



PBHV2160Z

600 V, 0.1 A NPN high-voltage low V_{CEsat} (BISS) transistor

24 June 2015

Product data sheet

1. General description

NPN high-voltage low V_{CEsat} Breakthrough In Small Signal (BISS) transistor in a SOT223 (SC-73) medium power Surface-Mounted Device (SMD) plastic package.

PNP complement: PBHV3160Z

2. Features and benefits

- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability
- High collector current gain h_{FE} at high I_C

3. Applications

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

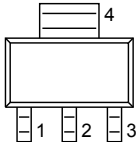
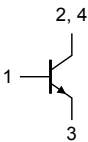
4. Quick reference data

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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 SC-73 (SOT223)	 sym016
2	C	collector		
3	E	emitter		
4	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBHV2160Z	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223

7. Marking

Table 4. Marking codes

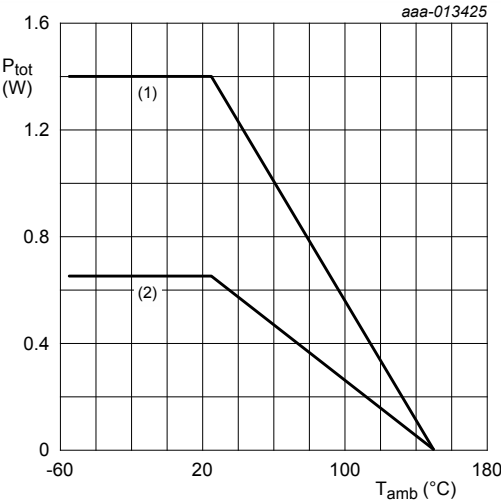
Type number	Marking code
PBHV2160Z	HV216Z

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} ≤ 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 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.



- (1) FR4 PCB, mounting pad for collector 6 cm²
(2) FR4 PCB, standard footprint

Fig. 1. Power derating curves

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.

