



PBHV3160Z-Q

600 V, 0.1 A PNP high-voltage low V_{CEsat} transistor

21 April 2023

Product data sheet

1. General description

PNP high-voltage low V_{CEsat} transistor in a medium power SOT223 (SC-73) Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- High voltage
- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability I_C
- High collector current gain h_{FE} at high I_C
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Electronic ballast for fluorescent lighting
- LED driver for LED chain module
- LCD backlighting
- HID front lighting
- Automotive motor management
- Hook switch for wired telecom
- Switch Mode Power Supply (SMPS)

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{CEO}	collector-emitter voltage	open base	-	-	-600	V
I _C	collector current		-	-	-0.1	A
h _{FE}	DC current gain	V _{CE} = -10 V; I _C = -10 mA; T _{amb} = 25 °C	70	130	-	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	<p>SC-73 (SOT223)</p>	<p>sym028</p>
2	C	collector		
3	E	emitter		
4	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBHV3160Z-Q	SC-73	plastic, surface-mounted package with increased heatsink; 4 leads; 2.3 mm pitch; 6.5 mm x 3.5 mm x 1.65 mm body	SOT223

7. Marking

Table 4. Marking codes

Type number	Marking code
PBHV3160Z-Q	HV316Z

8. Limiting values

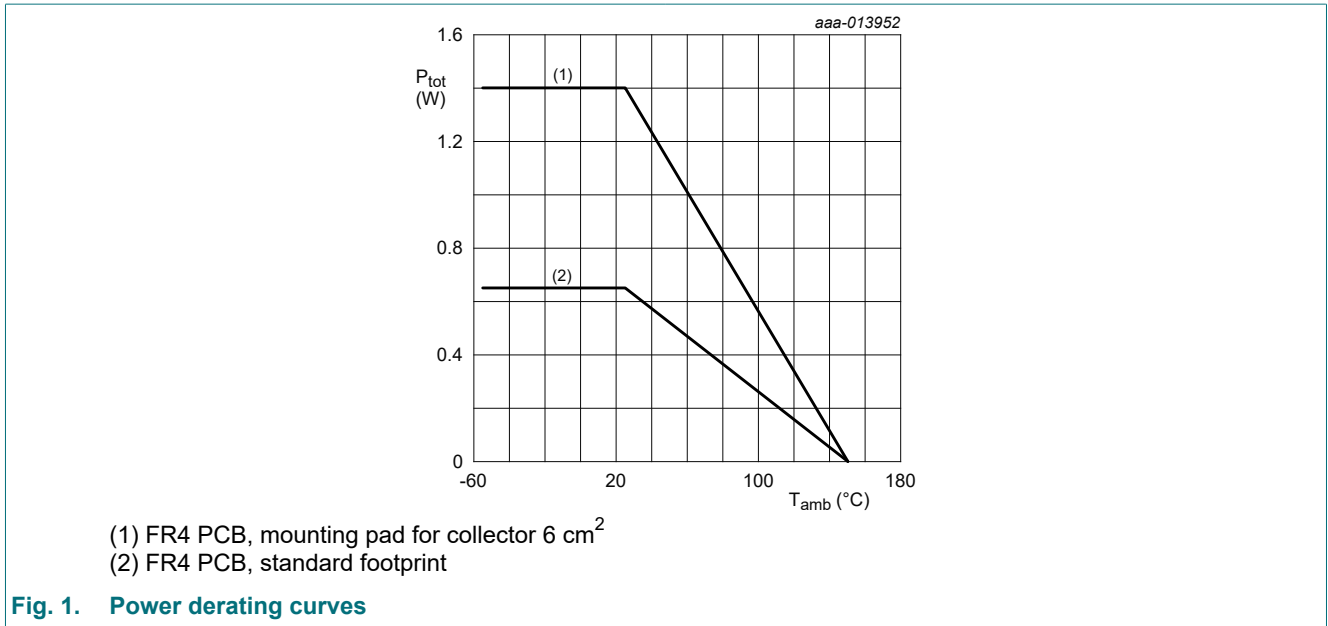
Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter		-	-600	V
V_{CEO}	collector-emitter voltage	open base		-	-600	V
V_{CESM}	collector-emitter peak voltage	$V_{BE} = 0$ V		-	-600	V
V_{EBO}	emitter-base voltage	open collector		-	-6	V
I_C	collector current			-	-0.1	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	0.65	W
			[2]	-	1.4	W
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.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².

