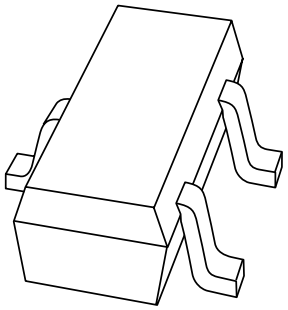
DATA SHEET



BFQ67T
NPN 8 GHz wideband transistor

Product specification
Supersedes data of 1999 Nov 02

2000 Mar 06

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NPN 8 GHz wideband transistor BFQ67T

FEATURES

- High power gain
- Low noise figure
- High transition frequency
- Gold metallization ensures excellent reliability
- SOT416 (SC-75) envelope.

APPLICATIONS

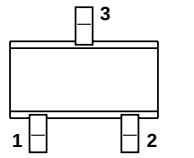
Wideband applications such as satellite TV tuners and RF portable communications equipment up to 2 GHz.

DESCRIPTION

NPN transistor in a plastic SOT416 (SC-75) package.

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



Top view MBK090

Marking code: V2.

Fig.1 SOT416.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	–	20	V
V_{CEO}	collector-emitter voltage	open base	–	–	10	V
I_C	collector current (DC)		–	–	50	mA
P_{tot}	total power dissipation	$T_s \leq 75$ °C; note 1	–	–	150	mW
h_{FE}	DC current gain	I_C = 15 mA; V_{CE} = 5 V; T_j = 25 °C	60	100	–	
f_T	transition frequency	I_C = 15 mA; V_{CE} = 8 V; f = 2 GHz; T_{amb} = 25 °C	–	8	–	GHz
G_{UM}	maximum unilateral power gain	I_C = 15 mA; V_{CE} = 8 V; f = 1 GHz; T_{amb} = 25 °C	–	13	–	dB
F	noise figure	I_C = 5 mA; V_{CE} = 8 V; f = 1 GHz	–	1.3	–	dB

Note

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

LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 60134).

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_{EBO}	emitter-base voltage	open collector	–	2.5	V
I_C	collector current (DC)		–	50	mA
P_{tot}	total power dissipation	$T_s \leq 75$ °C; note 1	–	150	mW
T_{stg}	storage temperature		−65	+150	°C
T_j	junction temperature		–	150	°C

Note

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

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j\text{-}s}$	thermal resistance from junction to soldering point	500	K/W

CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current	I_E = 0; V_{CB} = 5 V	–	–	50	nA
h_{FE}	DC current gain	I_C = 15 mA; V_{CE} = 5 V	60	100	–	
C_c	collector capacitance	$I_E = i_e$ = 0; V_{CB} = 8 V; f = 1 MHz	–	0.7	–	pF
C_e	emitter capacitance	$I_C = i_c$ = 0; V_{EB} = 0.5 V; f = 1 MHz	–	1.3	–	pF
C_{re}	feedback capacitance	I_C = 0; V_{CE} = 8 V; f = 1 MHz	–	0.5	–	pF
f_T	transition frequency	I_C = 15 mA; V_{CE} = 8 V; f = 2 GHz; T_{amb} = 25 °C	–	8	–	GHz
G_{UM}	maximum unilateral power gain	I_C = 15 mA; V_{CE} = 8 V; T_{amb} = 25 °C; note 1				
		f = 1 GHz	–	13	–	dB
		f = 2 GHz	–	8	–	dB
F	noise figure	$\Gamma_s = \Gamma_{opt}$; I_C = 5 mA; V_{CE} = 8 V;				
		f = 1 GHz	–	1.3	–	dB
		f = 2 GHz	–	2.2	–	dB
		$\Gamma_s = \Gamma_{opt}$; I_C = 15 mA; V_{CE} = 8 V;				
		f = 1 GHz	–	2	–	dB
		f = 2 GHz	–	2.7	–	dB
		V_{CE} = 8 V; f = 2 GHz; Z_s = 60 Ω;				
		I_C = 5 mA	–	2.5	–	dB
		I_C = 15 mA	–	3	–	dB

