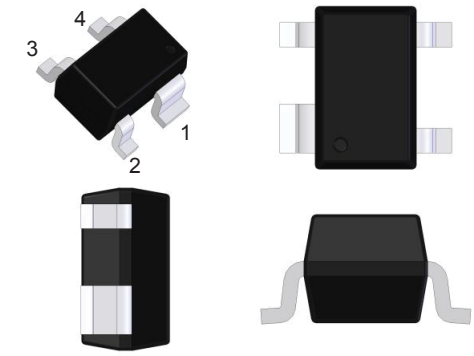
NPN Transistors

BFG425W

■ Features

- Very high power gain
- Low noise figure
- 25 GHz wideband transistor
- Emitter is thermal lead
- Low feedback capacitance.



SOT343R

1.Emitter
2.Base
3.Emitter
4.Collector

■ Absolute Maximum Ratings Ta = 25℃

Parameter	Symbol	Rating	Unit
Collector - Base Voltage	V_{CBO}	10	V
Collector - Emitter Voltage	V_{CEO}	4.5	
Emitter - Base Voltage	V_{EBO}	1	
Collector Current - Continuous	I_C	30	mA
Collector Power Dissipation See Fig.1 (Note.1)	P_C	135	mW
Thermal Resistance From Junction To Soldering Point	R_{thj-s}	350	K/W
Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{stg}	-65 to 150	

Note.1 : T_S is the temperature at the soldering point of the emitter pins.

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■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector- base breakdown voltage	V_{CBO}	I_C= 100 μA， I_E= 0	10			V
Collector- emitter breakdown voltage	V_{CEO}	I_C= 1 mA， I_B= 0	4.5			
Emitter - base breakdown voltage	V_{EBO}	I_E= 100 μ A， I_C= 0	1			
Collector-base cut-off current	I_{CBO}	V_{CB}= 4.5 V , I_E= 0			15	nA
DC current gain	h_{FE}	V_{CE}= 2V, I_C= 25mA See Fig.2	50	80	120	
Maximum power gain (Note.1)	G_{max}	I_C = 25 mA ,V_{CE} = 2 V, f = 2 GHz T_{amb} = 25 °C see Figs 6 and 7		20		dB
Insertion power gain	$\|S_{21}\|^2$	I_C = 25 mA ,V_{CE} = 2 V , f = 2 GHz T_{amb} = 25 °C see Fig.7		17		
Noise figure	NF	I_C = 2 mA , V_{CE} = 2 V , f = 900 MHz $G_S = G_{opt}$ see Fig.12		0.8		
		I_C = 2 mA , V_{CE} = 2 V, f = 2 GHz $\Gamma_S = \Gamma_{opt}$ see Fig.12		1.2		
Output power at 1 dB gain compression	P_{L1}	I_C = 25 mA ,V_{CE} = 2 V , f = 2 GHz , $Z_S = Z_{S\,opt}$, $Z_L = Z_{L\,opt}$ (Note.2)		12		dBm
Third order intercept point	ITO	I_C = 25 mA , V_{CE} = 2 V , f = 2 GHz , $Z_S = Z_{S\,opt}$, $Z_L = Z_{L\,opt}$ (Note.2)		22		
Collector capacitance	C_c	$I_E = i_e$ = 0 , V_{CB} = 2 V , f = 1 MHz		300		f F
Emitter capacitance	C_e	$I_C = i_c$ = 0 , V_{EB} = 0.5 V , f = 1 MHz		575		
Feedback capacitance	C_{re}	I_C = 0 , V_{CB} = 2 V , f = 1 MHz see Fig.3		95		
Transition frequency	f_T	V_{CE}= 2V, I_C= 25mA,f=2GHz See Fig.4		25		GHz

Note.1 : G_{max} is the maximum power gain, if K > 1. If K < 1 then G_{max} = MSG; see Figs 5, 6 and 7.

Note.2 : Z_S is optimized for noise; Z_L is optimized for gain.