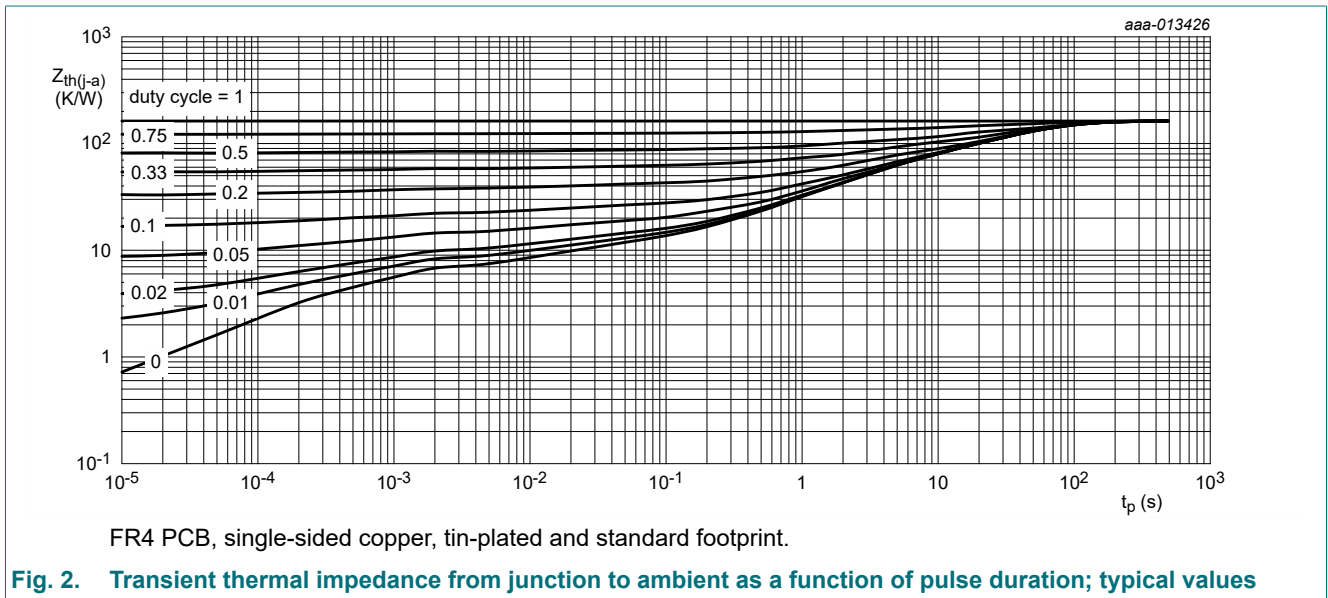


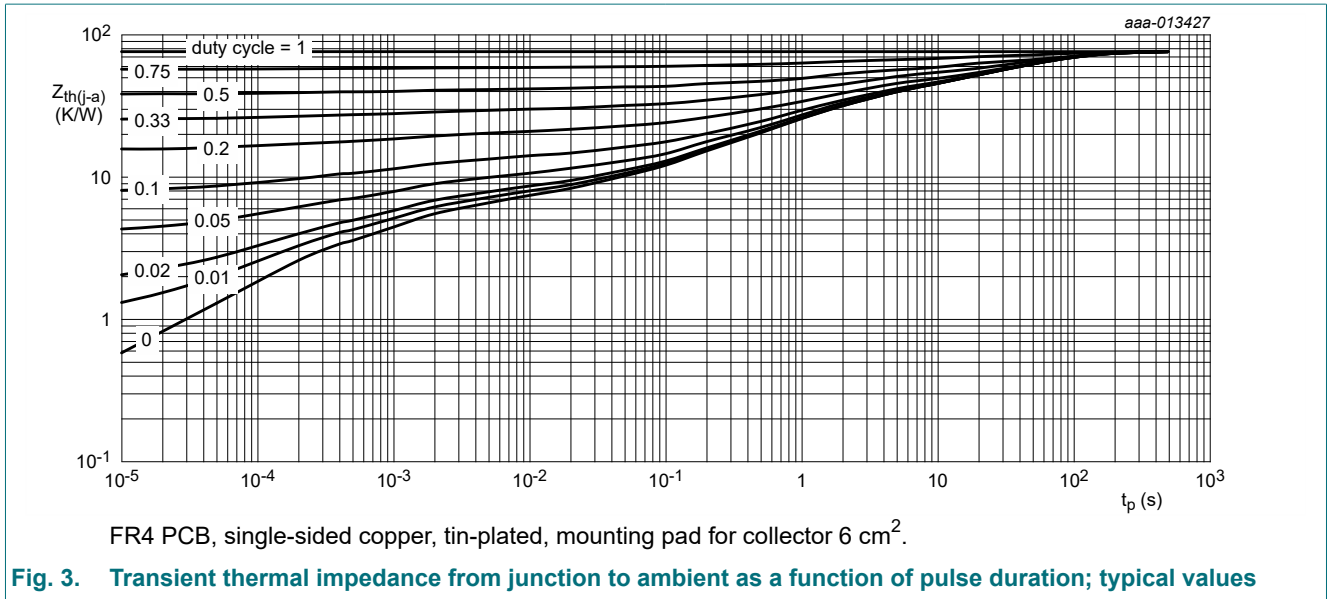
9. Thermal characteristics

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]	-	-	190	K/W
			[2]	-	-	89	K/W
R _{th(j-sp)}	thermal resistance from junction to solder point			-	-	20	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 6 cm².

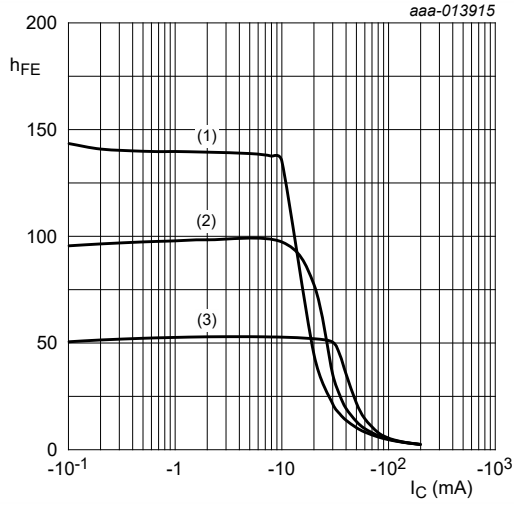




10. Characteristics

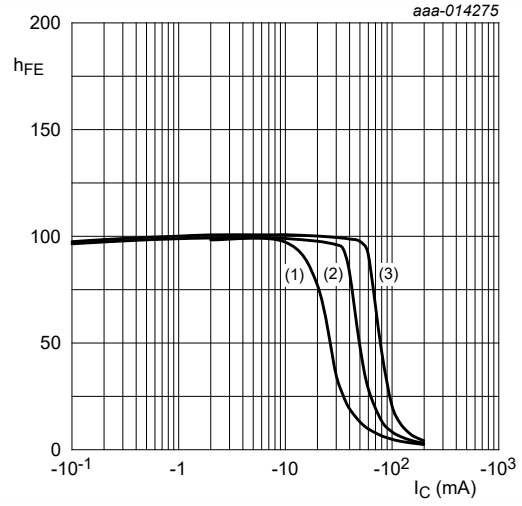
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I _{CB0}	collector-base cut-off current	V _{CB} = -400 V; I _E = 0 A; T _{amb} = 25 °C	-	-	-100	nA
		V _{CB} = -400 V; I _E = 0 A; T _j = 150 °C	-	-	-10	μA
I _{EBO}	emitter-base cut-off current	V _{EB} = -5 V; I _C = 0 A; T _{amb} = 25 °C	-	-	-100	nA
I _{CES}	collector-emitter cut-off current	V _{CE} = -400 V; V _{BE} = 0 V; T _{amb} = 25 °C	-	-	-100	nA
h _{FE}	DC current gain	V _{CE} = -10 V; I _C = -10 mA; T _{amb} = 25 °C	70	130	-	
V _{CEsat}	collector-emitter saturation voltage	I _C = -30 mA; I _B = -6 mA; T _{amb} = 25 °C	-	-150	-250	mV
V _{BEsat}	base-emitter saturation voltage	I _C = -50 mA; I _B = -5 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C	-	-	-950	mV
f _T	transition frequency	V _{CE} = -10 V; I _C = -5 mA; f = 100 MHz	-	38	-	MHz
C _c	collector capacitance	V _{CB} = -20 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C	-	6	-	pF
C _e	emitter capacitance	V _{EB} = -0.5 V; I _C = 0 A; i _c = 0 A; f = 1 MHz; T _{amb} = 25 °C	-	76	-	pF



