

isc Silicon NPN RF Transistor

2SC4536

DESCRIPTION

- Low Noise
 $NF = 1.5 \text{ dB TYP. @ } V_{CE} = 10 \text{ V, } I_C = 10 \text{ mA, } f = 1 \text{ GHz}$
- Low Distortion
 $IM_2 = 57.5 \text{ dB TYP. @ } V_{CE} = 10 \text{ V, } I_C = 50 \text{ mA}$
 $IM_3 = 82 \text{ dB TYP. @ } V_{CE} = 10 \text{ V, } I_C = 50 \text{ mA}$

APPLICATIONS

- Designed for use in middle power , low distortion low noise figure RF amplifier.

ABSOLUTE MAXIMUM RATINGS($T_a=25^\circ\text{C}$)

SYMBOL	PARAMETER	VALUE	UNIT
V_{CBO}	Collector-Base Voltage	30	V
V_{CEO}	Collector-Emitter Voltage	15	V
V_{EBO}	Emitter-Base Voltage	3.0	V
I_C	Collector Current-Continuous	0.25	A
P_C	Collector Power Dissipation @ $T_c=25^\circ\text{C}$	2	W
T_J	Junction Temperature	150	$^\circ\text{C}$
T_{stg}	Storage Temperature Range	-65~150	$^\circ\text{C}$

SOT-89 package

1: Base
2: Emitter
3: Collector

DIM	mm	
	MIN	MAX
A	1.40	1.60
b	0.32	0.52
b1	0.36	0.56
C	0.35	0.44
D	4.40	4.46
D1	1.40	1.80
E	2.30	2.60
E1	3.94	4.25
e	1.50typ	
e1	2.90	3.10
L	0.90	1.10

