

# DATA SHEET

## **BFQ166** NPN video transistor

Product specification  
Supersedes data of November 1995  
File under Discrete Semiconductors, SC05

1997 Oct 02

## NPN video transistor

## BFQ166

## FEATURES

- Low output capacitance
- High gain bandwidth
- Good thermal stability
- Gold metallization ensures excellent reliability
- High current applicability
- Surface mounting.

## APPLICATIONS

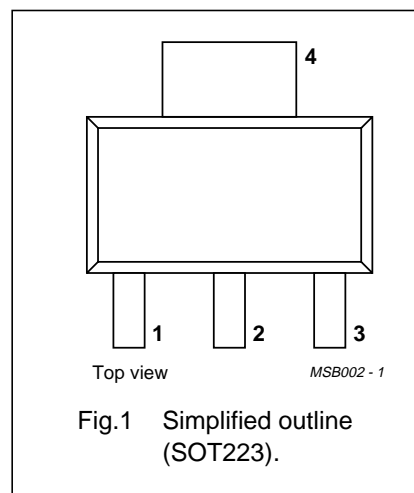
- Video amplifier cascode driver in high-resolution colour graphics monitors.

## DESCRIPTION

NPN video transistor in a SOT223 plastic package.

## PINNING

PIN	DESCRIPTION
1	emitter
2	base
3	emitter
4	collector



## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	–	20	V
$V_{CER}$	collector-emitter voltage	$R_{BE} = 100 \Omega$	–	–	19	V
$I_C$	collector current (DC)		–	–	500	mA
$P_{tot}$	total power dissipation	$T_s \leq 105 \text{ }^\circ\text{C}$ ; note 1	–	–	2	W
$h_{FE}$	DC current gain	$I_C = 300 \text{ mA}$ ; $V_{CE} = 5 \text{ V}$ ; see Fig.4	50	60	–	
$f_T$	transition frequency	$I_C = 300 \text{ mA}$ ; $V_{CE} = 5 \text{ V}$ ; $f = 100 \text{ MHz}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	1	–	–	GHz

## Note

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

## LIMITING VALUES

In accordance with the Absolute Maximum Rating 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	–	10	V
$V_{CER}$	collector-emitter voltage	$R_{BE} = 100 \Omega$	–	19	V
$V_{EBO}$	emitter-base voltage	open collector	–	3	V
$I_C$	collector current (DC)		–	500	mA
$P_{tot}$	total power dissipation	$T_s \leq 105 \text{ }^\circ\text{C}$ ; note 1; see Fig.3	–	2	W
$T_{stg}$	storage temperature		–65	+150	$^\circ\text{C}$
$T_j$	junction temperature		–	175	$^\circ\text{C}$

## Note

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

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## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-s}$	thermal resistance from junction to soldering point	$T_s = 105\text{ °C}$ ; $P_{tot} = 2\text{ W}$ ; notes 1 and 2	35	K/W

## Notes

- $T_s$  is the temperature at the soldering point of the collector lead.
- Device mounted on a printed-circuit board measuring  $40 \times 40 \times 1\text{ mm}$  (collector pad  $35 \times 17\text{ mm}$ ).

