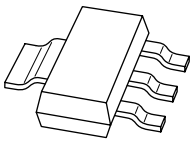


BCP69

20 V, 1 A PNP medium power transistor

Rev. 06 — 2 December 2008 Product data sheet

1. Product profile

1.1 General description

PNP medium power transistor in a Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

Type number[1]	Package		Package configuration
	NXP	JEITA	
BCP69	SOT223	SC-73	medium power
BCP69-16			
BCP69-16/DG			
BCP69-16/IN			
BCP69-25			

[1] /DG: halogen-free

1.2 Features

- High current
- Three current gain selections
- 1.4 W total power dissipation
- Medium power SMD plastic package

1.3 Applications

- Linear voltage regulators
- High-side switches
- Supply line switches
- MOSFET drivers
- Audio preamplifier

1.4 Quick reference data

Table 2. Quick reference data

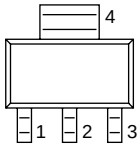
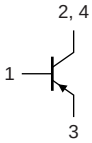
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	–20	V
I_C	collector current		-	-	–1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	-	–2	A

Table 2. Quick reference data *…continued*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
h_{FE}	DC current gain	V_{CE} = –1 V; I_C = –500 mA				
	BCP69		85	-	375	
	BCP69-16 BCP69-16/DG		100	-	250	
	BCP69-16/IN		140	-	230	
	BCP69-25		160	-	375	

2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	base		
2	collector		
3	emitter		
4	collector		

sym028

3. Ordering information

Table 4. Ordering information

Type number[1]	Package		
	Name	Description	Version
BCP69	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223
BCP69-16			
BCP69-16/DG			
BCP69-16/IN			
BCP69-25			

[1] /DG: halogen-free

4. Marking

Table 5. Marking codes

Type number[1]	Marking code
BCP69	BCP69
BCP69-16	BCP69/16
BCP69-16/DG	BCP69-16D
BCP69-16/IN	69-16N
BCP69-25	BCP69/25

[1] /DG: halogen-free

5. Limiting values

Table 6. Limiting values

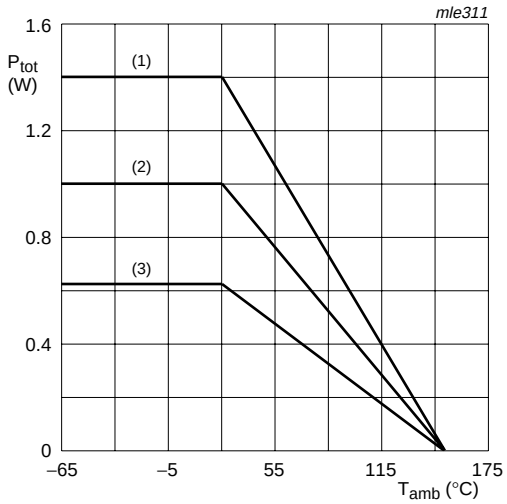
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter		-	–32	V
V_{CEO}	collector-emitter voltage	open base		-	–20	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		-	–2	A
I_{BM}	peak base current	single pulse; $t_p \leq 1$ ms		-	–200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	0.625	W
			[2]	-	1	W
			[3]	-	1.4	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 cm^2.

