

# DATA SHEET

## **BFQ231; BFQ231A** NPN video transistors

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

1997 Oct 02

## NPN video transistors

## BFQ231; BFQ231A

## FEATURES

- High breakdown voltages
- Low output capacitance
- High gain bandwidth
- Good thermal stability
- Gold metallization ensures excellent reliability.

## APPLICATIONS

- Buffer/driver in high-resolution colour graphics monitors.

## DESCRIPTION

NPN video transistor in a SOT54 (TO-92) plastic package.  
PNP complements: BFQ251 and BFQ251A.

## PINNING

PIN	DESCRIPTION
1	base
2	collector
3	emitter

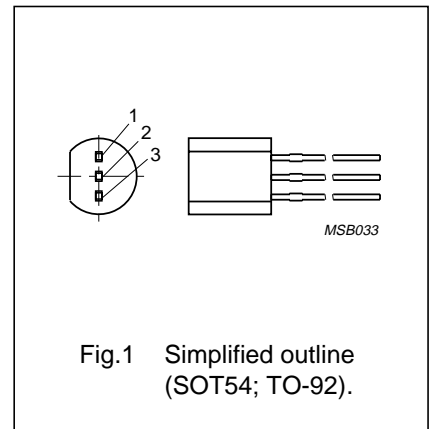


Fig.1 Simplified outline (SOT54; TO-92).

## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{CBO}$	collector-base voltage BFQ231 BFQ231A	open emitter	–	–	100	V
			–	–	115	V
$V_{CER}$	collector-emitter voltage BFQ231 BFQ231A	$R_{BE} = 100 \Omega$	–	–	95	V
			–	–	110	V
$I_C$	collector current (DC)		–	–	300	mA
$P_{tot}$	total power dissipation	$T_s \leq 65 \text{ }^\circ\text{C}$ ; note 1	–	–	1	W
$h_{FE}$	DC current gain	$I_C = 50 \text{ mA}$ ; $V_{CE} = 10 \text{ V}$	20	35	–	
$f_T$	transition frequency BFQ231 BFQ231A	$I_C = 50 \text{ mA}$ ; $V_{CE} = 10 \text{ V}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	1	1.4	–	GHz
			0.8	1.2	–	GHz

## Note

1.  $T_s$  is the temperature at the soldering point of the collector pin, 4 mm from the body.

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**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CBO</sub>	collector-base voltage	open emitter			
	BFQ231		–	100	V
	BFQ231A		–	115	V
V <sub>CEO</sub>	collector-emitter voltage	open base			
	BFQ231		–	65	V
	BFQ231A		–	95	V
V <sub>CER</sub>	collector-emitter voltage	R <sub>BE</sub> = 100 Ω			
	BFQ231		–	95	V
	BFQ231A		–	110	V
V <sub>EBO</sub>	emitter-base voltage	open collector	–	3	V
I <sub>C</sub>	collector current (DC)		–	300	mA
P <sub>tot</sub>	total power dissipation	T <sub>s</sub> ≤ 65 °C; notes 1 and 2; see Fig.3	–	1	W
T <sub>stg</sub>	storage temperature		–65	+150	°C
T <sub>j</sub>	junction temperature		–	150	°C

**Notes**

1. T<sub>s</sub> is the temperature at the soldering point of the collector pin, 4 mm from the body.
2. Transistor mounted on a printed-circuit board with a metallized pad area of 10 mm<sup>2</sup>.

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>th j-s</sub>	thermal resistance from junction to soldering point	note 1	85	K/W
R <sub>th j-a</sub>	thermal resistance from junction to ambient		185	K/W
R <sub>th s-a</sub>	thermal resistance from soldering point to ambient		100	K/W

