

BCP52; BCX52

60 V, 1 A PNP medium power transistors

Rev. 08 — 25 February 2008

Product data sheet

1. Product profile

1.1 General description

PNP medium power transistor series.

Table 1. Product overview

Type number ^[1]	Package			NPN complement
	NXP	JEITA	JEDEC	
BCP52	SOT223	SC-73	-	BCP55
BCX52	SOT89	SC-62	TO-243	BCX55

[1] Valid for all available selection groups.

1.2 Features

- High current
- Two current gain selections
- High power dissipation capability

1.3 Applications

- Linear voltage regulators
- High-side switches
- MOSFET drivers
- Amplifiers

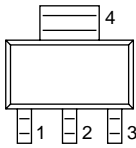
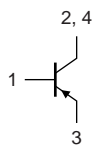
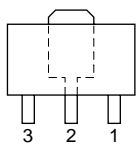
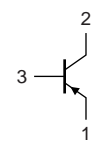
1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	-60	V
I_C	collector current		-	-	-1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	-	-1.5	A
h_{FE}	DC current gain	$V_{CE} = -2$ V; $I_C = -150$ mA	63	-	250	
	h_{FE} selection -10	$V_{CE} = -2$ V; $I_C = -150$ mA	63	-	160	
	h_{FE} selection -16	$V_{CE} = -2$ V; $I_C = -150$ mA	100	-	250	

2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Symbol
SOT223			
1	base		
2	collector		
3	emitter		
4	collector		
SOT89			
1	emitter		
2	collector		
3	base		

3. Ordering information

Table 4. Ordering information

Type number ^[1]	Package		Version
	Name	Description	
BCP52	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223
BCX52	SC-62	plastic surface-mounted package; collector pad for good heat transfer; 3 leads	SOT89

[1] Valid for all available selection groups.

4. Marking

Table 5. Marking codes

Type number	Marking code
BCP52	BCP52
BCP52-10	BCP52/10
BCP52-16	BCP52/16
BCX52	AE
BCX52-10	AG
BCX52-16	AM

