

UHF OSCILLATOR AND MIXER
NPN SILICON EPITAXIAL TRANSISTOR
MINI MOLD

DESCRIPTION

The 2SC3545 is an NPN silicon epitaxial transistor intended for use as UHF oscillator and mixer in a tuner of a TV receiver.

The device features stable oscillation and small frequency drift against any change of the supply voltage and the ambient temperature.

It is designed for use in small type equipments especially recommended for Hybrid Integrated Circuit and other applications.

FEATURES

- High Gain Bandwidth Product; $f_T = 2\ 000\ \text{MHz TYP.}$
- Low Collector to Base Time Constant; $C_c \cdot \tau_{cb} = 4\ \text{ps TYP.}$
- Low Feedback Capacitance; $C_{re} = 0.48\ \text{pF TYP.}$

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

Maximum Voltages and Current

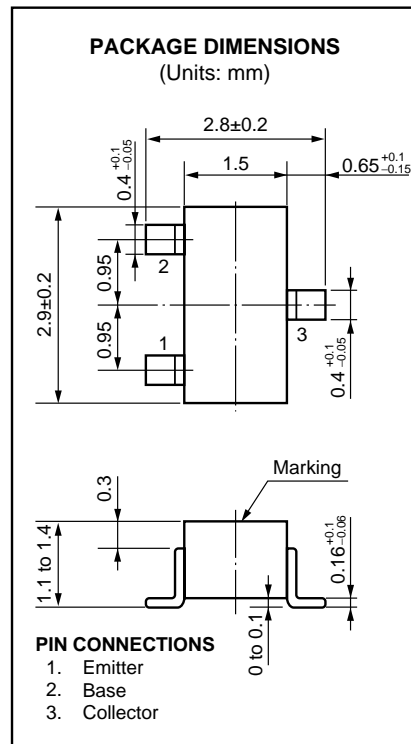
Collector to Base Voltage	V_{CB0}	30	V
Collector to Emitter Voltage	V_{CE0}	15	V
Emitter to Base Voltage	V_{EBO}	3.0	V
Collector Current	I_c	50	mA

Maximum Power Dissipation

Total Power Dissipation	P_T	150	mW
-------------------------	-------	-----	----

Maximum Temperature

Junction Temperature	T_j	125	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +125	$^\circ\text{C}$