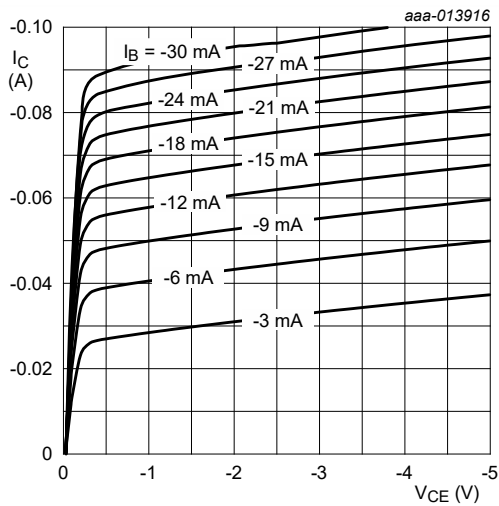
$V_{CE} = -10$ V
 (1) $T_{amb} = 100$ °C
 (2) $T_{amb} = 25$ °C
 (3) $T_{amb} = -55$ °C

Fig. 4. DC current gain as a function of collector current; typical values



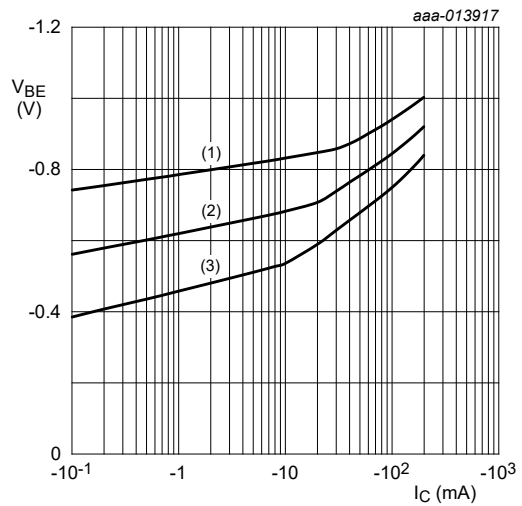
$h_{FE} = f(I_C)$
 $T_{amb} = 25$ °C
 (1) $V_{CE} = -10$ V
 (2) $V_{CE} = -25$ V
 (3) $V_{CE} = -50$ V

