isc Silicon NPN RF Transistor 2SC4228

DESCRIPTION

- High f_T
  8.0GHz TYP. @V_{CE} = 3 V, I_C = 5 mA, f = 2 GHz
- Low C_{re}
  0.3pF TYP., @V_{CB} = 3 V, I_E = 0, f = 1 MHz
- High $|S_{21e}|^2$
  7.5 dB TYP. @V_{CE} = 3 V, I_C = 5 mA, f = 2 GHz
- 100% tested
- Minimum Lot-to-Lot variations for robust device performance and reliable operation

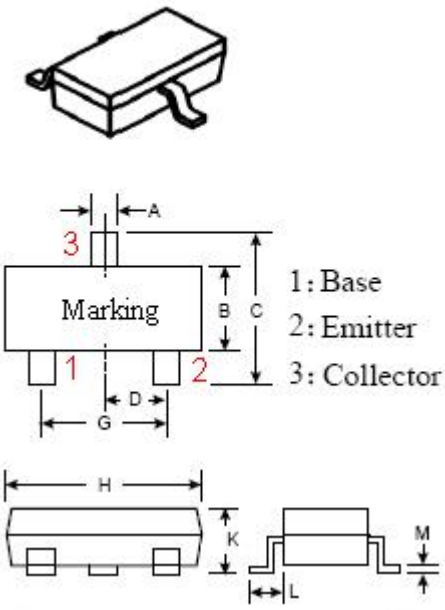
APPLICATIONS

- Designed for VHF, UHF low noise amplifier.

ABSOLUTE MAXIMUM RATINGS(T_a=25℃)

SYMBOL	PARAMETER	VALUE	UNIT
V_{CBO}	Collector-Base Voltage	20	V
V_{CEO}	Collector-Emitter Voltage	10	V
V_{EBO}	Emitter-Base Voltage	1.5	V
I_C	Collector Current-Continuous	35	mA
P_C	Collector Power Dissipation @T_C=25℃	0.15	W
T_J	Junction Temperature	150	℃
T_{stg}	Storage Temperature Range	-65~150	℃

SOT-323 package



DIM	mm	
	MIN	MAX
A	0.30	0.40
B	1.15	1.35
C	2.00	2.40
D	0.65	
H	1.80	2.20
K	0.80	1.00
M	0.10	0.25

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ELECTRICAL CHARACTERISTICS

T_C=25℃ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT
I_{CBO}	Collector Cutoff Current	V_{CB}= 10V; I_E= 0			1.0	μA
I_{EBO}	Emitter Cutoff Current	V_{EB}= 1V; I_C= 0			1.0	μA
h_{FE}	DC Current Gain	I_C= 5mA ; V_{CE}= 3V	50		250	
f_T	Current-Gain—Bandwidth Product	I_C= 5mA ; V_{CE}= 3V ; f= 2GHz	5.5	8.0		GHz
C_{re}	Feed-Back Capacitance	I_E= 0 ; V_{CB}= 3V; f= 1MHz		0.3	0.7	pF
$\|S_{21e}\|^2$	Insertion Power Gain	I_C= 5mA ; V_{CE}= 3V; f= 2GHz	5.5	7.5		dB
NF	Noise Figure	I_C= 5mA ; V_{CE}= 3V; f= 2GHz		1.9	3.2	dB