5. Limiting values

Table 6. Limiting values

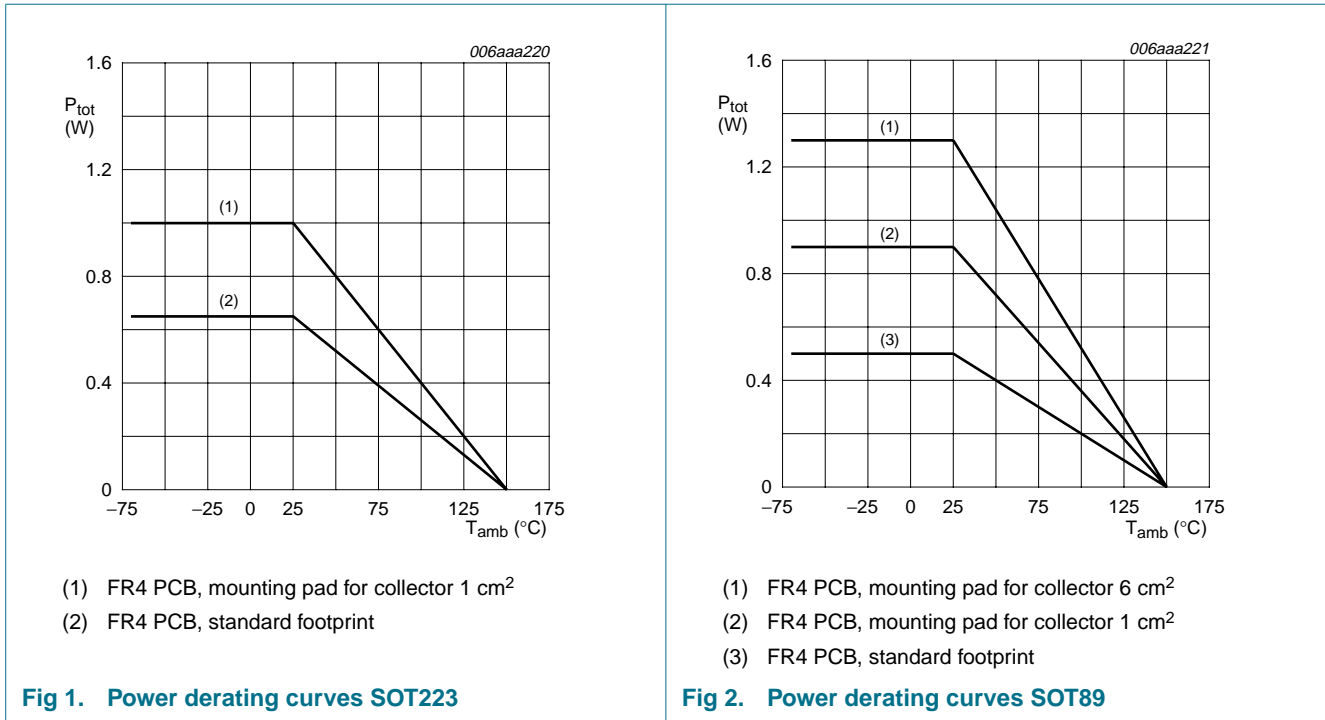
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit		
V_{CBO}	collector-base voltage	open emitter	-	-60	V		
V_{CEO}	collector-emitter voltage	open base	-	-60	V		
V_{EBO}	emitter-base voltage	open collector	-	-5	V		
I_C	collector current		-	-1	A		
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	-1.5	A		
I_{BM}	peak base current	single pulse; $t_p \leq 1$ ms	-	-0.2	A		
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C					
			BCP52	[1]	-	0.65	W
				[2]	-	1	W
			BCX52	[1]	-	0.5	W
				[2]	-	0.9	W
				[3]	-	1.3	W
T_j	junction temperature		-	150	°C		
T_{amb}	ambient temperature		-65	+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 1 cm².

