

# NEC

## SILICON TRANSISTOR 2SC4226

### HIGH FREQUENCY LOW NOISE AMPLIFIER NPN SILICON EPITAXIAL TRANSISTOR SUPER MINI MOLD

#### DESCRIPTION

The 2SC4226 is a low supply voltage transistor designed for VHF, UHF low noise amplifier.

It is suitable for a high density surface mount assembly since the transistor has been applied small mini mold package.

#### FEATURES

- Low Noise  
NF = 1.2 dB TYP. @ f = 1 GHz,  $V_{CE} = 3$  V,  $I_c = 7$  mA
- High Gain  
 $|S_{21e}|^2 = 9.0$  dB TYP. @ f = 1 GHz,  $V_{CE} = 3$  V,  $I_c = 7$  mA
- Small Mini Mold Package  
EIAJ: SC-70

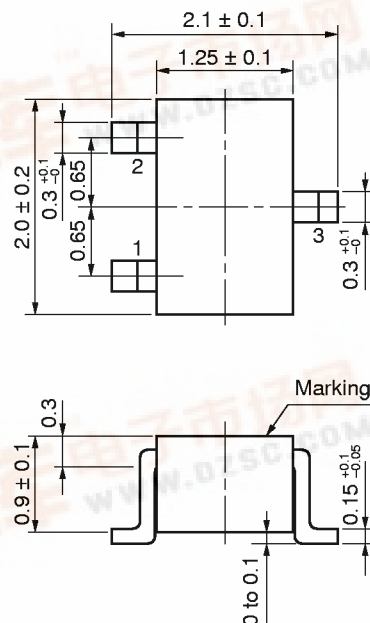
#### ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
2SC4226-T1	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin3 (Collector)face to perforation side of the tape.
2SC4226-T2	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin1 (Emitter), Pin2 (Base) face to perforation side of the tape.

\* Please contact with responsible NEC person, if you require evaluation sample. Unit sample quantity shall be 50 pcs. (Part No.: 2SC4226)

#### PACKAGE DIMENSIONS

in millimeters



#### PIN CONNECTIONS

1. Emitter
2. Base
3. Collector

**ABSOLUTE MAXIMUM RATINGS (TA = 25 °C)**

Collector to Base Voltage	V <sub>CB0</sub>	20	V
Collector to Emitter Voltage	V <sub>CE0</sub>	12	V
Emitter to Base Voltage	V <sub>EB0</sub>	3	V
Collector Current	I <sub>c</sub>	100	mA
Total Power Dissipation	P <sub>T</sub>	150	mW
Junction Temperature	T <sub>j</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-65 to +150	°C

**ELECTRICAL CHARACTERISTICS (TA = 25 °C)**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Collector Cutoff Current	I <sub>cBO</sub>			1.0	μA	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0
Emitter Cutoff Current	I <sub>EBO</sub>			1.0	μA	V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0
DC Current Gain	h <sub>FE</sub>	40	110	250		V <sub>CE</sub> = 3 V, I <sub>c</sub> = 7 mA*1
Gain Bandwidth Product	f <sub>T</sub>	3.0	4.5		GHz	V <sub>CE</sub> = 3 V, I <sub>c</sub> = 7 mA
Feed back Capacitance	C <sub>re</sub>		0.7	1.5	pF	V <sub>CE</sub> = 3 V, I <sub>E</sub> = 0, f = 1 MHz*2
Insertion Power Gain	S <sub>21e</sub>   <sup>2</sup>	7	9		dB	V <sub>CE</sub> = 3 V, I <sub>c</sub> = 7 mA, f = 1 GHz
Noise Figure	NF		1.2	2.5	dB	V <sub>CE</sub> = 3 V, I <sub>c</sub> = 7 mA, f = 1 GHz

\*1 Pulse Measurement ; PW ≤ 350 μs, Duty Cycle ≤ 2 % Pulsed.

