

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.

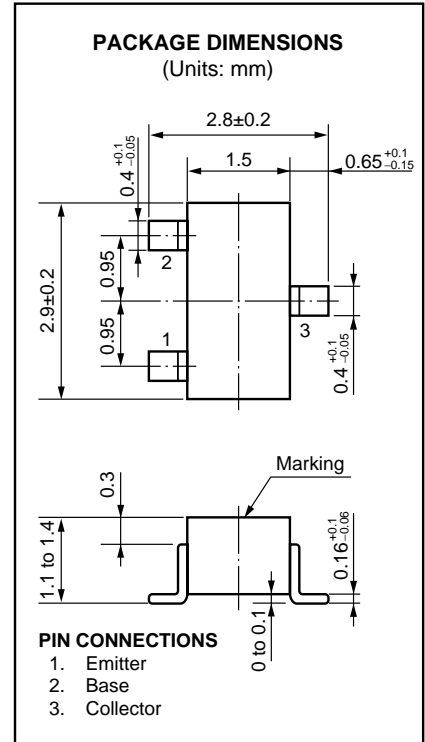
FEATURES

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

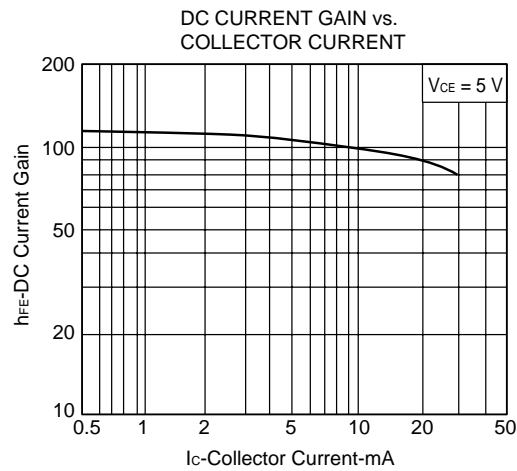
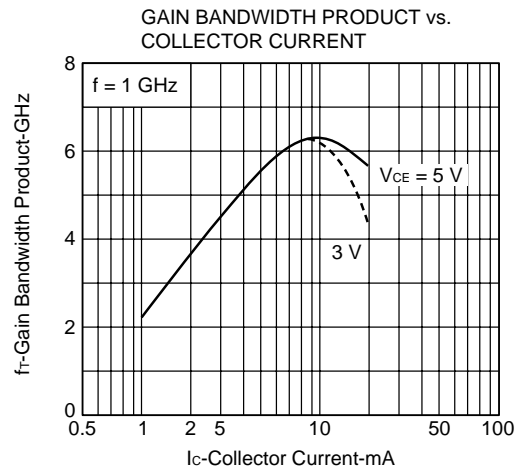
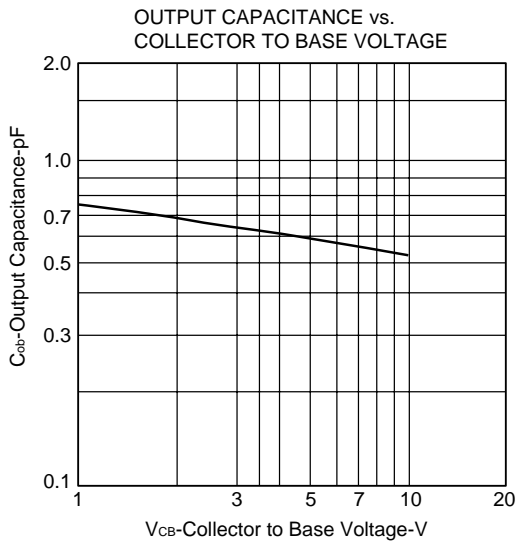
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I_{CBO}			0.1	μA	$V_{CB} = 15 \text{ V, } I_E = 0$
Emitter Cutoff Current	I_{EBO}			0.1	μA	$V_{EB} = 1 \text{ V, } I_C = 0$
Collector Saturation Voltage	$V_{CE(sat)}$			0.5	V	$h_{FE} = 10, I_C = 5 \text{ mA}$
DC Current Gain	h_{FE}	40	100	200		$V_{CE} = 5 \text{ V, } I_C = 5 \text{ mA} *1$
Gain Bandwidth Product	f_T		5.5		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_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	0.957	-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_{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	0.870	-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_{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	0.787	-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_{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	0.723	-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_{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	0.662	-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

[MEMO]

[MEMO]

[MEMO]

No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Corporation. NEC Corporation assumes no responsibility for any errors which may appear in this document.

NEC Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a device described herein or any other liability arising from use of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Corporation or others.

While NEC Corporation has been making continuous effort to enhance the reliability of its semiconductor devices, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC semiconductor device, customers must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features.

NEC devices are classified into the following three quality grades:

"Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.

Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

The quality grade of NEC devices is "Standard" unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact an NEC sales representative in advance.

Anti-radioactive design is not implemented in this product.