Note

1. 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

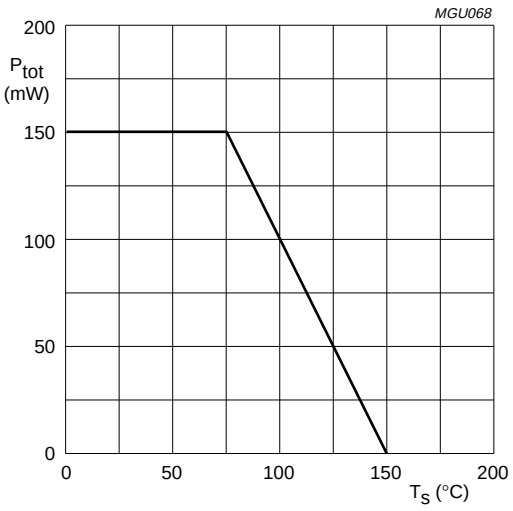
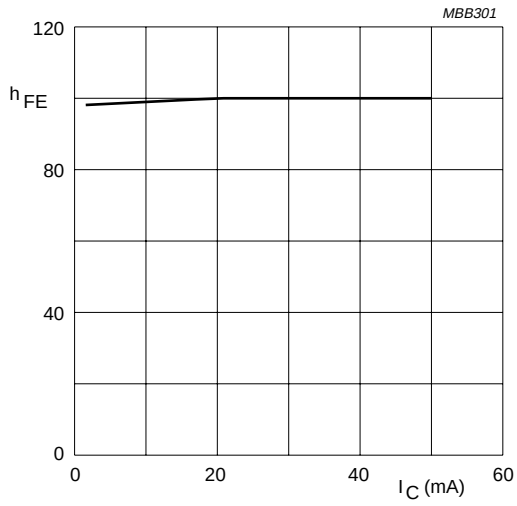
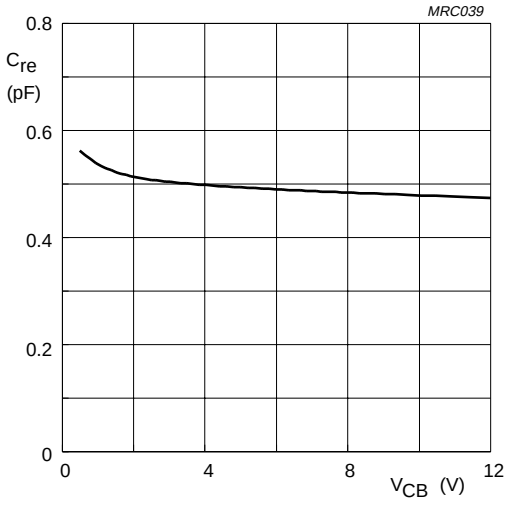


Fig.2 Power derating curve.



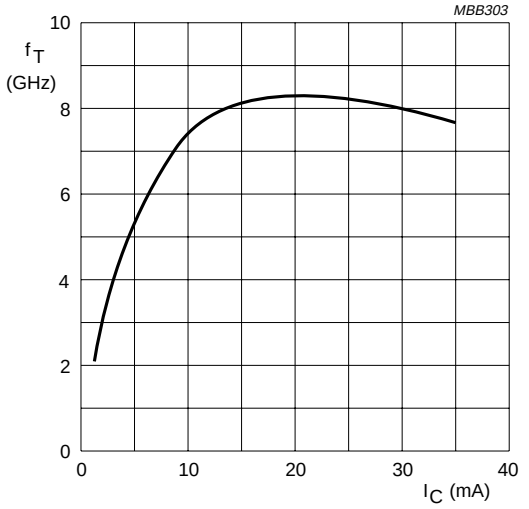
V_{CE} = 5 V; T_j = 25 °C.

Fig.3 DC current gain as a function of collector current.



I_C = 0; f = 1 MHz.