■ Marking

Marking	P5

■ Typical Characterisitics

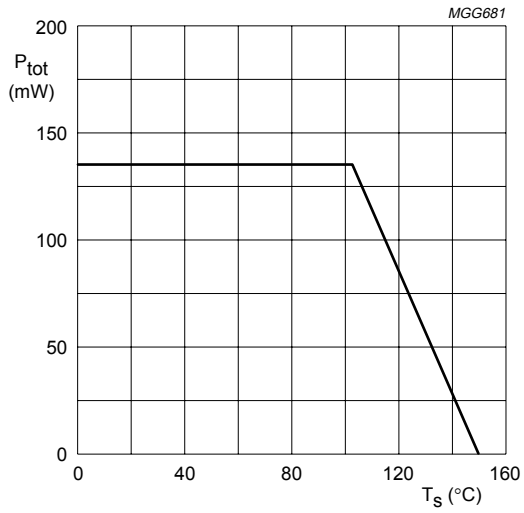

Fig.1 Power derating curve.

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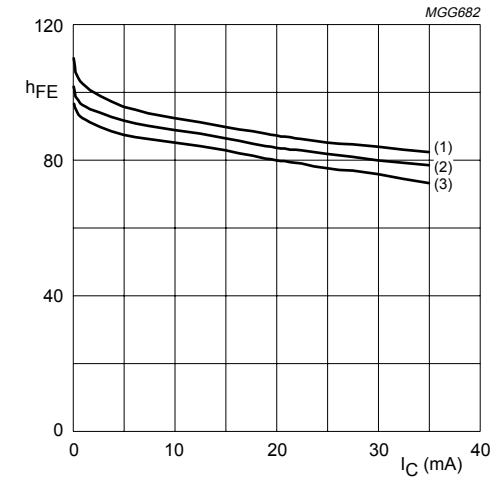
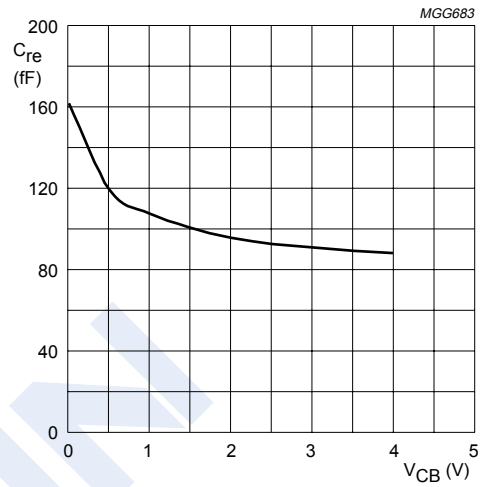
■ Typical Characterisitics



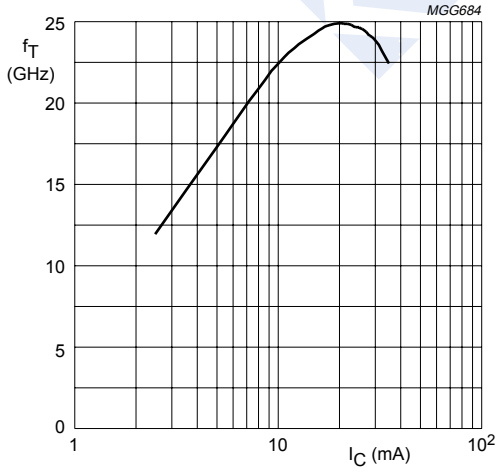
(1) V_{CE} = 3 V.
(2) V_{CE} = 2 V.
(3) V_{CE} = 1 V.

Fig.2 DC current gain as a function of collector current; typical values.



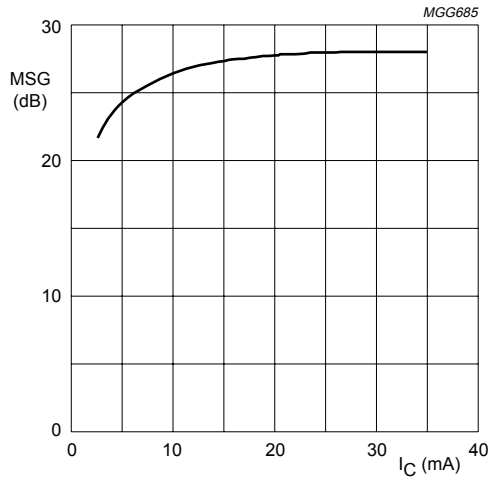
I_C = 0; f = 1 MHz.

Fig.3 Feedback capacitance as a function of collector-base voltage; typical values.