◆ **h_{FE} Classification**

Class	R43	R44	R45
Marking	R43	R44	R45
h_{FE}	50-100	80-160	125-250

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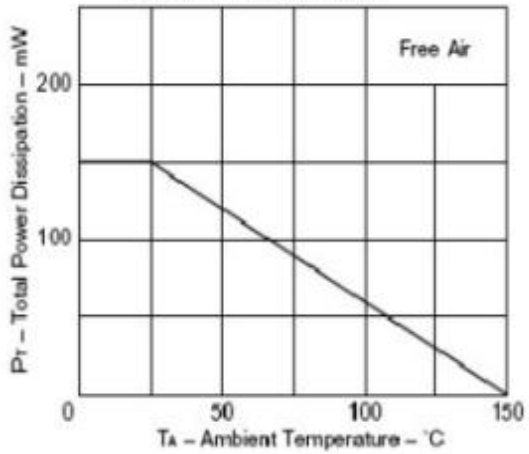
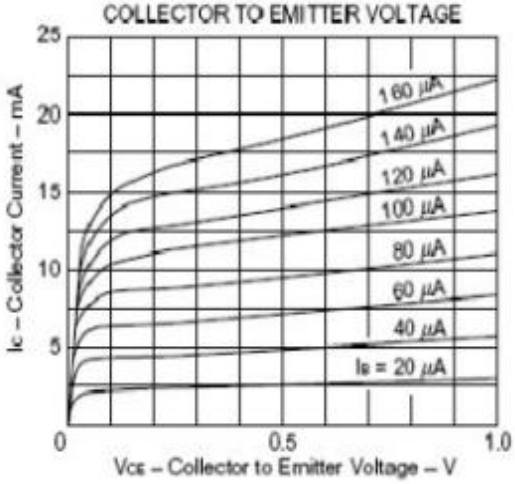
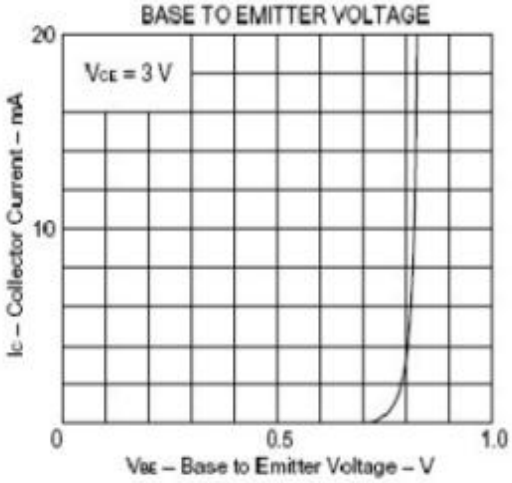
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



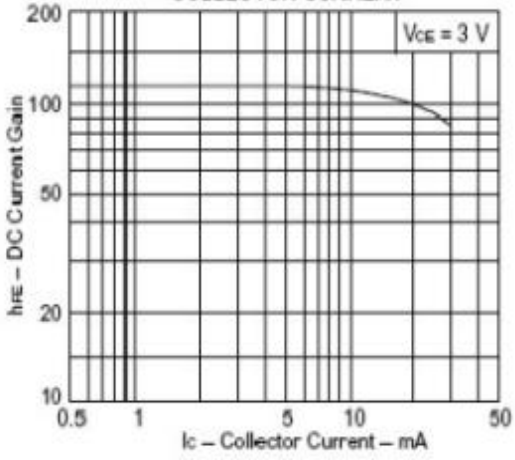
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



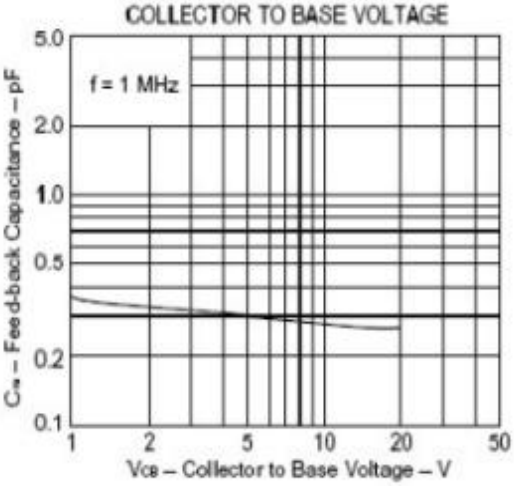
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



