

NPN SILICON EPITAXIAL TRANSISTOR  
UHF TV TUNER OSC/MIXER

DESCRIPTION

The 2SC4568 is an NPN silicon epitaxial transistor intended for use as UHF oscillator and UHF mixer in a tuner of TV receiver.

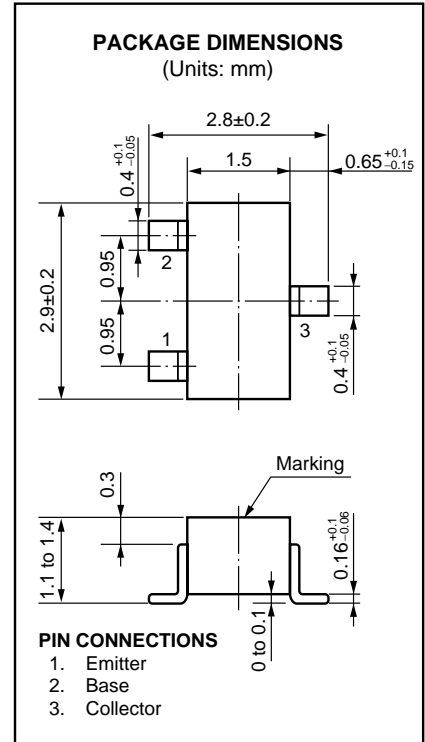
FEATURES

- High gain bandwidth product  
 $f_T = 5.5 \text{ GHz TYP.}$
- Low output capacitance  
 $C_{ob} = 0.7 \text{ pF TYP.}$
- Surface mount package  
EIAJ: SC-59

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

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	$I_C$	30	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 ( $T_A = 25 \text{ }^\circ\text{C}$ )

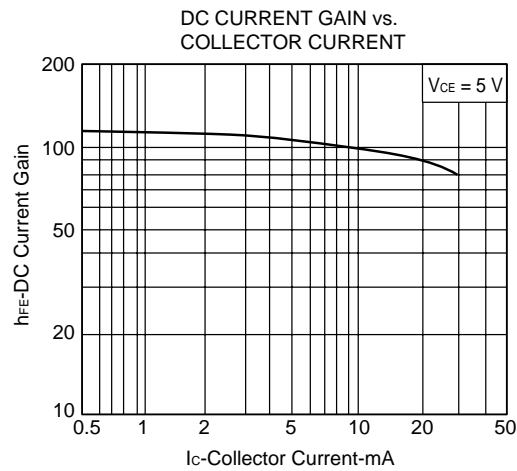
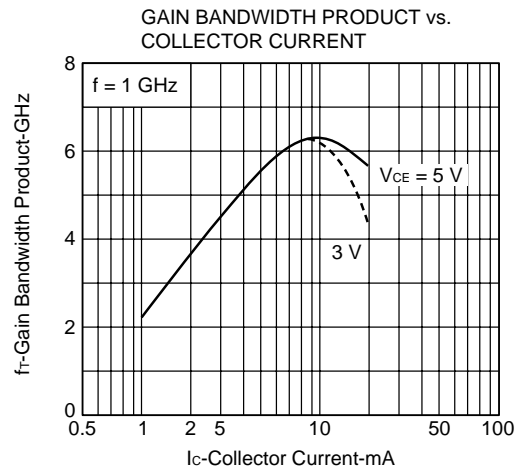
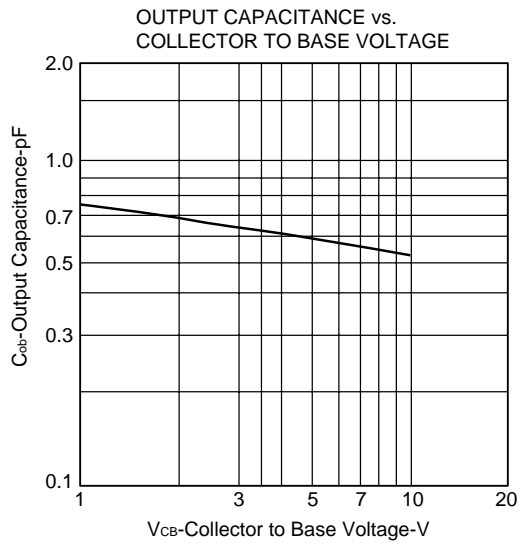
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	$I_{CBO}$			0.1	$\mu\text{A}$	$V_{CB} = 15 \text{ V}, I_E = 0$
Emitter Cutoff Current	$I_{EBO}$			0.1	$\mu\text{A}$	$V_{EB} = 1 \text{ V}, I_C = 0$
Collector Saturation Voltage	$V_{CE(sat)}$			0.5	V	$h_{FE} = 10, I_C = 5 \text{ mA}$
DC Current Gain	$h_{FE}$	40	100	200		$V_{CE} = 5 \text{ V}, I_C = 5 \text{ mA} *1$
Gain Bandwidth Product	$f_T$		5.5		GHz	$V_{CE} = 5 \text{ V}, I_C = 5 \text{ mA}, f = 1.0 \text{ GHz}$
Output Capacitance	$C_{ob}$		0.7	0.9	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:  $PW = 35 \mu\text{s}$ , Duty Cycle  $\leq 2 \%$

