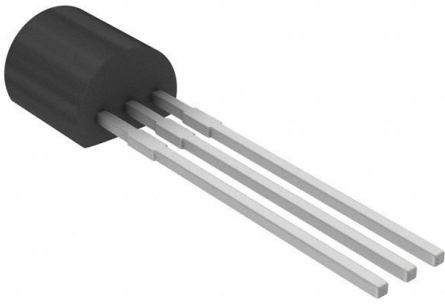


BC635-16,126 Datasheet

www.digi-electronics.com



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	BC635-16,126-DG
Manufacturer	NXP USA Inc.
Manufacturer Product Number	BC635-16,126
Description	TRANS NPN 45V 1A TO92-3
Detailed Description	Bipolar (BJT) Transistor NPN 45 V 1 A 180MHz 830 mW Through Hole TO-92-3



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

BC635-16,126

Series:

-

Transistor Type:

NPN

Voltage - Collector Emitter Breakdown (Max):

45 V

Current - Collector Cutoff (Max):

100nA (ICBO)

Power - Max:

830 mW

Operating Temperature:

150°C (TJ)

Package / Case:

TO-226-3, TO-92-3 (TO-226AA) Formed Leads

Base Product Number:

BC63

Manufacturer:

NXP USA Inc.

Product Status:

Obsolete

Current - Collector (Ic) (Max):

1 A

Vce Saturation (Max) @ Ib, Ic:

500mV @ 50mA, 500mA

DC Current Gain (hFE) (Min) @ Ic, Vce:

100 @ 150mA, 2V

Frequency - Transition:

180MHz

Mounting Type:

Through Hole

Supplier Device Package:

TO-92-3

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0075

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

BC635; BCP54; BCX54

45 V, 1 A NPN medium power transistors

Rev. 07 — 4 June 2007

Product data sheet

1. Product profile

1.1 General description

NPN medium power transistor series.

Table 1. Product overview

Type number ^[1]	Package			PNP complement
	NXP	JEITA	JEDEC	
BC635 ^[2]	SOT54	SC-43A	TO-92	BC636
BCP54	SOT223	SC-73	-	BCP51
BCX54	SOT89	SC-62	TO-243	BCX51

[1] Valid for all available selection groups.

[2] Also available in SOT54A and SOT54 variant packages (see [Section 2](#)).

1.2 Features

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

1.3 Applications

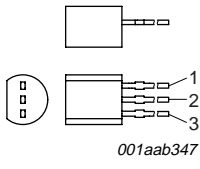
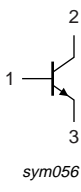
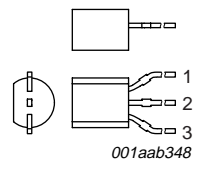
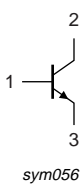
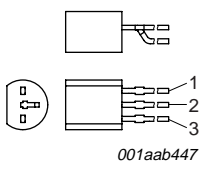
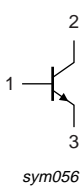
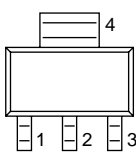
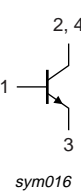
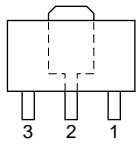
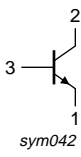
- Linear voltage regulators
- Low side switches
- MOSFET drivers
- Amplifiers

1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	45	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
SOT54			
1	base		
2	collector		
3	emitter		
SOT54A			
1	base		
2	collector		
3	emitter		
SOT54 variant			
1	base		
2	collector		
3	emitter		
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		
	Name	Description	Version
BC635 ^[2]	SC-43A	plastic single-ended leaded (through hole) package; 3 leads	SOT54
BCP54	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223
BCX54	SC-62	plastic surface-mounted package; collector pad for good heat transfer; 3 leads	SOT89

[1] Valid for all available selection groups.

[2] Also available in SOT54A and SOT54 variant packages (see [Section 2](#) and [Section 9](#)).

