

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

The 2SC4227 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.

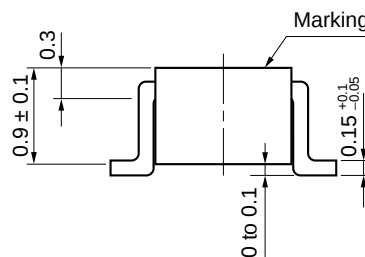
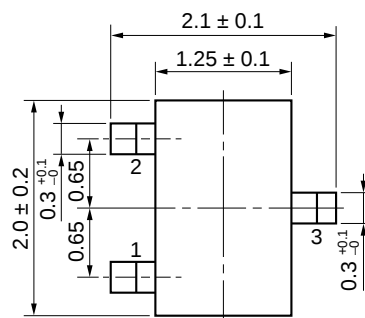
FEATURES

- Low Noise
NF = 1.4 dB TYP. @ $f = 1$ GHz, $V_{CE} = 3$ V, $I_C = 7$ mA
- High Gain
 $|S_{21e}|^2 = 12$ 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
2SC4227-T1	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin3 (Collector) face to perforation side of the tape.
2SC4227-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.: 2SC4227)

PACKAGE DIMENSIONS
in millimeters**PIN CONNECTIONS**

1. Emitter
2. Base
3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Collector to Base Voltage	V _{CBO}	20	V
Collector to Emitter Voltage	V _{CEO}	10	V
Emitter to Base Voltage	V _{EBO}	1.5	V
Collector Current	I _C	65	mA
Total Power Dissipation	P _T	150	mW
Junction Temperature	T _J	150	°C
Storage Temperature	T _{stg}	−65 to +150	°C

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Collector Cutoff Current	I _{CBO}			0.8	μA	V _{CB} = 10 V, I _E = 0
Emitter Cutoff Current	I _{EBO}			0.8	μA	V _{EB} = 1 V, I _C = 0
DC Current Gain	h _{FE}	40		240		V _{CE} = 3 V, I _C = 7 mA ^{*1}
Gain Bandwidth Product	f _T	4.5	7.0		GHz	V _{CE} = 3 V, I _C = 7 mA
Feedback Capacitance	C _{re}		0.45	0.9	pF	V _{CE} = 3 V, I _E = 0, f = 1 MHz ^{*2}
Insertion Power Gain	S _{21e} ²	10	12		dB	V _{CE} = 3 V, I _C = 7 mA, f = 1 GHz
Noise Figure	NF		1.4	2.7	dB	V _{CE} = 3 V, I _C = 7 mA, f = 1 GHz