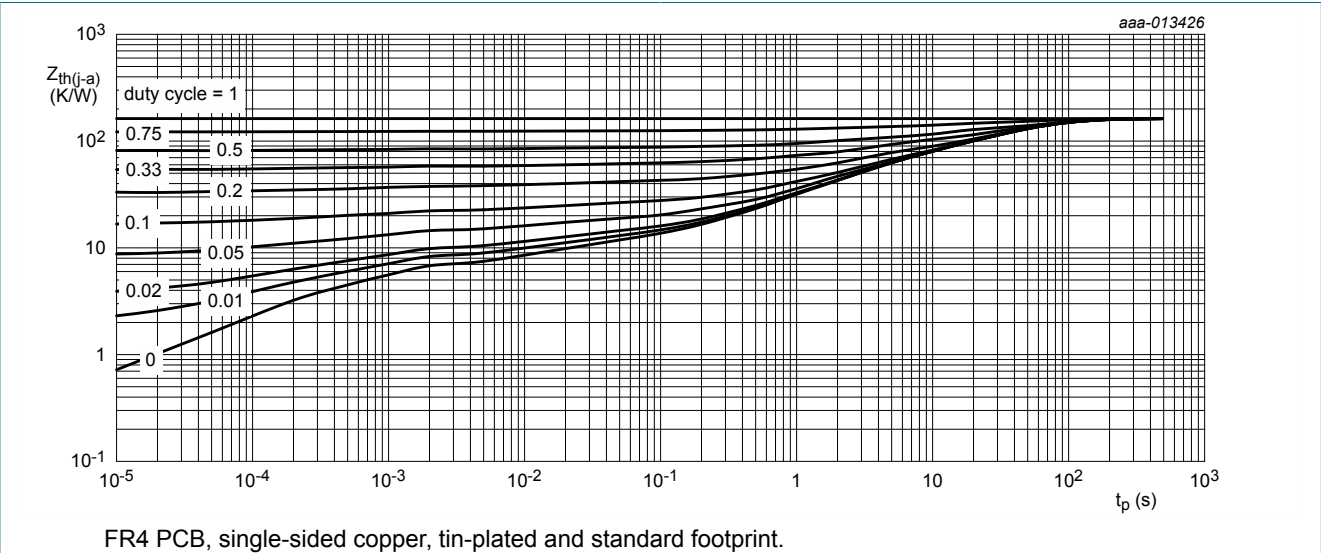


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

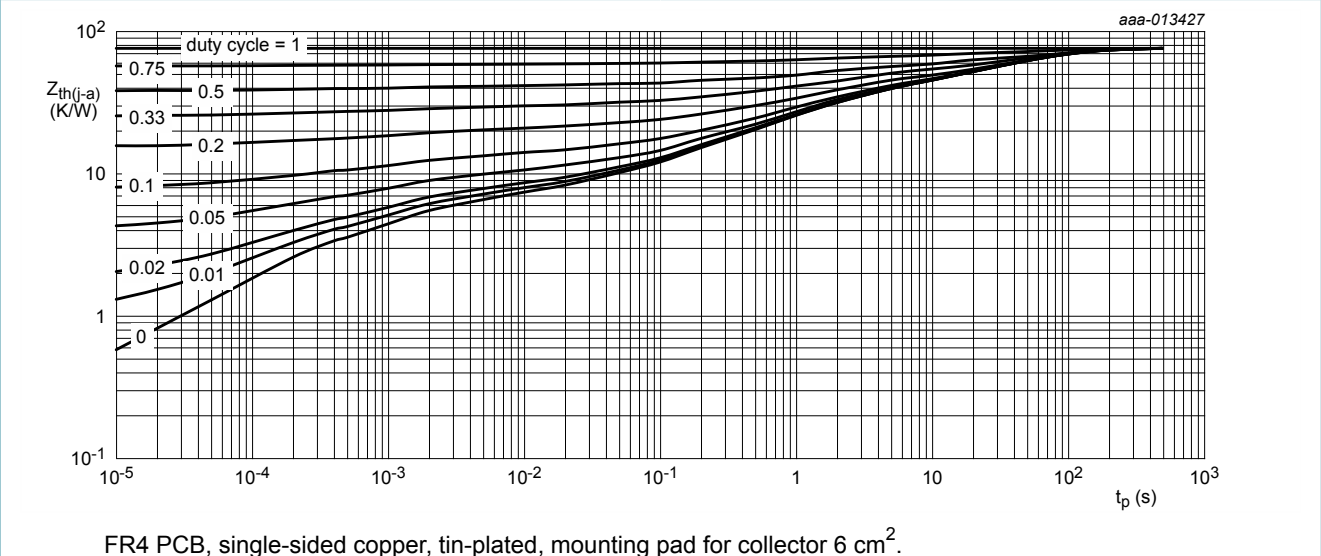
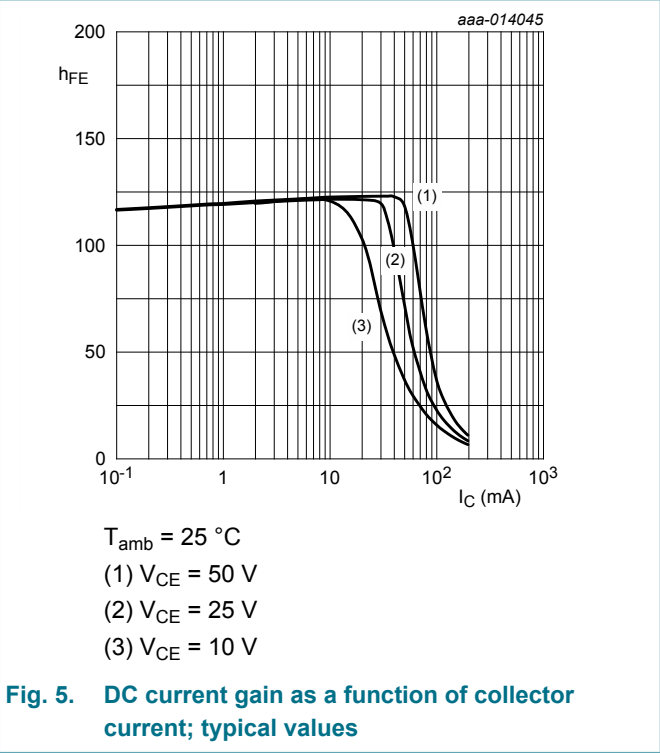
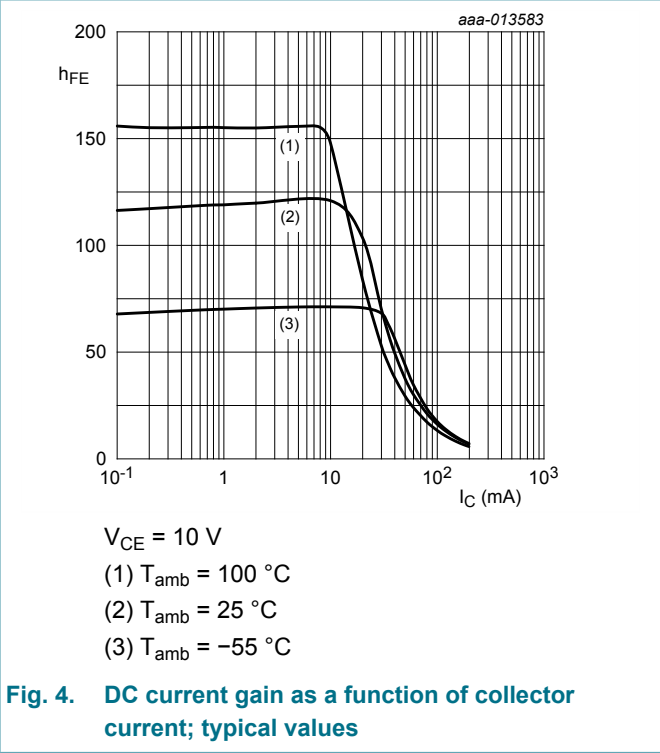