**Note**

1. T<sub>s</sub> is the temperature at the soldering point of the collector pin.

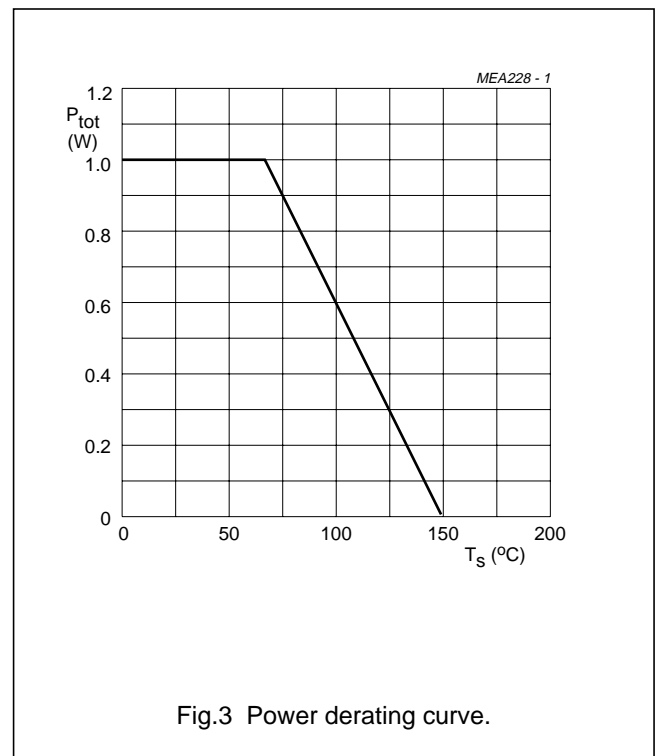
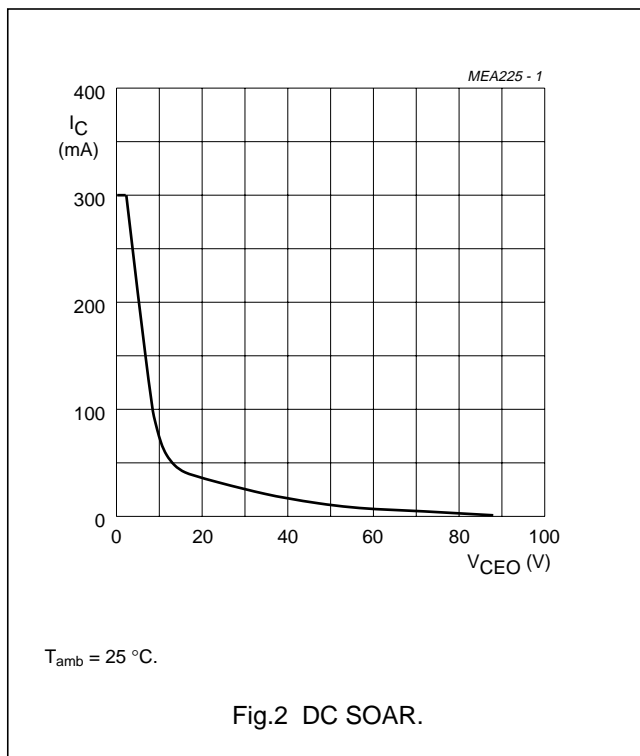
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**CHARACTERISTICS**