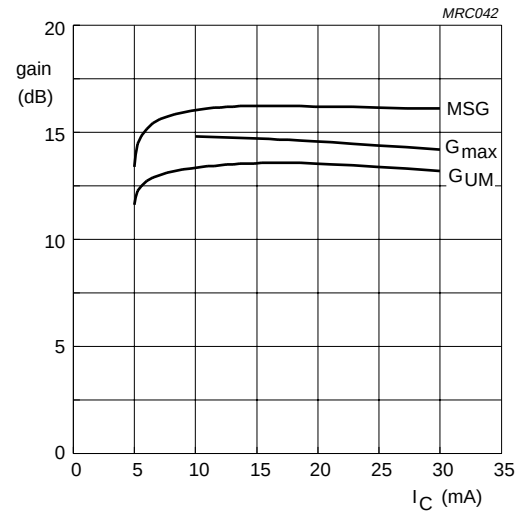
Fig.4 Feedback capacitance as a function of collector-base voltage.



V_{CE} = 8 V; f = 2 GHz; T_{amb} = 25 °C.

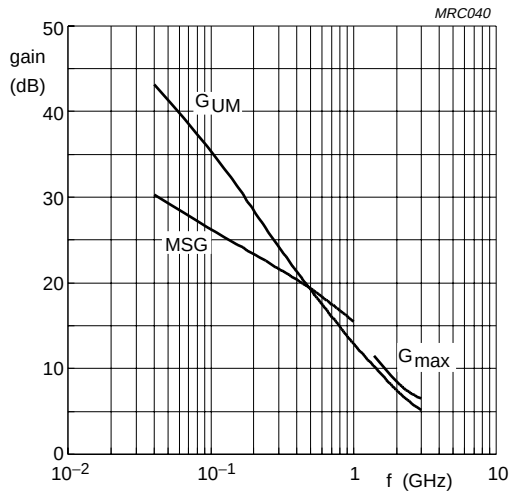
Fig.5 Transition frequency as a function of collector current.

In Figs 6 to 9, G_{UM} = maximum unilateral power gain; MSG = maximum stable gain; G_{max} = maximum available gain.



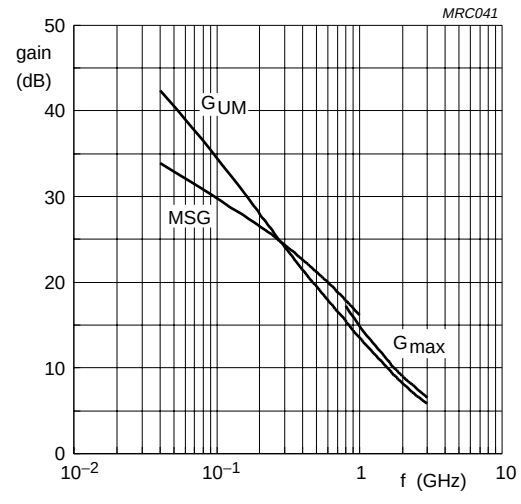
V_{CE} = 8 V; f = 1 GHz; T_{amb} = 25 °C.

Fig.6 Gain as a function of collector current.



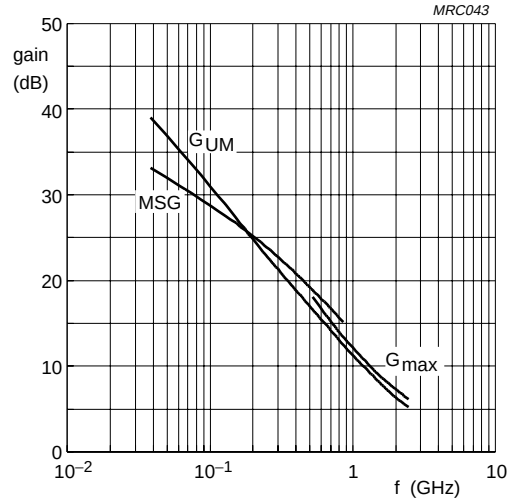
I_C = 5 mA; V_{CE} = 8 V; T_{amb} = 25 °C.

Fig.7 Gain as a function of frequency.



