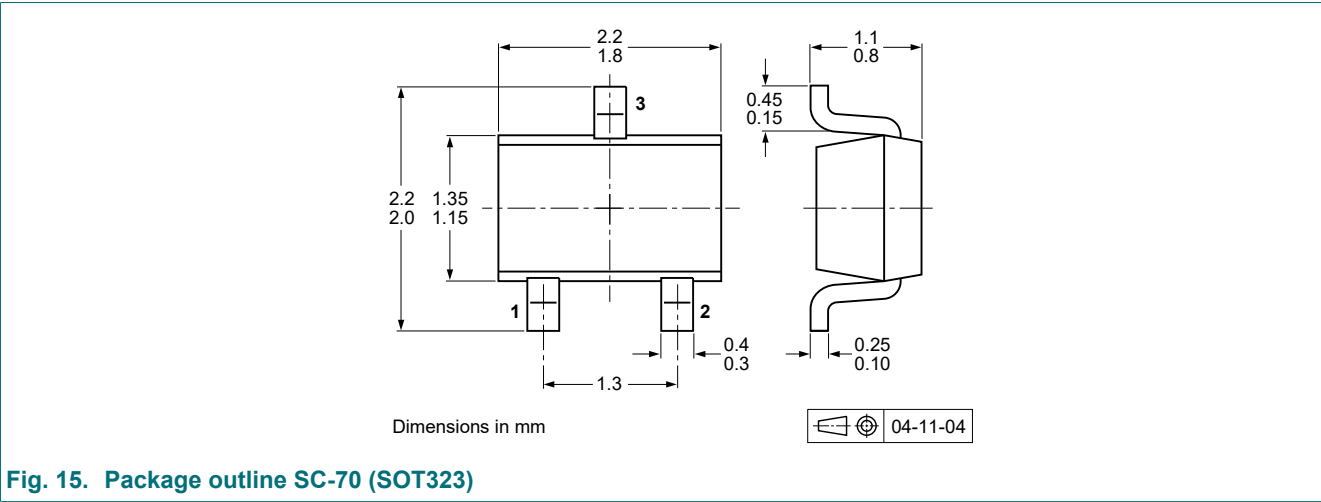


Fig. 14. Test circuit for switching times



12. Package outline



13. Soldering

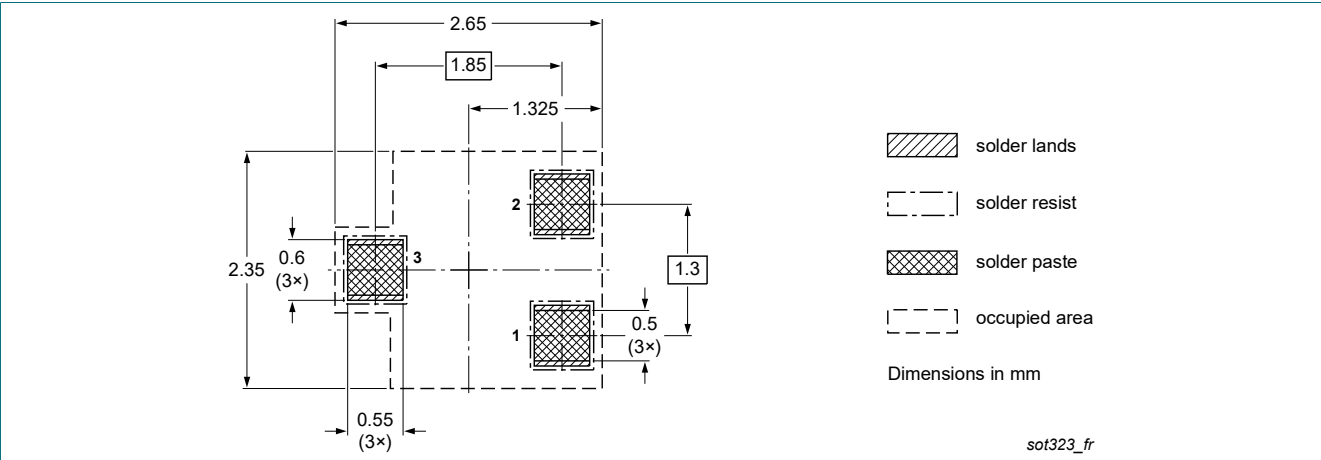


Fig. 16. Reflow soldering footprint for SC-70 (SOT323)

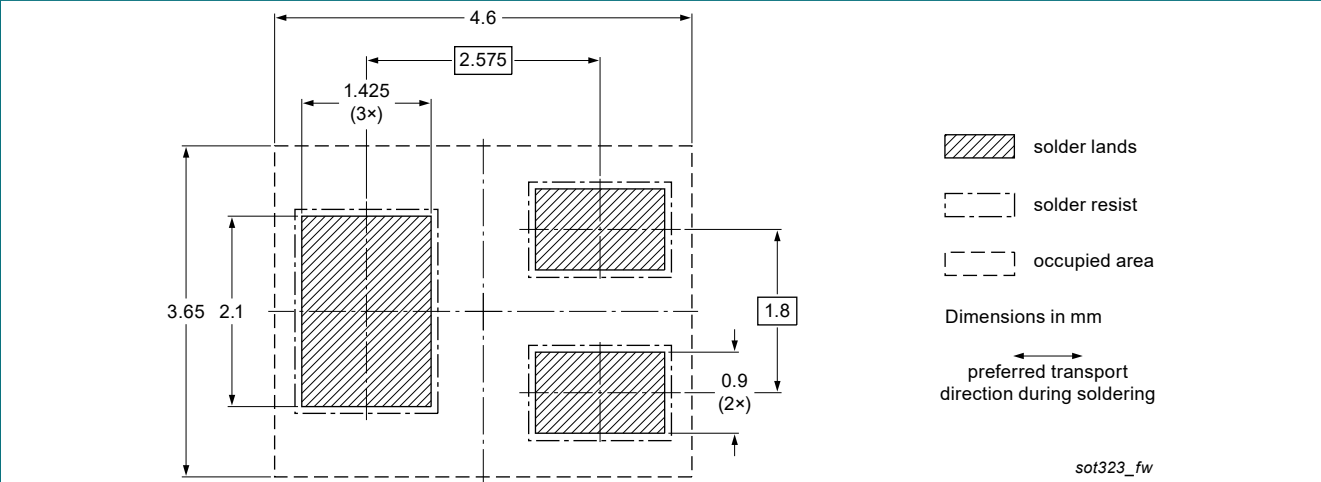


Fig. 17. Wave soldering footprint for SC-70 (SOT323)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS4160U v.4	20250804	Product data sheet	-	PBSS4160U v.3
Modifications	<ul style="list-style-type: none"><li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>Legal texts have been adapted to the new company name where appropriate.</li></ul>			
PBSS4160U v.3	20091211	Product data sheet	-	PBSS4160U v.2
PBSS4160U v.2	20050719	Product data sheet	-	PBSS4160U v.1
PBSS4160U v.1	20040423	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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