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
ICBO	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
ICES	collector-emitter cut-off current	V _{CE} = 400 V; V _{BE} = 0 V; T _{amb} = 25 °C	-	-	100	nA
IEBO	emitter-base cut-off current	V _{EB} = 4.8 V; I _C = 0 A; T _{amb} = 25 °C	-	-	100	nA
hFE	DC current gain	V _{CE} = 10 V; I _C = 10 mA; T _{amb} = 25 °C	70	125	-	
VCEsat	collector-emitter saturation voltage	I _C = 30 mA; I _B = 6 mA; T _{amb} = 25 °C	-	65	125	mV
VBEsat	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
Cc	collector capacitance	V _{CB} = 20 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C	-	1.7	-	pF
Ce	emitter capacitance	V _{EB} = 0.5 V; I _C = 0 A; i _c = 0 A; f = 1 MHz; T _{amb} = 25 °C	-	81	-	pF



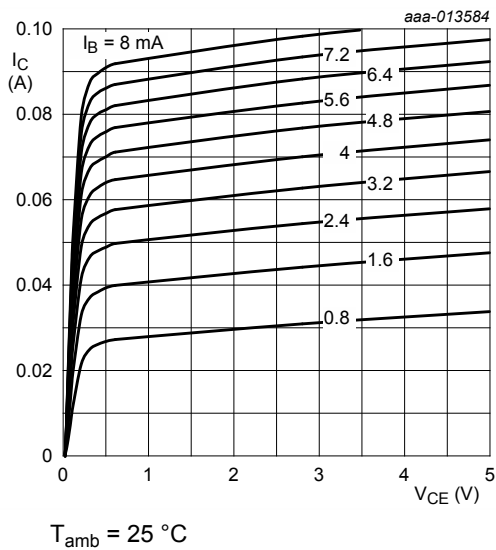


Fig. 6. Collector current as a function of collector-emitter voltage; typical values