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ELECTRICAL CHARACTERISTICS

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

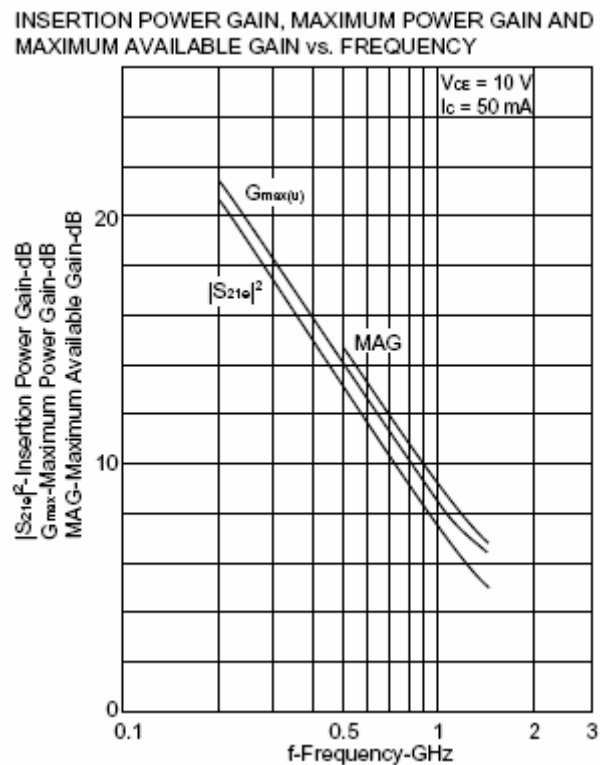
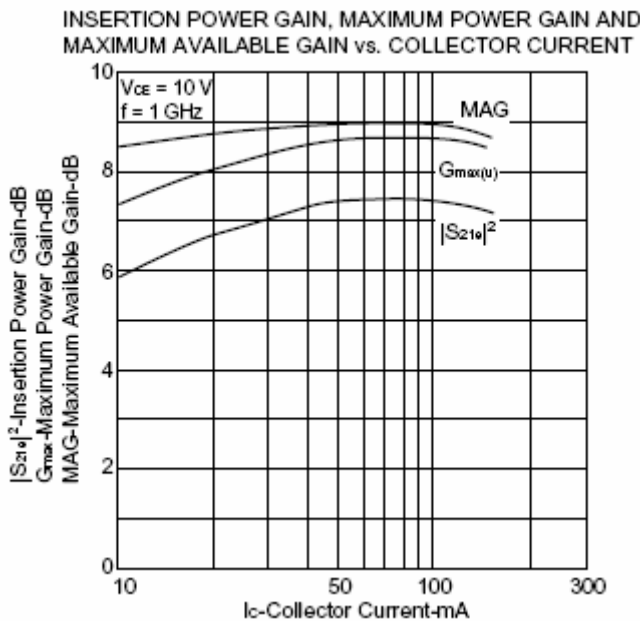
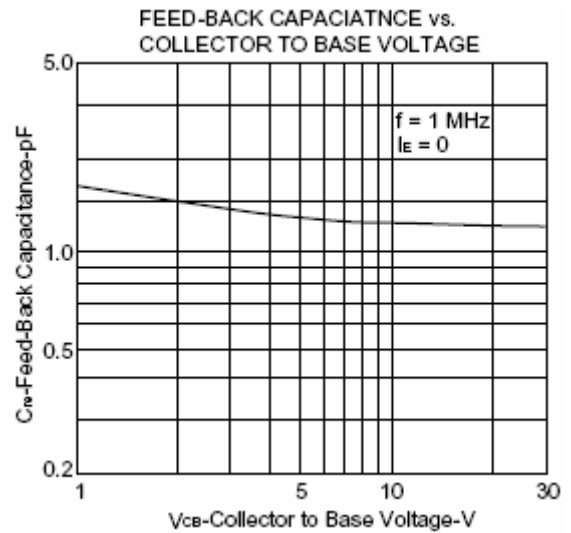
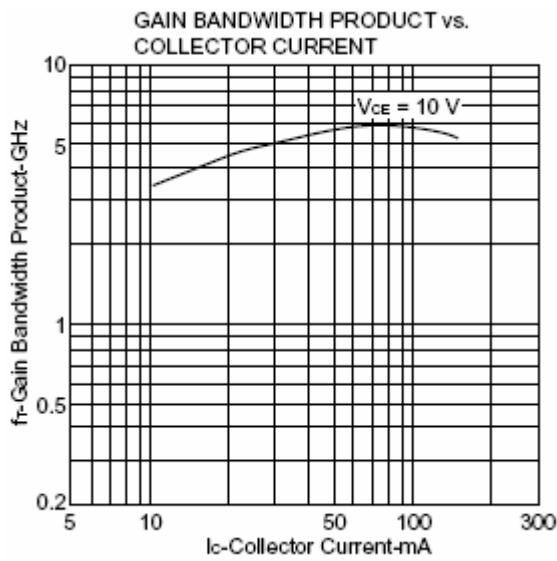
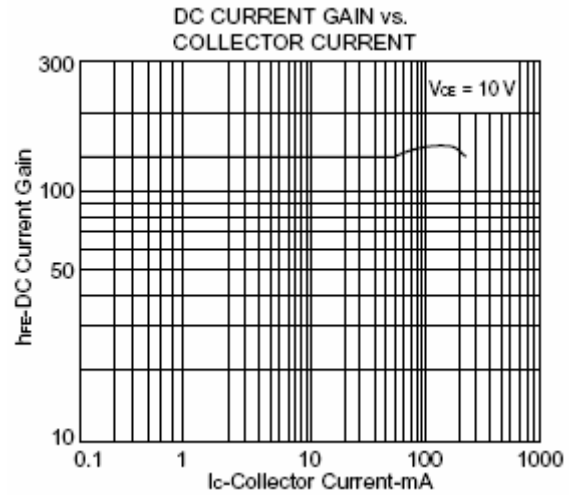
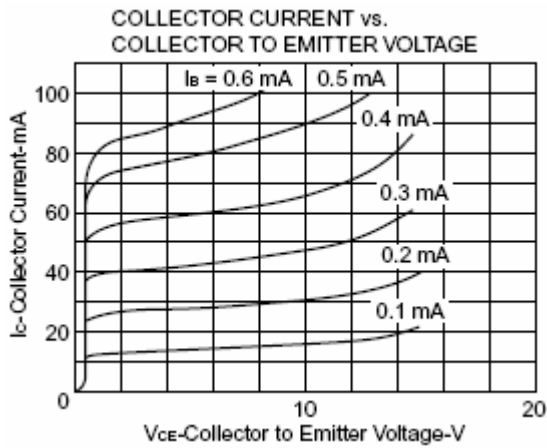
SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT
I_{CBO}	Collector Cutoff Current	$V_{CB}=20\text{V}; I_E=0$			5.0	μA
I_{EBO}	Emitter Cutoff Current	$V_{EB}=2\text{V}; I_C=0$			5.0	μA
h_{FE}	DC Current Gain	$I_C=50\text{mA}; V_{CE}=10\text{V}$	40		200	
$ S_{21e} ^2$	Insertion Power Gain	$I_C=50\text{mA}; V_{CE}=10\text{V}; f=1.0\text{GHz}$	5.5	7.3		dB
NF	Noise Figure	$I_C=50\text{mA}; V_{CE}=10\text{V}; f=500\text{MHz}$		1.5		dB
NF	Noise Figure	$I_C=50\text{mA}; V_{CE}=10\text{V}; f=1.0\text{GHz}$		2.0		dB
IM_2	2nd Intermodulation Distortion	$V_{CE}=10\text{V}, I_C=50\text{mA}, R_S=R_L=75\Omega$ $P_{in}=105\text{dB}\mu\text{V}/75\Omega, f_1=190\text{MHz}$ $f_2=90\text{MHz}, f=f_1-f_2$		59		dB
IM_3	3rd Intermodulation Distortion	$V_{CE}=10\text{V}, I_C=50\text{mA}, R_S=R_L=75\Omega$ $P_{in}=105\text{dB}\mu\text{V}/75\Omega, f_1=190\text{MHz}$ $f_2=200\text{MHz}, f=2\times f_1-f_2$		82		dB