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



(1) FR4 PCB, mounting pad for collector 6 cm^2

(2) FR4 PCB, mounting pad for collector 1 cm^2

(3) FR4 PCB, standard footprint

Fig 1. Power derating curves

6. Thermal characteristics

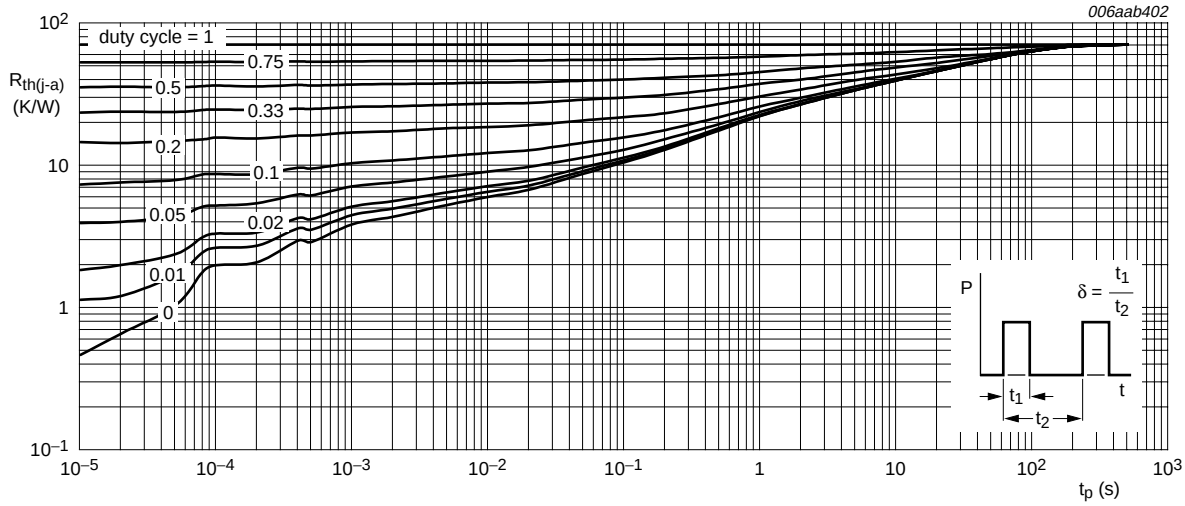
Table 7. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	200	K/W
			[2]	-	-	125	K/W
			[3]	-	-	89	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	15	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 cm^2.

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



FR4 PCB, mounting pad for collector 6 cm^2

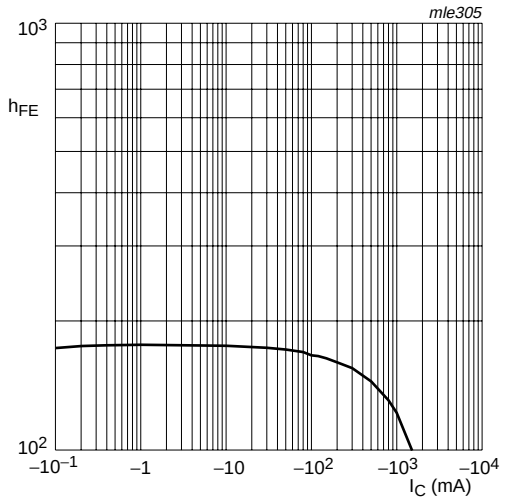
Fig 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

7. Characteristics

Table 8. Characteristics

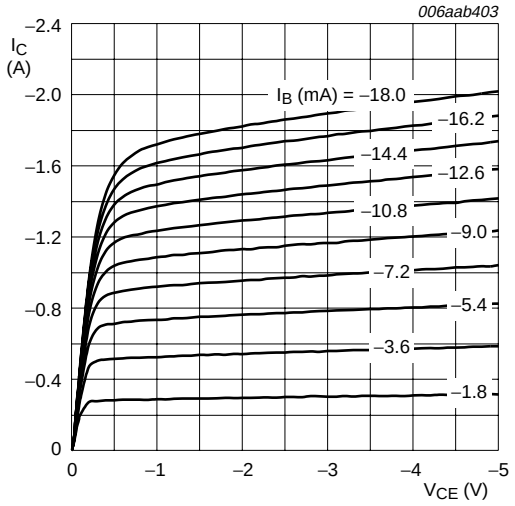
T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	V_{CB} = –25 V; I_E = 0 A	-	-	–100	nA
		V_{CB} = –25 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					
	BCP69	V_{CE} = –10 V; I_C = –5 mA	50	-	-	
		V_{CE} = –1 V; I_C = –500 mA	85	-	375	
		V_{CE} = –1 V; I_C = –1 A	60	-	-	
	BCP69-16 BCP69-16/DG	V_{CE} = –1 V; I_C = –500 mA	100	-	250	
	BCP69-16/IN	V_{CE} = –1 V; I_C = –500 mA	140	-	230	
	BCP69-25	V_{CE} = –1 V; I_C = –500 mA	160	-	375	
V_{CEsat}	collector-emitter saturation voltage	I_C = –1 A; I_B = –100 mA	-	-	–500	mV
V_{BE}	base-emitter voltage	V_{CE} = –10 V; I_C = –5 mA	-	-	–700	mV
		V_{CE} = –1 V; I_C = –1 A	-	-	–1	V
C_c	collector capacitance	V_{CB} = –10 V; I_E = i_e = 0 A; f = 1 MHz	-	28	-	pF
f_T	transition frequency	V_{CE} = –5 V; I_C = –50 mA; f = 100 MHz	40	140	-	MHz