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

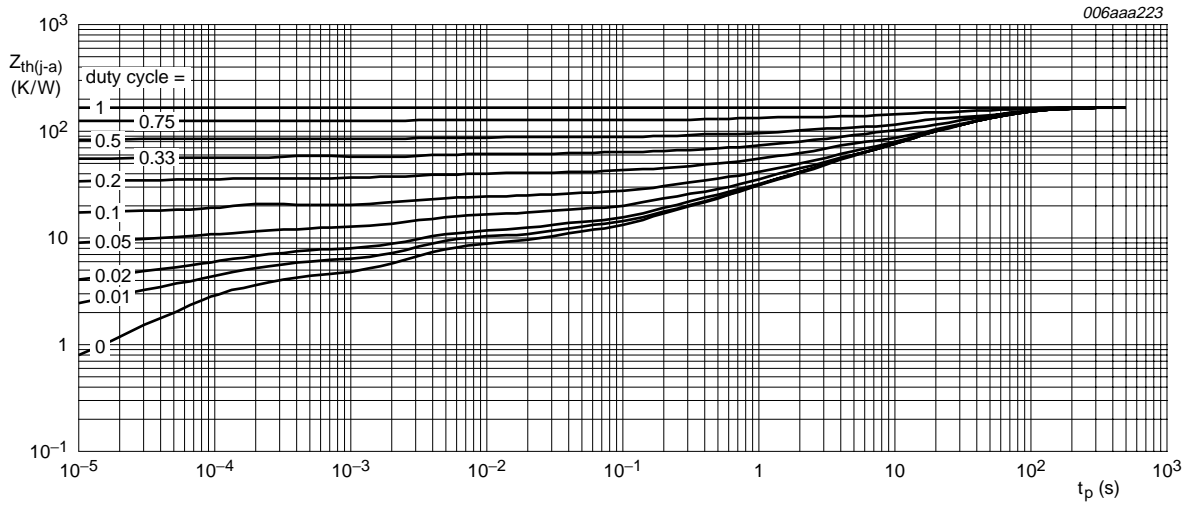


6. Thermal characteristics

Table 7. Thermal characteristics

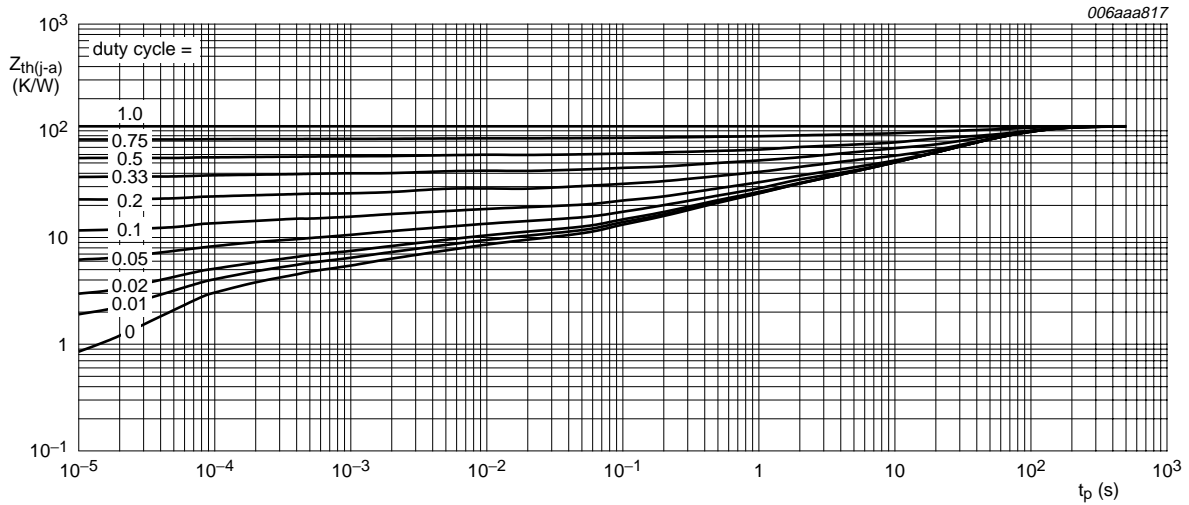
Symbol	Parameter	Conditions	Min	Typ	Max	Unit		
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air						
			BCP52	[1]	-	-	190	K/W
				[2]	-	-	125	K/W
			BCX52	[1]	-	-	230	K/W
				[2]	-	-	135	K/W
				[3]	-	-	95	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point							
		BCP52	-	-	17	K/W		
		BCX52	-	-	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 1 cm².
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².