4. Marking

Table 5. Marking codes

Type number	Marking code
BC635	C635
BC635-16	C63516
BCP54	BCP54
BCP54-10	BCP54/10
BCP54-16	BCP54/16
BCX54	BA
BCX54-10	BC
BCX54-16	BD

5. Limiting values

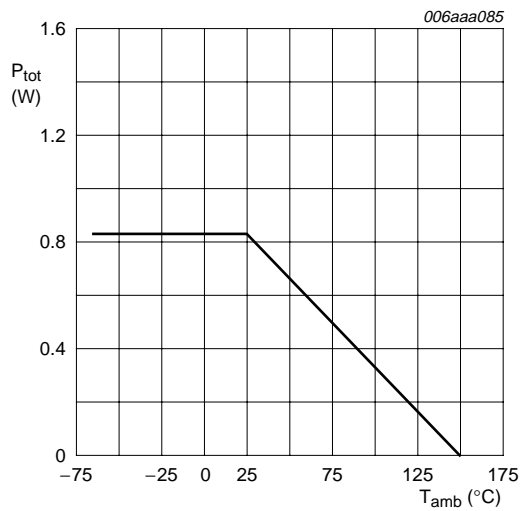
Table 6. Limiting values*In accordance with the Absolute Maximum Rating System (IEC 60134).*

Symbol	Parameter	Conditions	Min	Max	Unit	
V_{CBO}	collector-base voltage	open emitter	-	45	V	
V_{CEO}	collector-emitter voltage	open base	-	45	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				
			BC635	[1] -	0.83	W
			BCP54	[1] -	0.64	W
				[2] -	0.96	W
			BCX54	[1] -	0.5	W
				[2] -	0.85	W
[3] -	1.25	W				
T_j	junction temperature		-	150	°C	
T_{amb}	ambient temperature		-65	+150	°C	
T_{stg}	storage temperature		-65	+150	°C	

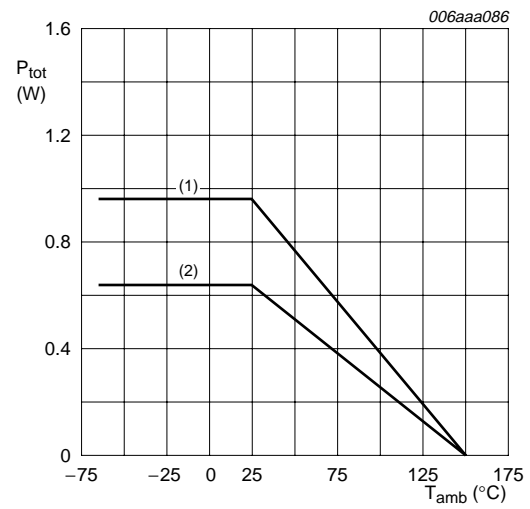
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm².

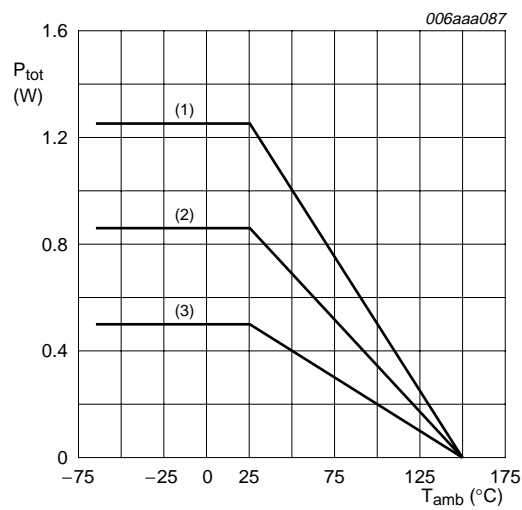
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².



FR4 PCB, standard footprint

Fig 1. Power derating curve SOT54(1) FR4 PCB, mounting pad for collector 1 cm²

(2) FR4 PCB, standard footprint

Fig 2. Power derating curves SOT223(1) FR4 PCB, mounting pad for collector 6 cm²(2) FR4 PCB, mounting pad for collector 1 cm²