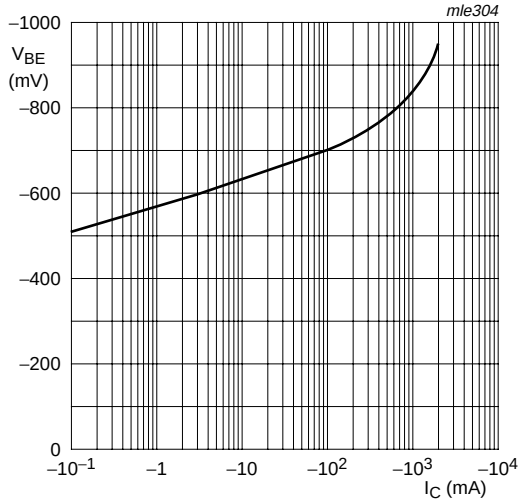
V_{CE} = −1 V

Fig 3. BCP69-16: DC current gain as a function of collector current; typical values



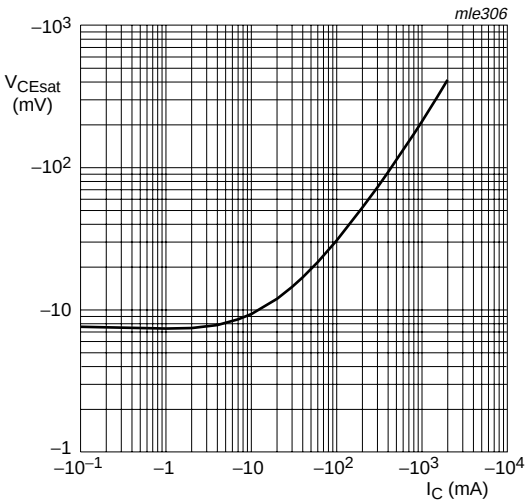
T_{amb} = 25 °C

Fig 4. BCP69-16: Collector current as a function of collector-emitter voltage; typical values



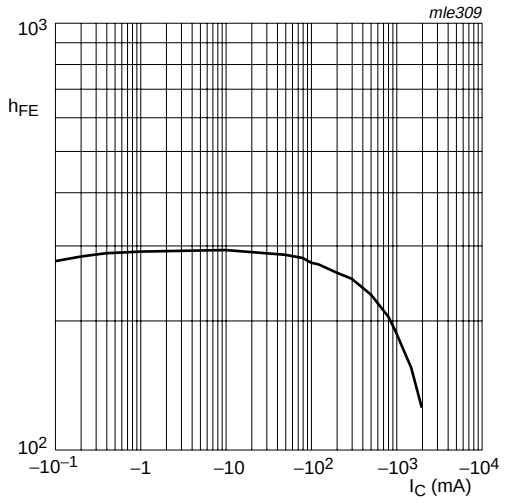
V_{CE} = −1 V

Fig 5. BCP69-16: Base-emitter voltage as a function of collector current; typical values



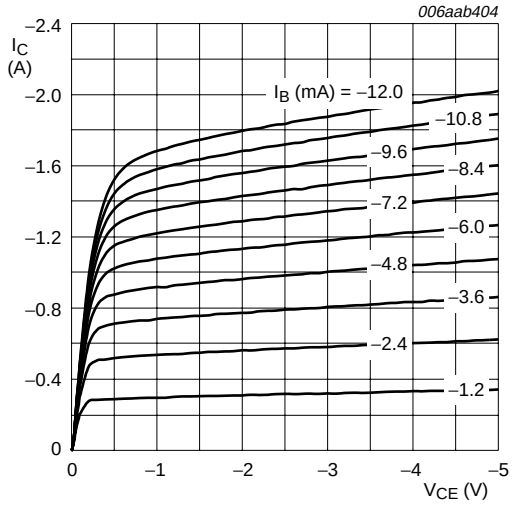
I_C/I_B = 10

Fig 6. BCP69-16: Collector-emitter saturation voltage as a function of collector current; typical values