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



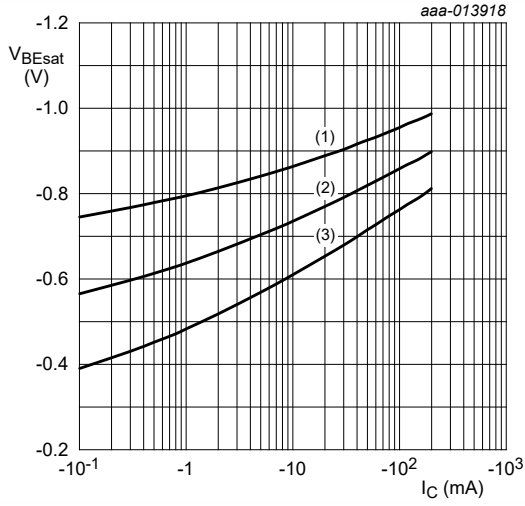
$T_{amb} = 25$ °C

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



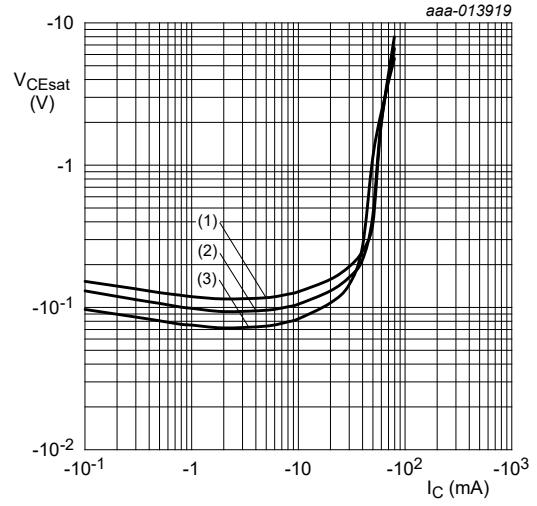
$V_{CE} = -10$ V
 (1) $T_{amb} = -55$ °C
 (2) $T_{amb} = 25$ °C
 (3) $T_{amb} = 100$ °C

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



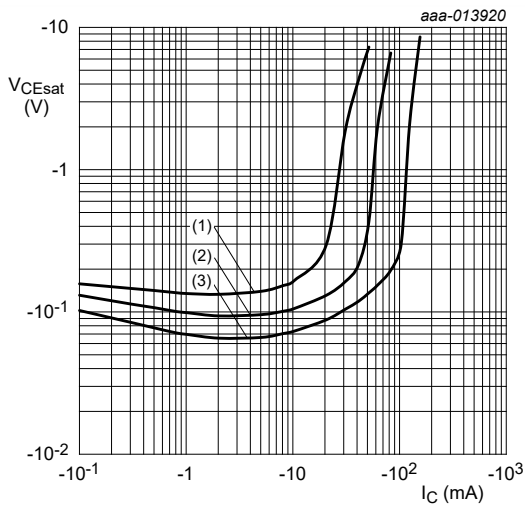
$I_C/I_B = 5$
 (1) $T_{amb} = -55^\circ C$
 (2) $T_{amb} = 25^\circ C$
 (3) $T_{amb} = 100^\circ C$

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



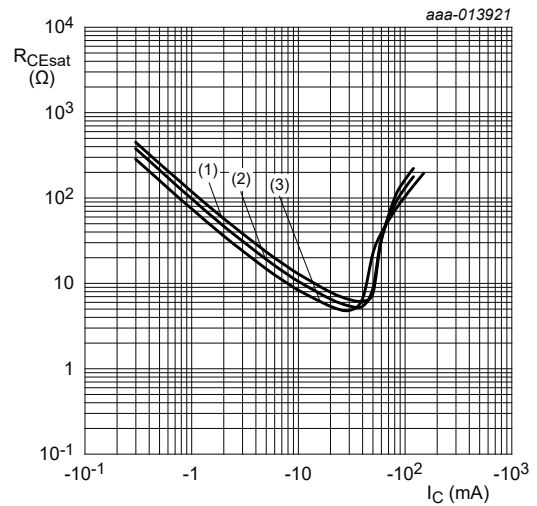
$I_C/I_B = 5$
 (1) $T_{amb} = 100^\circ C$
 (2) $T_{amb} = 25^\circ C$
 (3) $T_{amb} = -55^\circ C$

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



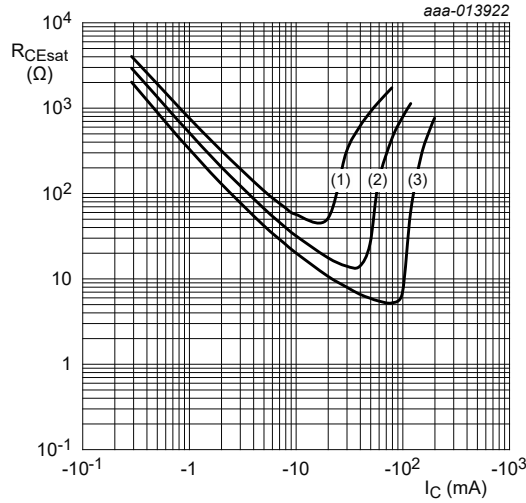
$T_{amb} = 25^\circ C$
 (1) $I_C/I_B = 10.0$
 (2) $I_C/I_B = 5.0$
 (3) $I_C/I_B = 2.5$