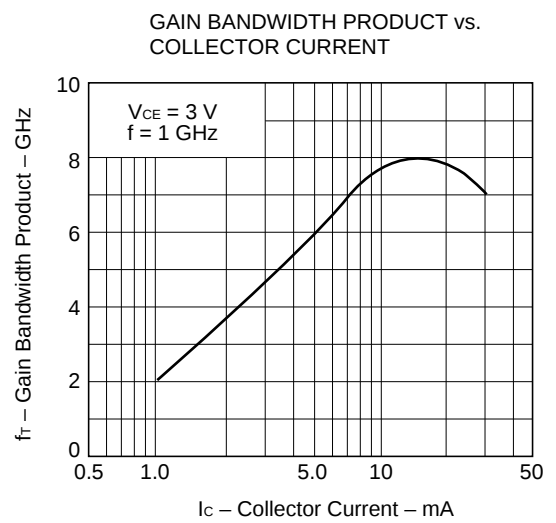
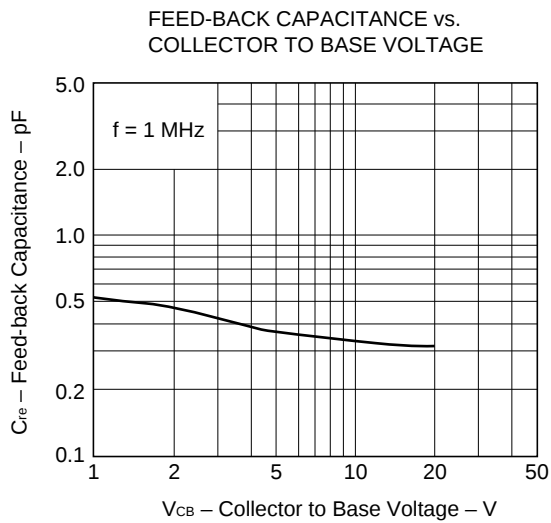
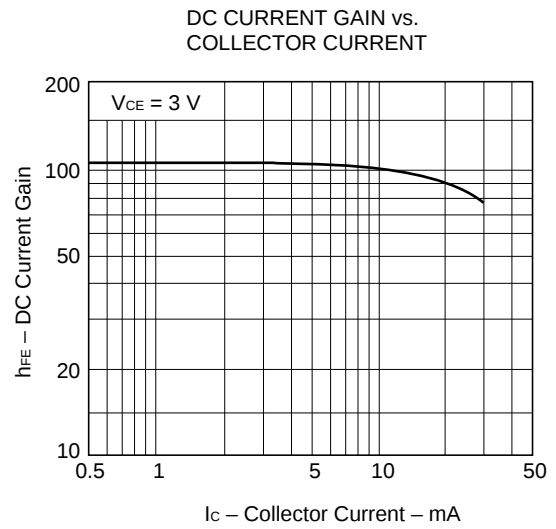
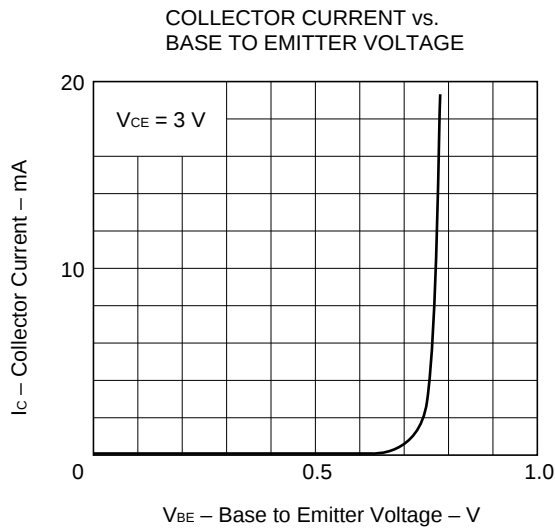
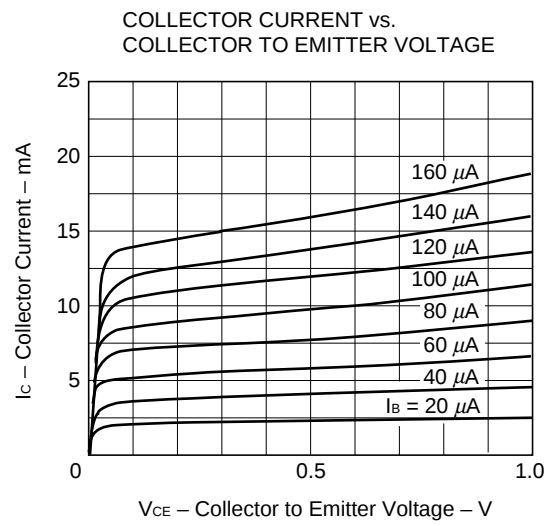
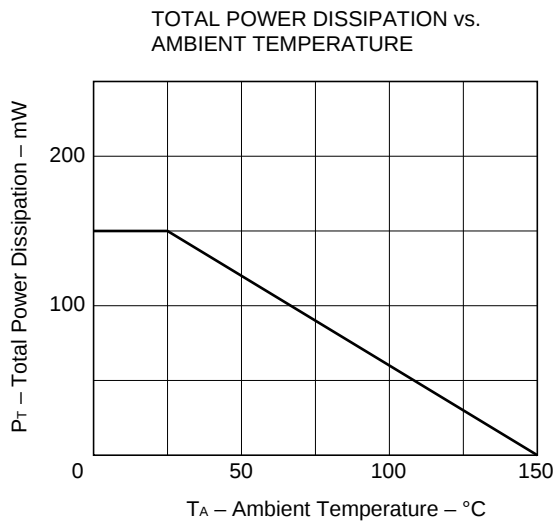
^{*1} Pulse Measurement ; PW ≤ 350 μs, Duty Cycle ≤ 2 % Pulsed.