(3) FR4 PCB, standard footprint

Fig 3. Power derating curves SOT89

6. Thermal characteristics

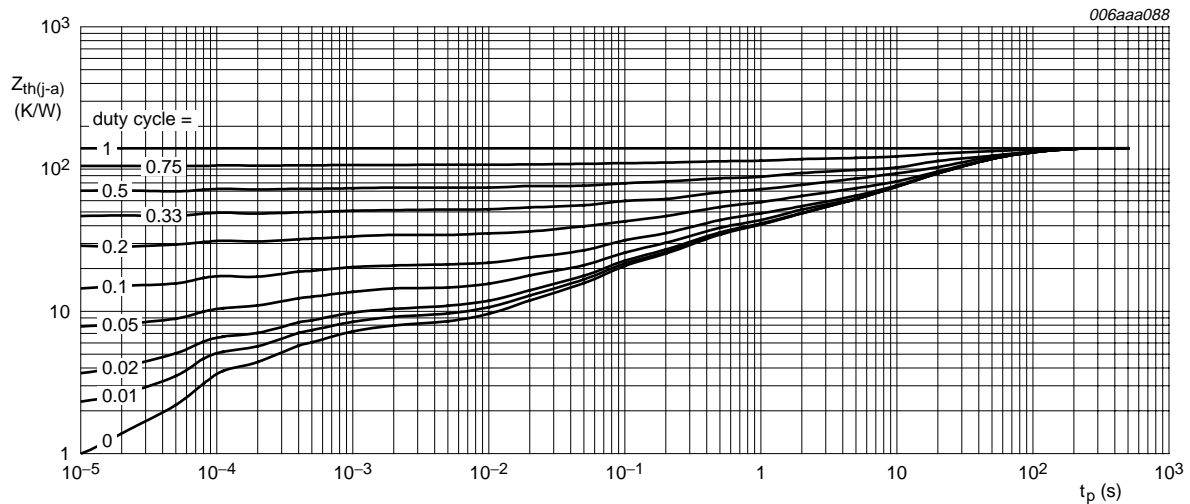
Table 7. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit		
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air						
			BC635	[1]	-	-	150	K/W
			BCP54	[1]	-	-	195	K/W
				[2]	-	-	130	K/W
			BCX54	[1]	-	-	250	K/W
				[2]	-	-	145	K/W
[3]	-	-		100	K/W			
$R_{th(j-sp)}$	thermal resistance from junction to solder point							
		BC635	-	-	40	K/W		
		BCP54	-	-	17	K/W		
		BCX54	-	-	30	K/W		

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

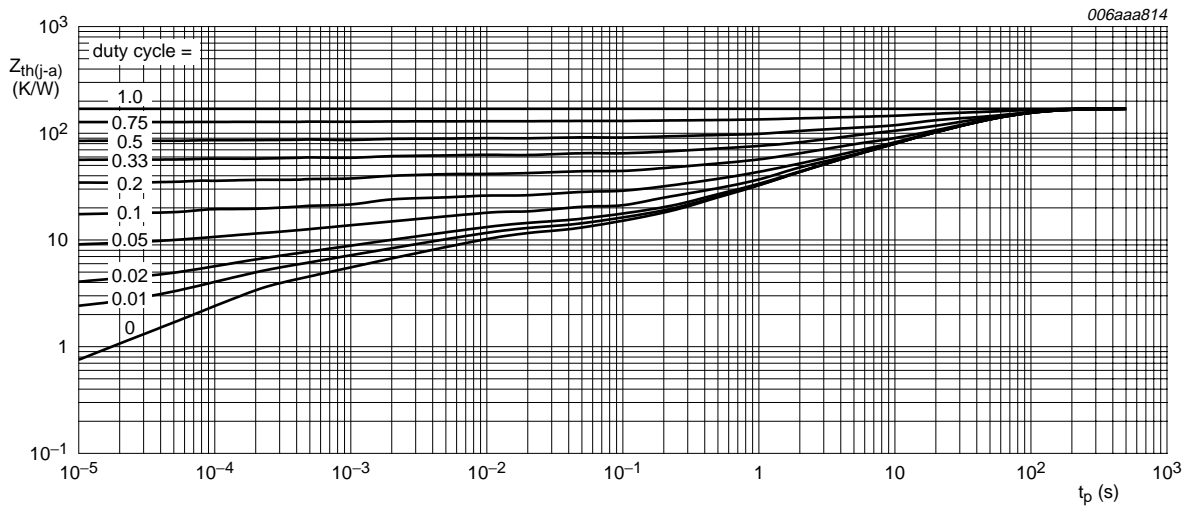
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm².

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



FR4 PCB, standard footprint

Fig 4. Transient thermal impedance from junction to ambient as a function of pulse duration for SOT54; typical values



FR4 PCB, standard footprint

Fig 5. Transient thermal impedance from junction to ambient as a function of pulse duration for SOT223; typical values