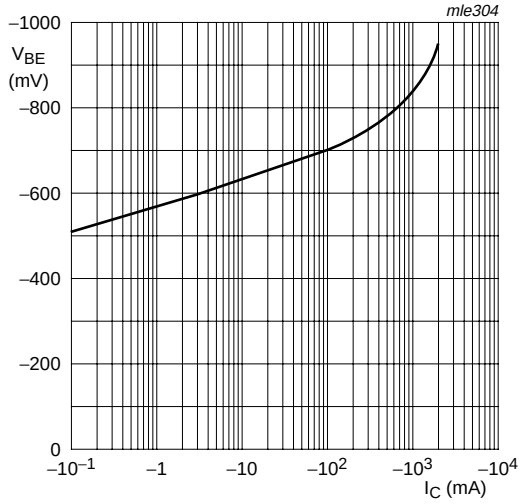
V_{CE} = −1 V

Fig 7. BCP69-25: DC current gain as a function of collector current; typical values



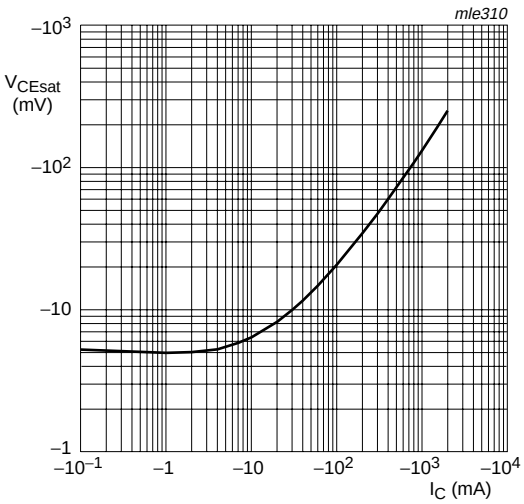
T_{amb} = 25 °C

Fig 8. BCP69-25: Collector current as a function of collector-emitter voltage; typical values



V_{CE} = −1 V

Fig 9. BCP69-25: Base-emitter voltage as a function of collector current; typical values



I_C/I_B = 10

Fig 10. BCP69-25: Collector-emitter saturation voltage as a function of collector current; typical values

8. Package outline

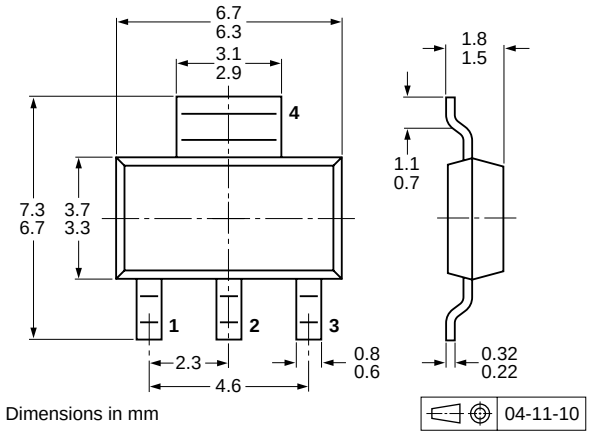


Fig 11. Package outline SOT223 (SC-73)

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
BCP69	SOT223	8 mm pitch, 12 mm tape and reel	-115	-135
BCP69-16				
BCP69-16/DG				
BCP69-16/IN				
BCP69-25				

[1] For further information and the availability of packing methods, see Section 13.

