



PBSS4160U

60 V, 1 A NPN low V_{CEsat} transistor

4 August 2025

Product data sheet

1. General description

NPN low V_{CEsat} 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_{CEsat}
- High collector current capability: I_C and I_{CM}
- High collector current gain (h_{FE}) at high I_C
- 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

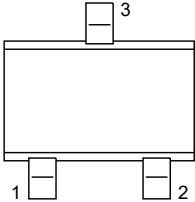
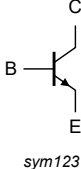
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{CEO}	collector-emitter voltage	open base	-	-	60	V
I _{BM}	peak base current	single pulse; t _p ≤ 1 ms	-	-	1	A
I _{CM}	peak collector current		-	-	2	A
R _{CEsat}	collector-emitter saturation resistance	I _C = 1 A; I _B = 100 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 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)	 sym123
2	E	emitter		
3	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS4160U	SC-70	plastic, surface-mounted package; 3 leads; 1.3 mm pitch; 2 mm x 1.25 mm x 0.95 mm body	SOT323

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PBSS4160U	52%

[1] % = placeholder for manufacturing site code

8. Limiting values

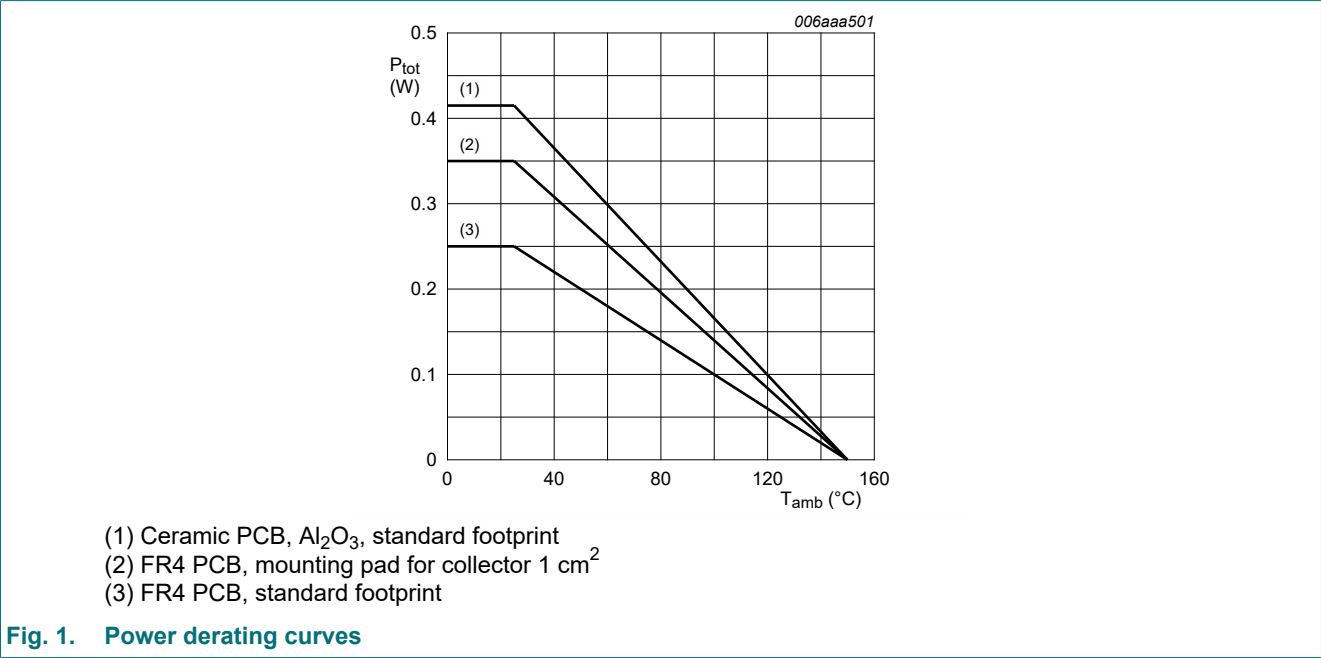
Table 5. Limiting values

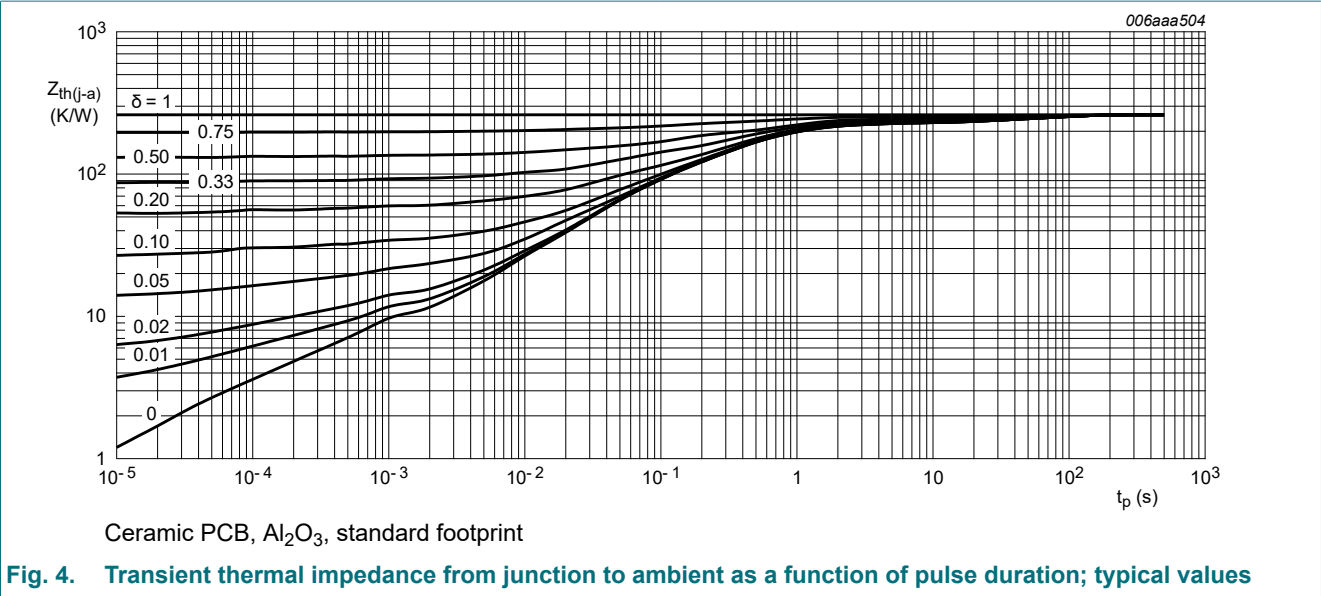
In accordance with the Absolute Maximum Rating System (IEC 60134).

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 ≤ 1 ms		-	2	A
I _B	base current			-	300	mA
I _{BM}	peak base current	single pulse; t _p ≤ 1 ms		-	1	A
P _{tot}	total power dissipation	T _{amb} ≤ 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 _{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 cm².
- [3] Device mounted on a ceramic PCB, Al₂O₃, standard footprint.





10. Characteristics

Table 7. Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
C _c	collector capacitance	V _{CB} = 10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C	-	5.5	10	pF