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

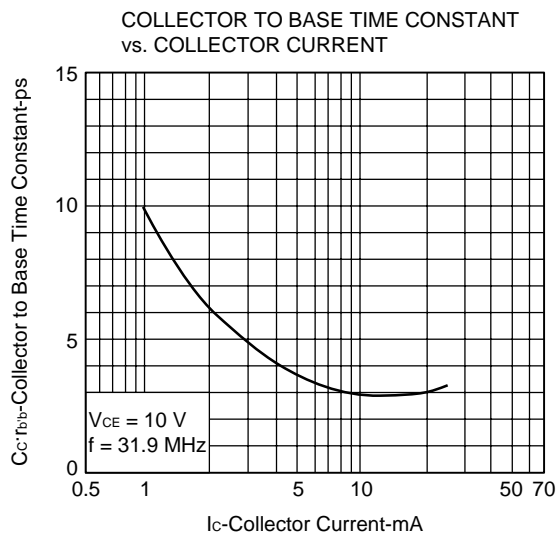
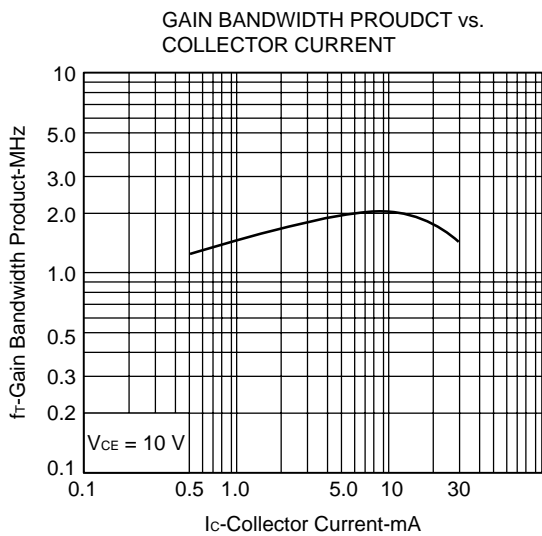
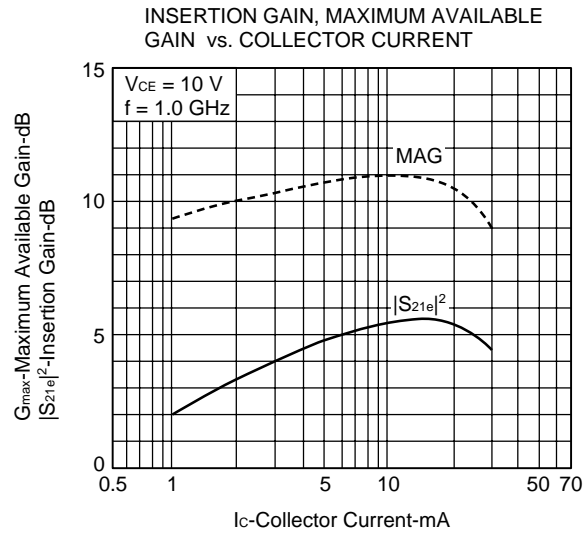
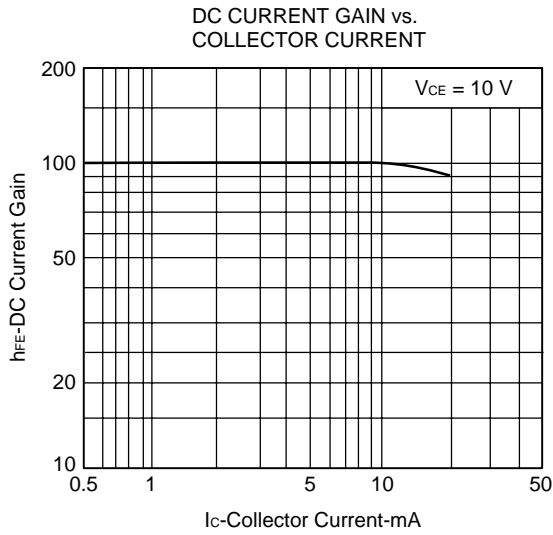
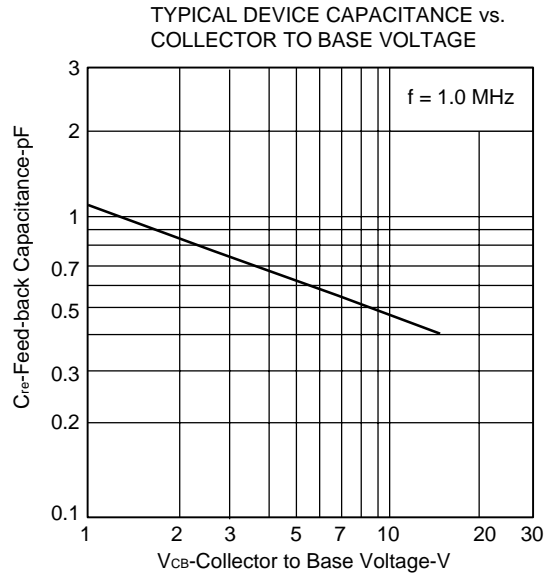
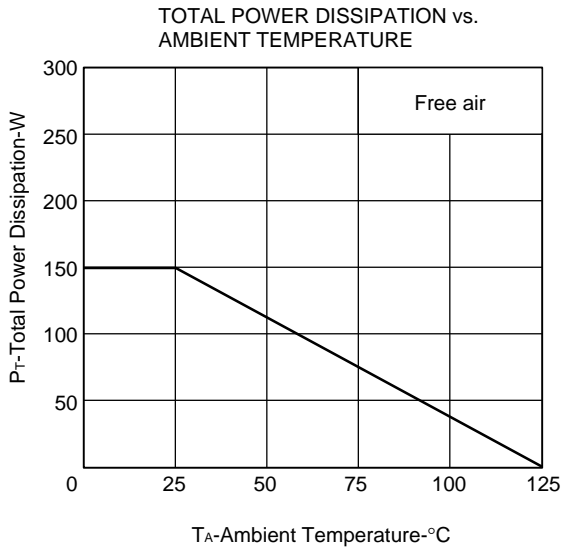
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I_{c0}			0.1	μA	$V_{CB} = 12\ \text{V}, I_E = 0$
DC Current Gain	h_{FE}	50	100	250		$V_{CE} = 10\ \text{V}, I_c = 5.0\ \text{mA}$
Collector Saturation Voltage	$V_{CE(sat)}$			0.5	V	$I_c = 10\ \text{mA}, I_E = 1.0\ \text{mA}$
Gain Bandwidth Product	f_T	1.3	2.0		MHz	$V_{CE} = 10\ \text{V}, I_E = -5.0\ \text{mA}$
Output Capacitance	C_{ob}		0.48	1.0	pF	$V_{CB} = 10\ \text{V}, I_E = 0, f = 1.0\ \text{MHz}$
Collector to Base Time Constant	$C_c \cdot \tau_{cb}$		4	10	ps	$V_{CE} = 10\ \text{V}, I_E = -5.0\ \text{mA}, f = 31.9\ \text{MHz}$