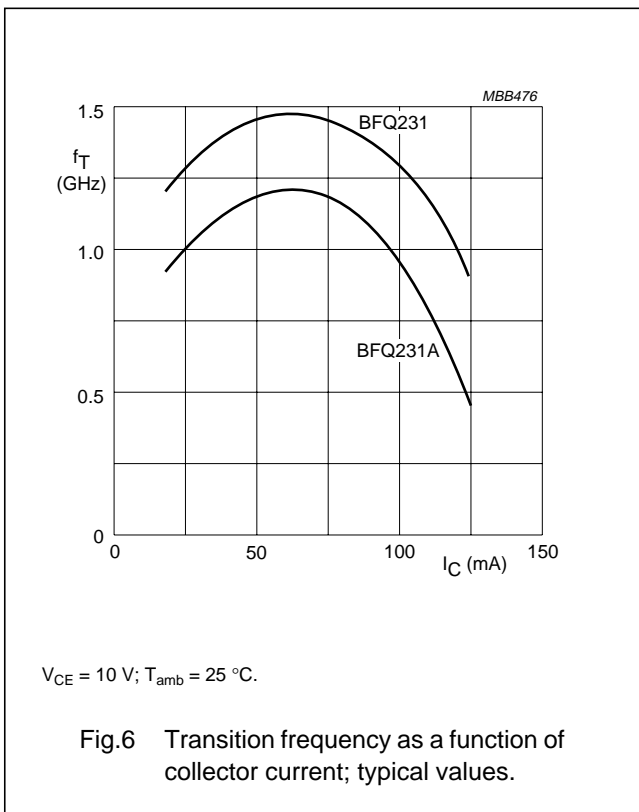
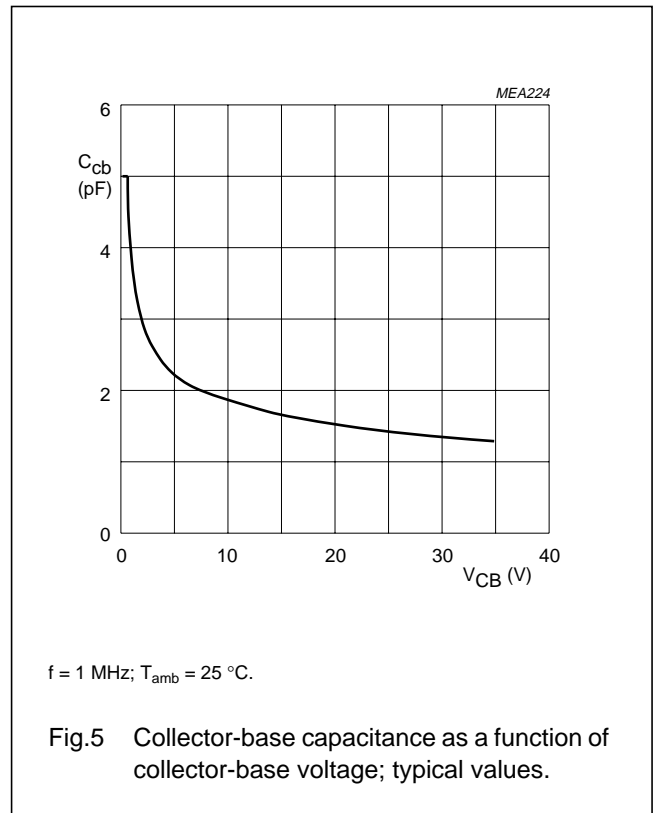
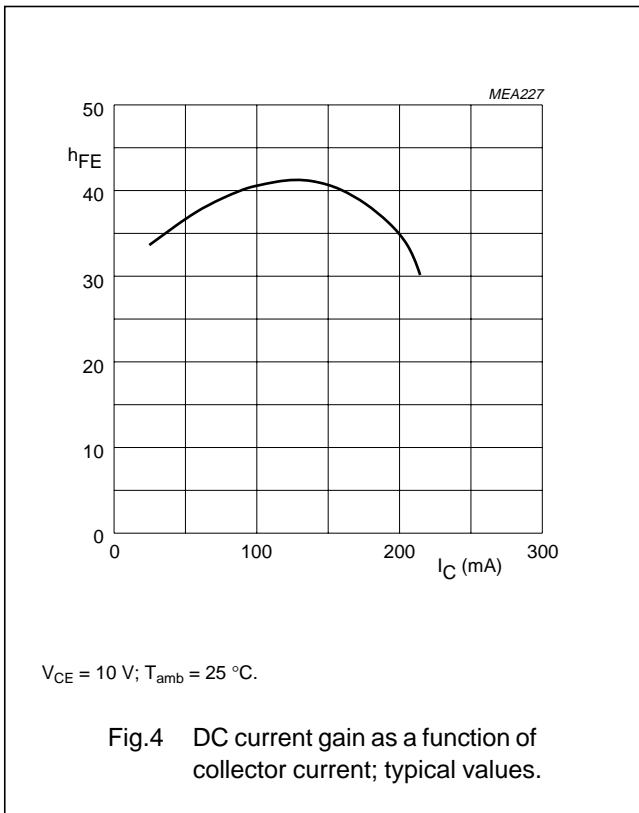
$T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage BFQ231 BFQ231A	$I_C = 0.1\text{ mA}; I_E = 0$	100	–	–	V
			115	–	–	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage BFQ231 BFQ231A	$I_C = 10\text{ mA}; I_B = 0$	65	–	–	V
			95	–	–	V
$V_{(BR)CER}$	collector-emitter breakdown voltage BFQ231 BFQ231A	$I_C = 10\text{ mA}; R_{BE} = 100\ \Omega$	95	–	–	V
			110	–	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_E = 0.1\text{ mA}; I_C = 0$	3	–	–	V
$I_{CES}$	collector-emitter cut-off current	$I_B = 0; V_{CE} = 50\text{ V}$	–	–	100	$\mu\text{A}$
$I_{CBO}$	collector-base cut-off current	$I_E = 0; V_{CB} = 10\text{ V}$	–	–	20	$\mu\text{A}$
$h_{FE}$	DC current gain	$I_C = 50\text{ mA}; V_{CE} = 10\text{ V};$ see Fig.4	20	35	–	
$C_{cb}$	collector-base capacitance	$I_C = i_c = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz};$ see Fig.5	–	1.8	–	pF
$f_T$	transition frequency BFQ231 BFQ231A	$I_C = 50\text{ mA}; V_{CE} = 10\text{ V};$ see Fig.6	1	1.4	–	GHz
			0.8	1.2	–	GHz