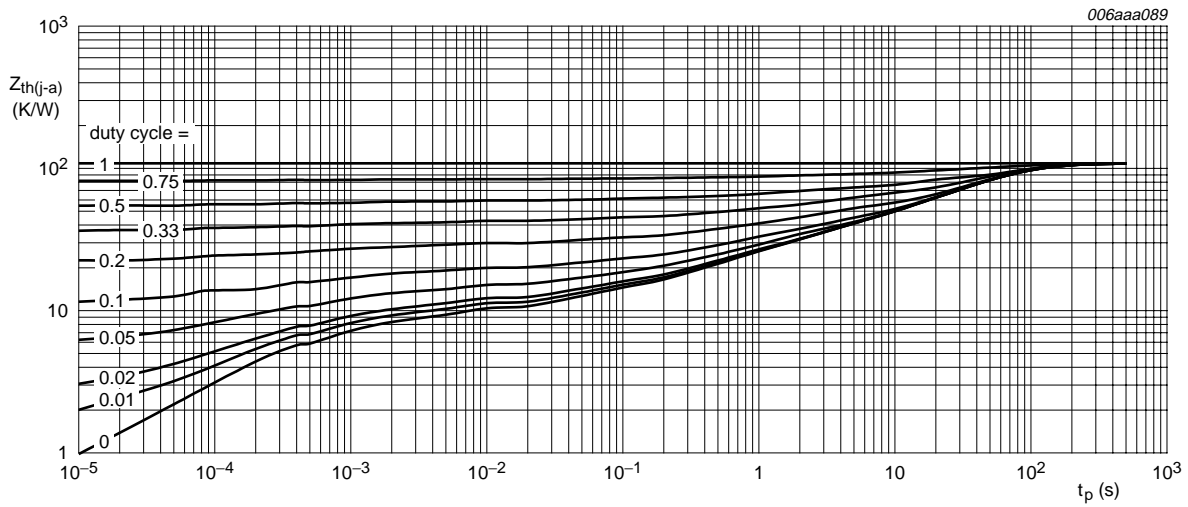
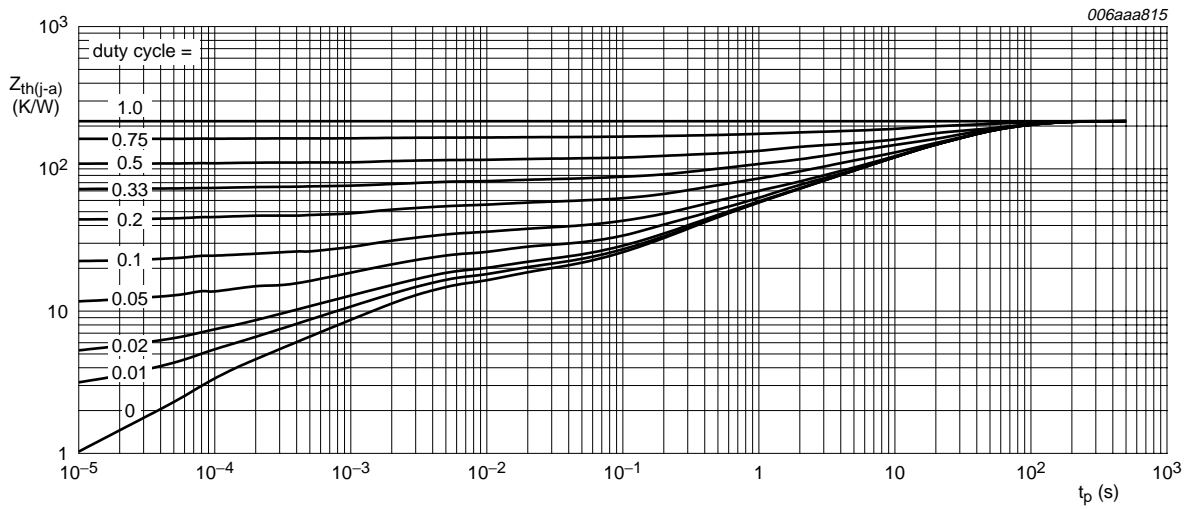
FR4 PCB, mounting pad for collector 1 cm^2

Fig 6. Transient thermal impedance from junction to ambient as a function of pulse duration for SOT223; typical values



FR4 PCB, standard footprint

Fig 7. Transient thermal impedance from junction to ambient as a function of pulse duration for SOT89; typical values