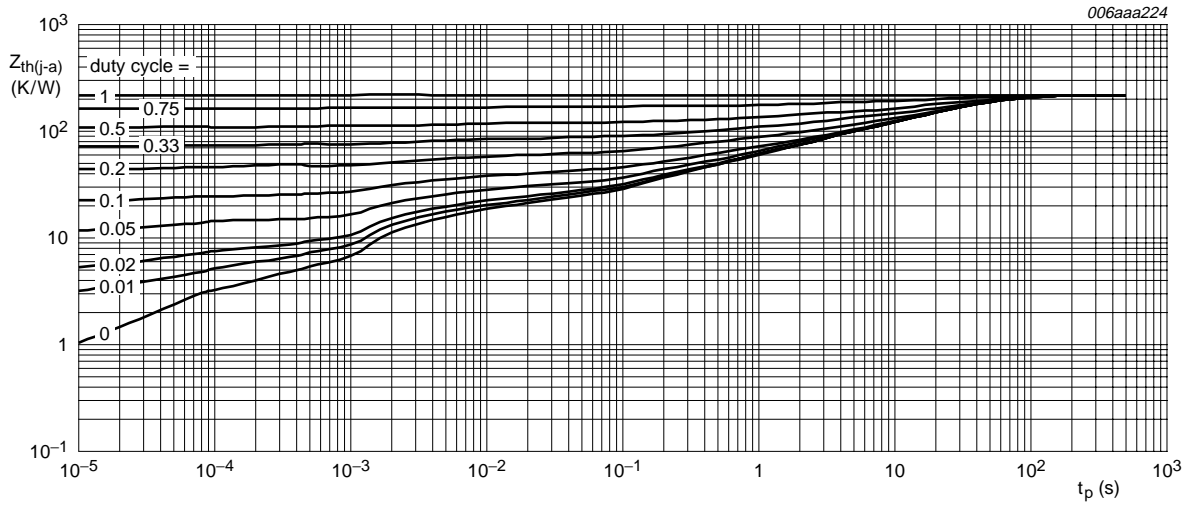
FR4 PCB, standard footprint

Fig 3. Transient thermal impedance from junction to ambient as a function of pulse duration for SOT223; typical values



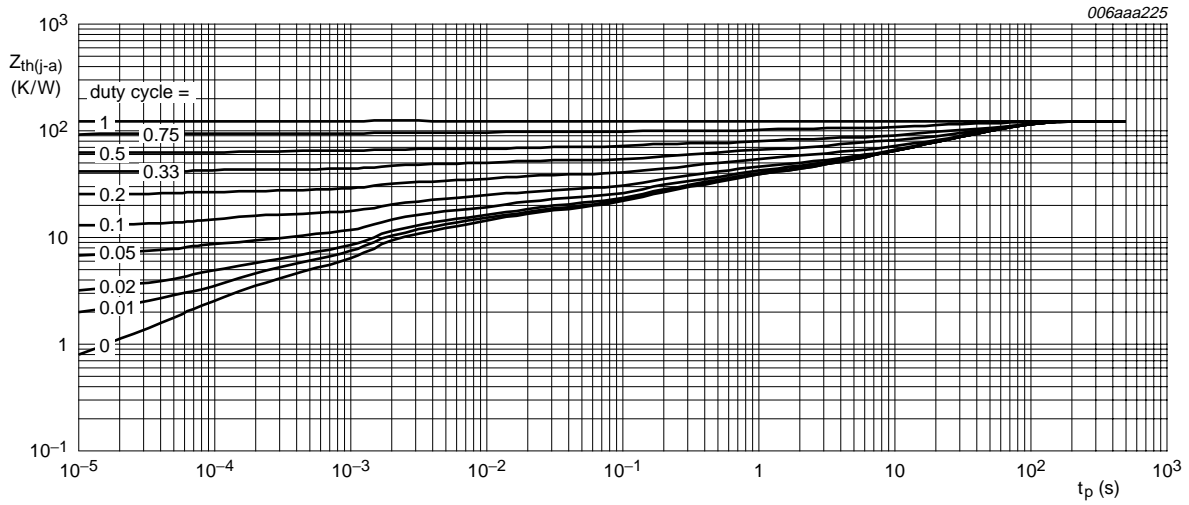
FR4 PCB, mounting pad for collector 1 cm²

Fig 4. Transient thermal impedance from junction to ambient as a function of pulse duration for SOT223; typical values