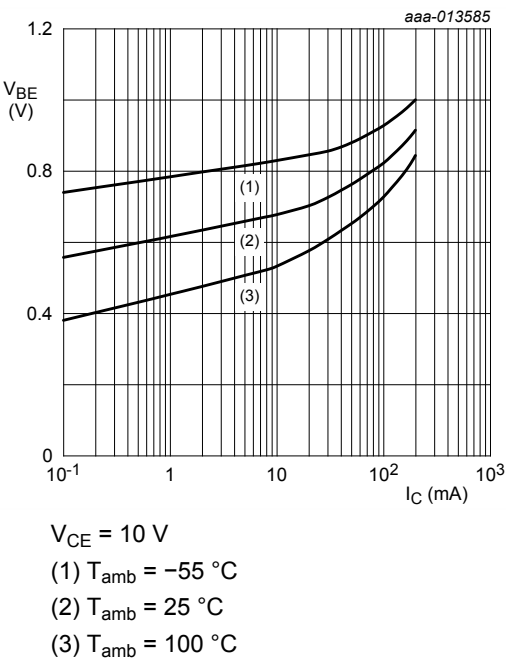


Fig. 7. Base-emitter voltage as a function of collector current; typical values

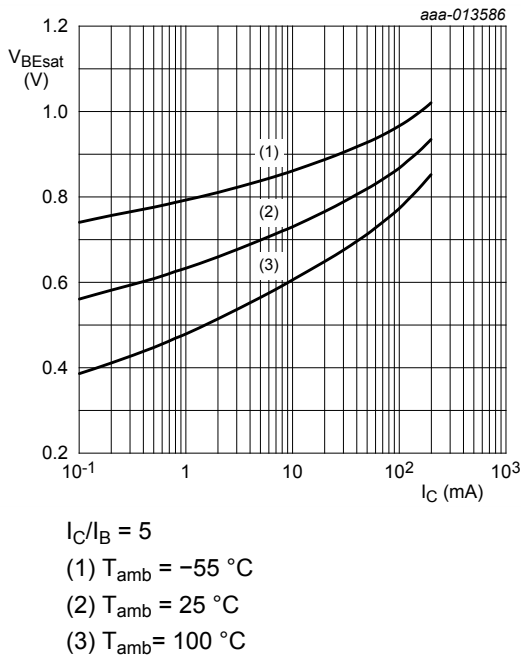


Fig. 8. Base-emitter saturation voltage as a function of collector current; typical values

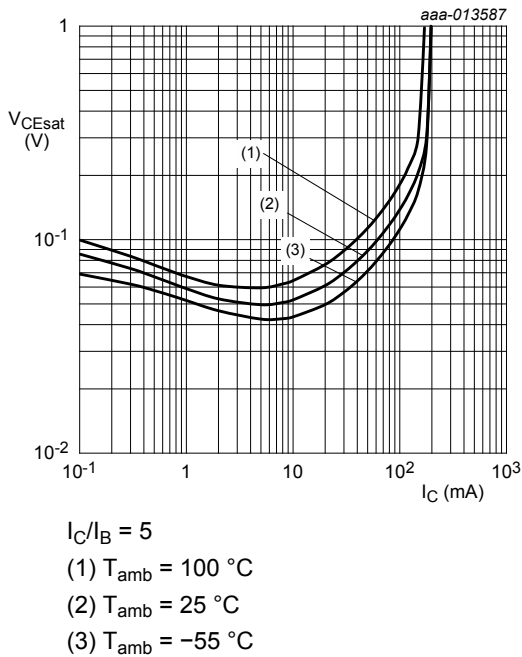


Fig. 9. Collector-emitter saturation voltage as a function of collector current; typical values

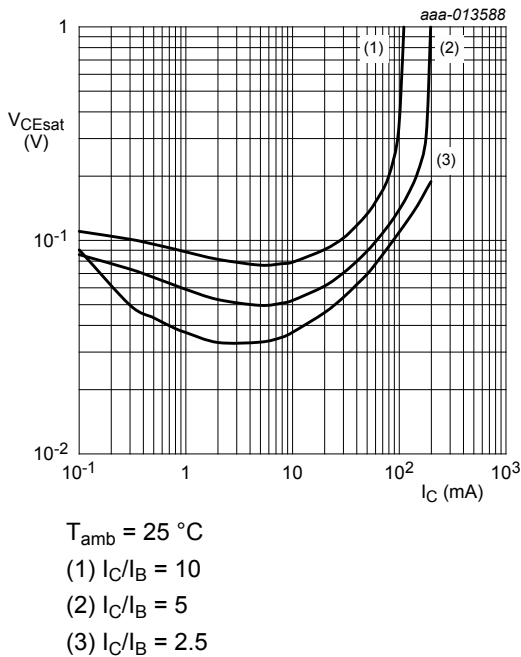


Fig. 10. Collector-emitter saturation voltage as a function of collector current; typical values

