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 fluorecent 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	Тур	Max	Unit
V _{CEO}	collector-emitter voltage	open base	-	-	600	V
I _C	collector current		-	-	0.1	Α



600 V, 0.1 A NPN high-voltage low VCEsat (BISS) transistor

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	В	base	4	2, 4
2	С	collector		1—
3	Е	emitter		. 1
4	С	collector	☐1 ☐2 ☐3 SC-73 (SOT223)	3 sym016

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

600 V, 0.1 A NPN high-voltage low VCEsat (BISS) transistor

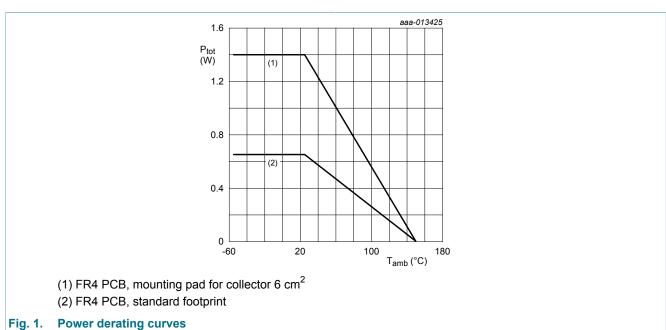
8. Limiting values

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	Α
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	0.65	W
			[2]	-	1.4	W
Tj	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.



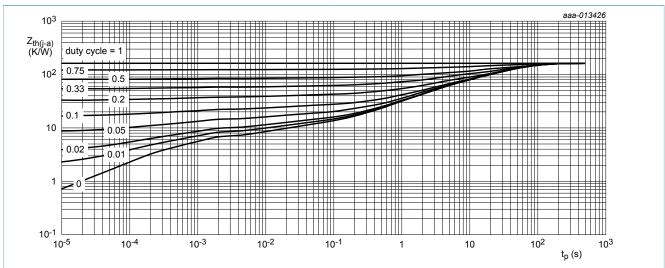
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Thermal characteristics

Table 6. Thermal characteristics

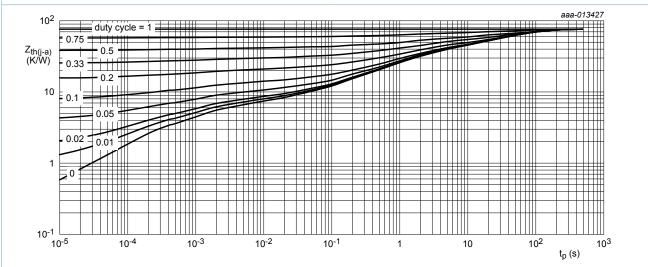
Symbol	Parameter	Conditions		Min	Тур	Max	Unit
	thermal resistance from junction to ambient	in free air	[1]	-	-	190	K/W
			<u>[2]</u>	-	-	89	K/W
R _{th(j-sp)}	thermal resistance from junction to solder point			-	-	20	K/W

- Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².



FR4 PCB, single-sided copper, tin-plated and standard footprint.

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



FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².

PBHV2160Z

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

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10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
I _{CBO}	collector-base cut-off	V _{CB} = 400 V; I _E = 0 A; T _{amb} = 25 °C	-	-	100	nA
	current	V _{CB} = 400 V; I _E = 0 A; T _j = 150 °C	-	-	10	μA
I _{CES}	collector-emitter cut-off current	V _{CE} = 400 V; V _{BE} = 0 V; T _{amb} = 25 °C	-	-	100	nA
I _{EBO}	emitter-base cut-off current	V_{EB} = 4.8 V; I_{C} = 0 A; T_{amb} = 25 °C	-	-	100	nA
h _{FE}	DC current gain	V_{CE} = 10 V; I_{C} = 10 mA; T_{amb} = 25 °C	70	125	-	
V _{CEsat}	collector-emitter saturation voltage	$I_C = 30 \text{ mA}; I_B = 6 \text{ mA}; T_{amb} = 25 \text{ °C}$	-	65	125	mV
V _{BEsat}	base-emitter saturation voltage	I_{C} = 50 mA; I_{B} = 5 mA; pulsed; $t_{p} \le 300 \ \mu s; \ \delta \le 0.02 \ ; T_{amb}$ = 25 °C	-	-	950	mV
C _c	collector capacitance	$V_{CB} = 20 \text{ V}; I_E = 0 \text{ A}; i_e = 0 \text{ A};$ $f = 1 \text{ MHz}; T_{amb} = 25 ^{\circ}\text{C}$	-	1.7	-	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	-	81	-	pF