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

Fig.4 Transition frequency as a function of collector current; typical values.



V_{CE} = 2 V; f = 900 MHz.

Fig.5 Maximum stable gain as a function of collector current; typical values.

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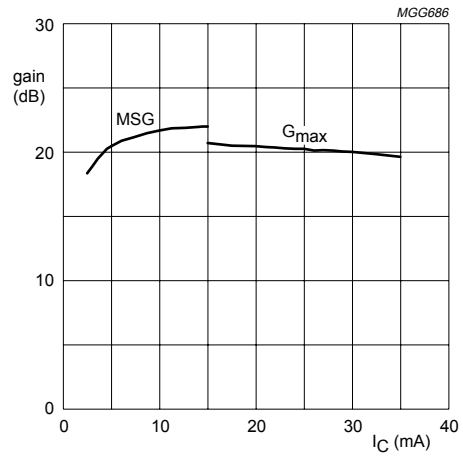
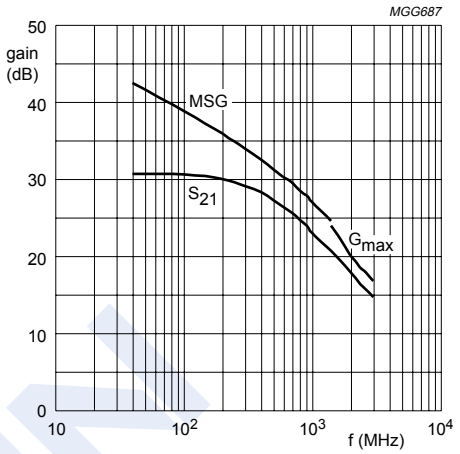
■ Typical Characterisitics



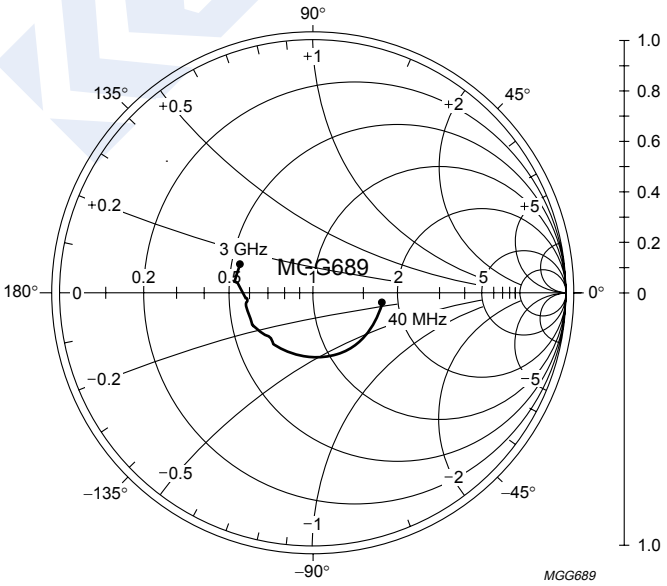
V_{CE} = 2 V; f = 2 GHz.

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



I_C = 25 mA; V_{CE} = 2 V.

Fig.7 Gain as a function of frequency; typical values.



I_C = 25 mA; V_{CE} = 2 V; Z_o = 50 Ω.

Fig.8 Common emitter input reflection coefficient (S_{11}); typical values.