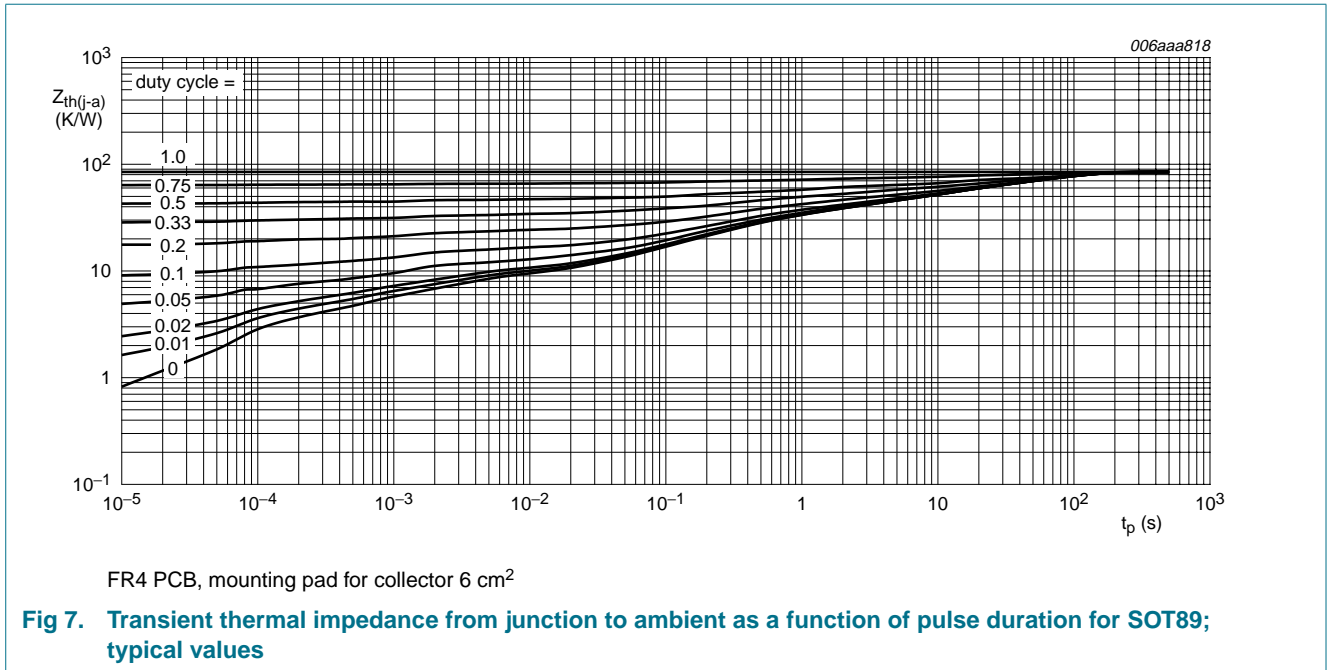
FR4 PCB, standard footprint

Fig 5. Transient thermal impedance from junction to ambient as a function of pulse duration for SOT89; typical values



FR4 PCB, mounting pad for collector 1 cm²

Fig 6. Transient thermal impedance from junction to ambient as a function of pulse duration for SOT89; typical values



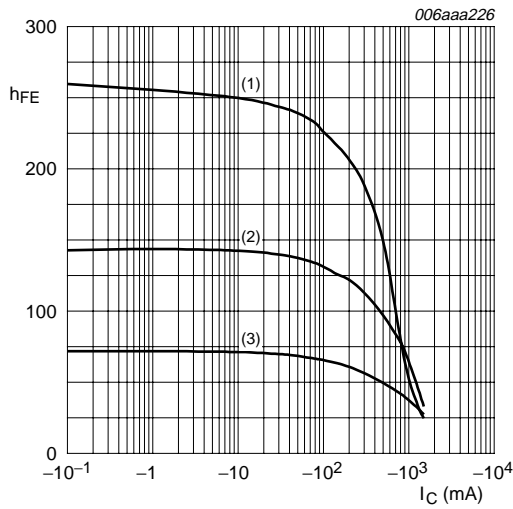
7. Characteristics

Table 8. Characteristics

T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I _{CBO}	collector-base cut-off current	V _{CB} = -30 V; I _E = 0 A;	-	-	-100	nA
		V _{CB} = -30 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	-	-	-100	nA
h _{FE}	DC current gain	V _{CE} = -2 V				
		I _C = -5 mA	63	-	-	
		I _C = -150 mA	63	-	250	
		I _C = -500 mA	[1] 40	-	-	
	DC current gain	V _{CE} = -2 V				
	h _{FE} selection -10	I _C = -150 mA	63	-	160	
	h _{FE} selection -16	I _C = -150 mA	100	-	250	
V _{CEsat}	collector-emitter saturation voltage	I _C = -500 mA; I _B = -50 mA	[1] -	-	-0.5	V
V _{BE}	base-emitter voltage	V _{CE} = -2 V; I _C = -500 mA	[1] -	-	-1	V
C _C	collector capacitance	V _{CB} = -10 V; I _E = i _e = 0 A; f = 1 MHz	-	15	-	pF
f _T	transition frequency	V _{CE} = -5 V; I _C = -50 mA; f = 100 MHz	-	145	-	MHz