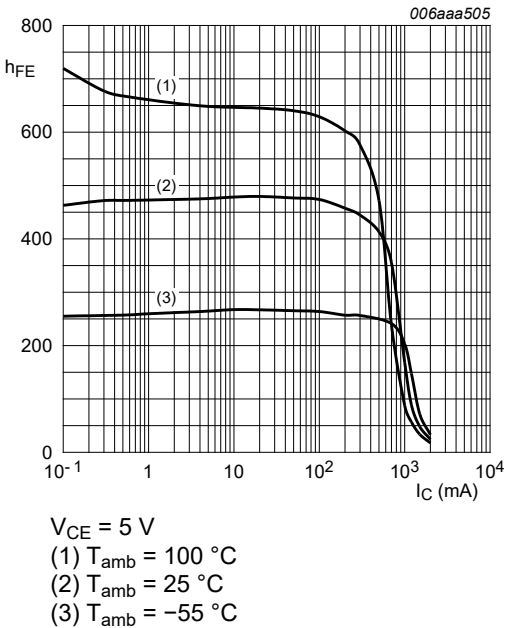


Fig. 5. DC current gain as a function of collector current; typical values

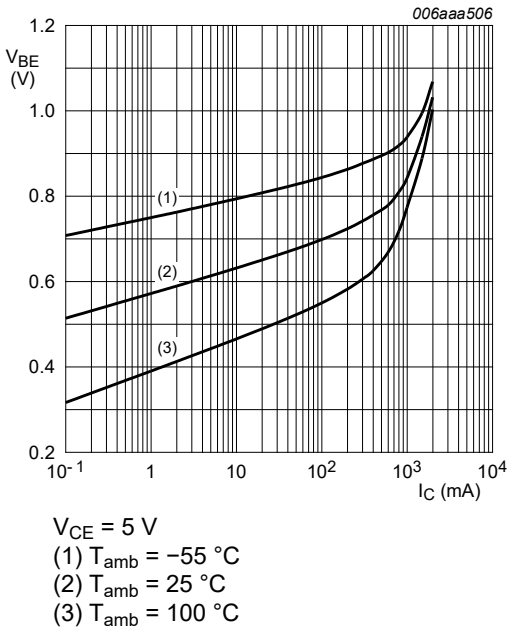


Fig. 6. Base-emitter voltage as a function of collector current; typical values

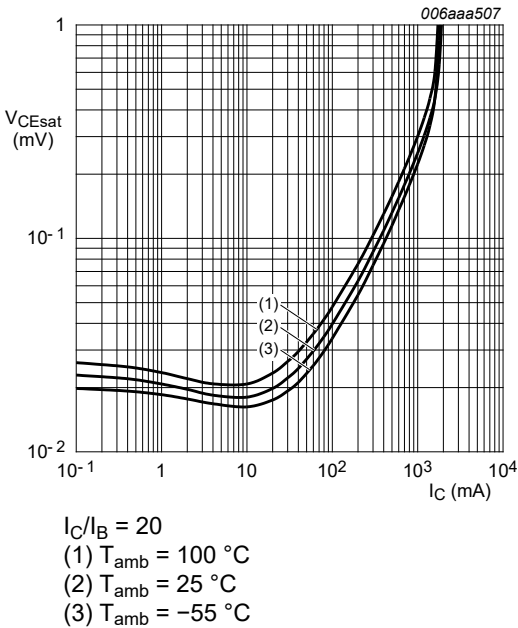


Fig. 7. Collector-emitter saturation voltage as a function of collector current; typical values

