

# DATA SHEET

**BFG31**

**PNP 5 GHz wideband transistor**

Product specification  
Supersedes data of November 1992

1995 Sep 12



# PNP 5 GHz wideband transistor

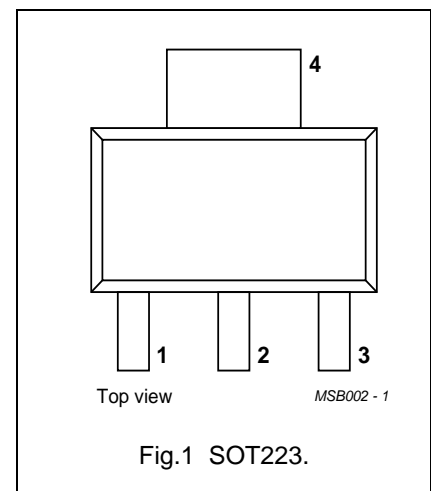
# BFG31

### FEATURES

- High output voltage capability
- High gain bandwidth product
- Good thermal stability
- Gold metallization ensures excellent reliability.

### PINNING

PIN	DESCRIPTION
1	emitter
2	base
3	emitter
4	collector



### DESCRIPTION

PNP planar epitaxial transistor mounted in a plastic SOT223 envelope.

It is intended for wideband amplifier applications.

NPN complement is the BFG97.

### QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{CEO}$	collector-emitter voltage	open base	–	–	–15	V
$I_C$	DC collector current		–	–	–100	mA
$P_{tot}$	total power dissipation	up to $T_s = 135\text{ °C}$ ; note 1	–	–	1	W
$h_{FE}$	DC current gain	$I_C = -70\text{ mA}$ ; $V_{CE} = -10\text{ V}$ ; $T_{amb} = 25\text{ °C}$	25	–	–	
$f_T$	transition frequency	$I_C = -70\text{ mA}$ ; $V_{CE} = -10\text{ V}$ ; $f = 500\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	–	5.0	–	GHz
$G_{UM}$	maximum unilateral power gain	$I_C = -70\text{ mA}$ ; $V_{CE} = -10\text{ V}$ ; $f = 800\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	–	12	–	dB
$V_o$	output voltage	$I_C = -100\text{ mA}$ ; $V_{CE} = -10\text{ V}$ ; $R_L = 75\text{ }\Omega$ ; $T_{amb} = 25\text{ °C}$	–	600	–	mV

### LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	–20	V
$V_{CEO}$	collector-emitter voltage	open base	–	–15	V
$V_{EBO}$	emitter-base voltage	open collector	–	–3	V
$I_C$	DC collector current		–	–100	mA
$P_{tot}$	total power dissipation	up to $T_s = 135\text{ °C}$ ; note 1	–	1	W
$T_{stg}$	storage temperature		–65	150	°C
$T_j$	junction temperature		–	175	°C

### Note

1.  $T_s$  is the temperature at the soldering point of the collector tab.

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**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	THERMAL RESISTANCE
$R_{th\ j-s}$	thermal resistance from junction to soldering point	up to $T_s = 135\text{ °C}$ ; note 1	40 K/W

**Note**

- $T_s$  is the temperature at the soldering point of the collector tab.

**CHARACTERISTICS**

$T_j = 25\text{ °C}$  unless otherwise specified.