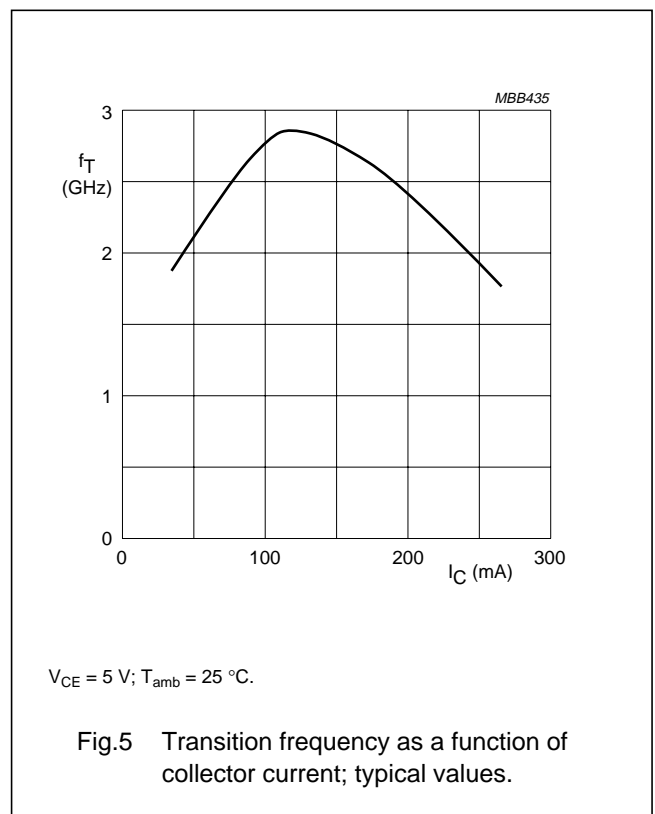
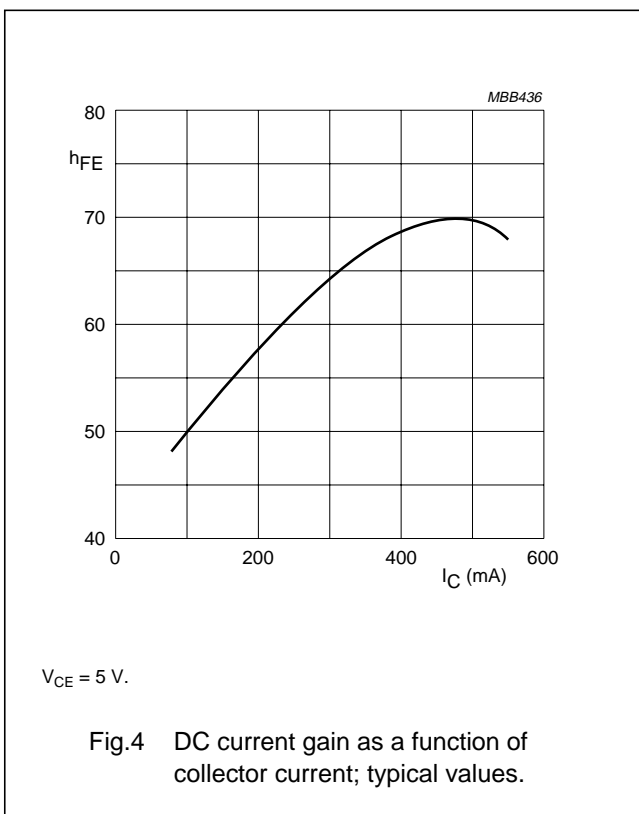
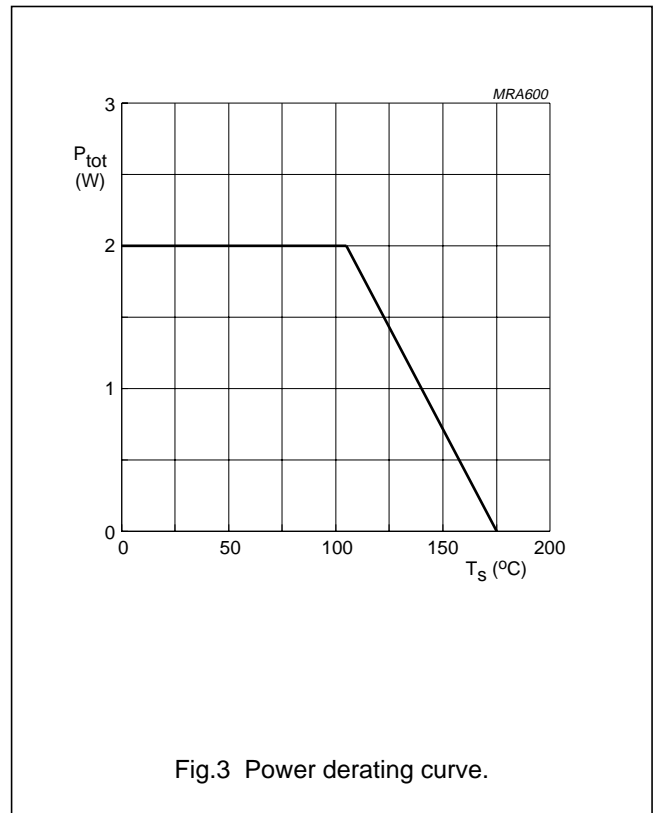
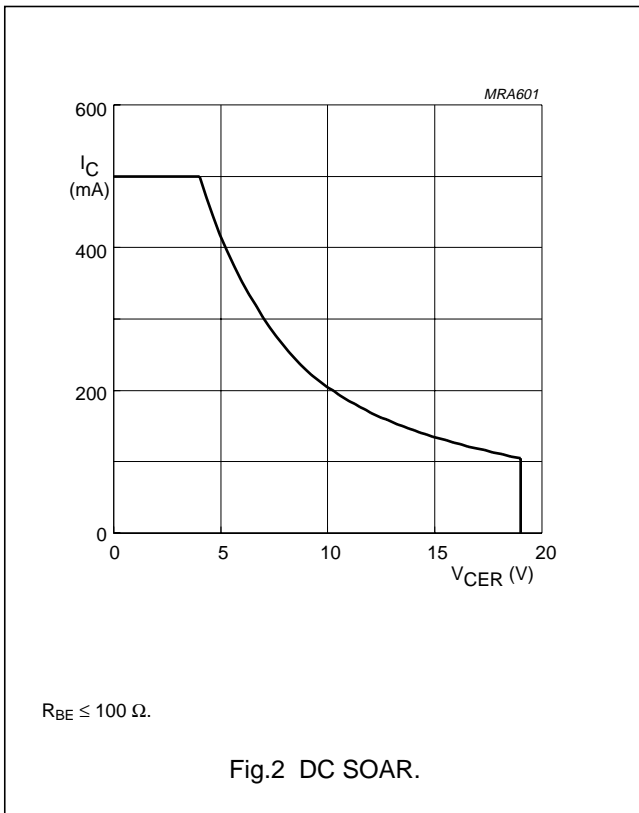
## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = 5\text{ mA}$ ; $I_E = 0$	20	–	–	V
$V_{(BR)CER}$	collector-emitter breakdown voltage	$I_C = 10\text{ mA}$ ; $R_{BE} = 100\ \Omega$	19	–	–	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = 10\text{ mA}$ ; $I_B = 0$	10	–	–	V
$I_{CES}$	collector-emitter cut-off current	$V_{CE} = 10\text{ V}$ ; $V_{BE} = 0$	–	–	100	$\mu\text{A}$
$h_{FE}$	DC current gain	$I_C = 300\text{ mA}$ ; $V_{CE} = 5\text{ V}$ ; see Fig.4	50	60	–	
$C_c$	collector capacitance	$I_E = i_e = 0$ ; $V_{CB} = 5\text{ V}$ ; $f = 1\text{ MHz}$	–	4.5	–	pF
$C_{cb}$	collector-base capacitance	$I_C = i_c = 0$ ; $V_{CB} = 5\text{ V}$ ; $f = 1\text{ MHz}$ ; see Fig.6	–	3.2	–	pF
$f_T$	transition frequency	$I_C = 300\text{ mA}$ ; $V_{CE} = 5\text{ V}$ ; $f = 100\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$ ; see Fig.5	1	–	–	GHz

