NEC

SILICON TRANSISTOR
2SC4569

UHF TV TUNER OSC/MIXER
NPN SILICON EPITAXIAL TRANSISTOR

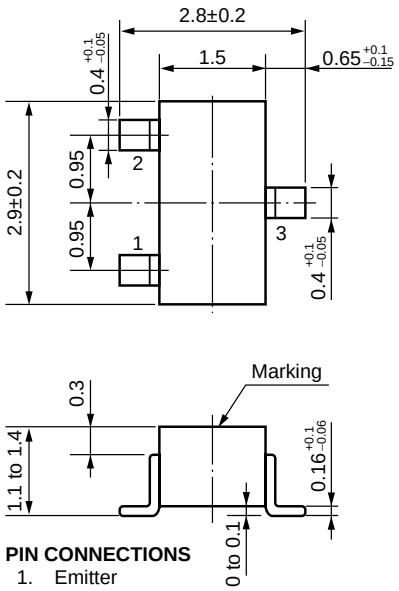
DESCRIPTION

The 2SC4569 is an NPN silicon epitaxial transistro intended for use as UHF oscillator and UHF mixer in a tuner of TV receiver.

FEATURES

- High gain bandwidty product
  f_T = 5.0 GHz TYP.
- Low output capacitance
  C_{ob} = 0.9 pF TYP.
- Surface mount package
  EIAJ: SC-59

PACKAGE DIMENSIONS
(Units: mm)



PIN CONNECTIONS
1. Emitter
2. Base
3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Maximum Voltages and Current			
Collector to Base Voltage	V_{CBO}	20	V
Collector to Emitter Voltage	V_{CEO}	12	V
Emitter to Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	60	mA
Total Power Dissipation	P_T	150	mW
Junction Temperature	T_j	125	°C
Storage Temperature	T_{stg}	−55 to +125	°C

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I_{CBO}			0.1	μA	V_{CB} = 15 V, I_E = 0
Emitter Cutoff Current	I_{EBO}			0.1	μA	V_{EB} = 1 V, I_C = 0
Collector Saturation Voltage	$V_{CE(sat)}$			0.5	V	h_{EF} = 10, I_C = 5 mA
DC Current Gain	h_{FE}	40	100	200		V_{CE} = 5 V, I_C = 5 mA ***1**
Gain Bandwidth Product	f_T		5.0		GHz	V_{CE} = 5 V, I_C = 5 mA f = 1.0 GHz
Output Capacitance	C_{ob}		0.9	1.2	pF	V_{CB} = 5 V, I_E = 0, f = 1.0 MHz
Insertion Gain	$\|S_{21e}\|^2$	5.0			dB	V_{CE} = 5 V, I_C = 5 mA, f = 1.0 MHz

***1** Pulsd: PW ≤ 35 μS, Dyty Cycle ≤ 2 %

★ **h_{FE} Classification**

Class	T75/EB *	T76/FB *	T77/GB *
Marking	T75	T76	T77
h_{FE}	40 to 80	60 to 120	100 to 200

* Old Specification / New Specification

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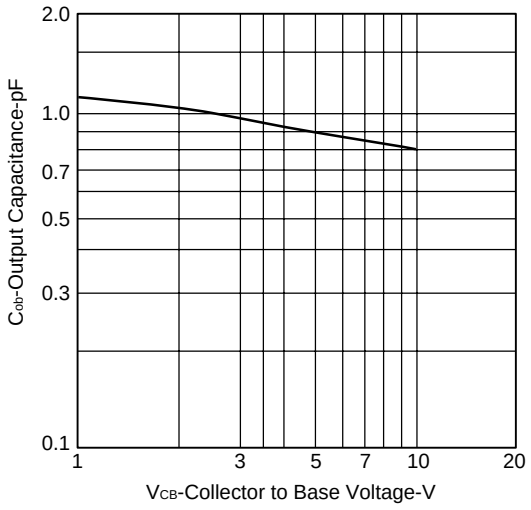
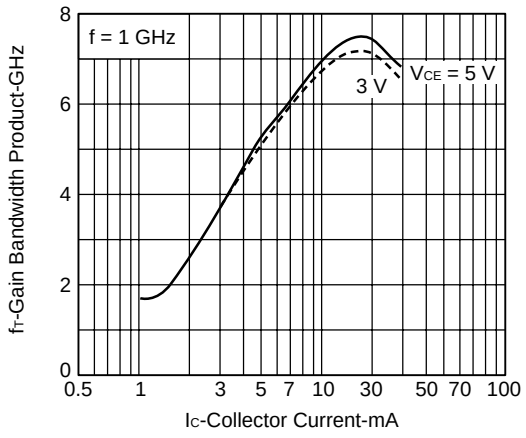
The mark ★ shows major revised points.