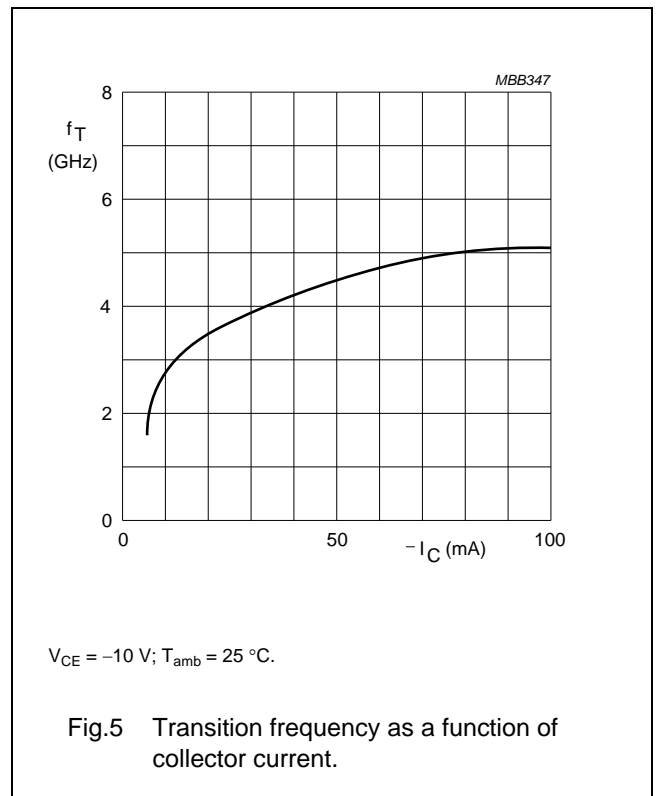
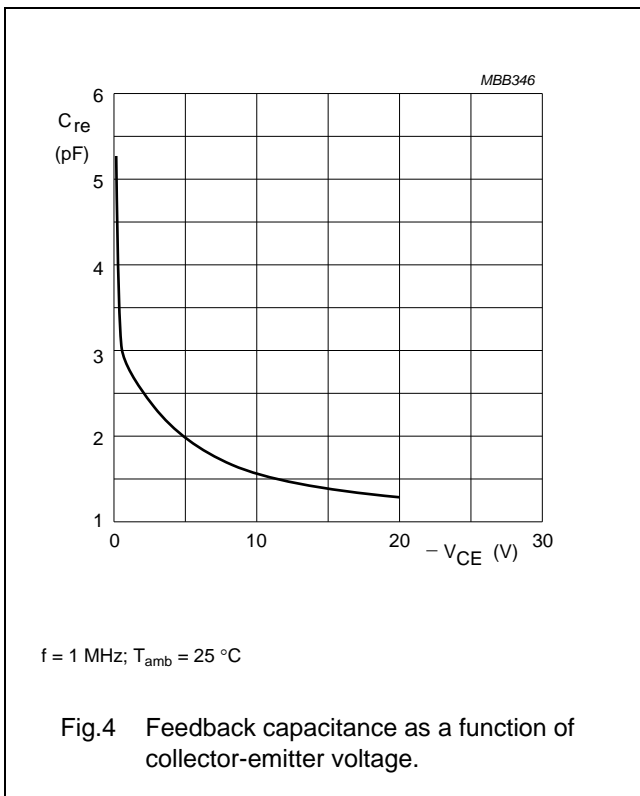
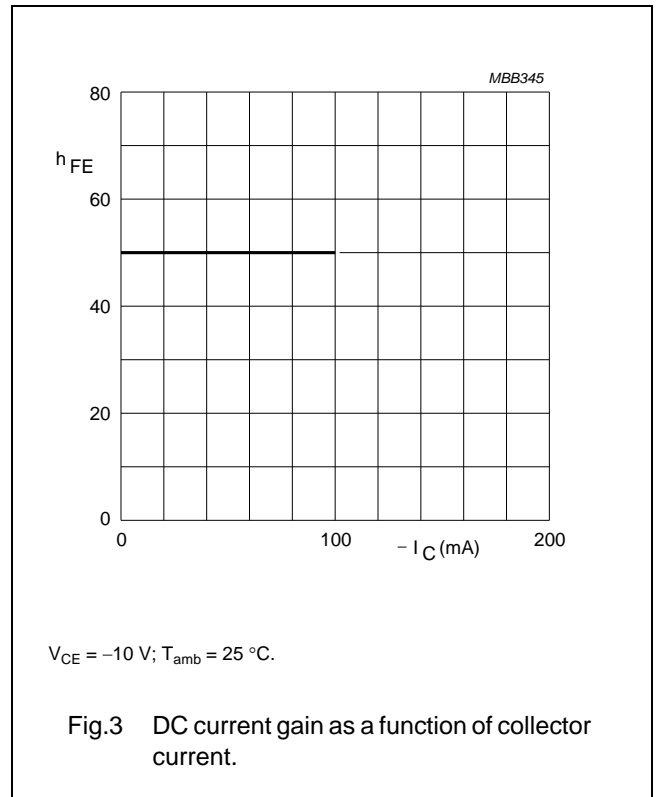
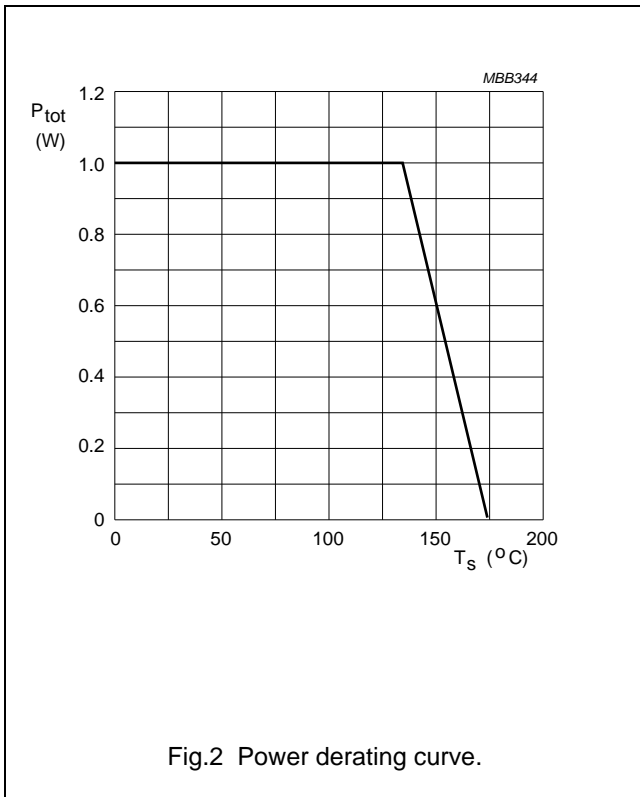
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	open emitter; $I_C = -10\text{ mA}$	-20	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	open base; $I_C = -10\text{ mA}$	-18	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	open collector; $I_E = -0.1\text{ mA}$	-3	-	-	V
$I_{CBO}$	collector cut-off current	$I_E = 0$ ; $V_{CB} = -10\text{ V}$	-	-	-1	$\mu\text{A}$
$h_{FE}$	DC current gain	$I_C = -70\text{ mA}$ ; $V_{CE} = -10\text{ V}$ ; $T_{amb} = 25\text{ °C}$	25	-	-	
$C_{cb}$	collector-base capacitance	$I_C = 0$ ; $V_{CB} = -10\text{ V}$ ; $f = 1\text{ MHz}$ ;	-	1.8	-	pF
$C_{eb}$	emitter-base capacitance	$I_C = 0$ ; $V_{EB} = -10\text{ V}$ ; $f = 1\text{ MHz}$	-	5	-	pF
$C_{re}$	feedback capacitance	$I_C = 0$ ; $V_{CE} = -10\text{ V}$ ; $f = 1\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	-	1.6	-	pF
$f_T$	transition frequency	$I_C = -70\text{ mA}$ ; $V_{CE} = -10\text{ V}$ ; $f = 500\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	-	5	-	GHz
$G_{UM}$	maximum unilateral power gain; note 1	$I_C = -70\text{ mA}$ ; $V_{CE} = -10\text{ V}$ ; $f = 500\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	-	16	-	dB
		$I_C = -70\text{ mA}$ ; $V_{CE} = -10\text{ V}$ ; $f = 800\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	-	12	-	dB
$V_o$	output voltage	note 2	-	600	-	mV
$V_o$	output voltage	note 3	-	550	-	mV