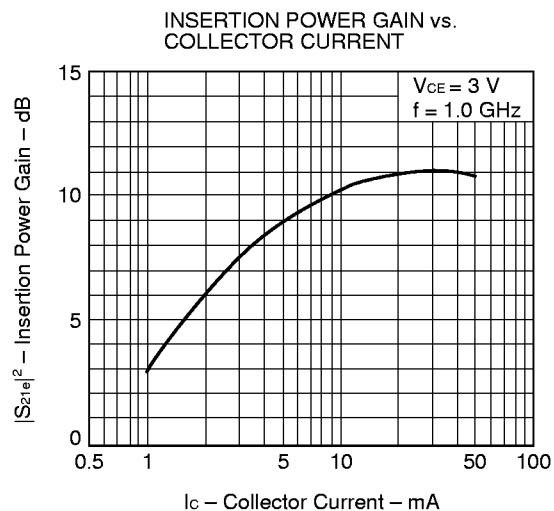
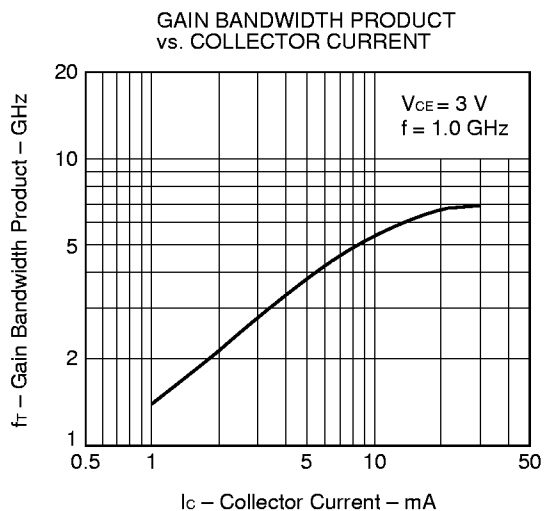
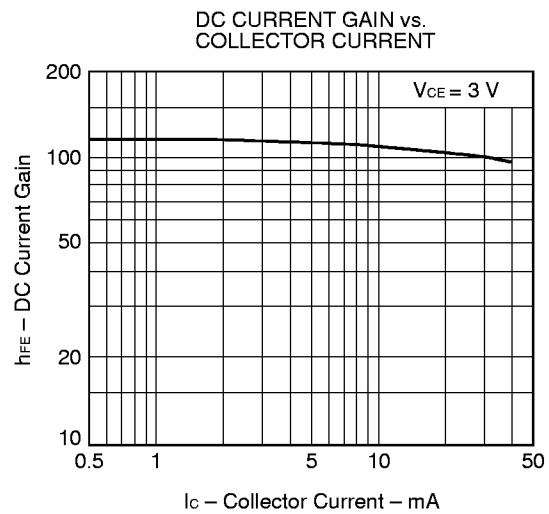
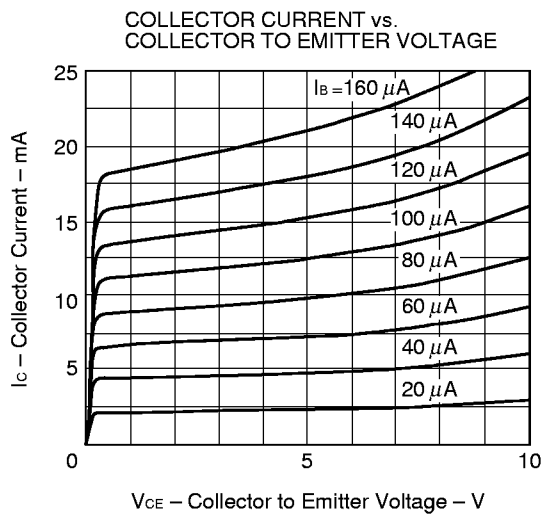
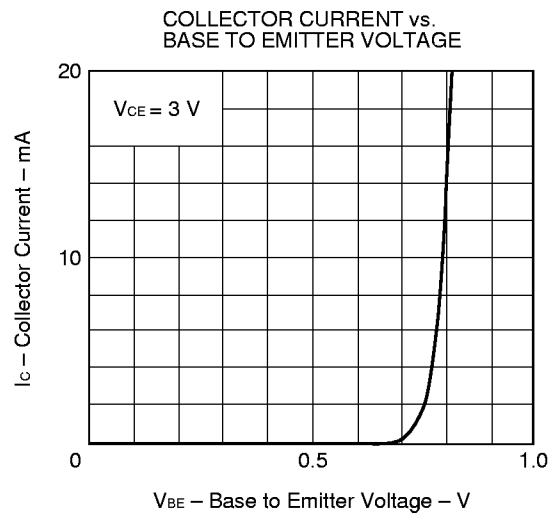
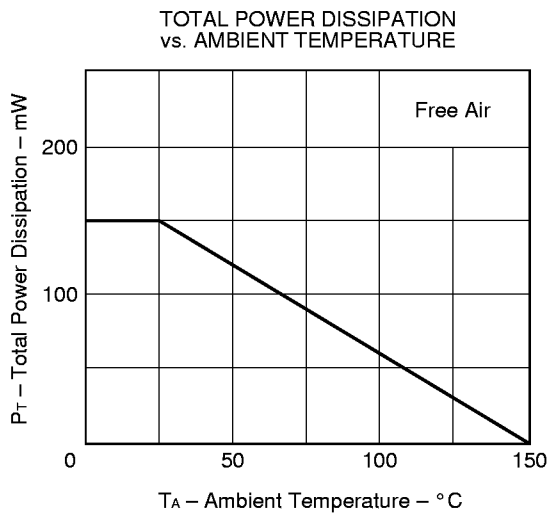
\*2 Measured with 3 terminals bridge, Emitter and Case should be grounded.