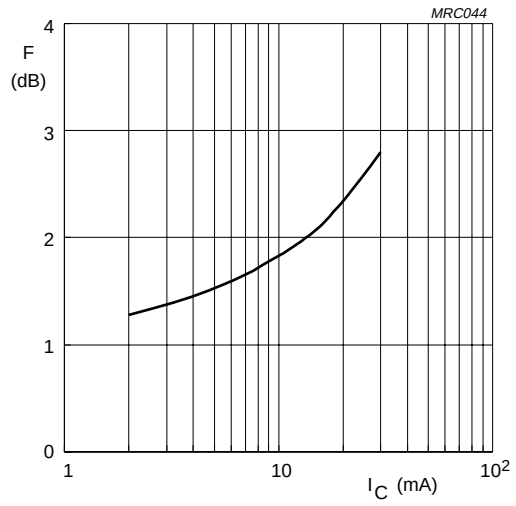
I_C = 15 mA; V_{CE} = 8 V; T_{amb} = 25 °C.

Fig.8 Gain as a function of frequency.



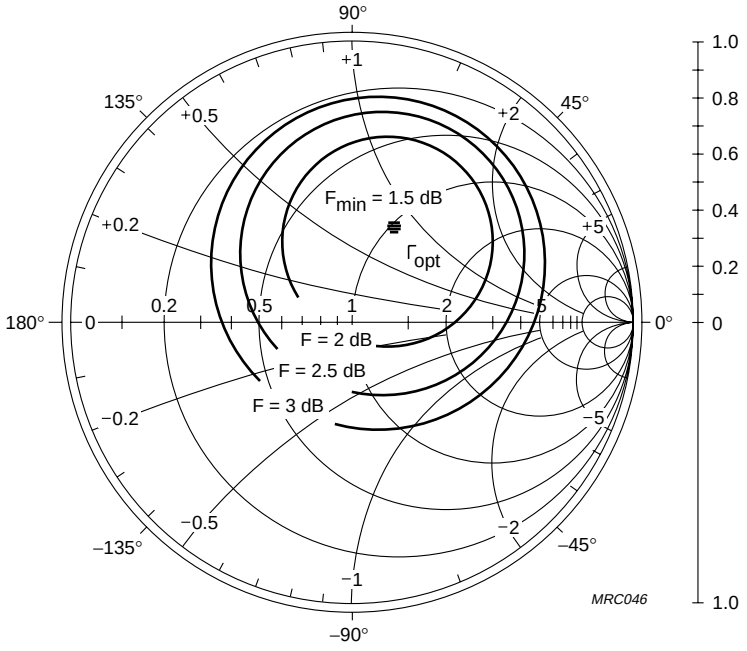
I_C = 30 mA; V_{CE} = 8 V; T_{amb} = 25 °C.

Fig.9 Gain as a function of frequency.



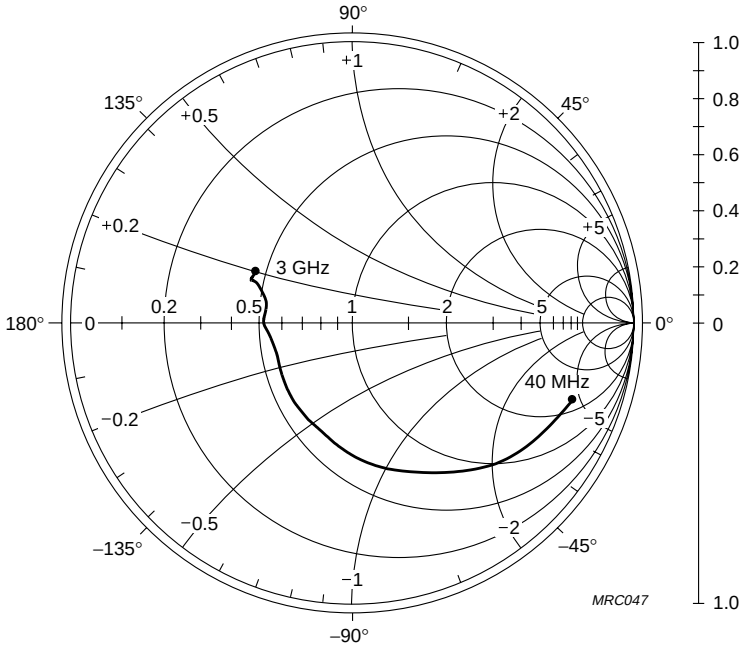
V_{CE} = 8 V; f = 1 GHz.