**Notes**

- $G_{UM}$  is the maximum unilateral power gain, assuming  $S_{12}$  is zero and  $G_{UM} = 10 \log \frac{|s_{21}|^2}{(1 - |s_{11}|^2)(1 - |s_{22}|^2)}$  dB.
- $d_{im} = -60\text{ dB}$ ;  $I_C = -70\text{ mA}$ ;  $V_{CE} = -10\text{ V}$ ;  $R_L = 75\ \Omega$ ;  $T_{amb} = 25\text{ °C}$ ;  
 $V_p = V_o$  at  $d_{im} = -60\text{ dB}$ ;  $f_p = 850.25\text{ MHz}$ ;  
 $V_q = V_o - 6\text{ dB}$ ;  $f_q = 858.25\text{ MHz}$ ;  
 $V_r = V_o - 6\text{ dB}$ ;  $f_r = 860.25\text{ MHz}$ ;  
 measured at  $f_{(p+q-r)} = 848.25\text{ MHz}$ .
- $d_{im} = -60\text{ dB}$  (DIN 45004B);  $I_C = -70\text{ mA}$ ;  $V_{CE} = -10\text{ V}$ ;  $R_L = 75\ \Omega$ ;  $T_{amb} = 25\text{ °C}$ ;  
 $V_p = V_o =$  at  $d_{im} = -60\text{ dB}$ ;  $f_p = 445.25\text{ MHz}$ ;  
 $V_q = V_o - 6\text{ dB}$ ;  $f_q = 453.25\text{ MHz}$ ;  
 $V_r = V_o - 6\text{ dB}$ ;  $f_r = 455.25\text{ MHz}$ ;  
 measured at  $f_{(p+q-r)} = 443.25\text{ MHz}$ .