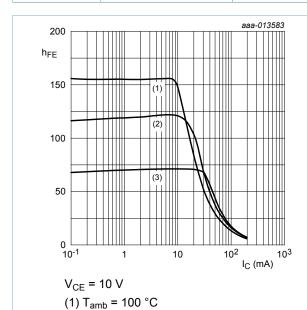
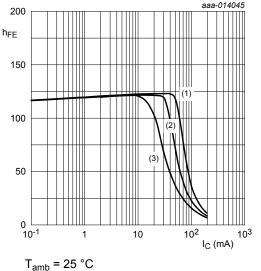


Fig. 4. DC current gain as a function of collector current; typical values

(2) $T_{amb} = 25 \, ^{\circ}C$ (3) $T_{amb} = -55 \, ^{\circ}C$



 $I_{amb} = 25 \text{ C}$ (1) $V_{CE} = 50 \text{ V}$ (2) $V_{CE} = 25 \text{ V}$ (3) $V_{CE} = 10 \text{ V}$

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

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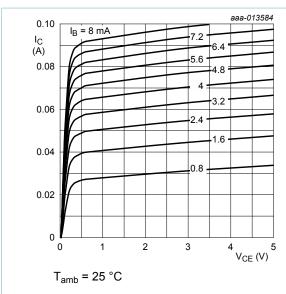
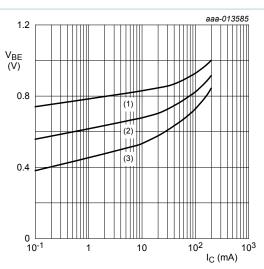


Fig. 6. Collector current as a function of collectoremitter voltage; typical values



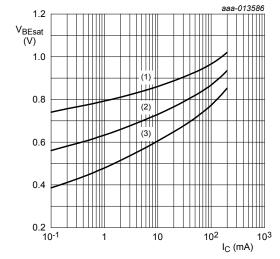
 V_{CE} = 10 V

(1) $T_{amb} = -55 \, ^{\circ}C$

(2) $T_{amb} = 25 \, ^{\circ}C$

(3) T_{amb} = 100 °C

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



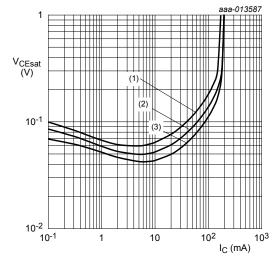
 $I_C/I_B = 5$

(1) $T_{amb} = -55 \,^{\circ}C$

(2) $T_{amb} = 25 \, ^{\circ}C$

(3) T_{amb}= 100 °C

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



 $I_C/I_B = 5$

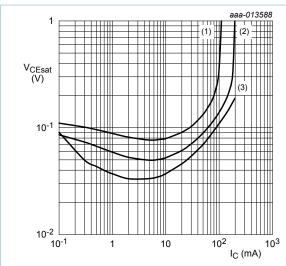
(1) $T_{amb} = 100 \, ^{\circ}C$

(2) T_{amb} = 25 °C

(3) $T_{amb} = -55 \, ^{\circ}C$

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

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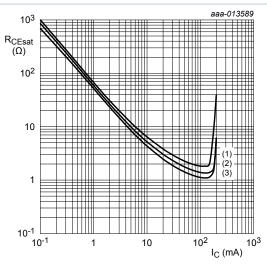
$$T_{amb}$$
 = 25 °C