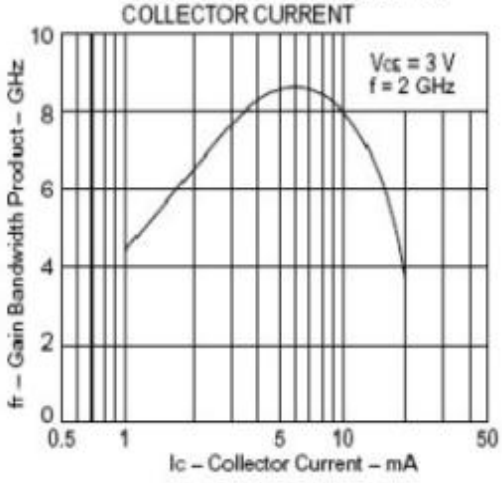
DC CURRENT GAIN vs.
COLLECTOR CURRENT



FEED-BACK CAPACITANCE vs.
COLLECTOR TO BASE VOLTAGE



GAIN BANDWIDTH PRODUCT vs.
COLLECTOR CURRENT



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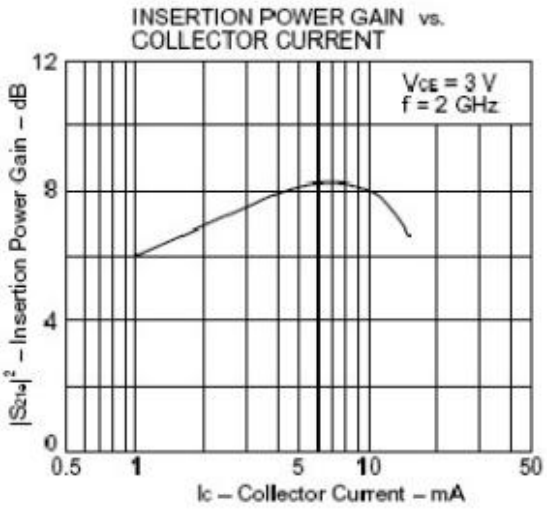

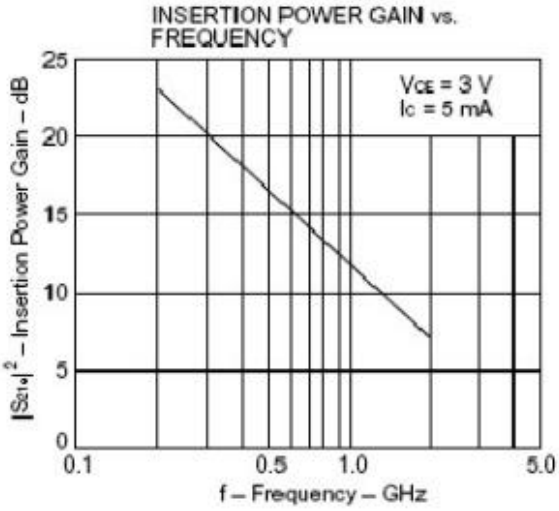

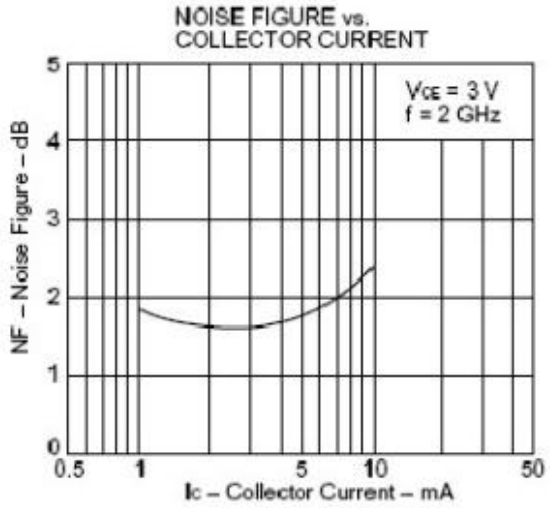

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S-PARAMETER

VCE = 3 V, IC = 5 mA, ZO = 50Ω

Freque.	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.875	–18.6	14.087	161.1	0.018	78.2	0.958	–10.1
200	0.762	–35.0	12.290	145.1	0.034	68.6	0.888	–17.7
300	0.677	–47.2	10.888	133.6	0.048	66.6	0.800	–24.4
400	0.565	–59.4	9.275	123.6	0.055	65.8	0.719	–26.7
500	0.495	–67.5	8.300	115.7	0.063	63.5	0.669	–28.7
600	0.425	–76.1	7.184	108.9	0.074	61.1	0.610	–30.3
700	0.372	–81.6	6.454	104.8	0.084	63.8	0.600	–30.6
800	0.327	–88.5	5.818	99.5	0.089	62.7	0.560	–31.3
900	0.289	–93.6	5.231	95.5	0.092	64.6	0.543	–30.1
1000	0.255	–100.5	4.820	92.0	0.104	62.8	0.519	–33.4
1100	0.236	–105.2	4.444	88.8	0.105	64.2	0.512	–31.8
1200	0.214	–112.2	4.142	85.3	0.113	64.2	0.497	–33.4
1300	0.195	–117.6	3.842	83.2	0.122	63.6	0.476	–33.2
1400	0.182	–123.8	3.554	79.3	0.127	65.0	0.481	–34.2
1500	0.165	–129.9	3.343	77.4	0.139	64.1	0.467	–34.6
1600	0.153	–137.4	3.218	75.3	0.140	64.5	0.466	–34.8
1700	0.145	–144.3	3.091	73.6	0.152	65.4	0.458	–37.2
1800	0.139	–151.8	2.857	70.4	0.162	64.3	0.456	–36.1
1900	0.134	–157.0	2.764	68.7	0.168	62.3	0.451	–38.4
2000	0.129	–164.7	2.624	66.4	0.176	64.8	0.445	–39.0