^{*2} Measured with 3 terminals bridge, Emitter and Case should be grounded.

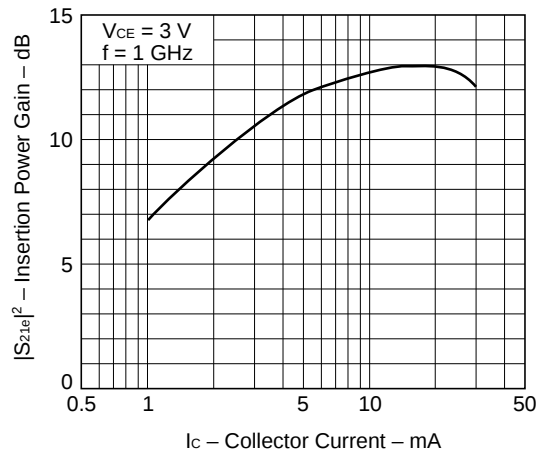
h_{FE} Classification

Rank	R33	R34	R35
Marking	R33	R34	R35
h _{FE}	40 to 90	70 to 150	110 to 240

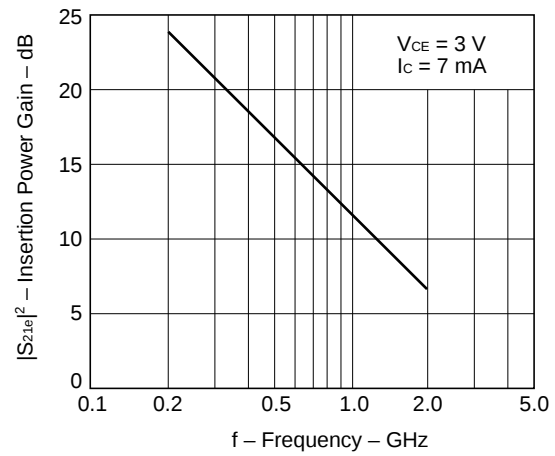
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



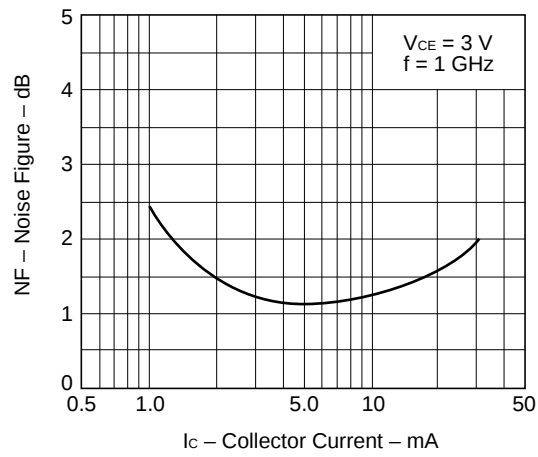
INSERTION POWER GAIN vs.
COLLECTOR CURRENT



INSERTION POWER GAIN vs.
FREQUENCY



NOISE FIGURE vs.
COLLECTOR CURRENT



S-PARAMETER(V_{CE} = 3 V, I_C = 7 mA, Z_O = 50 Ω)