[2] /DG: halogen-free

10. Soldering

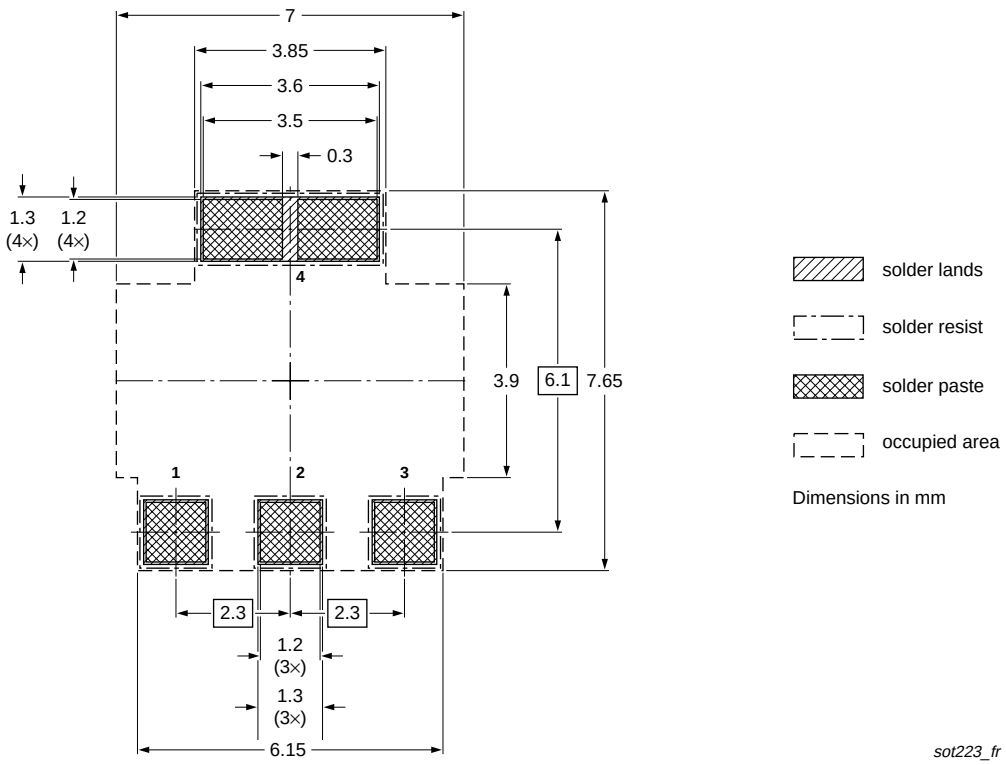


Fig 12. Reflow soldering footprint SOT223 (SC-73)

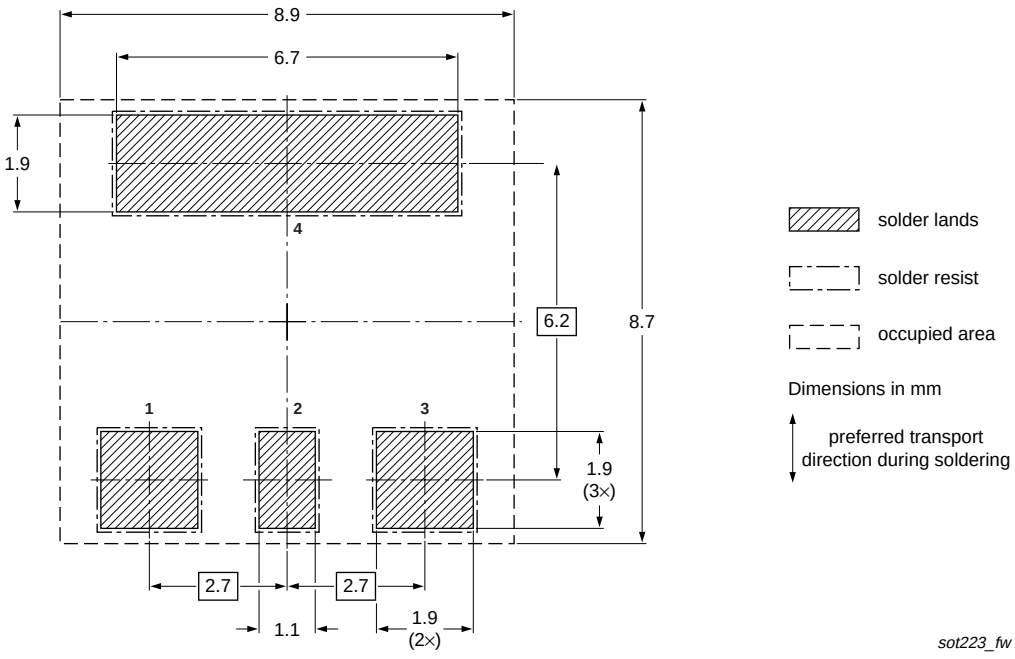


Fig 13. Wave soldering footprint SOT223 (SC-73)

11. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BCP69_6	20081202	Product data sheet	-	BCP69_5
Modifications:	• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Table 1 “Product overview”: enhanced • Table 4 “Ordering information”: enhanced • Figure 2, 4 and 8: updated • Figure 11: superseded by minimized package outline drawing • Section 9 “Packing information”: added • Section 10 “Soldering”: enhanced • Section 12 “Legal information”: updated			
BCP69_5	20031125	Product specification	-	BCP69_4
BCP69_4	20021115	Product specification	-	BCP69_3
BCP69_3	19990408	Product specification	-	BCP69_CNV_2

12. Legal information

12.1 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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