TYPICAL CHARACTERISTICS (T_A = 25 °C)

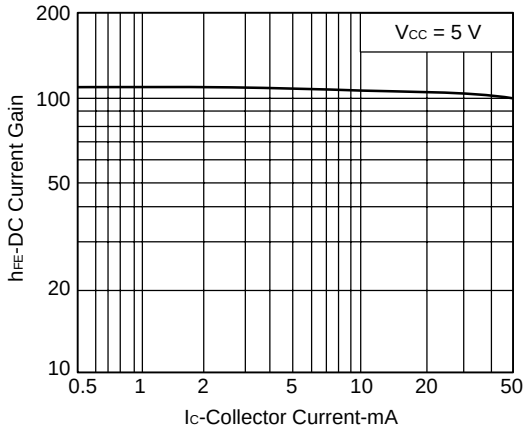
OUTPUT CAPACITANCE vs.
COLLECTOR TO BASE VOLTAGE



GAIN BANDWIDTH PRODUCT vs.
COLLECTOR CURRENT



DC CURRENT GAIN vs.
COLLECTOR CURRENT



S-PARAMETER

V_{CE} = 5 V, I_C = 1 mA

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.958	–18.7	3.299	164.6	0.038	77.8	0.973	–7.8
200.00	0.917	–36.4	3.151	150.4	0.072	68.2	0.944	–14.5
300.00	0.855	–53.0	2.926	137.5	0.100	59.7	0.899	–20.6
400.00	0.799	–67.5	2.685	126.2	0.118	51.7	0.850	–25.9
500.00	0.739	–81.5	2.462	116.1	0.134	45.8	0.806	–29.7
600.00	0.693	–93.5	2.256	107.3	0.142	41.1	0.778	–33.0
700.00	0.647	–104.2	2.072	99.9	0.148	37.6	0.743	–35.9
800.00	0.607	–113.9	1.889	92.4	0.152	35.2	0.716	–39.0
900.00	0.583	–123.7	1.760	86.5	0.154	33.4	0.702	–40.6
1000.00	0.559	–132.5	1.615	79.8	0.155	31.7	0.688	–43.4

V_{CE} = 5 V, I_C = 3 mA

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.860	–29.5	9.203	156.2	0.035	74.7	0.932	–14.9
200.00	0.754	–55.1	7.982	137.3	0.062	61.5	0.826	–25.6
300.00	0.648	–75.6	6.693	122.6	0.078	55.1	0.723	–32.3
400.00	0.562	–91.9	5.623	111.9	0.090	51.0	0.641	–36.7
500.00	0.506	–106.5	4.796	103.1	0.099	48.9	0.583	–39.1
600.00	0.462	–118.1	4.188	95.9	0.106	48.2	0.547	–41.0
700.00	0.429	–127.8	3.695	90.3	0.112	48.7	0.514	–42.2
800.00	0.400	–137.4	3.278	84.5	0.119	48.1	0.492	–44.3
900.00	0.390	–144.7	2.984	79.9	0.127	49.2	0.478	–45.2
1000.00	0.378	–153.3	2.711	75.0	0.133	49.8	0.467	–47.2

V_{CE} = 5 V, I_C = 5 mA

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.769	–38.2	13.666	149.3	0.032	70.4	0.885	–20.1
200.00	0.630	–68.1	10.889	128.6	0.054	60.9	0.728	–32.1
300.00	0.513	–89.7	8.545	114.5	0.067	55.6	0.606	–37.7
400.00	0.442	–106.3	6.888	104.9	0.076	54.2	0.528	–40.6
500.00	0.399	–120.6	5.752	97.1	0.086	54.8	0.495	–42.0
600.00	0.368	–131.7	4.940	91.0	0.094	54.5	0.446	–42.9
700.00	0.345	–140.4	4.300	86.2	0.104	55.8	0.420	–43.9
800.00	0.329	–149.4	3.801	81.3	0.113	56.3	0.401	–45.3
900.00	0.323	–156.7	3.434	77.3	0.123	56.7	0.390	–45.8
1000.00	0.316	–163.7	3.112	72.8	0.133	56.8	0.384	–47.4

V_{CE} = 5 V, I_C = 7 mA

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.698	–45.4	17.070	144.7	0.031	68.1	0.839	–24.3
200.00	0.540	–77.6	12.682	122.8	0.049	58.9	0.655	–35.9
300.00	0.435	–99.9	9.583	109.5	0.061	58.2	0.533	–40.4
400.00	0.372	–116.7	7.566	100.8	0.071	58.1	0.461	–43.1
500.00	0.343	–129.7	6.238	93.8	0.080	59.3	0.415	–42.9
600.00	0.321	–139.8	5.324	88.4	0.090	59.9	0.390	–43.1
700.00	0.306	–148.4	4.613	84.0	0.100	60.7	0.370	–44.0
800.00	0.297	–157.5	4.066	79.4	0.113	60.7	0.354	–45.3
900.00	0.291	–162.9	3.669	75.7	0.124	61.2	0.344	–45.7
1000.00	0.286	–170.4	3.319	71.6	0.135	61.0	0.340	–47.6

V_{CE} = 5 V, I_C = 9 mA

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.629	–51.3	19.656	140.7	0.029	66.7	0.800	–27.2
200.00	0.474	–85.3	13.850	118.7	0.045	61.4	0.598	–38.3
300.00	0.381	–107.7	10.219	106.2	0.056	59.8	0.481	–41.5
400.00	0.334	–123.4	7.978	98.1	0.067	61.1	0.170	–42.4
500.00	0.310	–137.2	6.530	91.8	0.079	61.8	0.375	–43.0
600.00	0.295	–146.9	5.550	86.7	0.089	63.4	0.356	–43.0
700.00	0.286	–154.5	4.805	82.5	0.101	63.6	0.339	–43.4
800.00	0.274	–162.4	4.228	78.3	0.112	63.5	0.325	–44.8
900.00	0.275	–168.2	3.793	74.8	0.125	63.7	0.317	–45.5
1000.00	0.274	–175.1	3.442	71.0	0.136	63.2	0.310	–47.2

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▶**Technical issue**

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