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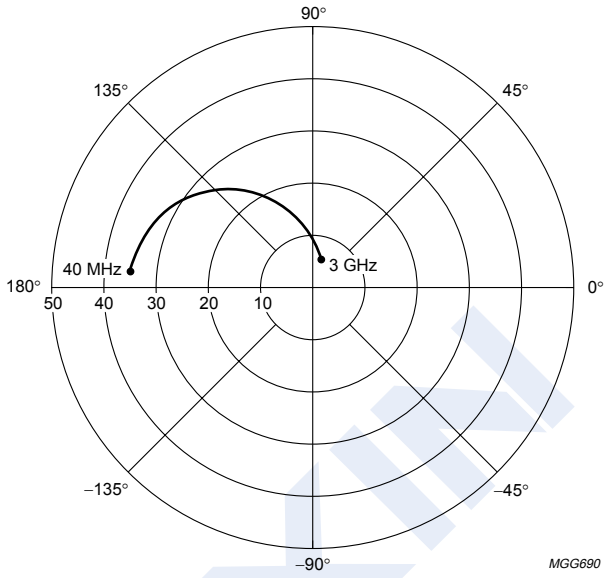
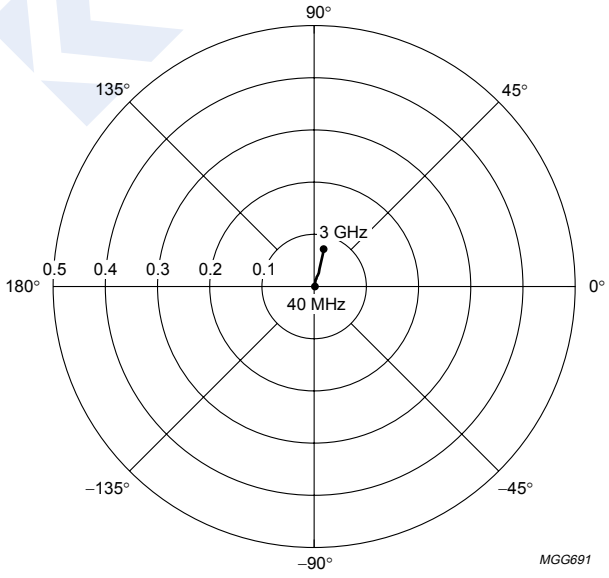
■ Typical Characterisitics



I_C = 25 mA; V_{CE} = 2 V.

Fig.9 Common emitter forward transmission coefficient (S_{21}); typical values.



I_C = 25 mA; V_{CE} = 2 V.

Fig.10 Common emitter reverse transmission coefficient (S_{12}); typical values.

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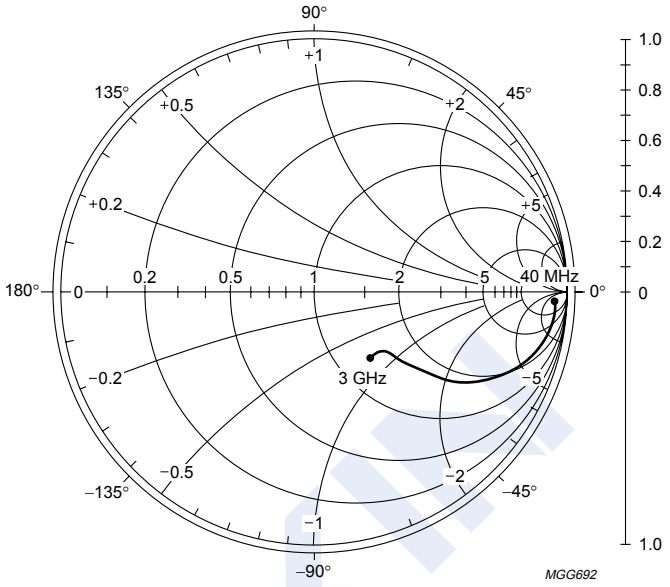
■ Typical Characterisitics



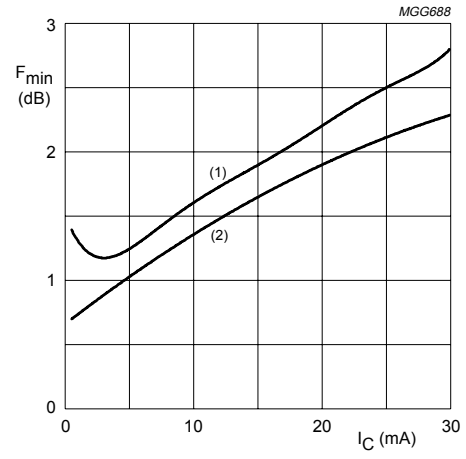
I_C = 25 mA; V_{CE} = 2 V; Z_o = 50 Ω.

Fig.11 Common emitter output reflection coefficient (S_{22}); typical values.

