MAQ591

item can replace **BFQ591**

HUIYEE ELECTRONIC

Approved by:
Checked by:
Issued by:

SPECIFICATION

PRODUCT: NPN 7.0GHz wideband transistor

MODEL: MAQ591 S OT89

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FEATURES

- High power gain
- Low noise figure
- High transition frequency
- Gold metallization ensures excellent reliability.

APPLICATIONS

Intended for applications in the GHz range such as MATV or CATV amplifiers and RF communications subscribers equipment.

DESCRIPTION

NPN wideband transistor in a SOT89 plastic package.

PINNING

PIN	DESCRIPTION
1	emitter
2	collector
3	base

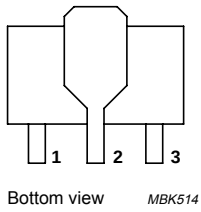


Fig.1 Simplified outline (SOT89).

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	–	–	15	V
I_C	collector current (DC)		–	–	200	mA
P_{tot}	total power dissipation	$T_s \leq 90$ ℃; note 1	–	–	2.25	W
h_{FE}	DC current gain	I_C = 70 mA; V_{CE} = 8 V	60	90	250	
C_{re}	feedback capacitance	I_C = 0; V_{CB} = 12 V; f = 1 MHz	–	0.8	–	pF
f_T	transition frequency	I_C = 70 mA; V_{CE} = 12 V; f = 1 GHz	–	7	–	GHz
G_{UM}	maximum unilateral power gain	I_C = 70 mA; V_{CE} = 12 V; f = 900 MHz; T_{amb} = 25 °C	–	11	–	dB
$\|s_{21}\|^2$	insertion power gain	I_C = 70 mA; V_{CE} = 12 V; f = 900 MHz; T_{amb} = 25 °C	–	10	–	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	–	15	V
V_{EBO}	emitter-base voltage	open collector	–	3	V
I_C	collector current (DC)		–	200	mA
P_{tot}	total power dissipation	$T_s \leq 90$ ℃; note 1	–	2.25	W
T_{stg}	storage temperature		–65	+150	℃
T_j	junction temperature		–	175	℃

Note

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

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}s}$	thermal resistance from junction to soldering point	$T_s \leq 90$ ℃; note 1	38	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	–	–	20	V
$V_{(BR)CES}$	collector-emitter breakdown voltage	I_C = 0.1 mA; I_B = 0	–	–	15	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	I_E = 0.1 mA; I_C = 0	–	–	3	V
I_{CBO}	collector-base leakage current	I_E = 0; V_{CB} = 10	–	–	100	nA
h_{FE}	DC current gain	I_C = 70 mA ; V_{CE} = 8 V	60	90	250	
C_{re}	feedback capacitance	I_C = 0; V_{CB} = 12 V; f = 1 MHz	–	0.8	–	pF
f_T	transition frequency	I_C = 70 mA; V_{CE} = 12 V; f = 1 GHz	–	7	–	GHz
G_{UM}	maximum unilateral power gain; note 1	I_C = 70 mA; V_{CE} = 12 V; T_{amb} = 25 °C				
		f = 900 MHz	–	11	–	dB
		f = 2 GHz	–	5.5	–	dB
$\|s_{21}\|^2$	insertion power gain	I_C = 70 mA; V_{CE} = 12 V; f = 1 GHz; T_{amb} = 25 °C	–	10	–	dB
V_o	output voltage	note 2	–	700	–	mV

Notes

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.

2. d_{im} = 60 dB (DIN45004B); $V_p = V_o$; $V_q = V_o$ –6 dB; f_p = 795.25 MHz; f_q = 803.25 MHz; f_r = 803.25 MHz; measured at $f_{(p+q+r)}$ = 793.25 MHz.