◆ h_{FE} Classification

Class	QQ	QR	QS
Marking	QQ	QR	QS
h_{FE}	40-80	60-120	100-200

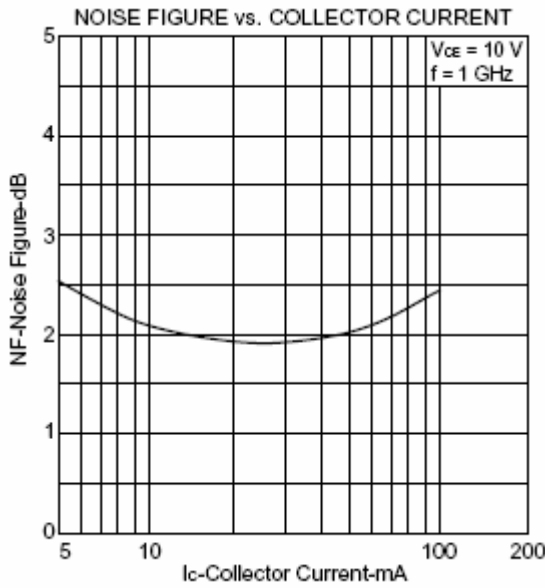
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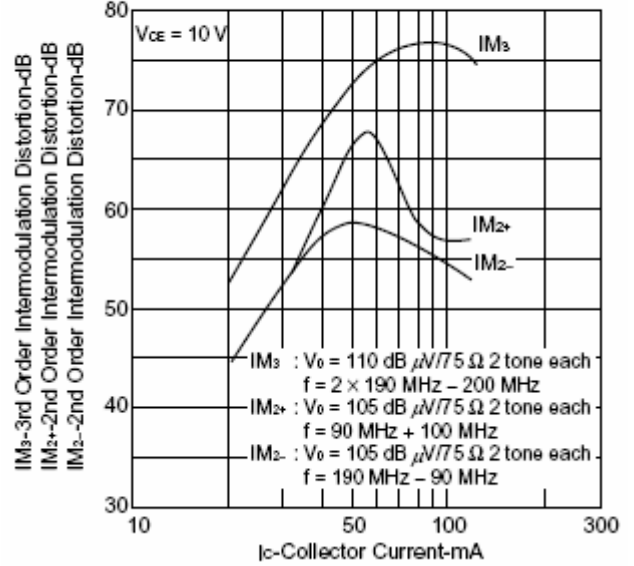