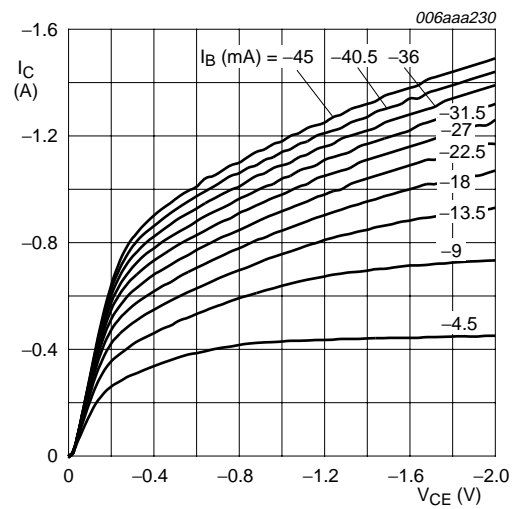
[1] Pulse test: t_p ≤ 300 μs; δ = 0.02.



$V_{CE} = -2\text{ V}$

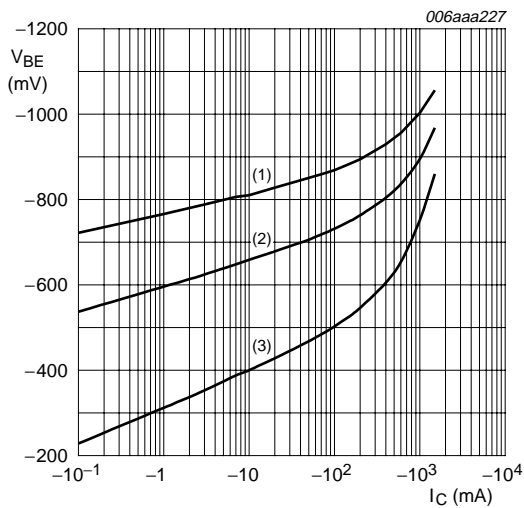
- (1) $T_{amb} = 150\text{ }^{\circ}\text{C}$
- (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
- (3) $T_{amb} = -55\text{ }^{\circ}\text{C}$

Fig 8. DC current gain as a function of collector current; typical values



$T_{amb} = 25\text{ }^{\circ}\text{C}$

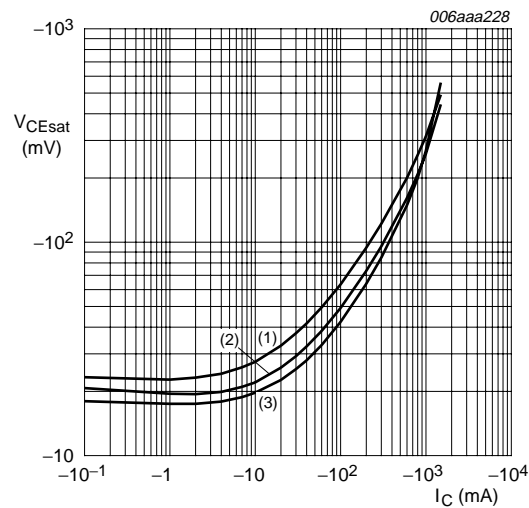
Fig 9. Collector current as a function of collector-emitter voltage; typical values



$V_{CE} = -2\text{ V}$

- (1) $T_{amb} = -55\text{ }^{\circ}\text{C}$
- (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
- (3) $T_{amb} = 150\text{ }^{\circ}\text{C}$