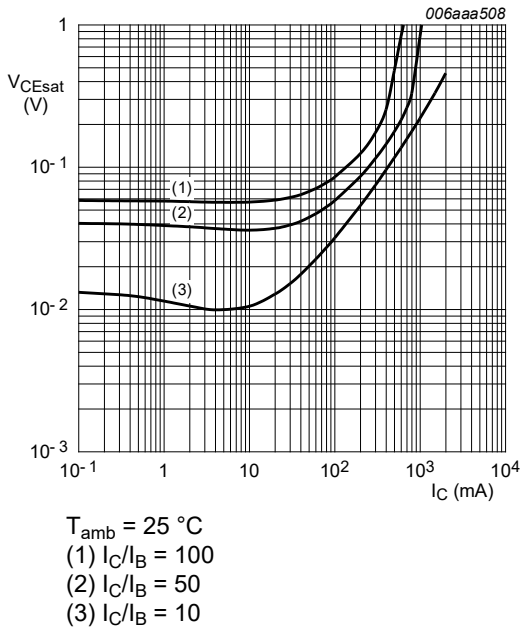


Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values

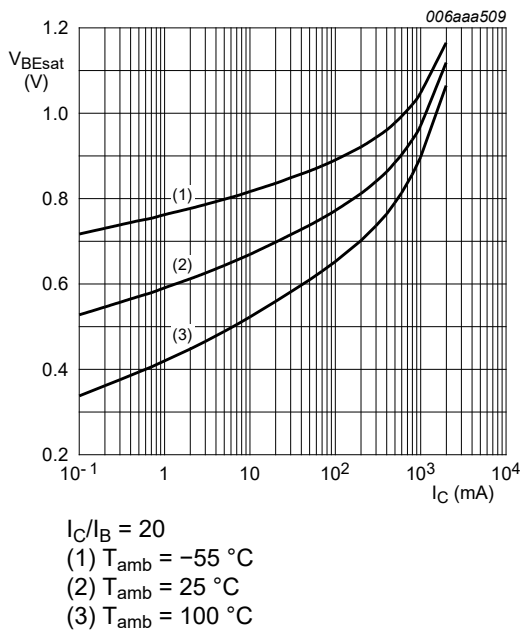


Fig. 9. Base-emitter saturation voltage as a function of collector current; typical values

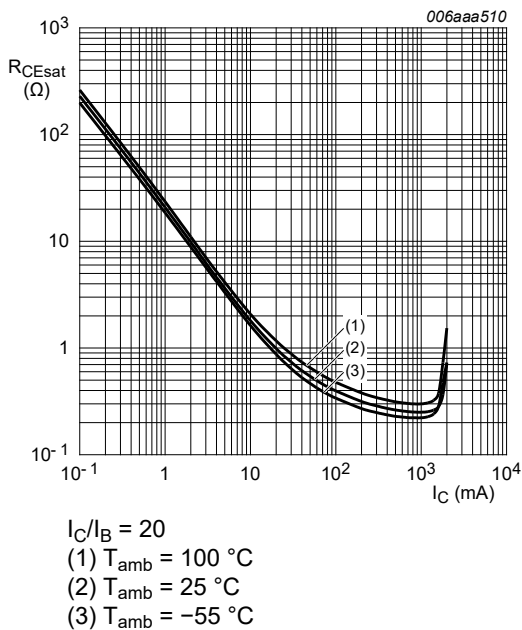


Fig. 10. Collector-emitter saturation resistance as a function of collector current; typical values

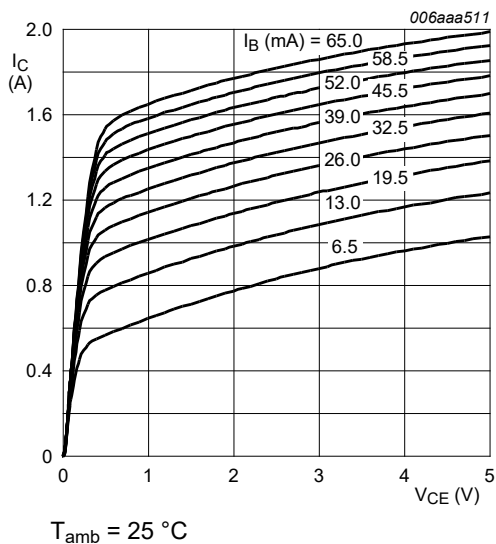


Fig. 11. Collector current as a function of collector-emitter voltage; typical values

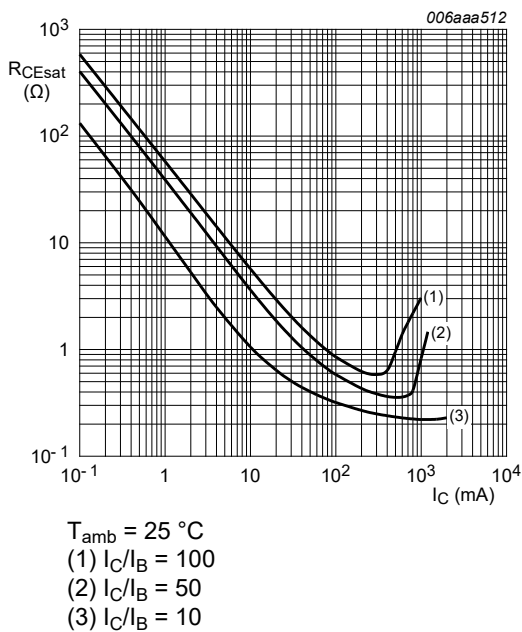


Fig. 12. Collector-emitter saturation resistance as a function of collector current; typical values