FREQUENCY		S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	
100.00	.804	-23.8	11.631	154.8	.023	74.8	.920	-16.5	
200.00	.692	-48.6	10.839	137.5	.040	64.1	.791	-27.7	
300.00	.581	-70.3	9.722	123.8	.050	59.9	.675	-33.5	
400.00	.489	-89.0	8.519	112.9	.060	56.7	.597	-37.0	
500.00	.419	-104.9	7.434	104.1	.067	55.9	.538	-38.7	
600.00	.376	-117.1	6.468	97.5	.075	55.6	.497	-40.0	
700.00	.342	-128.6	5.729	91.8	.082	55.7	.467	-41.0	
800.00	.321	-138.4	5.115	86.7	.089	56.3	.443	-41.7	
900.00	.305	-147.3	4.630	82.5	.096	56.1	.427	-42.5	
1000.00	.296	-155.2	4.207	78.5	.104	56.4	.412	-43.6	
1100.00	.289	-162.2	3.879	74.8	.111	56.0	.401	-44.6	
1200.00	.284	-169.3	3.595	71.4	.119	56.4	.393	-45.8	
1300.00	.282	-175.3	3.349	68.1	.127	56.2	.384	-47.3	
1400.00	.281	179.0	3.133	64.8	.136	56.0	.379	-48.8	
1500.00	.283	173.8	2.945	61.9	.143	55.4	.372	-50.1	
1600.00	.283	168.6	2.780	58.8	.151	55.0	.367	-51.8	
1700.00	.285	163.8	2.631	56.2	.160	54.4	.363	-53.7	
1800.00	.286	159.9	2.514	53.3	.168	53.9	.359	-55.4	
1900.00	.289	155.4	2.390	50.5	.177	53.3	.354	-57.3	
2000.00	.293	151.8	2.293	47.8	.186	52.5	.351	-59.2	

(V_{CE} = 3 V, I_C = 5 mA, Z_O = 50 Ω)

FREQUENCY		S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	
100.00	.818	-29.4	14.580	156.2	.023	79.9	.932	-14.4	
200.00	.689	-54.3	12.120	137.5	.040	65.1	.824	-23.4	
300.00	.594	-73.1	10.142	124.6	.052	55.0	.716	-30.3	
400.00	.500	-89.8	8.340	114.4	.063	58.5	.620	-32.2	
500.00	.457	-102.8	7.300	107.5	.069	56.4	.577	-34.2	
600.00	.404	-115.0	6.211	101.0	.081	54.9	.525	-35.1	
700.00	.377	-124.4	5.496	96.8	.084	59.5	.511	-36.1	
800.00	.359	-134.3	4.908	91.4	.091	58.4	.471	-36.2	
900.00	.342	-141.5	4.450	88.1	.097	58.4	.458	-35.3	
1000.00	.335	-150.3	4.018	84.7	.100	61.2	.440	-36.5	
1100.00	.326	-155.9	3.750	81.4	.112	61.8	.442	-36.8	
1200.00	.321	-162.4	3.410	78.1	.115	61.4	.417	-37.8	
1300.00	.317	-167.2	3.181	75.6	.124	62.3	.412	-38.5	
1400.00	.321	-173.4	2.995	72.5	.131	63.9	.411	-39.9	
1500.00	.318	-177.5	2.802	69.8	.138	63.6	.407	-40.4	
1600.00	.320	176.6	2.665	67.3	.149	66.4	.400	-41.1	
1700.00	.323	173.2	2.533	66.1	.156	65.3	.394	-43.7	
1800.00	.326	167.8	2.369	63.0	.162	65.9	.394	-44.3	
1900.00	.331	165.6	2.275	61.0	.177	65.4	.390	-45.5	
2000.00	.333	161.4	2.196	59.2	.183	64.5	.384	-47.6	