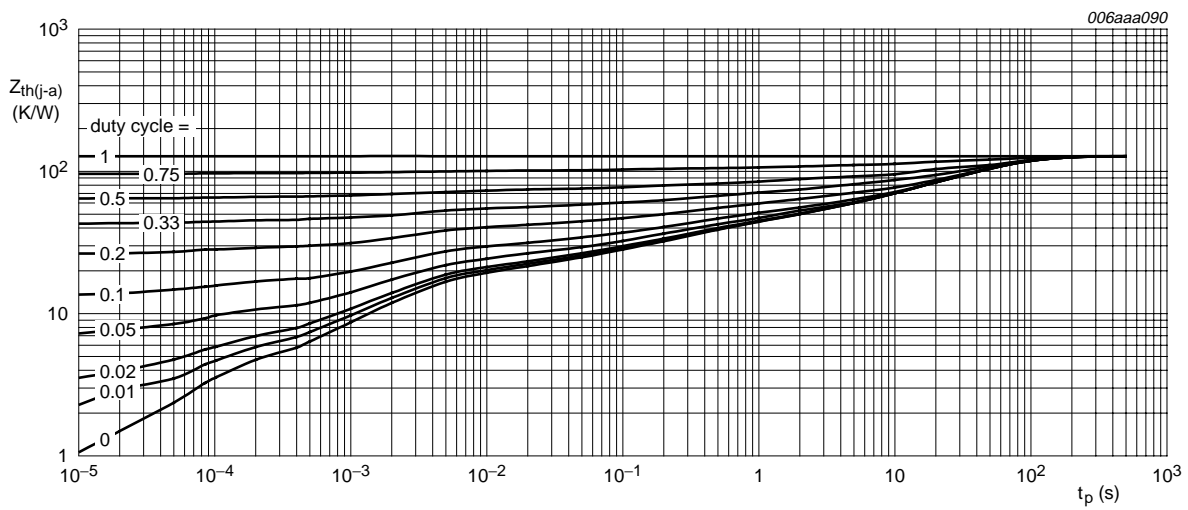
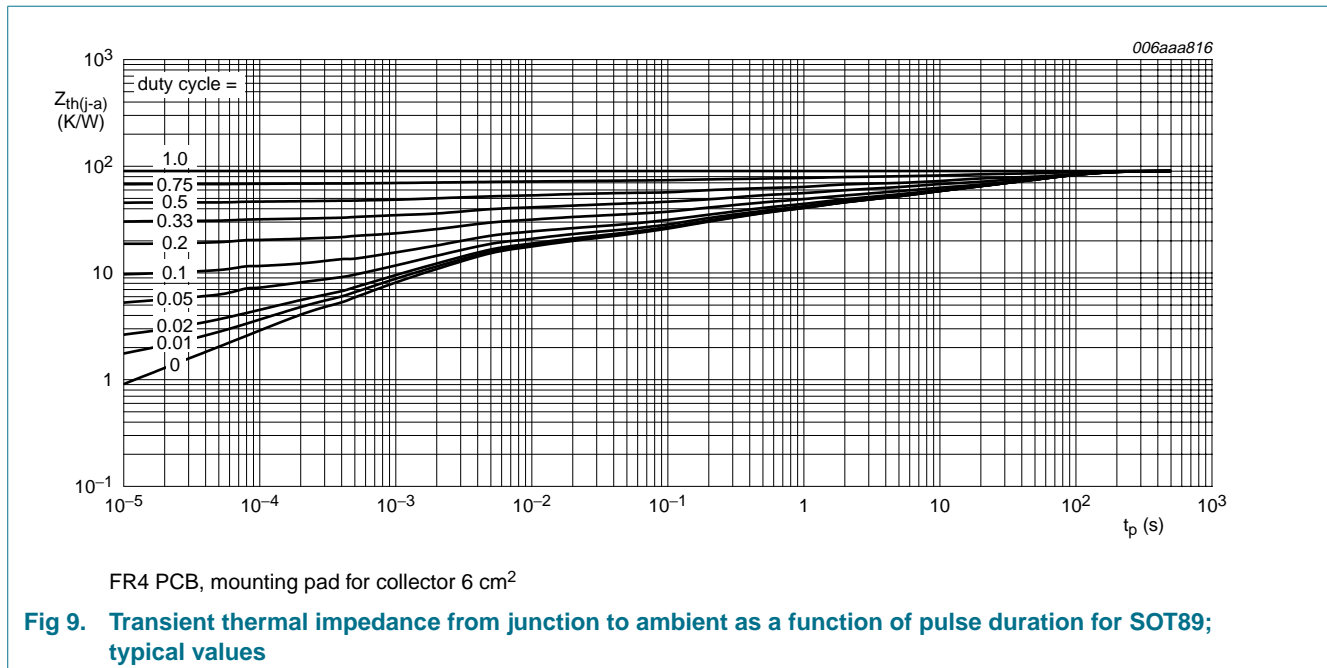
FR4 PCB, mounting pad for collector 1 cm^2

Fig 8. Transient thermal impedance from junction to ambient as a function of pulse duration for SOT89; typical values