Fig.10 Minimum noise figure as a function of collector current.



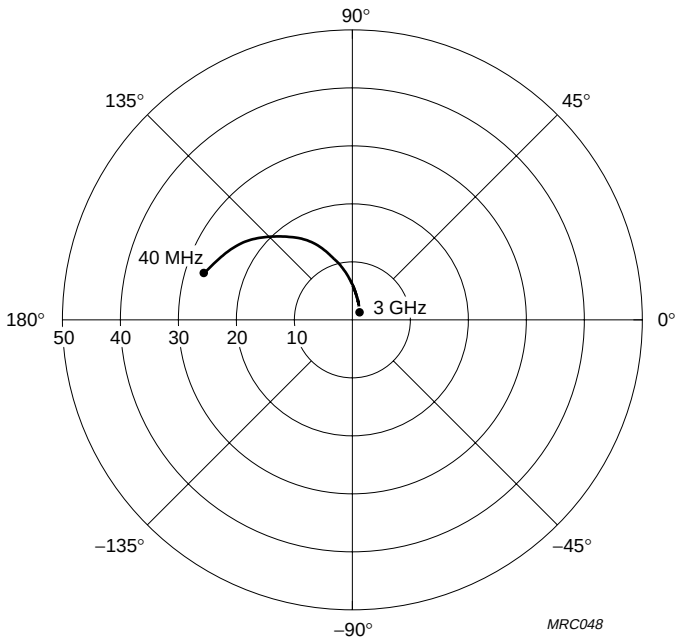
I_C = 5 mA; V_{CE} = 8 V;
f = 1 GHz; Z_o = 50 Ω.

Fig.11 Noise circle.



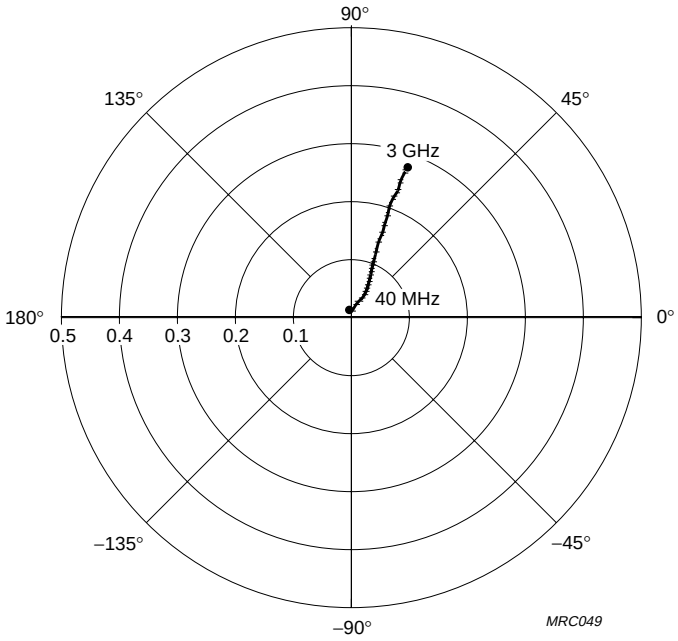
I_C = 15 mA; V_{CE} = 8 V; Z_o = 50 Ω.

Fig.12 Common emitter input reflection coefficient (S_{11}).