h_{FE} Classification

Class	M/P *	L/Q *	K/R *
Marking	T42	T43	T44
h_{FE}	50 to 100	70 to 140	120 to 250

* Old Specification / New Specification

TYPICAL CHARACTERISTICS (T_A = 25 °C)



S-PARAMETER

$V_{CE} = 10\text{ V}$, $I_c = 5\text{ mA}$, $Z_o = 50\ \Omega$

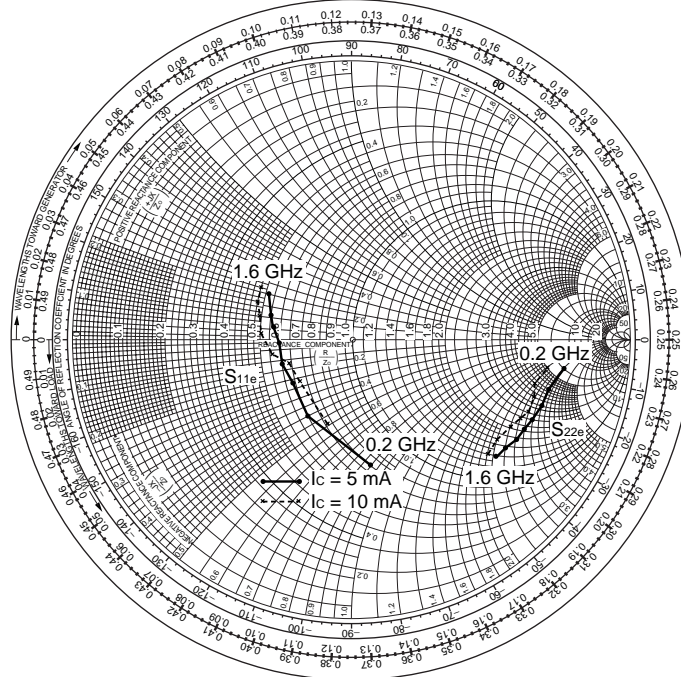
f (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.472	-80.6	7.581	114.1	0.037	60.2	0.780	-8.2
400	0.310	-117.3	4.029	92.9	0.055	55.5	0.723	-15.1
600	0.261	-139.9	2.926	81.7	0.077	60.2	0.721	-18.8
800	0.262	-160.4	2.118	70.2	0.098	62.8	0.698	-22.6
1000	0.270	-176.6	1.860	62.8	0.108	64.6	0.691	-25.1
1200	0.288	172.3	1.504	54.4	0.125	65.7	0.688	-30.7
1400	0.323	162.4	1.413	47.9	0.148	66.4	0.664	-35.1
1600	0.356	151.0	1.201	40.9	0.160	68.0	0.658	-39.3