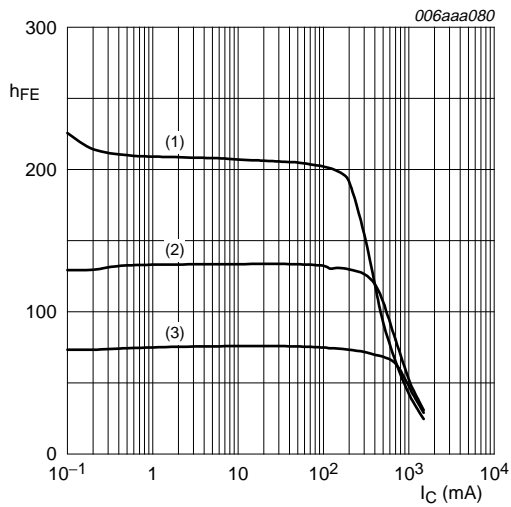
7. Characteristics

Table 8. Characteristics

$T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	$V_{CB} = 30\text{ V}; I_E = 0\text{ A}$	-	-	100	nA
		$V_{CB} = 30\text{ V}; I_E = 0\text{ A}; T_j = 150^{\circ}\text{C}$	-	-	10	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}$	-	-	100	nA
h_{FE}	DC current gain	$V_{CE} = 2\text{ V}$				
		$I_C = 5\text{ mA}$	63	-	-	
		$I_C = 150\text{ mA}$	63	-	250	
		$I_C = 500\text{ mA}$	[1] 40	-	-	
	DC current gain	$V_{CE} = 2\text{ V}$				
	h_{FE} selection -10	$I_C = 150\text{ mA}$	63	-	160	
	h_{FE} selection -16	$I_C = 150\text{ mA}$	100	-	250	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 500\text{ mA}; I_B = 50\text{ mA}$	[1] -	-	500	mV
V_{BE}	base-emitter voltage	$V_{CE} = 2\text{ V}; I_C = 500\text{ mA}$	[1] -	-	1	V
C_C	collector capacitance	$V_{CB} = 10\text{ V}; I_E = i_e = 0\text{ A}; f = 1\text{ MHz}$	-	6	-	pF
f_T	transition frequency	$V_{CE} = 5\text{ V}; I_C = 50\text{ mA}; f = 100\text{ MHz}$	100	180	-	MHz

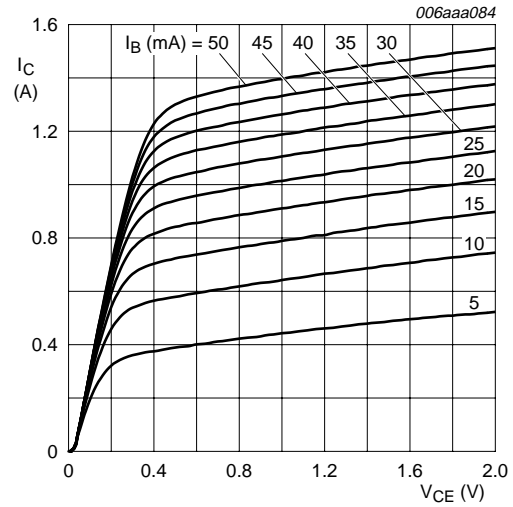
[1] Pulse test: $t_p \leq 300\text{ }\mu\text{s}; \delta = 0.02$.



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

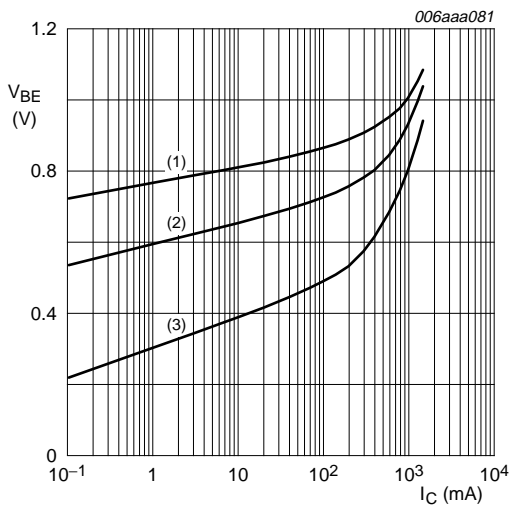
- (1) $T_{amb} = 150 \text{ }^\circ\text{C}$
- (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
- (3) $T_{amb} = -55 \text{ }^\circ\text{C}$

Fig 10. DC current gain as a function of collector current; typical values



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

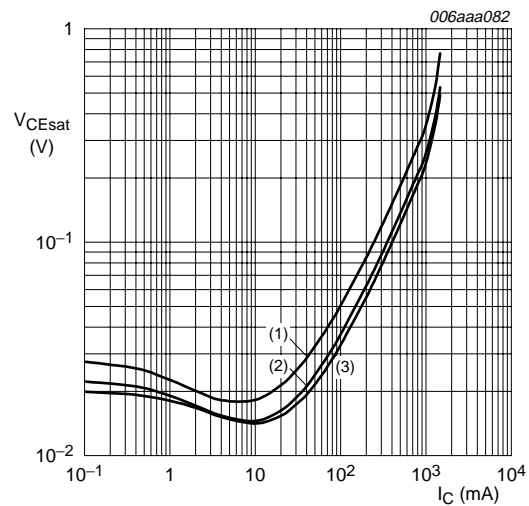
Fig 11. Collector current as a function of collector-emitter voltage; typical values