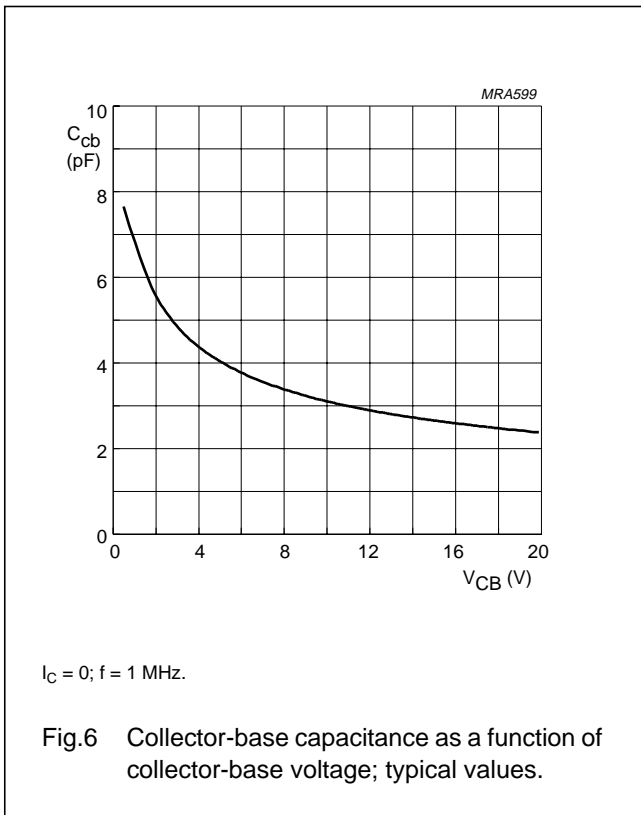
NPN video transistor

BFQ166



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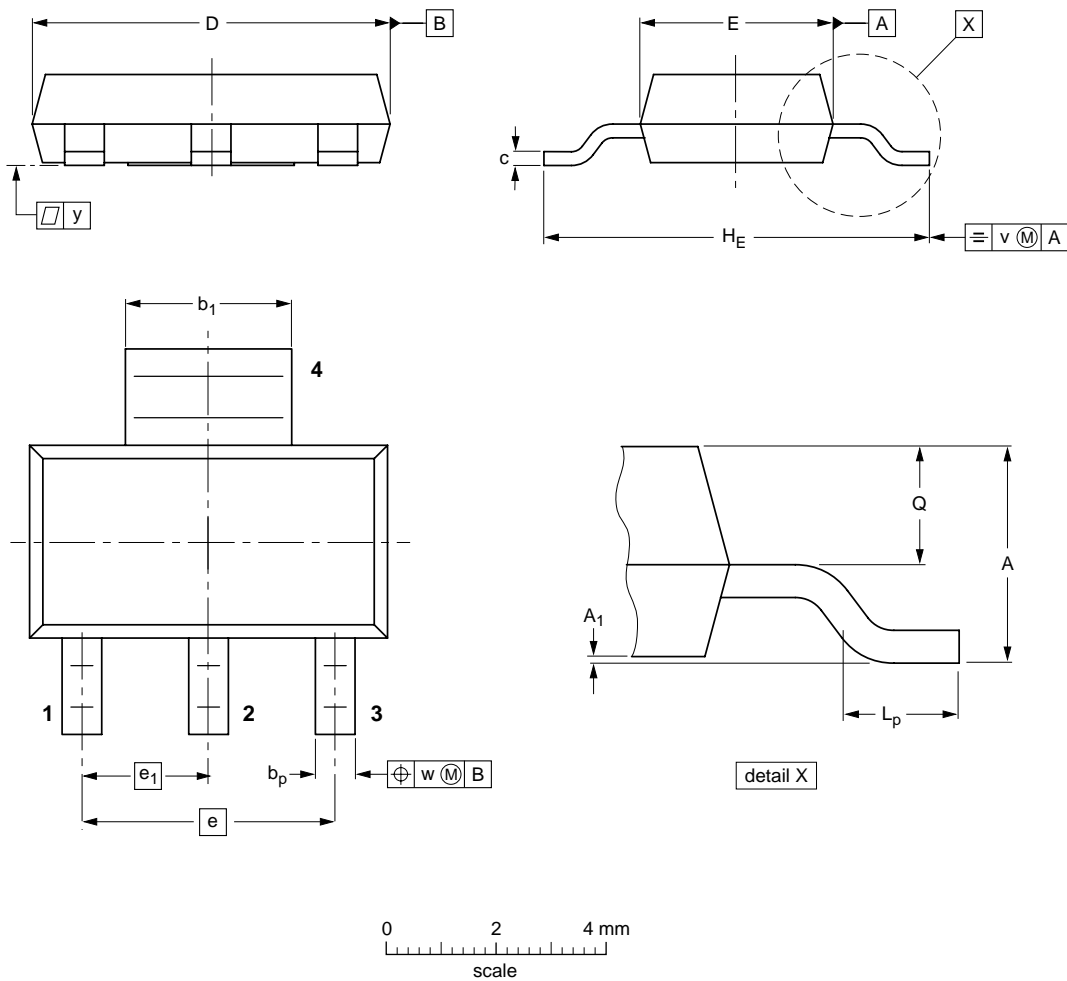
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PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 4 leads

SOT223



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub>	b <sub>p</sub>	b <sub>1</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w	y
mm	1.8 1.5	0.10 0.01	0.80 0.60	3.1 2.9	0.32 0.22	6.7 6.3	3.7 3.3	4.6	2.3	7.3 6.7	1.1 0.7	0.95 0.85	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT223						96-11-11 97-02-28

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**DEFINITIONS**

<b>Data sheet status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

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Printed in The Netherlands

127027/00/02/pp8

Date of release: 1997 Oct 02

Document order number: 9397 750 02871

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