11. Test information

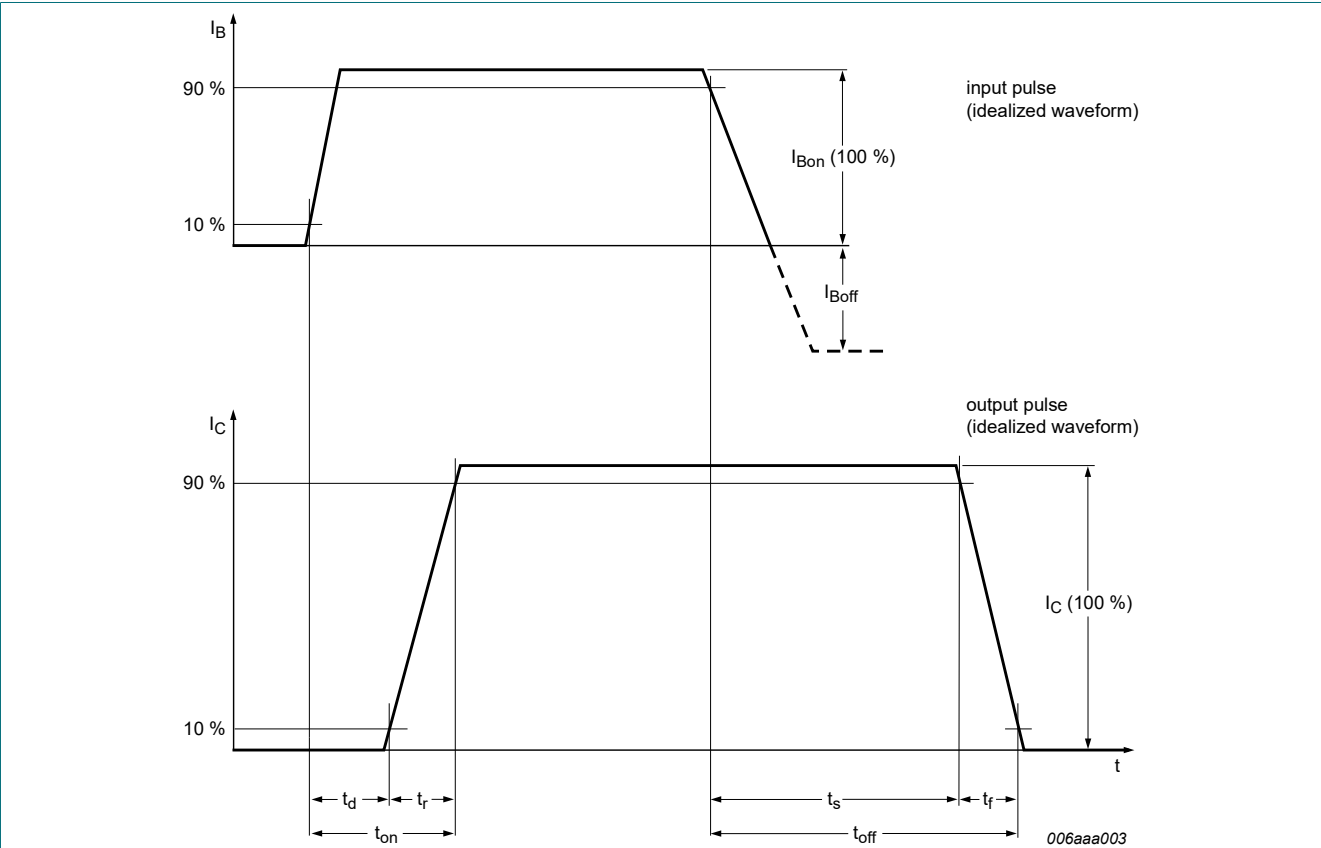


Fig. 13. Transistor switching time definition

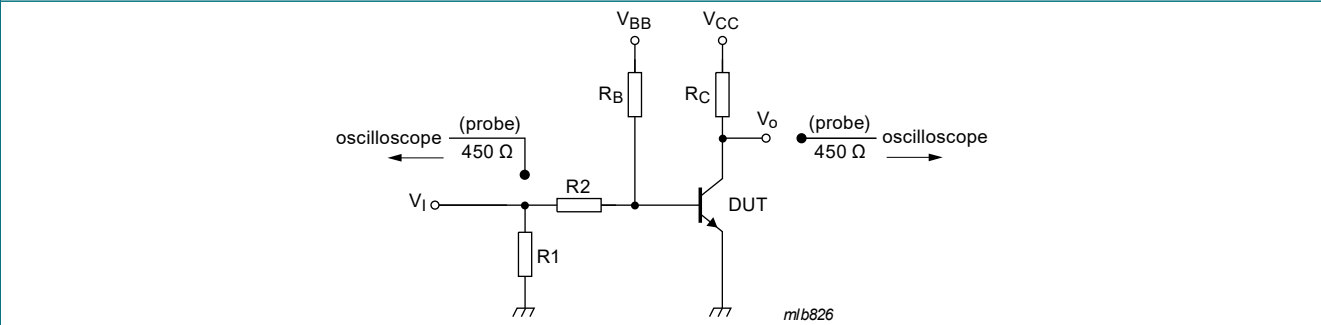