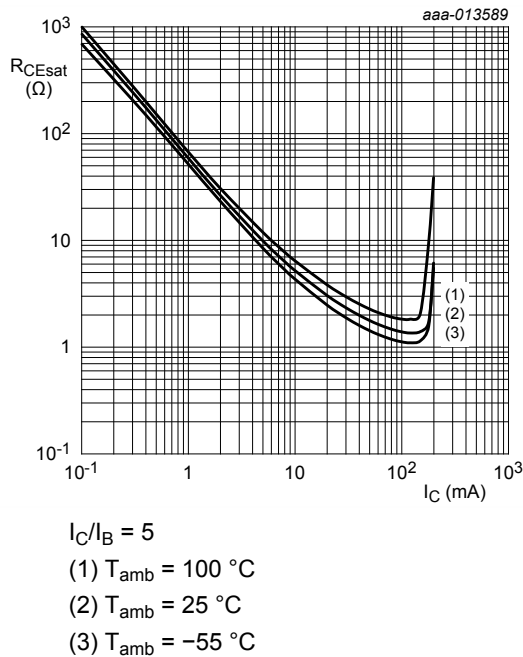


Fig. 11. Collector-emitter saturation resistance as a function of collector current; typical values

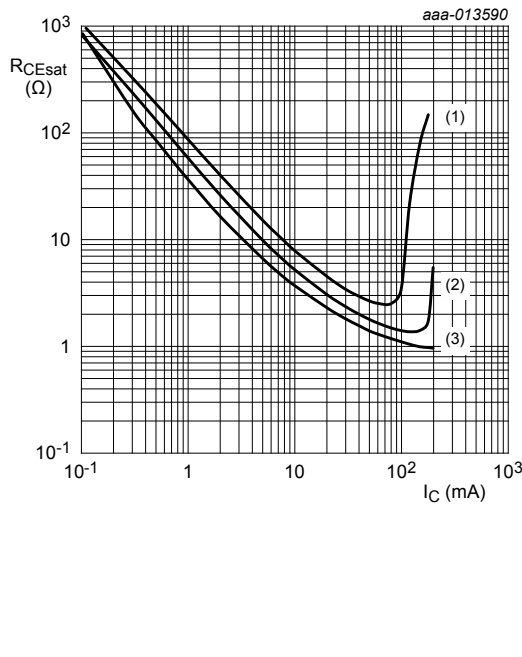


Fig. 12. Collector-emitter saturation resistance as a function of collector current; typical values