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

- (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 12. 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 13. Collector-emitter saturation voltage as a function of collector current; typical values

8. Package outline

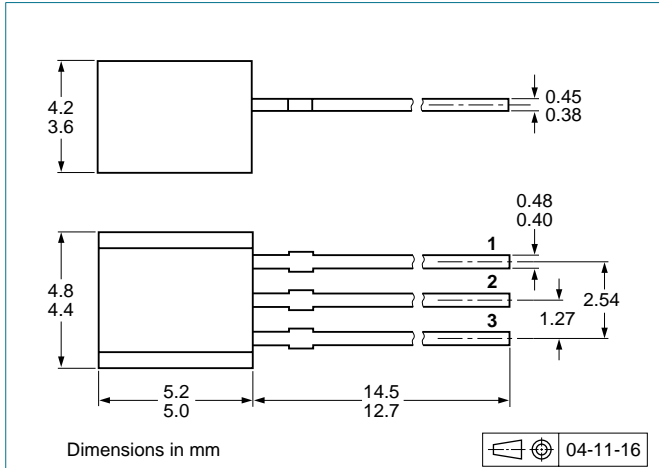


Fig 14. Package outline SOT54 (SC-43A/TO-92)

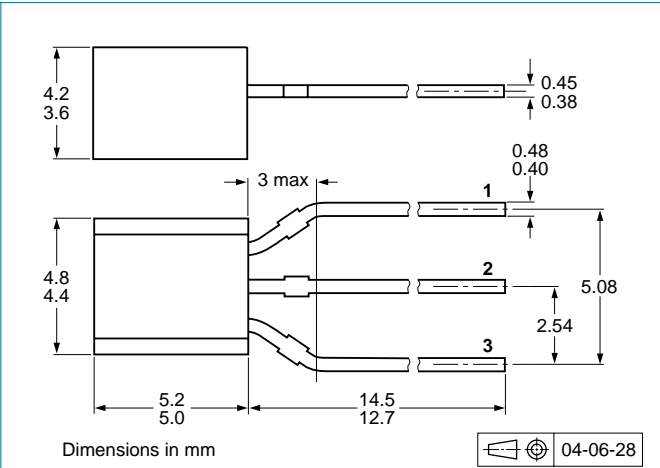


Fig 15. Package outline SOT54A

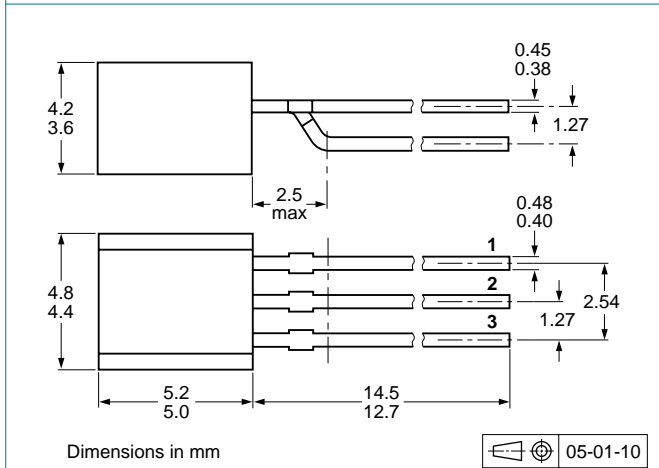


Fig 16. Package outline SOT54 variant

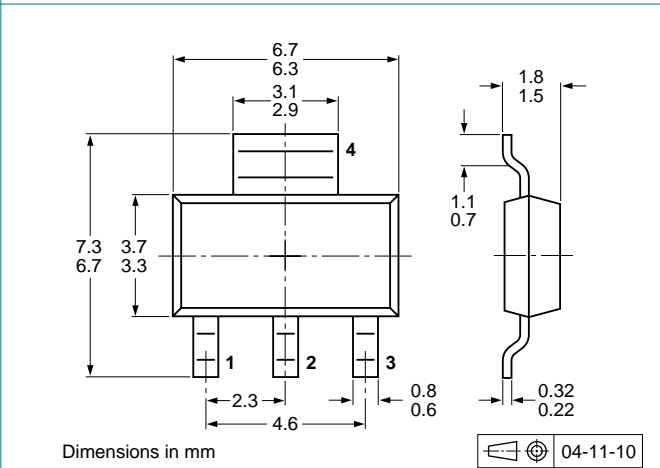


Fig 17. Package outline SOT223 (SC-73)