(1)
$$I_C/I_B = 10$$

(2)
$$I_C/I_B = 5$$

(3)
$$I_C/I_B = 2.5$$

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



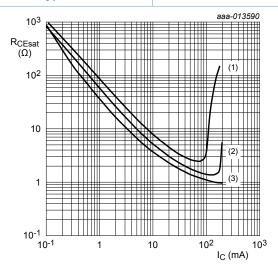
$$I_{\rm C}/I_{\rm B}=5$$

(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 °C

(1)
$$I_C/I_B = 10$$

(2)
$$I_C/I_B = 5$$

(3)
$$I_C/I_B = 2.5$$

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

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11. Package outline

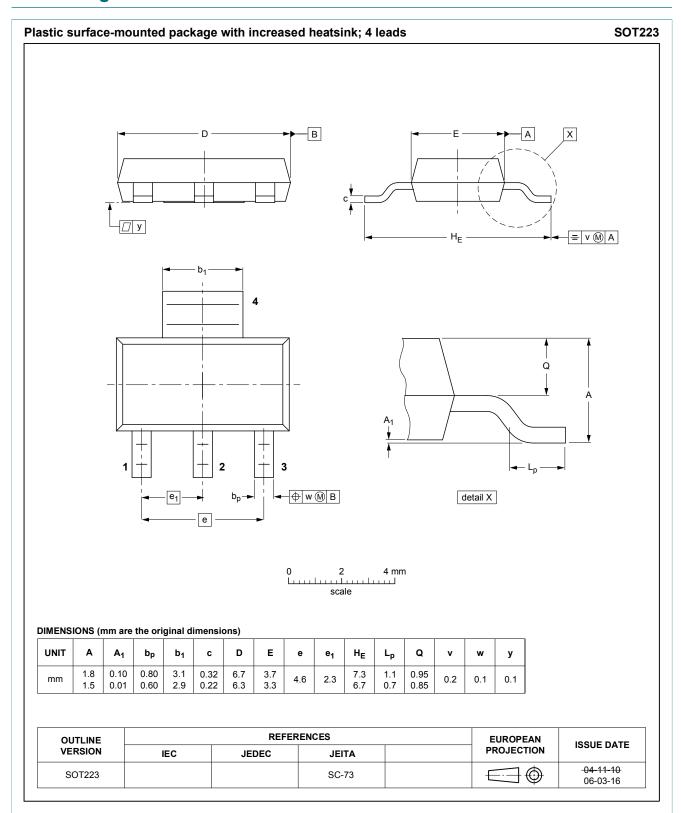


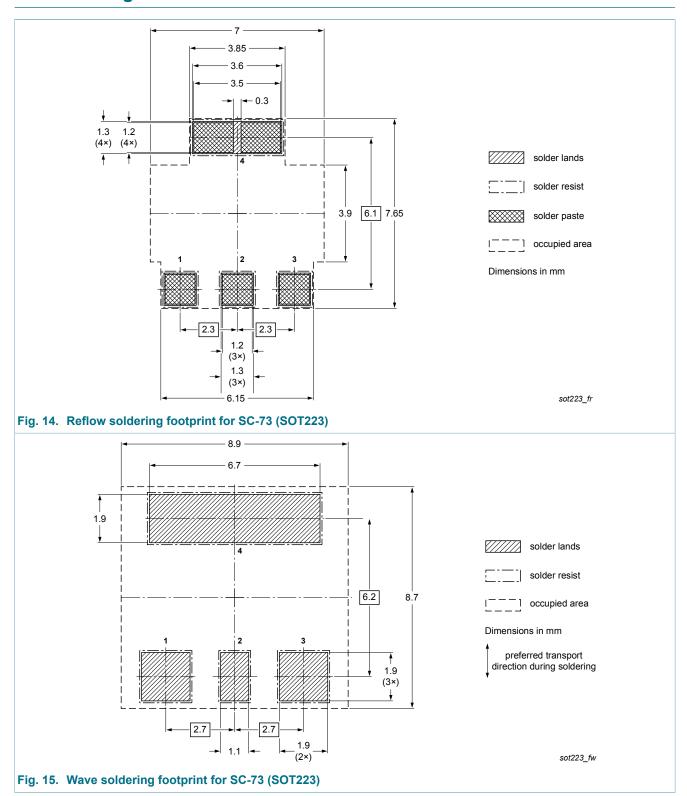
Fig. 13. Package outline SC-73 (SOT223)

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12. Soldering



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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	-	-

600 V, 0.1 A NPN high-voltage low VCEsat (BISS) transistor

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