Noise data

V_{CE} = 2 V; typical values.

f (MHz)	I_C (mA)	F_{min} (dB)	Γ_{mag}	Γ_{angle}	r_n (Ω)
900	1	0.7	0.67	19.1	0.40
	2	0.8	0.48	17.8	0.27
	4	1	0.28	11.7	0.24
	10	1.4	0.02	−63.9	0.19
	15	1.6	0.11	−162.4	0.18
	20	1.9	0.19	−165.5	0.18
	25	2.1	0.25	−166.3	0.19
	30	2.3	0.29	−166.5	0.19
2000	1	1.3	0.56	57.5	0.36
	2	1.2	0.43	57.2	0.25
	4	1.2	0.22	60.8	0.18
	10	1.6	0.06	137.4	0.19
	15	1.9	0.13	−162.1	0.20
	20	2.2	0.17	−155.5	0.20
	25	2.5	0.22	−152.2	0.21
	30	2.8	0.27	−150.8	0.25



(1) V_{CE} = 2 V; f = 2 GHz.
(2) V_{CE} = 2 V; f = 900 MHz.

Fig.12 Minimum noise figure as a function of the collector current; typical values.

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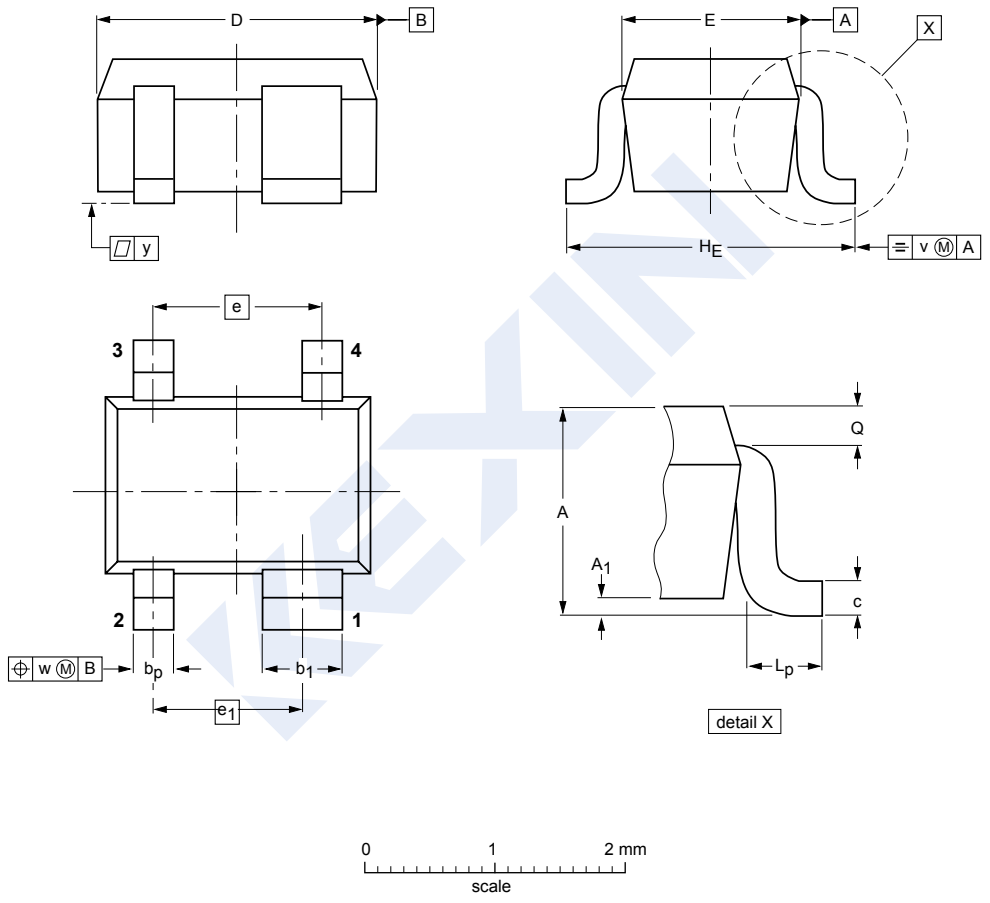
■ Typical Application

PACKAGE OUTLINE

Plastic surface mounted package; reverse pinning; 4 leads

SOT343R



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	b_1	c	D	E	e	e_1	H_E	L_p	Q	v	w	y
mm	1.1 0.8	0.1	0.4 0.3	0.7 0.5	0.25 0.10	2.2 1.8	1.35 1.15	1.3	1.15	2.2 2.0	0.45 0.15	0.23 0.13	0.2	0.2	0.1