$h_{FE}$  Classification

Class	T72	T73	T74
Marking	T72	T73	T74
$h_{FE}$	40 to 80	60 to 120	100 to 200

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



**S-PARAMETER**

V<sub>CE</sub> = 5 V, I<sub>c</sub> = 1 mA

FREQUENCY MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.957	-12.8	3.310	168.1	0.029	81.2	0.988	-5.9
200.00	0.930	-24.4	3.179	157.0	0.056	74.9	0.958	-12.1
300.00	0.878	-35.6	3.059	145.0	0.080	67.6	0.933	-18.2
400.00	0.832	-46.7	2.887	136.0	0.100	61.6	0.900	-22.2
500.00	0.777	-56.0	2.712	127.0	0.117	56.7	0.858	-26.4
600.00	0.714	-64.8	2.533	118.1	0.130	51.7	0.823	-30.8
700.00	0.656	-73.6	2.397	111.0	0.140	49.2	0.791	-33.4
800.00	0.611	-81.2	2.231	104.1	0.150	46.1	0.764	-36.1
900.00	0.570	-89.3	2.109	97.9	0.156	43.6	0.751	-38.5
1000.00	0.537	-96.4	1.962	91.9	0.163	42.3	0.722	-40.5

V<sub>CE</sub> = 5 V, I<sub>c</sub> = 3 mA

FREQUENCY MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.870	-21.3	9.155	160.5	0.028	77.3	0.957	-11.3
200.00	0.783	-39.1	8.201	143.7	0.050	68.7	0.875	-20.9
300.00	0.671	-54.8	7.205	129.5	0.067	62.2	0.795	-28.0
400.00	0.563	-67.6	6.242	119.2	0.079	58.6	0.722	-31.7
500.00	0.506	-77.9	5.428	110.5	0.090	55.8	0.660	-34.9
600.00	0.433	-86.6	4.760	102.8	0.098	54.0	0.617	-37.7
700.00	0.390	-94.9	4.261	96.9	0.107	54.2	0.584	-38.8
800.00	0.349	-103.4	3.829	91.5	0.116	53.8	0.558	-40.2
900.00	0.316	-111.1	3.505	86.5	0.123	53.7	0.546	-41.7
1000.00	0.294	-116.3	3.207	82.2	0.131	53.4	0.525	-42.7

V<sub>CE</sub> = 5 V, I<sub>c</sub> = 5 mA

FREQUENCY MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.787	-27.6	13.507	154.8	0.026	75.7	0.928	-15.2
200.00	0.661	-49.1	11.261	135.2	0.045	66.7	0.798	-25.7
300.00	0.529	-66.0	9.283	120.5	0.059	61.6	0.695	-32.1
400.00	0.441	-79.3	7.647	110.8	0.070	59.5	0.618	-34.3
500.00	0.374	-88.9	6.458	103.1	0.079	59.4	0.563	-36.5
600.00	0.313	-98.4	5.530	96.5	0.088	59.1	0.525	-38.0
700.00	0.284	-105.7	4.900	91.2	0.098	60.0	0.500	-38.6
800.00	0.252	-114.2	4.351	86.7	0.107	59.9	0.481	-39.6
900.00	0.232	-122.5	3.956	82.3	0.118	59.7	0.473	-40.7
1000.00	0.211	-126.6	3.596	78.5	0.127	59.7	0.457	-41.4

V<sub>CE</sub> = 5 V, I<sub>c</sub> = 7 mA

FREQUENCY MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.723	-33.0	16.785	150.2	0.024	70.3	0.897	-18.0
200.00	0.569	-56.4	13.165	129.2	0.041	65.3	0.739	-28.5
300.00	0.437	-73.6	10.387	115.0	0.055	63.3	0.623	-33.6
400.00	0.361	-86.7	8.359	106.1	0.064	62.3	0.559	-34.8
500.00	0.302	-96.7	6.939	99.0	0.073	62.4	0.510	-36.1
600.00	0.252	-106.5	5.917	92.9	0.083	61.9	0.481	-37.1
700.00	0.232	-114.4	5.178	88.3	0.095	62.9	0.460	-37.6
800.00	0.204	-122.2	4.589	84.1	0.103	62.8	0.445	-38.2
900.00	0.189	-131.3	4.150	80.2	0.115	63.2	0.439	-39.5
1000.00	0.175	-136.0	3.774	76.6	0.126	62.7	0.427	-40.3

V<sub>CE</sub> = 5 V, I<sub>c</sub> = 9 mA

FREQUENCY MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.662	-37.3	19.267	146.4	0.024	75.4	0.870	-20.1
200.00	0.497	-62.6	14.383	124.9	0.038	66.2	0.693	-30.0
300.00	0.374	-80.6	11.350	111.3	0.050	63.6	0.587	-33.9
400.00	0.307	-93.7	8.733	102.8	0.061	64.5	0.522	-34.3
500.00	0.254	-103.1	7.194	96.4	0.075	64.5	0.479	-34.9
600.00	0.213	-114.0	6.093	90.7	0.081	64.9	0.455	-36.0
700.00	0.197	-121.0	5.331	86.4	0.092	65.2	0.438	-36.1
800.00	0.178	-129.0	4.702	82.5	0.103	65.0	0.426	-36.9
900.00	0.170	-138.2	4.243	78.7	0.113	64.9	0.421	-38.0
1000.00	0.156	-144.1	3.866	75.4	0.125	64.6	0.410	-39.1

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