

To our customers,

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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UHF TV TUNER OSC/MIXER
NPN SILICON EPITAXIAL TRANSISTOR

DESCRIPTION

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

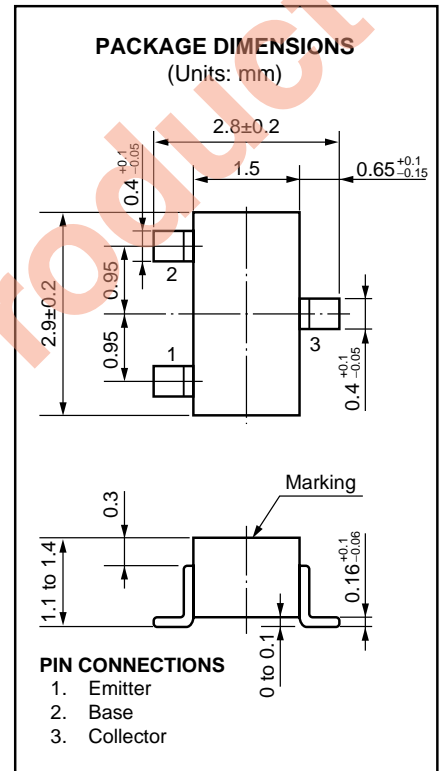
FEATURES

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

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

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	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +125	$^\circ\text{C}$



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

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

*1 Pulsed: $PW \leq 35\ \mu\text{s}$, Duty Cycle $\leq 2\%$

★

h_{FE} Classification

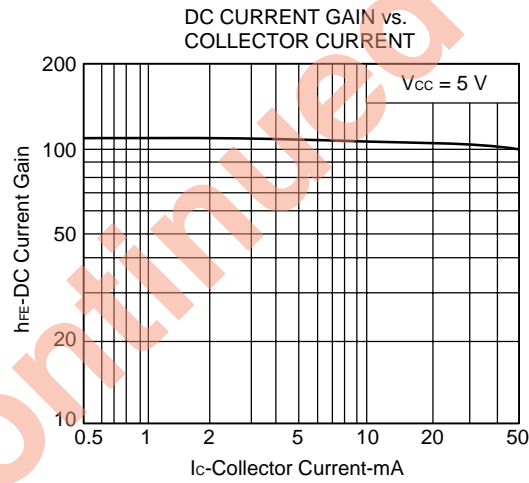
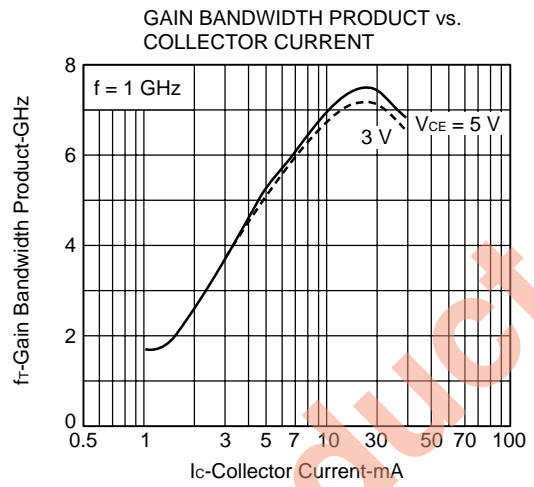
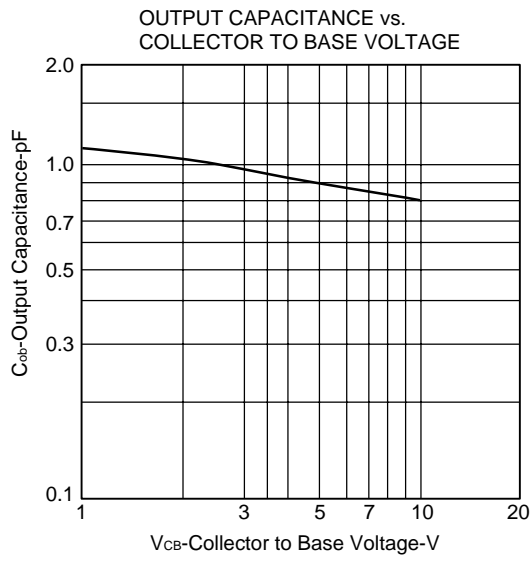
Class	T75/EB *	T76/FB *	T77/GB *
Marking	T75	T76	T77
h_{FE}	40 to 80	60 to 120	100 to 200

* Old Specification / New Specification

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TYPICAL CHARACTERISTICS (T_A = 25 °C)



S-PARAMETER

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

FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	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 MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	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 MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	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 MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	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 MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	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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M8E 00.4-0110

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