Fig. 14. Test circuit for switching times

12. Package outline

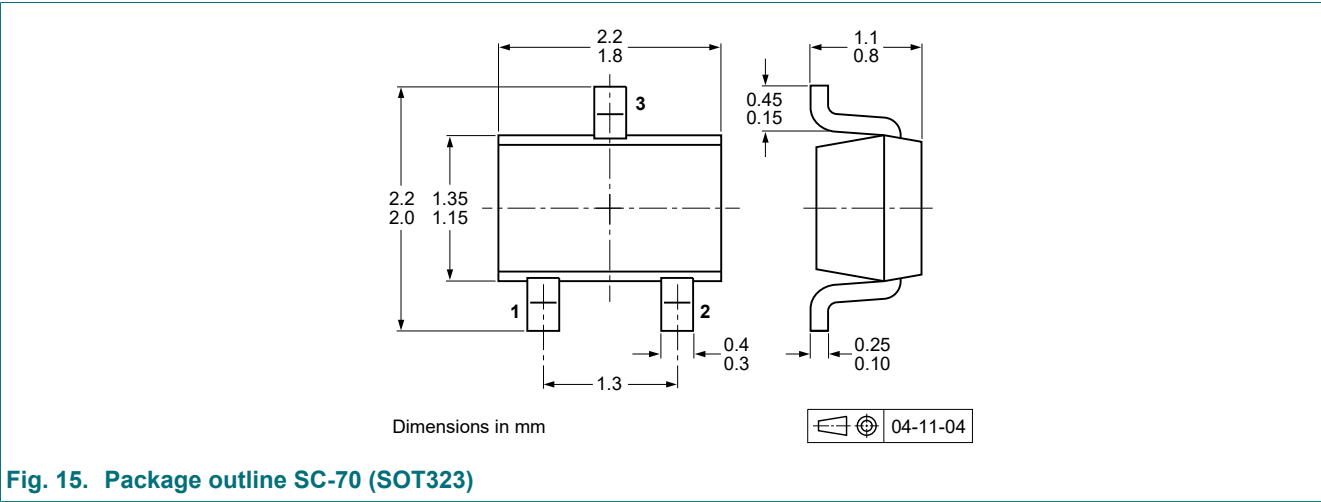


Fig. 15. Package outline SC-70 (SOT323)