$V_{CE} = 10\text{ V}$, $I_c = 10\text{ mA}$, $Z_o = 50\ \Omega$

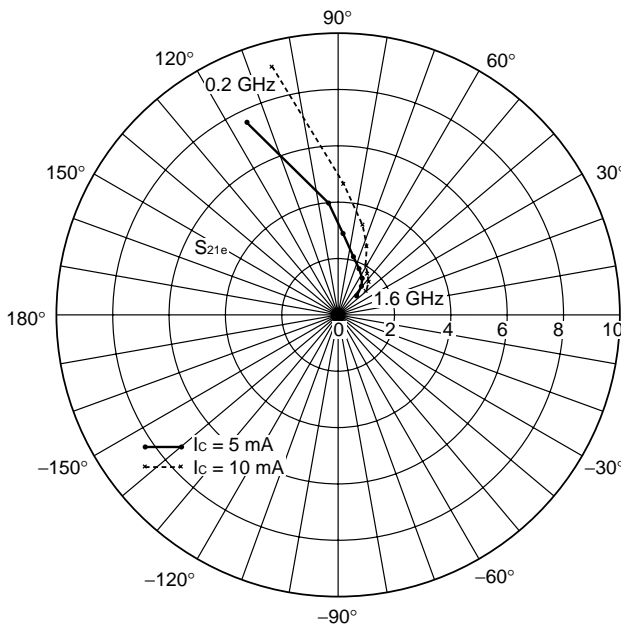
f (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.323	-101.4	8.735	104.9	0.037	49.5	0.711	-8.5
400	0.246	-136.2	4.383	87.4	0.052	65.2	0.693	-13.8
600	0.247	-158.8	3.120	78.0	0.074	67.3	0.696	-16.8
800	0.273	-173.7	2.259	67.2	0.086	68.2	0.679	-20.0
1000	0.299	172.6	1.968	60.1	0.102	69.4	0.671	-23.8
1200	0.314	162.7	1.589	52.5	0.126	70.1	0.663	-26.6
1400	0.353	154.5	1.483	46.3	0.146	70.4	0.648	-33.7
1600	0.380	144.7	1.257	39.5	0.166	70.3	0.648	-38.5

S-PARAMETER

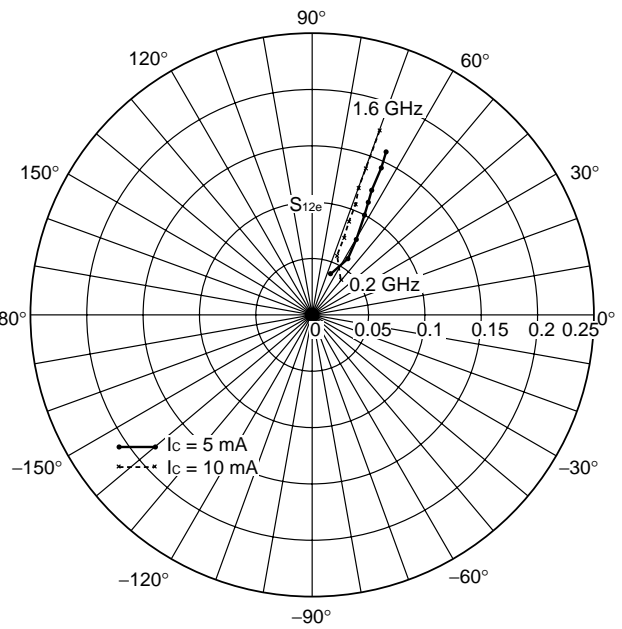
S_{11e}, S_{22e}-FREQUENCY CONDITION V_{CE} = 10 V, 200 MHz Step



S_{21e}-FREQUENCY CONDITION V_{CE} = 10 V, 200 MHz Step



S_{12e}-FREQUENCY CONDITION V_{CE} = 10 V, 200 MHz Step



[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.