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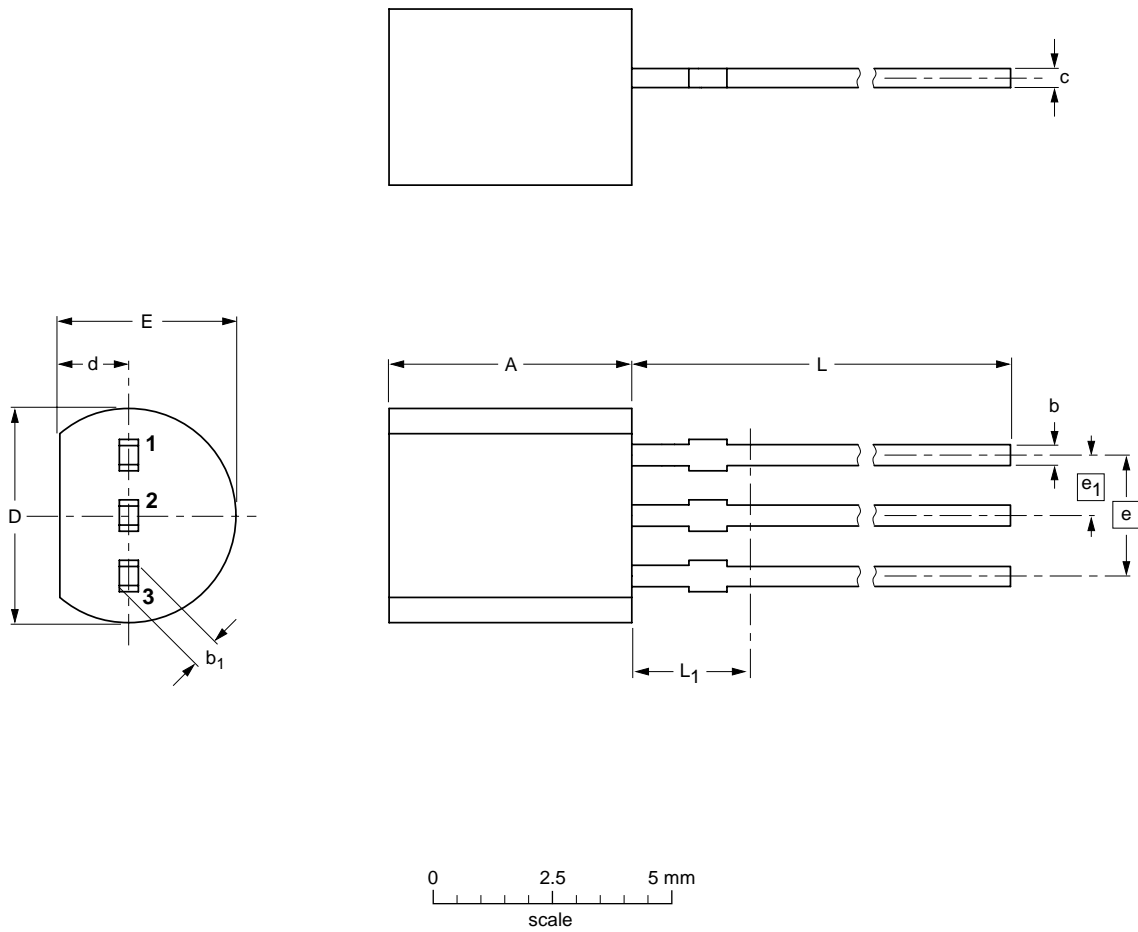
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PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads

SOT54



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b <sub>1</sub>	c	D	d	E	e	e <sub>1</sub>	L	L <sub>1</sub> <sup>(1)</sup>
mm	5.2 5.0	0.48 0.40	0.66 0.56	0.45 0.40	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT54		TO-92	SC-43		97-02-28

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<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

127027/00/03/pp8

Date of release: 1997 Oct 02

Document order number: 9397 750 02881

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