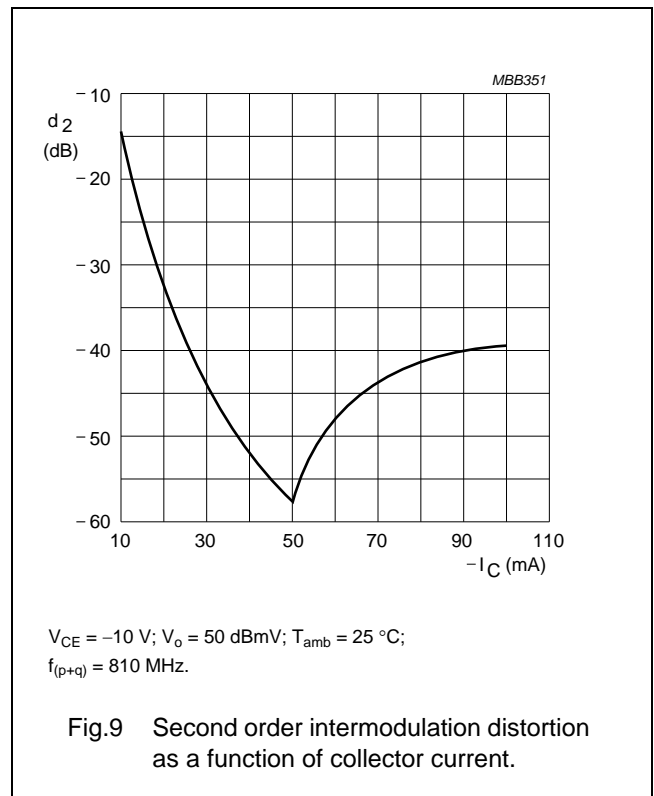
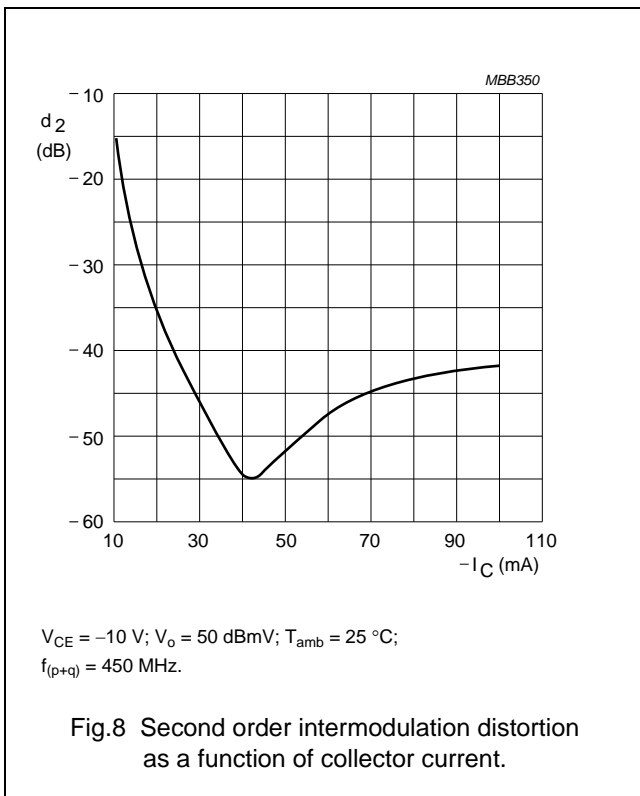
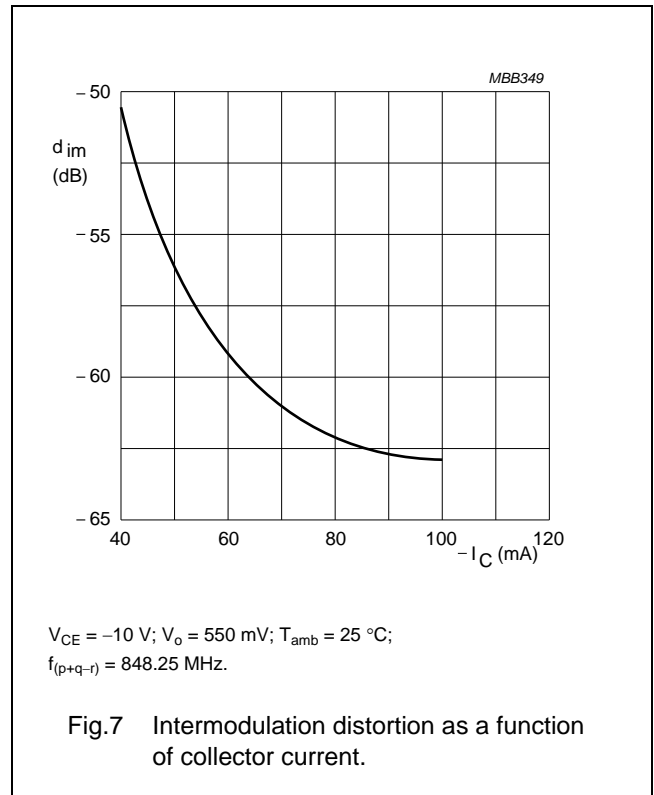
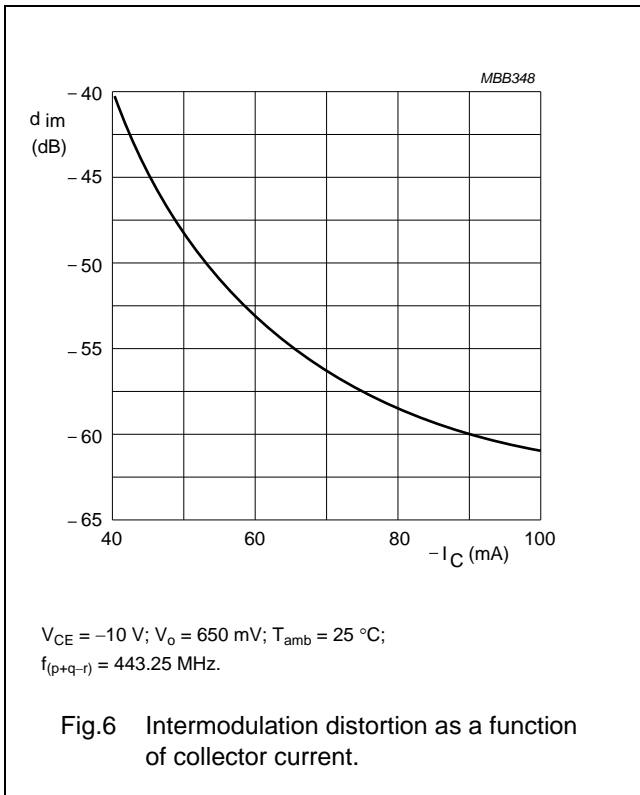
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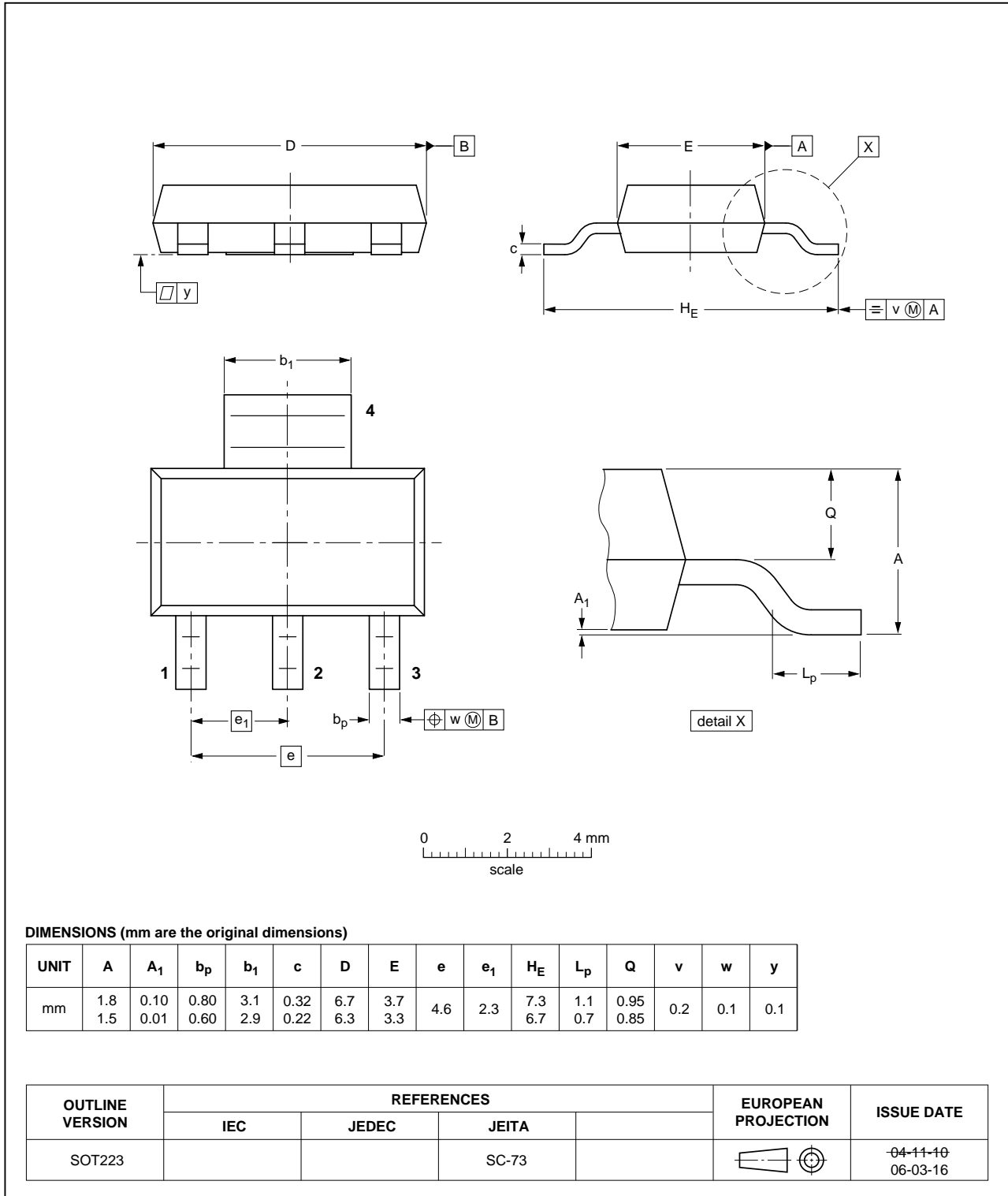
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PACKAGE OUTLINE

Plastic surface-mounted package with increased heatsink; 4 leads

SOT223



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## DATA SHEET STATUS

DOCUMENT STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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