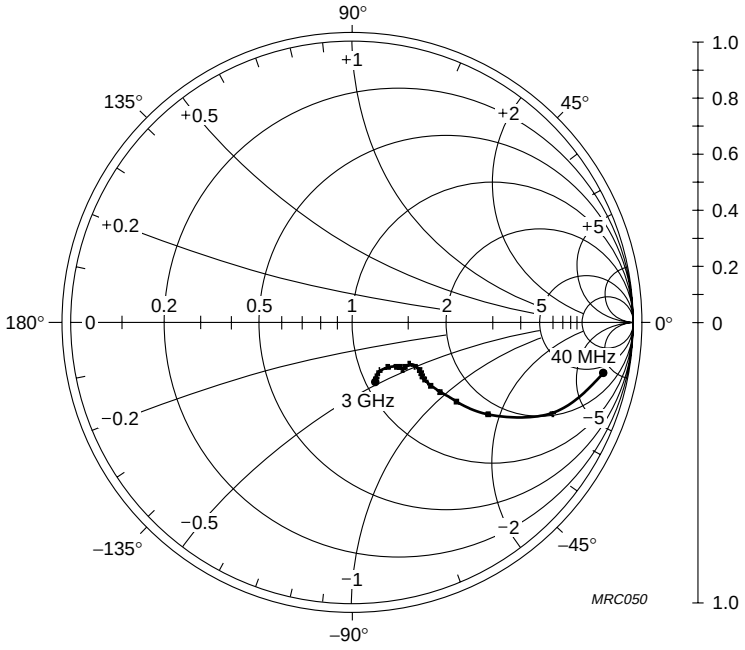
I_C = 15 mA; V_{CE} = 8 V.

Fig.13 Common emitter forward transmission coefficient (S_{21}).



I_C = 15 mA; V_{CE} = 8 V.

Fig.14 Common emitter reverse transmission coefficient (S_{12}).

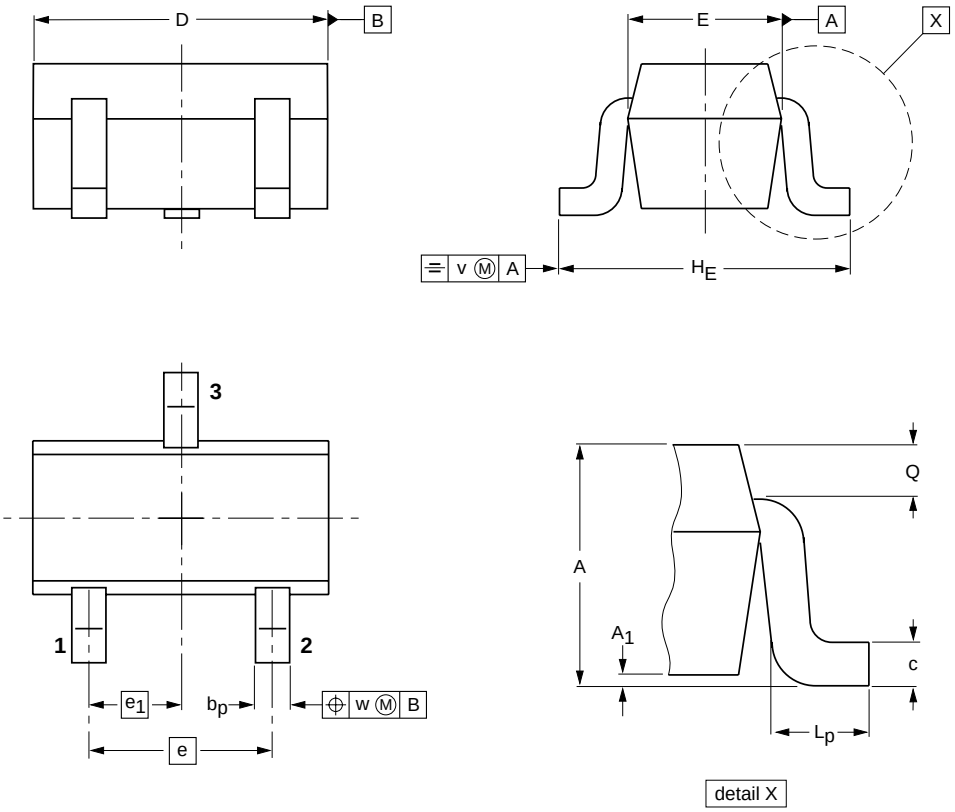


I_C = 15 mA; V_{CE} = 8 V; Z_o = 50 Ω.

Fig.15 Common emitter output reflection coefficient (S_{22}).

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads **SOT416**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	0.95 0.60	0.1	0.30 0.15	0.25 0.10	1.8 1.4	0.9 0.7	1	0.5	1.75 1.45	0.45 0.15	0.23 0.13	0.2	0.2

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT416			SC-75			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 60134). 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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