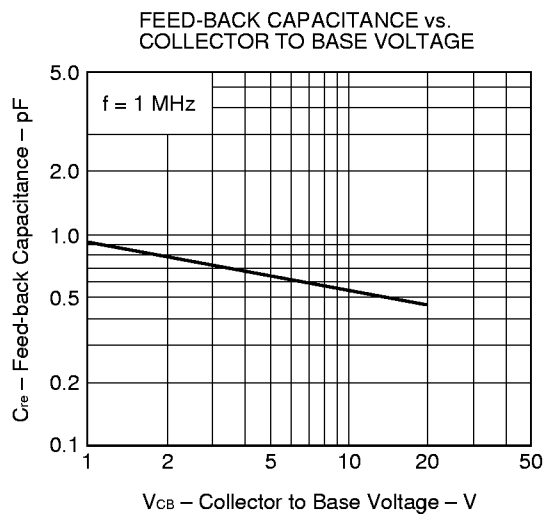
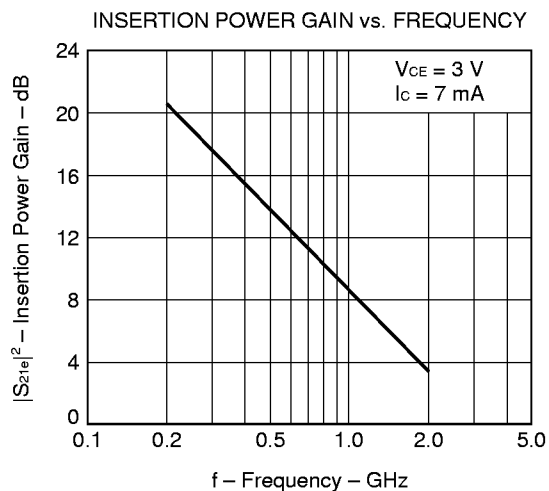
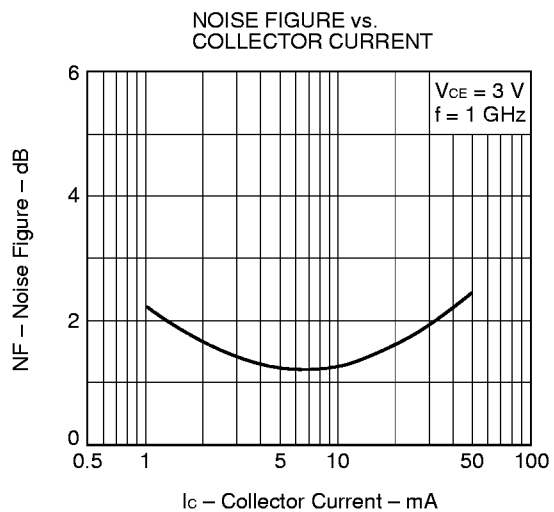
**h<sub>FE</sub> Classification**