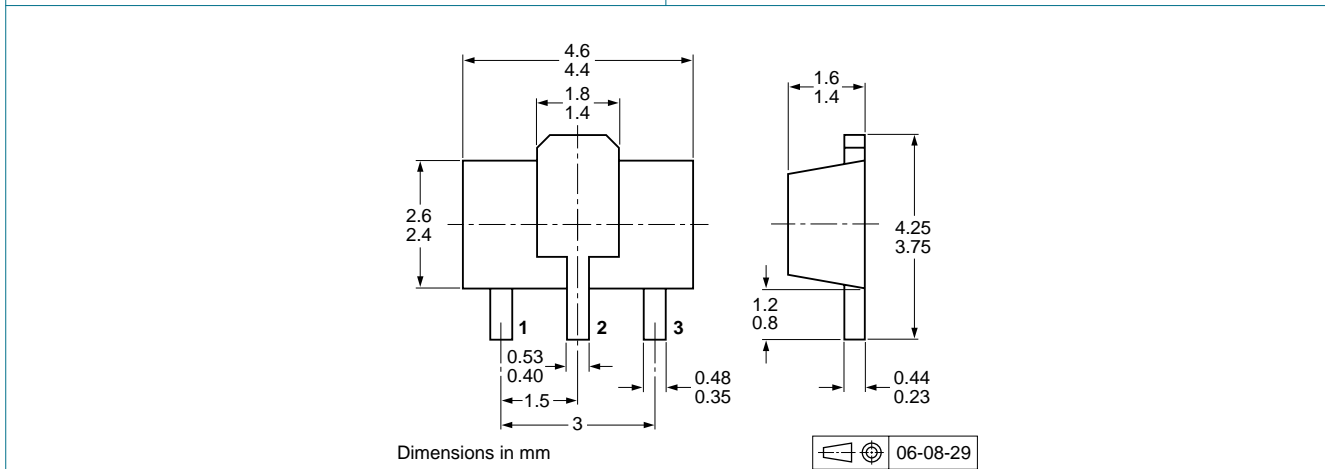


Fig 18. Package outline SOT89 (SC-62/TO-243)

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	5000	10000
BC635	SOT54	bulk, straight leads	-	-	-412	-
	SOT54A	tape and reel, wide pitch	-	-	-	-116
		tape ammopack, wide pitch	-	-	-	-126
	SOT54 variant	bulk, delta pinning	-	-	-112	-
BCP54	SOT223	8 mm pitch, 12 mm tape and reel	-115	-135	-	-
BCX54	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
BC635_BCP54_BCX54_7	20070604	Product data sheet	-	BC635_BCP54_BCX54_6
Modifications:				
<ul style="list-style-type: none"> • Table 1 “Product overview”: amended • Section 1.2 “Features”: amended • Section 1.3 “Applications”: amended • Table 2 “Quick reference data”: I_C parameter redefined to collector current • Table 2 “Quick reference data”: I_{CM} condition added • Figure 2 and 3: amended • Table 6 “Limiting values”: I_C parameter redefined to collector current • Table 6 “Limiting values”: I_{CM} condition added • Table 6 “Limiting values”: P_{tot} values for BCP54 and BCX54 adapted • Table 7 “Thermal characteristics”: R_{th(j-a)} values for BCP54 and BCX54 rounded • Figure 4: Z_{th} redefined to Z_{th(j-a)} transient thermal impedance from junction to ambient • Figure 4: t_p parameter redefined to pulse duration • Figure 5: added • Figure 6: Z_{th} redefined to Z_{th(j-a)} transient thermal impedance from junction to ambient • Figure 6: t_p parameter redefined to pulse duration • Figure 7: added • Figure 8: Z_{th} redefined to Z_{th(j-a)} transient thermal impedance from junction to ambient • Figure 8: t_p parameter redefined to pulse duration • Figure 9: added • Figure 11: amended • Table 9 “Packing methods”: new packing method for BCX54 added • Section 11 “Legal information”: updated 				
BC635_BCP54_BCX54_6	20050225	Product data sheet	CPCN200405029	BC635_637_639_4 BCP54_55_56_5 BCX54_55_56_4
BC635_637_639_4	20011010	Product specification	-	BC635_637_639_3
BCP54_55_56_5	20030206	Product specification	-	BCP54_55_56_4
BCX54_55_56_4	20011010	Product specification	-	BCX54_55_56_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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For sales office addresses, send an email to: salesaddresses@nxp.com

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