11. Package outline

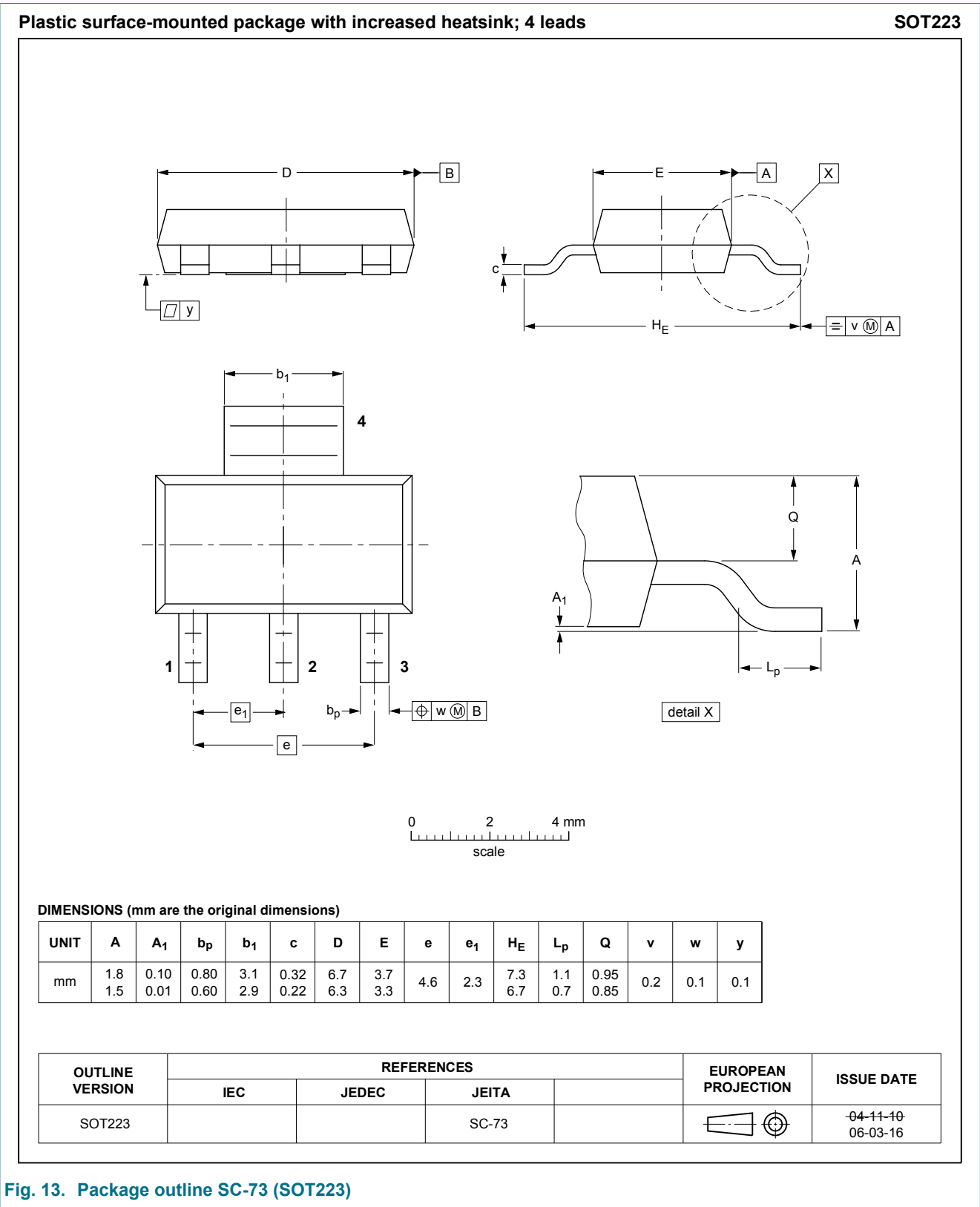


Fig. 13. Package outline SC-73 (SOT223)