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



$I_C/I_B = 5$
 (1) $T_{amb} = 100^\circ C$
 (2) $T_{amb} = 25^\circ C$
 (3) $T_{amb} = -55^\circ C$

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



$T_{amb} = 25\text{ }^{\circ}\text{C}$
 (1) $I_C/I_B = 10.0$
 (2) $I_C/I_B = 5.0$
 (3) $I_C/I_B = 2.5$

Fig. 12. Collector-emitter saturation resistance 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

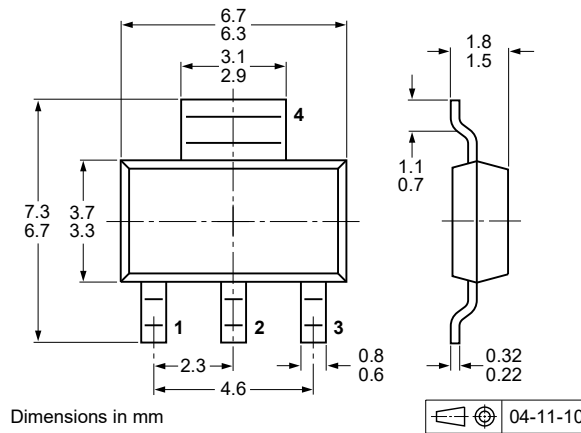


Fig. 13. Package outline SC-73 (SOT223)

