DATA SHEET

BFQ231; BFQ231A
NPN video transistors

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

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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

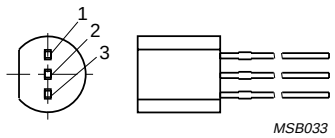


Fig.1 Simplified outline (SOT54; TO-92).

QUICK REFERENCE DATA

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

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			
	BFQ231		–	100	V
	BFQ231A		–	115	V
V_{CEO}	collector-emitter voltage	open base			
	BFQ231		–	65	V
	BFQ231A		–	95	V
V_{CER}	collector-emitter voltage	R_{BE} = 100 Ω			
	BFQ231		–	95	V
	BFQ231A		–	110	V
V_{EBO}	emitter-base voltage	open collector	–	3	V
I_C	collector current (DC)		–	300	mA
P_{tot}	total power dissipation	$T_S \leq 65$ °C; notes 1 and 2; see Fig.3	–	1	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C

Notes

1. T_S 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^2.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}s}$	thermal resistance from junction to soldering point	note 1	85	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient		185	K/W
$R_{th\ s\text{-}a}$	thermal resistance from soldering point to ambient		100	K/W

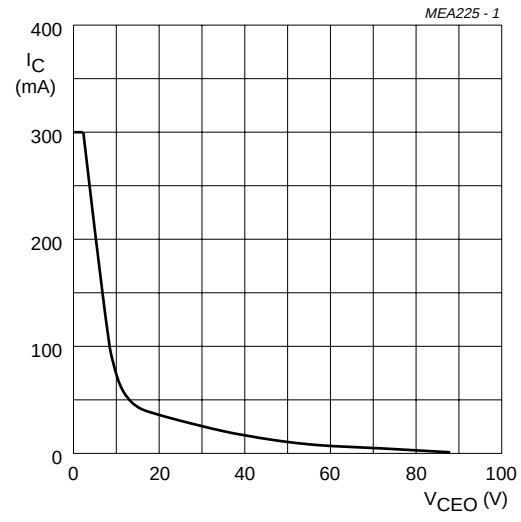
Note

1. T_S is the temperature at the soldering point of the collector pin.

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

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



T_{amb} = 25 °C.

Fig.2 DC SOAR.

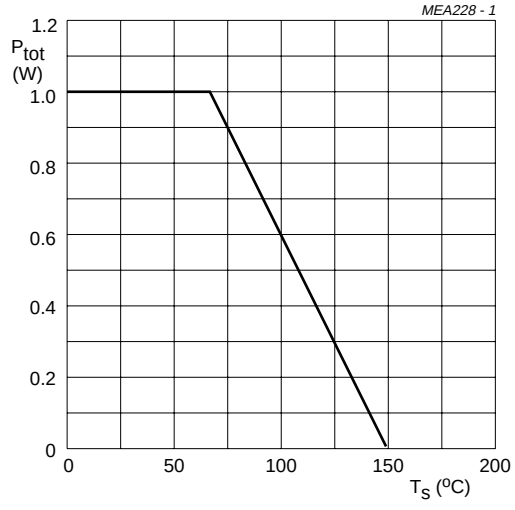
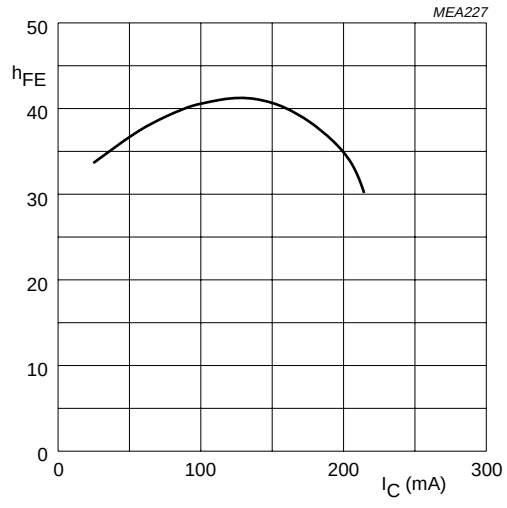
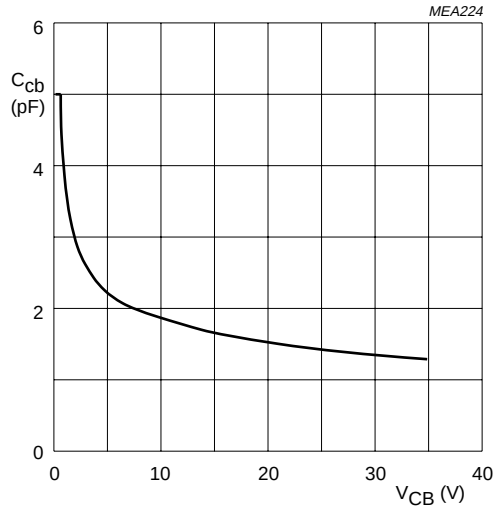


Fig.3 Power derating curve.