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

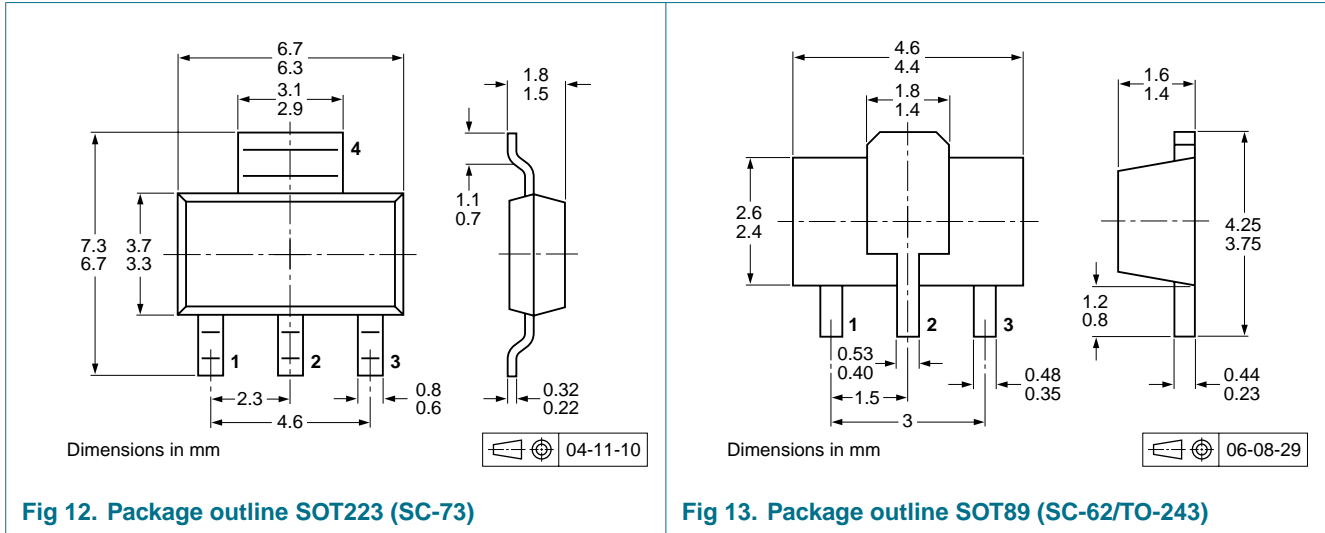


$I_C/I_B = 10$

- (1) $T_{amb} = 150\text{ }^{\circ}\text{C}$
- (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
- (3) $T_{amb} = -55\text{ }^{\circ}\text{C}$

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

8. Package outline



9. Packing information

Table 9. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.^[1]

Type number ^[2]	Package	Description	Packing quantity	
			1000	4000
BCP52	SOT223	8 mm pitch, 12 mm tape and reel	-115	-135
BCX52	SOT89	8 mm pitch, 12 mm tape and reel; T1 ^[3]	-115	-135
		8 mm pitch, 12 mm tape and reel; T3 ^[4]	-120	-

[1] For further information and the availability of packing methods, see [Section 12](#).

[2] Valid for all available selection groups.

[3] T1: normal taping

[4] T3: 90° rotated taping

10. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BCP52_BCX52_8	20080225	Product data sheet	-	BC638_BCP52_BCX52_7
Modifications:	<ul style="list-style-type: none"> Type numbers BC638 and BC638-16 have been removed Figure 9: amended 			
BC638_BCP52_BCX52_7	20070626	Product data sheet	-	BC638_BCP52_BCX52_6
BC638_BCP52_BCX52_6	20060329	Product data sheet	-	BC636_638_640_5 BCP51_52_53_5 BCX51_52_53_4
BC636_638_640_5	20041011	Product specification	-	BC636_638_640_4
BCP51_52_53_5	20030206	Product specification	-	BCP51_52_53_4
BCX51_52_53_4	20011010	Product specification	-	BCX51_52_53_3

11. Legal information

11.1 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 URL <http://www.nxp.com>.

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