S-PARAMETER(V_{CE} = 3 V, I_C = 3 mA, Z_O = 50 Ω)

FREQUENCY		S11		S21		S12		S22	
MHz		MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00		.906	−22.7	9.710	161.6	.026	82.5	.962	−10.6
200.00		.810	−43.7	8.541	145.3	.049	63.8	.895	−18.3
300.00		.742	−60.6	7.695	133.4	.062	58.7	.811	−25.8
400.00		.638	−76.6	6.580	122.4	.073	56.0	.732	−27.7
500.00		.587	−89.8	5.934	114.1	.082	53.4	.680	−31.2
600.00		.524	−102.2	5.148	107.1	.091	49.7	.624	−33.5
700.00		.490	−111.4	4.627	102.2	.094	51.8	.603	−34.4
800.00		.460	−121.4	4.181	96.0	.099	51.2	.568	−35.0
900.00		.435	−129.9	3.827	92.6	.101	52.9	.540	−35.7
1000.00		.427	−138.2	3.443	88.1	.107	50.9	.523	−36.7
1100.00		.404	−144.9	3.199	84.2	.115	53.7	.512	−36.8
1200.00		.399	−151.7	2.989	79.8	.113	56.6	.500	−38.6
1300.00		.392	−157.9	2.779	77.4	.121	54.9	.489	−39.2
1400.00		.392	−163.6	2.638	73.5	.126	56.4	.483	−40.4
1500.00		.386	−169.1	2.443	71.3	.135	56.4	.477	−41.8
1600.00		.380	−174.5	2.344	68.0	.137	60.0	.477	−42.4
1700.00		.382	−179.7	2.239	65.3	.143	59.5	.466	−44.4
1800.00		.389	176.1	2.113	63.0	.151	59.4	.461	−44.9
1900.00		.383	172.5	2.025	61.4	.154	62.6	.456	−46.9
2000.00		.387	168.3	1.922	58.2	.163	62.0	.464	−48.3

(V_{CE} = 3 V, I_C = 7 mA, Z_O = 50 Ω)

FREQUENCY		S11		S21		S12		S22	
MHz		MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00		1.009	−14.5	3.544	168.8	.027	78.6	.994	−5.6
200.00		.955	−29.7	3.359	156.3	.055	73.6	.969	−10.1
300.00		.937	−42.6	3.277	147.1	.073	63.4	.947	−15.9
400.00		.864	−56.2	3.034	136.6	.091	57.7	.898	−18.8
500.00		.838	−67.3	2.891	128.6	.107	51.1	.865	−22.1
600.00		.775	−79.3	2.674	120.0	.116	46.6	.824	−25.8
700.00		.745	−88.5	2.485	114.2	.125	45.2	.803	−27.5
800.00		.708	−99.1	2.338	106.8	.127	41.2	.776	−29.7
900.00		.670	−107.9	2.177	101.4	.132	40.2	.740	−31.5
1000.00		.649	−116.8	2.052	96.0	.135	37.2	.723	−33.7
1100.00		.621	−124.0	1.914	90.8	.131	36.6	.719	−34.2
1200.00		.608	−131.8	1.819	86.0	.129	35.4	.700	−36.3
1300.00		.587	−138.5	1.713	82.4	.130	35.2	.691	−37.6
1400.00		.587	−144.5	1.628	77.7	.128	36.1	.681	−39.2
1500.00		.573	−152.6	1.533	73.4	.127	36.0	.662	−40.7
1600.00		.559	−157.1	1.464	70.3	.124	37.5	.660	−42.7
1700.00		.562	−164.2	1.421	67.2	.120	39.1	.658	−44.0
1800.00		.557	−168.9	1.350	64.7	.122	43.3	.658	−46.0
1900.00		.557	−173.9	1.296	61.1	.122	45.2	.641	−47.8
2000.00		.551	−178.6	1.240	58.0	.124	48.5	.643	−50.1

[MEMO]

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