Rank	R23	R24	R25
Marking	R23	R24	R25
h <sub>FE</sub>	40 to 80	70 to 140	125 to 250



TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)





S-PARAMETER

V<sub>CE</sub> = 3 V, I<sub>c</sub> = 7 mA, Z<sub>o</sub> = 50 Ω

FREQUENCY	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG
100.00	.750	-45.7	11.858	144.0	.035	63.3	.816	-28.5
200.00	.618	-84.9	10.093	122.3	.053	53.2	.609	-41.8
300.00	.528	-114.5	8.219	107.7	.064	50.6	.481	-46.7
400.00	.483	-134.3	6.684	97.9	.073	50.6	.411	-49.1
500.00	.459	-148.5	5.565	90.5	.081	50.7	.365	-50.5
600.00	.447	-158.8	4.737	84.6	.089	52.3	.337	-51.5
700.00	.441	-167.4	4.134	79.7	.098	53.5	.316	-52.6
800.00	.439	-174.4	3.653	75.2	.107	54.2	.300	-54.2
900.00	.437	179.2	3.283	71.1	.117	54.9	.290	-55.9
1000.00	.437	173.7	2.978	67.2	.126	55.6	.281	-57.9
1100.00	.440	168.6	2.732	63.7	.136	55.8	.275	-59.6
1200.00	.443	163.9	2.533	60.0	.147	55.3	.270	-62.3
1300.00	.444	159.6	2.357	56.6	.158	55.4	.267	-64.7
1400.00	.449	155.5	2.216	53.4	.169	55.3	.264	-67.5
1500.00	.450	151.6	2.077	50.3	.180	54.7	.259	-70.6
1600.00	.455	147.9	1.972	47.4	.192	54.5	.258	-73.3
1700.00	.459	144.3	1.868	44.3	.202	53.9	.256	-76.3
1800.00	.462	140.9	1.789	41.3	.214	53.0	.255	-79.6
1900.00	.466	137.5	1.702	38.4	.226	52.3	.253	-83.0
2000.00	.470	134.4	1.635	36.1	.238	51.5	.253	-86.4

V<sub>CE</sub> = 3 V, I<sub>c</sub> = 5 mA, Z<sub>o</sub> = 50 Ω

FREQUENCY	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG
100.00	.819	-38.9	8.934	148.0	.038	65.8	.868	-23.6
200.00	.701	-73.4	8.007	127.6	.060	53.1	.687	-36.7
300.00	.608	-102.3	6.898	112.6	.072	47.6	.560	-42.4
400.00	.549	-123.6	5.819	101.8	.079	45.2	.483	-45.4
500.00	.511	-139.6	4.970	93.5	.086	45.7	.434	-47.2
600.00	.494	-151.0	4.255	86.9	.093	46.5	.402	-48.6
700.00	.481	-160.8	3.750	81.4	.099	47.2	.379	-49.9
800.00	.475	-168.6	3.328	76.3	.107	48.9	.361	-51.5
900.00	.472	-175.7	3.004	72.0	.113	49.7	.350	-53.4
1000.00	.471	178.2	2.734	67.7	.122	50.9	.340	-55.4
1100.00	.473	172.8	2.522	64.0	.130	51.6	.332	-57.3
1200.00	.474	167.6	2.355	60.2	.139	52.3	.328	-59.7
1300.00	.474	162.9	2.176	56.7	.148	53.1	.322	-62.3
1400.00	.477	158.4	2.038	53.2	.158	53.3	.319	-65.2
1500.00	.481	154.4	1.921	49.8	.168	53.7	.315	-68.2
1600.00	.484	150.3	1.818	46.7	.177	53.3	.313	-70.9
1700.00	.489	146.5	1.726	43.9	.190	53.3	.312	-73.9
1800.00	.490	142.9	1.647	40.6	.200	53.0	.312	-77.2
1900.00	.495	139.3	1.578	37.6	.212	52.7	.309	-80.8
2000.00	.501	136.0	1.505	35.0	.223	52.0	.309	-84.0