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S-PARAMETER

VCE = 3 V, IC = 3 mA, ZO = 50Ω

Freque.	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.943	–13.4	9.384	165.9	0.020	84.1	0.969	–7.7
200	0.868	–26.6	8.668	152.8	0.038	77.2	0.936	–13.8
300	0.815	–37.7	8.165	142.9	0.051	67.9	0.876	–20.9
400	0.717	–48.9	7.279	132.9	0.062	63.9	0.804	–23.5
500	0.655	–56.8	6.780	125.5	0.075	63.9	0.764	–26.7
600	0.577	–65.5	6.061	118.0	0.084	60.0	0.708	–29.7
700	0.518	–71.2	5.504	112.8	0.091	59.7	0.685	–31.1
800	0.468	–78.1	5.074	106.7	0.098	57.0	0.639	–32.0
900	0.420	–83.7	4.632	102.8	0.102	59.0	0.611	–32.8
1000	0.380	–90.6	4.340	98.3	0.105	56.6	0.592	–35.0
1100	0.344	–94.8	3.951	94.8	0.112	57.8	0.579	–34.1
1200	0.321	–101.6	3.717	90.5	0.121	59.0	0.551	–35.0
1300	0.291	–105.9	3.485	87.6	0.128	58.7	0.532	–35.9
1400	0.273	–111.7	3.306	84.3	0.135	59.8	0.535	–36.6
1500	0.250	–117.2	3.134	80.7	0.140	58.0	0.511	–37.5
1600	0.228	–122.4	2.959	79.0	0.145	59.5	0.516	–37.7
1700	0.219	–128.5	2.819	76.0	0.153	59.0	0.504	–39.0
1800	0.199	–135.3	2.699	73.9	0.161	58.4	0.493	–39.9
1900	0.193	–139.6	2.572	71.9	0.163	60.3	0.489	–41.4
2000	0.182	–146.9	2.474	68.3	0.175	59.8	0.482	–41.4

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S-PARAMETER

VCE = 3 V, IC = 1 mA, ZO = 50Ω

Freque.	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	1.023	–7.6	3.505	172.1	0.025	86.4	0.995	–4.6
200	0.983	–16.1	3.400	163.3	0.039	79.3	0.986	–7.8
300	0.975	–22.4	3.368	157.3	0.061	74.6	0.976	–12.8
400	0.922	–31.8	3.219	149.1	0.075	70.7	0.936	–15.1
500	0.899	–36.9	3.186	143.3	0.093	66.4	0.922	–18.8
600	0.849	–44.7	3.046	135.7	0.105	62.2	0.885	–22.5
700	0.812	–50.6	2.905	131.1	0.113	61.7	0.880	–24.4
800	0.774	–57.1	2.830	124.4	0.128	55.7	0.846	–27.2
900	0.727	–62.9	2.694	119.2	0.134	55.6	0.808	–28.8
1000	0.680	–69.3	2.597	114.1	0.146	53.7	0.790	–31.8
1100	0.651	–74.1	2.479	109.3	0.146	50.3	0.766	–32.8
1200	0.616	–79.8	2.392	104.8	0.155	49.8	0.741	–34.9
1300	0.575	–85.2	2.302	101.1	0.155	46.2	0.714	–35.9
1400	0.546	–90.6	2.207	96.0	0.160	46.7	0.708	–36.8
1500	0.512	–95.8	2.110	92.1	0.168	43.6	0.685	–38.4
1600	0.481	–100.6	2.034	88.8	0.165	45.5	0.676	–40.1
1700	0.463	–106.3	1.989	85.5	0.176	45.3	0.667	–41.8
1800	0.440	–111.8	1.903	82.2	0.173	43.8	0.649	–42.3
1900	0.419	–116.4	1.854	78.9	0.174	43.5	0.633	–44.2
2000	0.394	–121.2	1.779	75.5	0.173	43.7	0.630	–45.2

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