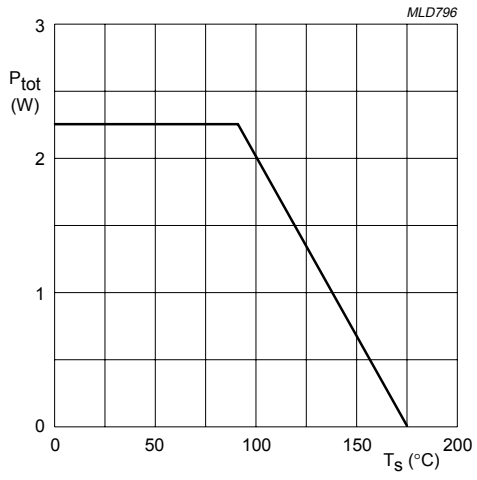
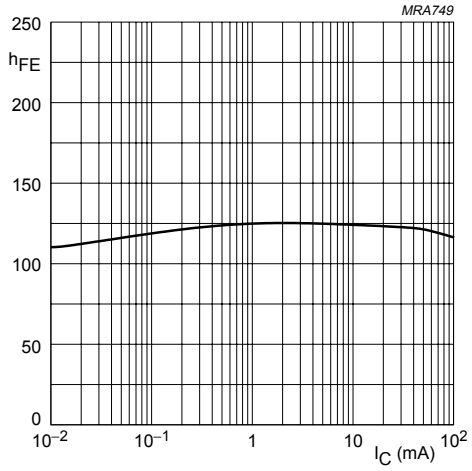
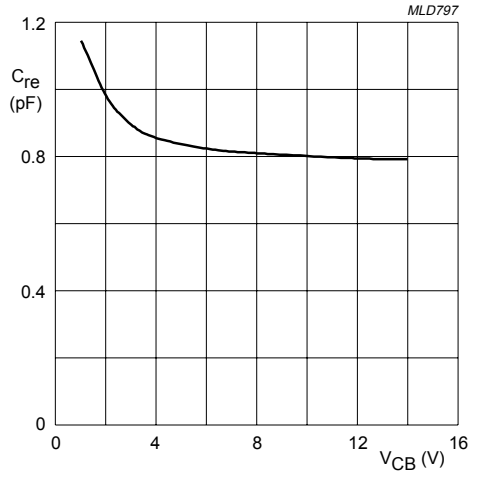


Fig.2 Power derating curve.



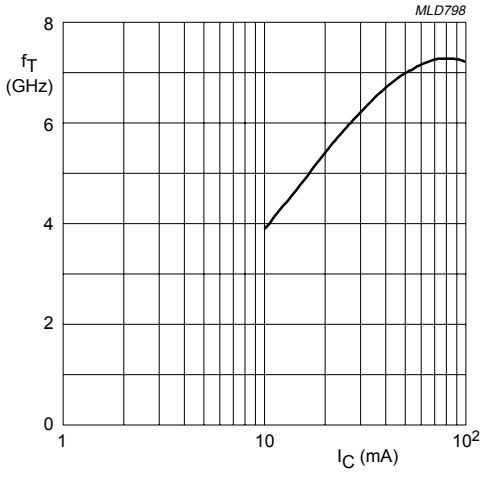
V_{CE} = 12 V.

Fig.3 DC current gain as a function of collector current; typical values.



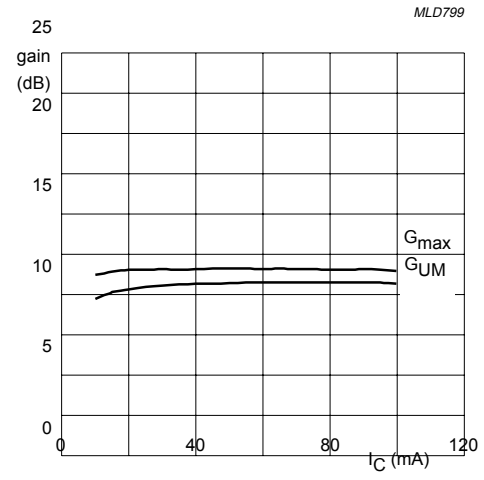
I_C = 0; f = 1 MHz.