S-PARAMETER

V<sub>CE</sub> = 3 V, I<sub>c</sub> = 3 mA, Z<sub>o</sub> = 50 Ω

FREQUENCY	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG
100.00	.899	-30.6	5.578	153.7	.042	69.0	.923	-17.3
200.00	.808	-60.6	5.327	134.4	.069	54.5	.793	-29.2
300.00	.723	-86.7	4.877	119.6	.084	46.0	.679	-35.4
400.00	.660	-108.2	4.341	108.1	.093	41.1	.604	-39.5
500.00	.610	-125.9	3.883	98.5	.098	38.8	.550	-42.0
600.00	.583	-138.6	3.388	90.9	.102	37.4	.513	-44.2
700.00	.560	-150.0	3.046	84.3	.106	37.8	.487	-45.9
800.00	.547	-159.4	2.741	78.5	.108	38.1	.468	-47.9
900.00	.538	-167.4	2.498	73.4	.112	39.5	.455	-49.9
1000.00	.535	-174.4	2.287	68.9	.116	41.0	.444	-52.3
1100.00	.534	179.3	2.111	64.6	.120	43.0	.435	-54.7
1200.00	.533	173.4	1.965	60.2	.125	45.1	.429	-57.2
1300.00	.533	168.3	1.830	56.3	.131	46.7	.424	-59.9
1400.00	.534	163.2	1.721	52.7	.139	48.3	.422	-62.8
1500.00	.538	158.7	1.620	49.2	.146	49.8	.417	-65.7
1600.00	.542	154.3	1.544	45.7	.155	51.3	.414	-68.8
1700.00	.545	150.0	1.464	42.7	.164	52.4	.415	-72.0
1800.00	.548	146.1	1.396	39.5	.174	53.0	.412	-75.3
1900.00	.552	142.0	1.336	36.6	.187	53.7	.411	-78.8
2000.00	.556	138.3	1.280	33.6	.199	54.1	.411	-82.3

V<sub>CE</sub> = 3 V, I<sub>c</sub> = 1 mA, Z<sub>o</sub> = 50 Ω

FREQUENCY	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG
100.00	.967	-22.9	1.935	159.9	.045	74.0	.978	-9.2
200.00	.930	-45.8	1.968	143.1	.083	60.1	.931	-17.4
300.00	.884	-67.1	1.938	129.1	.108	48.9	.870	-23.2
400.00	.842	-85.9	1.827	117.2	.125	39.4	.822	-28.0
500.00	.801	-103.1	1.748	106.7	.134	32.6	.779	-31.9
600.00	.771	-117.0	1.576	97.4	.137	27.1	.749	-35.3
700.00	.742	-130.0	1.498	89.2	.137	22.9	.722	-38.4
800.00	.722	-141.2	1.403	81.9	.134	20.0	.702	-41.3
900.00	.706	-151.1	1.326	75.6	.129	18.5	.690	-44.4
1000.00	.695	-159.9	1.242	69.6	.124	17.8	.680	-47.4
1100.00	.689	-167.7	1.169	64.5	.118	18.1	.671	-50.4
1200.00	.685	-174.9	1.102	59.6	.112	19.8	.666	-53.6
1300.00	.681	178.7	1.030	55.3	.106	23.5	.660	-56.9
1400.00	.681	172.6	.979	50.9	.103	28.0	.658	-60.4
1500.00	.683	166.8	.925	47.2	.100	33.6	.654	-64.0
1600.00	.684	161.4	.884	43.6	.102	40.4	.651	-67.6
1700.00	.684	156.1	.842	40.4	.107	47.5	.651	-71.5
1800.00	.686	151.4	.804	37.3	.115	53.5	.649	-75.1
1900.00	.689	146.6	.773	34.6	.127	57.9	.646	-79.2
2000.00	.690	142.1	.738	32.3	.141	62.1	.646	-83.0