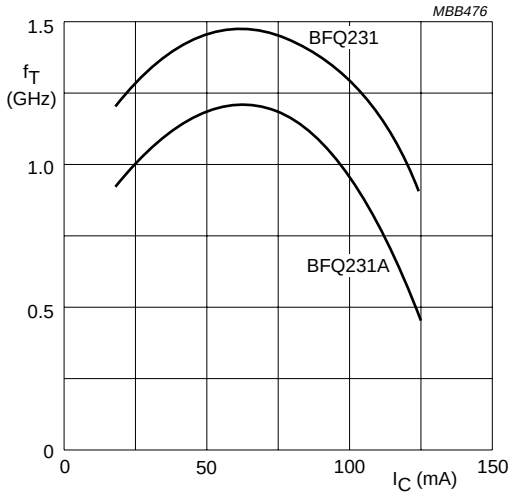
V_{CE} = 10 V; T_{amb} = 25 °C.

Fig.4 DC current gain as a function of collector current; typical values.



f = 1 MHz; T_{amb} = 25 °C.

Fig.5 Collector-base capacitance as a function of collector-base voltage; typical values.

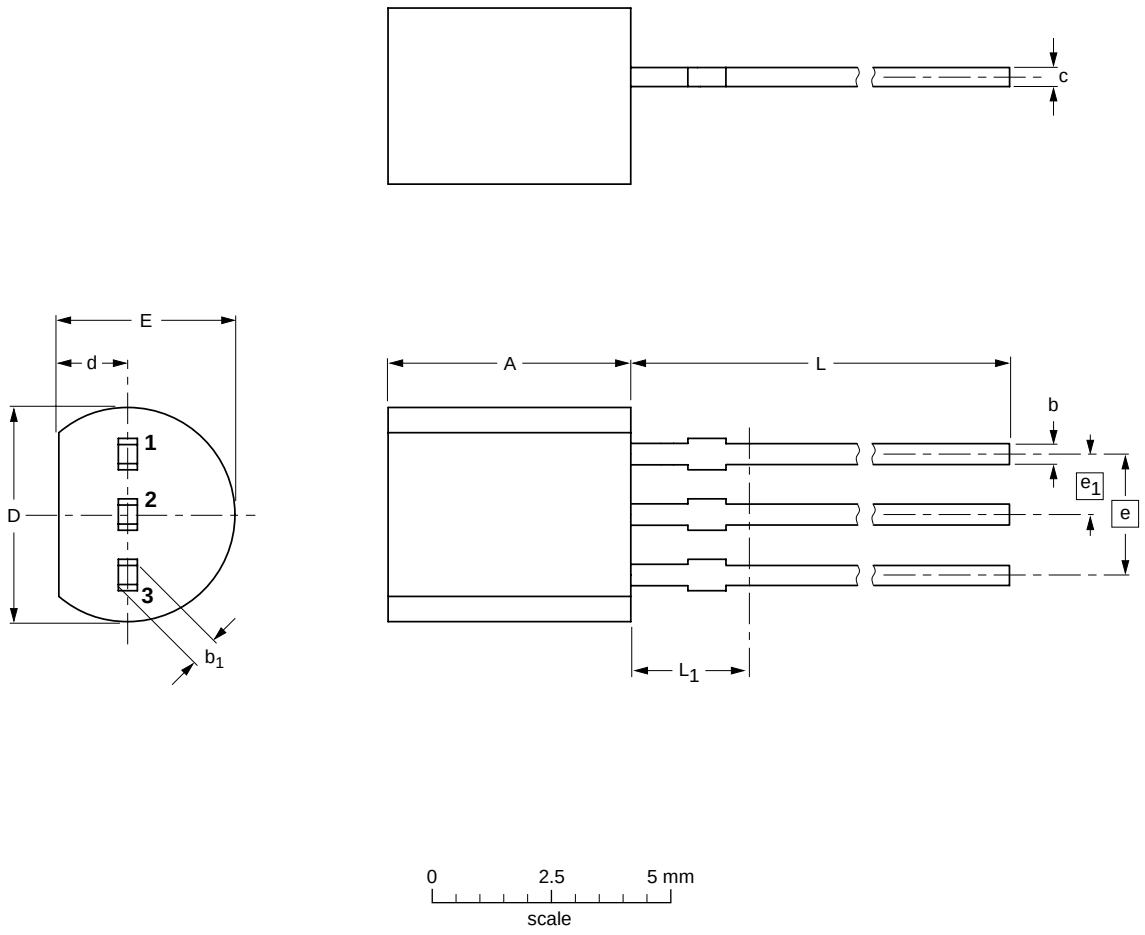


V_{CE} = 10 V; T_{amb} = 25 °C.

Fig.6 Transition frequency as a function of collector current; typical values.

PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads **SOT54**



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b_1	c	D	d	E	e	e_1	L	L_1(1)
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

DEFINITIONS

Data sheet status	
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.
Limiting values	
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.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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