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



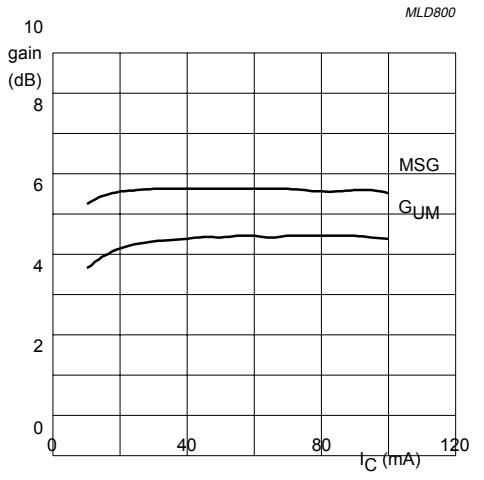
V_{CE} = 12 V; f = 1 GHz.

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



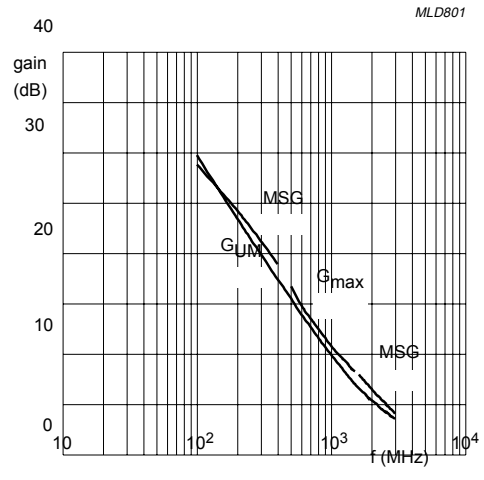
V_{CE} = 12 V; f = 900 MHz.

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



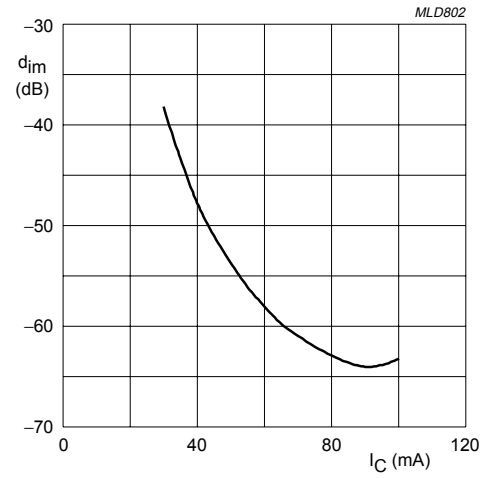
V_{CE} = 12 V; f = 2 GHz.

Fig.7 Gain as a function of collector current; typical values.



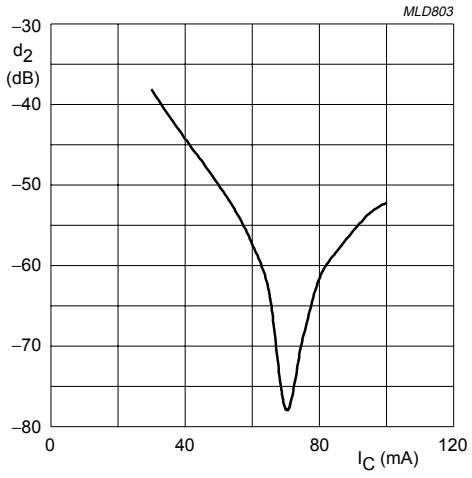
I_C = 70 mA; V_{CE} = 12 V.

Fig.8 Gain as a function of frequency; typical values.



V_o = 700 mV; V_{CE} = 12 V; T_{amb} = 25 °C; $f_{(p+q+r)}$ = 793.25 MHz.

Fig.9 Intermodulation distortion as function of collector current; typical values.



V_o = 316 mV; V_{CE} = 12 V; $f_{(p+q)}$ = 810 MHz.

Fig.10 Second order intermodulation distortion as function of collector current; typical values.