13. Soldering

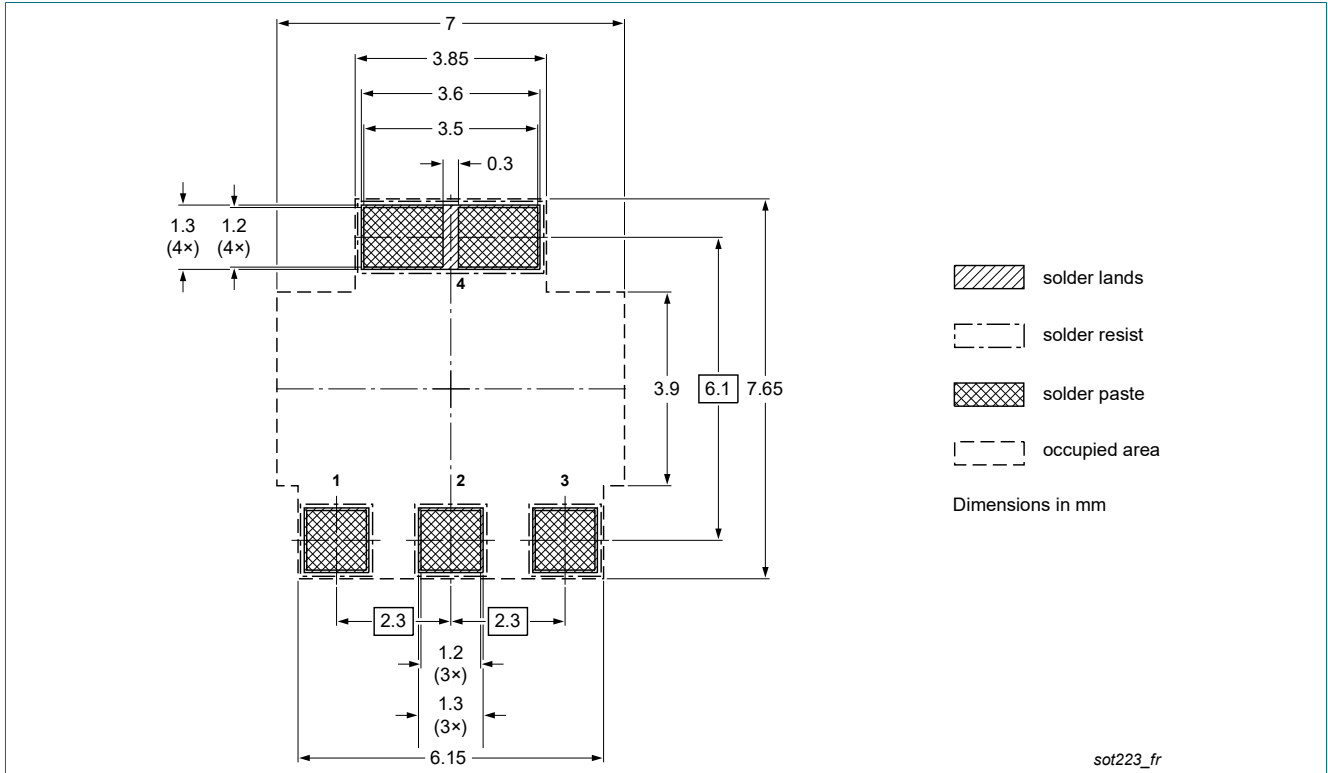


Fig. 14. Reflow soldering footprint for SC-73 (SOT223)

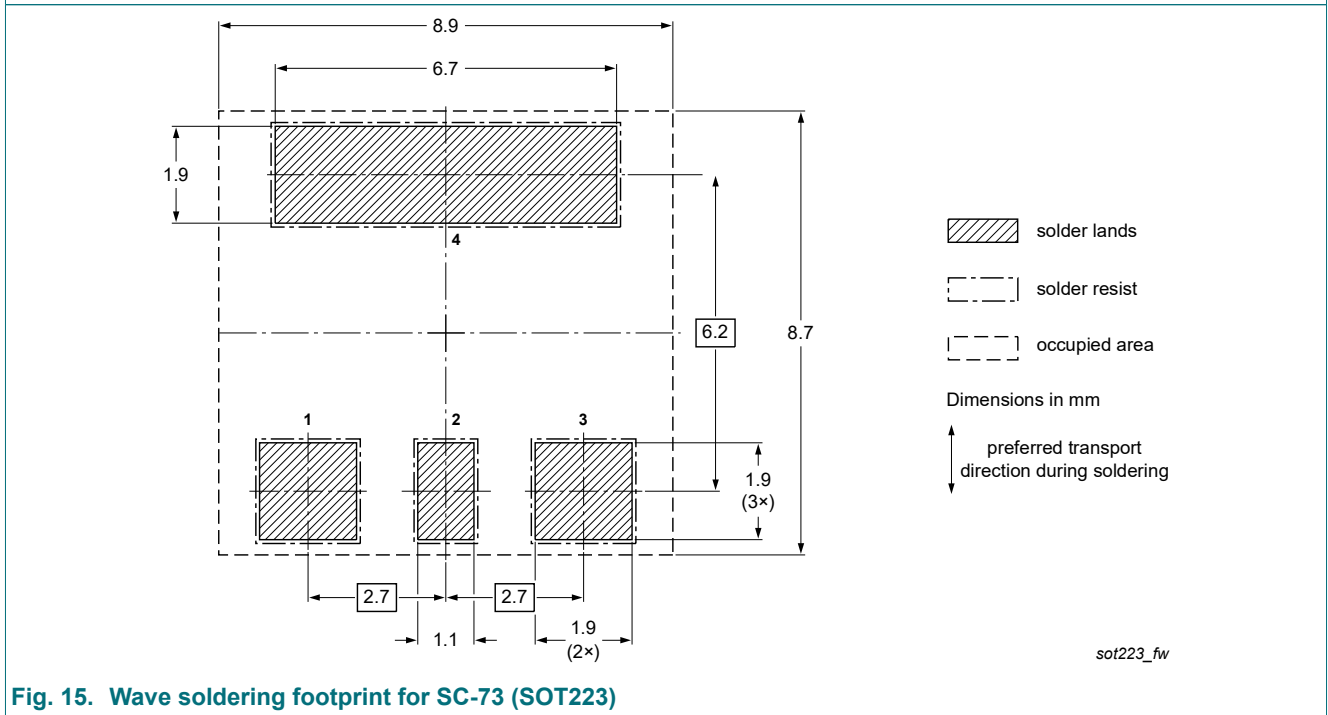


Fig. 15. Wave soldering footprint for SC-73 (SOT223)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBHV3160Z-Q v.1	20230421	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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Date of release: 21 April 2023