13. Soldering

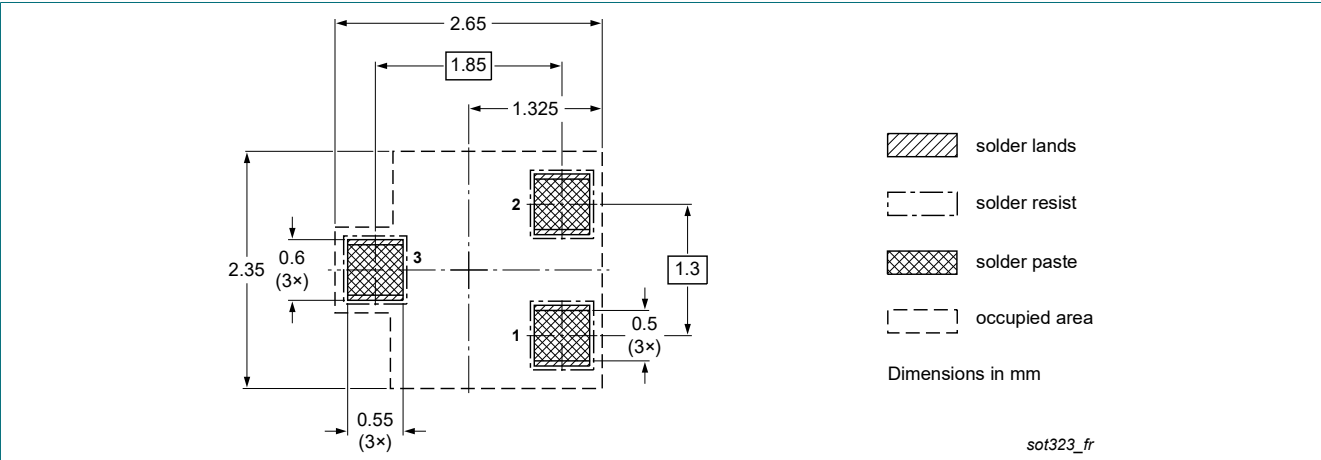


Fig. 16. Reflow soldering footprint for SC-70 (SOT323)

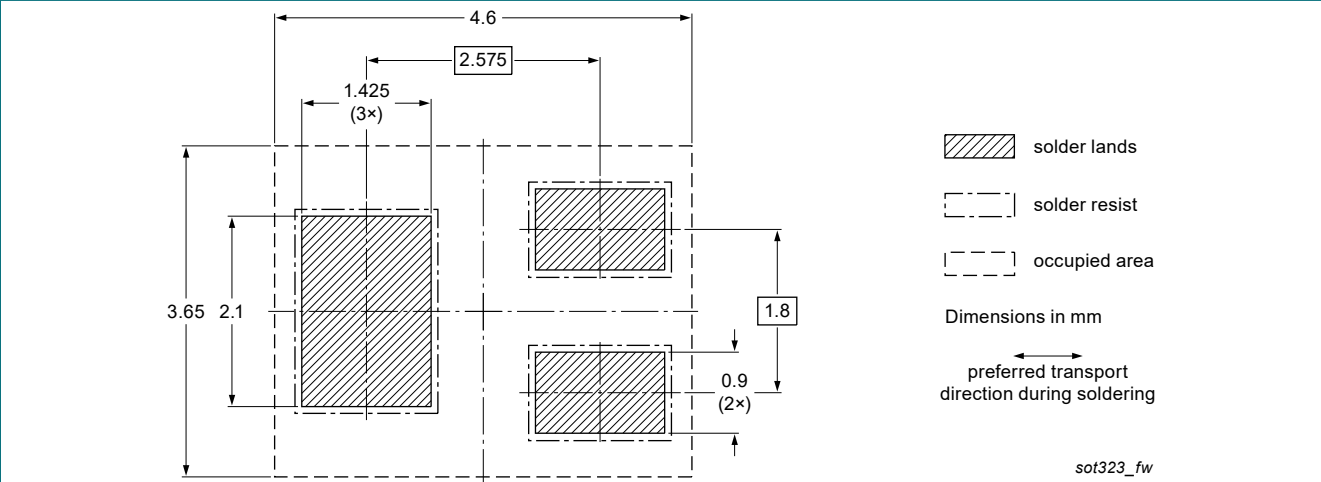


Fig. 17. Wave soldering footprint for SC-70 (SOT323)

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	- The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. - Legal texts have been adapted to the new company name where appropriate.			
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".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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