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3RD ORDER INTERMODULATION DISTORTION, 2ND ORDER INTERMODULATION DISTORTION (+) AND 2ND ORDER INTERMODULATION DISTORTION (-) vs. COLLECTOR CURRENT



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S-PARAMETERV_{CE} = 10 V, I_C = 50 mA

Freque. (MHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.455	-139.5	19.845	103.5	0.033	59.9	0.359	-92.5
200	0.425	-164.6	10.155	93.1	0.057	65.8	0.211	-113.9
300	0.419	-177.2	7.482	86.4	0.085	65.7	0.184	-126.8
400	0.422	175.9	5.341	78.5	0.100	63.8	0.173	-138.5
500	0.431	167.7	4.356	75.3	0.125	67.5	0.174	-140.9
600	0.425	162.2	3.612	71.2	0.148	65.7	0.175	-146.8
700	0.445	155.2	3.271	68.1	0.179	64.1	0.176	-150.6
800	0.435	151.7	2.843	61.6	0.194	60.6	0.179	-152.4
900	0.470	146.4	2.497	58.6	0.210	61.2	0.191	-157.3
1000	0.442	142.1	2.292	56.5	0.237	60.6	0.186	-157.7
1100	0.468	138.1	2.163	51.9	0.270	57.8	0.196	-160.9
1200	0.451	132.3	1.982	48.1	0.285	54.6	0.203	-162.5
1300	0.477	129.4	1.816	44.4	0.296	53.3	0.220	-165.7
1400	0.478	124.2	1.712	43.7	0.315	53.8	0.221	-168.8
1500	0.492	122.1	1.701	38.6	0.349	49.7	0.237	-170.9
1600	0.490	116.9	1.538	35.7	0.355	47.3	0.230	-172.1
1700	0.503	115.8	1.489	32.6	0.375	44.5	0.255	-174.8
1800	0.505	111.9	1.399	32.0	0.382	44.9	0.260	-177.1
1900	0.512	109.3	1.445	28.2	0.424	42.2	0.276	-178.7
2000	0.522	105.4	1.291	24.3	0.414	39.4	0.269	175.9

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 $V_{CE} = 10\text{ V}$, $I_C = 100\text{ mA}$

Freque. (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.458	-145.3	20.257	101.0	0.035	53.6	0.333	-100.7
200	0.423	-169.1	10.259	91.6	0.059	71.2	0.207	-123.1
300	0.417	179.5	7.545	85.5	0.084	67.2	0.181	-136.8
400	0.422	173.6	5.390	78.0	0.103	65.6	0.179	-147.4
500	0.431	165.5	4.387	74.8	0.126	68.1	0.180	-148.8
600	0.422	160.6	3.633	70.9	0.149	67.1	0.185	-154.0
700	0.445	153.7	3.290	67.8	0.183	65.1	0.185	-157.9
800	0.432	150.5	2.864	61.6	0.197	60.4	0.188	-159.2
900	0.466	145.2	2.514	58.6	0.215	62.6	0.199	-163.7
1000	0.440	140.9	2.306	56.5	0.242	60.5	0.195	-163.9
1100	0.465	137.1	2.177	52.0	0.274	57.9	0.203	-167.3
1200	0.450	131.3	1.994	48.2	0.289	54.6	0.210	-168.5
1300	0.472	128.6	1.830	44.6	0.300	52.8	0.228	-170.8
1400	0.473	123.5	1.723	44.0	0.321	53.2	0.228	-173.3
1500	0.490	121.5	1.713	38.9	0.357	49.2	0.246	-176.1
1600	0.485	116.5	1.549	35.9	0.359	46.6	0.234	-178.0
1700	0.500	115.0	1.498	32.8	0.379	44.1	0.259	-179.9
1800	0.500	111.2	1.411	32.3	0.387	44.6	0.264	178.3
1900	0.509	108.5	1.455	28.4	0.431	41.8	0.279	176.2
2000	0.516	104.9	1.302	24.4	0.418	38.4	0.273	171.0