12. Soldering

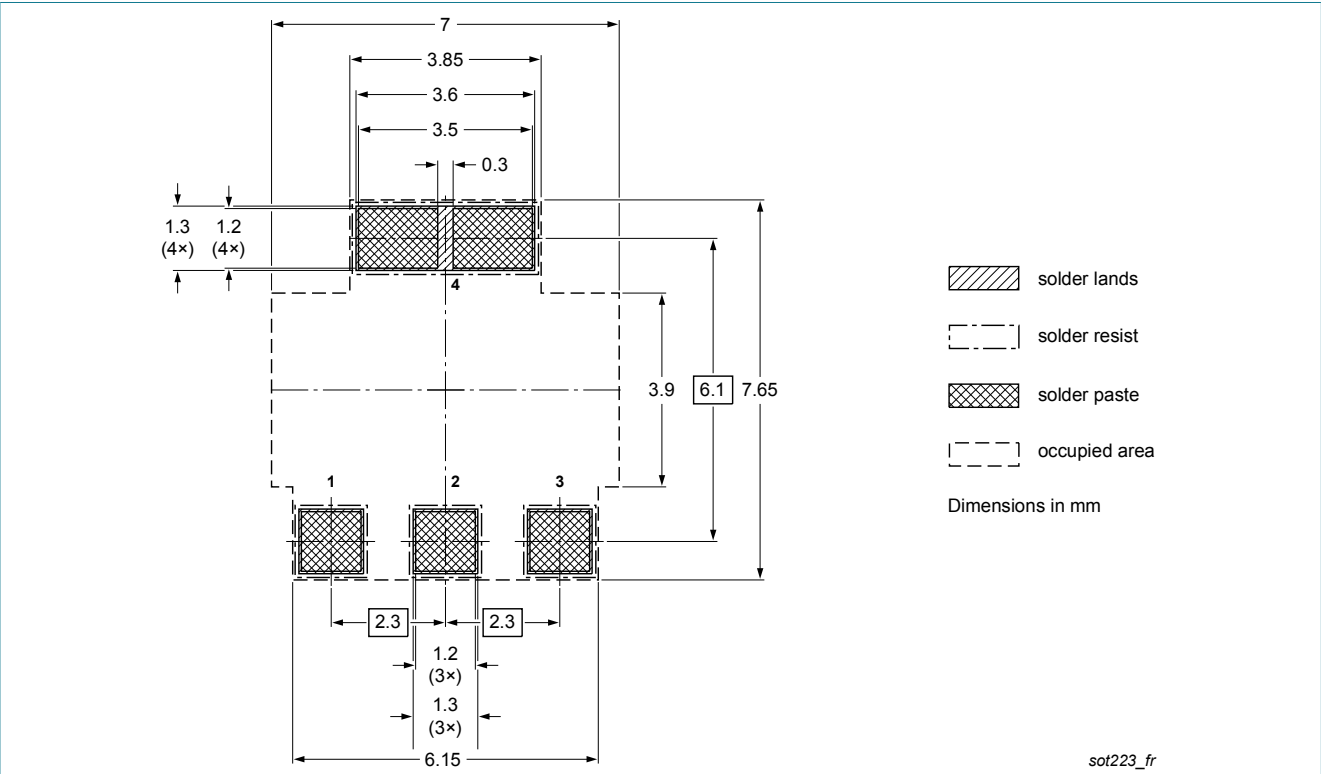


Fig. 14. Reflow soldering footprint for SC-73 (SOT223)

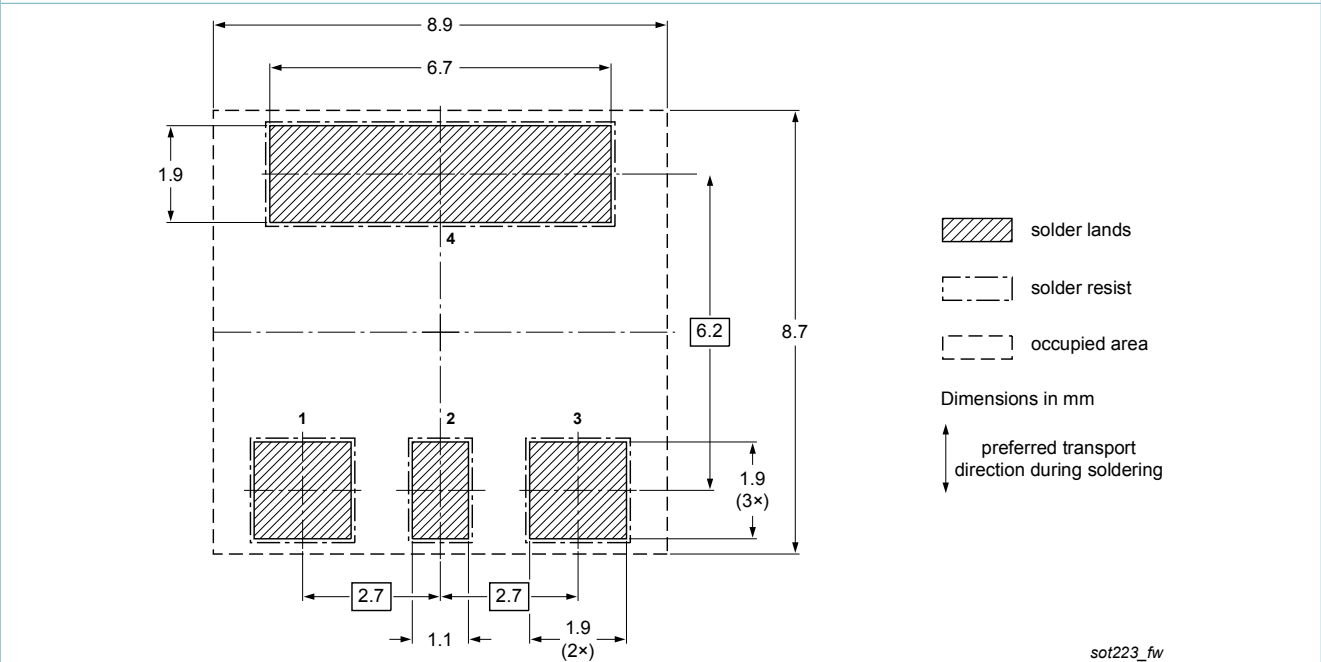


Fig. 15. Wave soldering footprint for SC-73 (SOT223)

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBHV2160Z v.1	20150624	Product data sheet	-	-

14. Legal information

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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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Date of release: 24 June 2015