

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; $C_C \cdot r_{bb'} = 4\text{ ps}$ TYP.
- Low Feedback Capacitance; $C_{re} = 0.48\text{ pF}$ TYP.

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

Maximum Voltages and Current

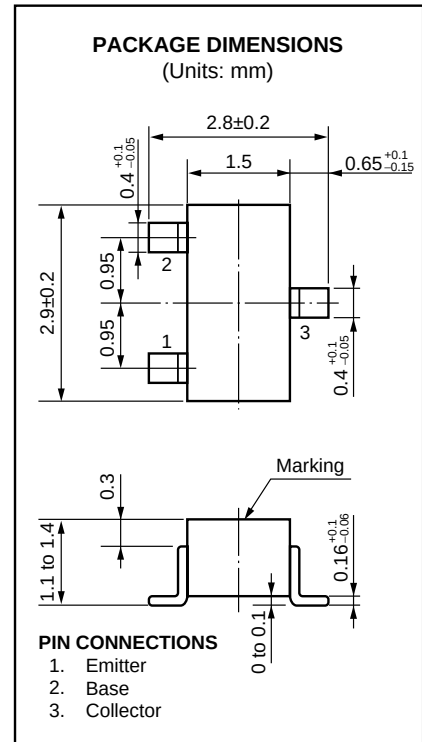
Collector to Base Voltage	V_{CBO}	30	V
Collector to Emitter Voltage	V_{CEO}	15	V
Emitter to Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	50	mA

Maximum Power Dissipation

Total Power Dissipation	P_T	150	mW
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Maximum Temperature

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

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

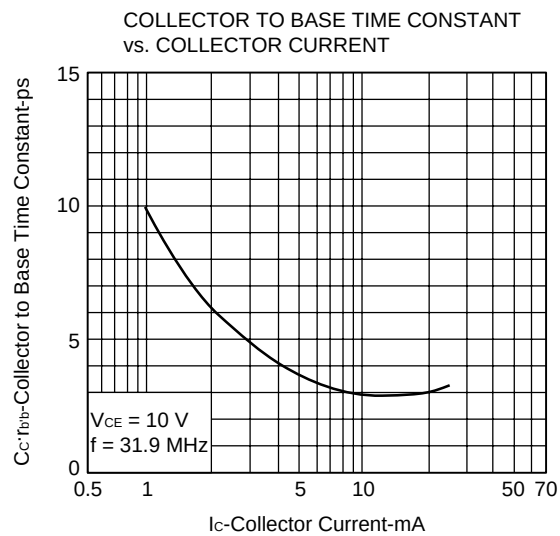
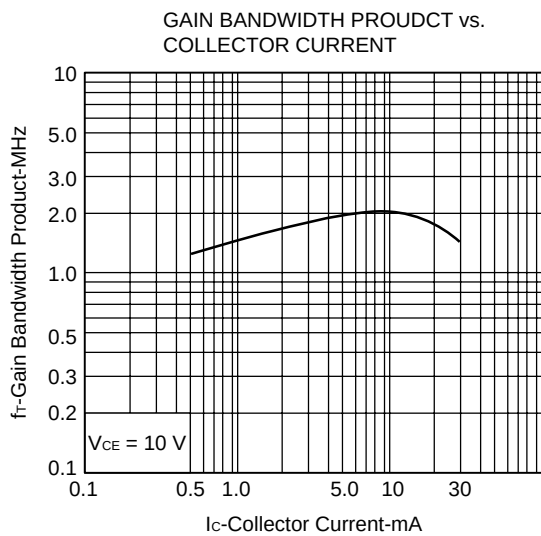
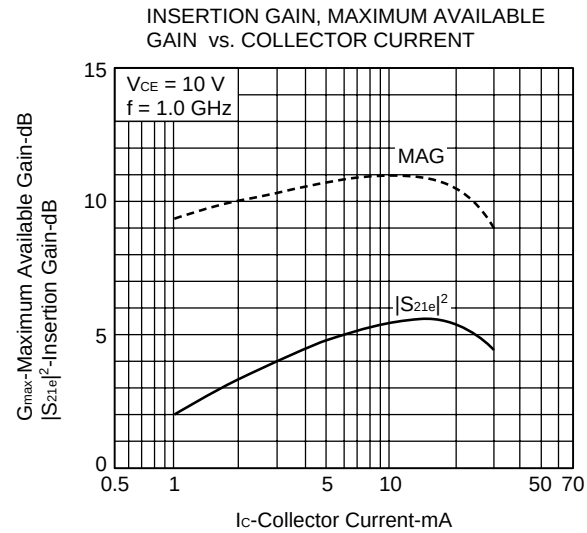
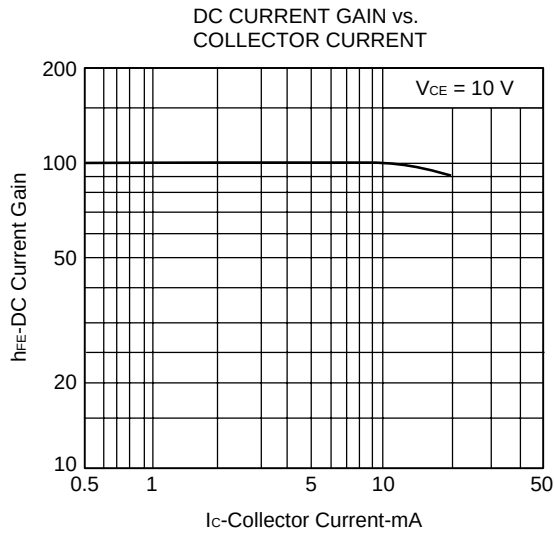
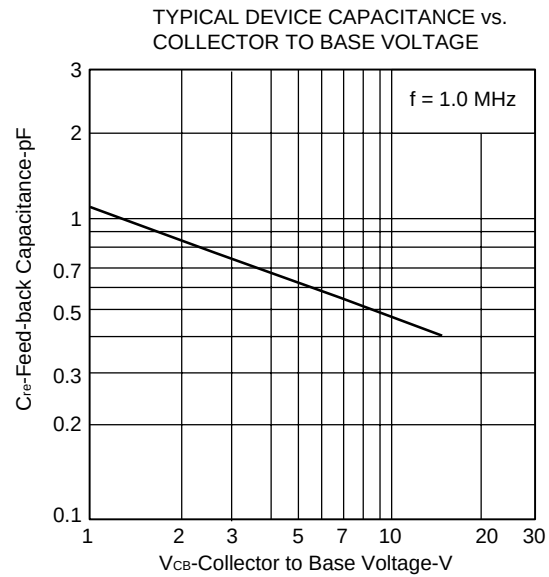
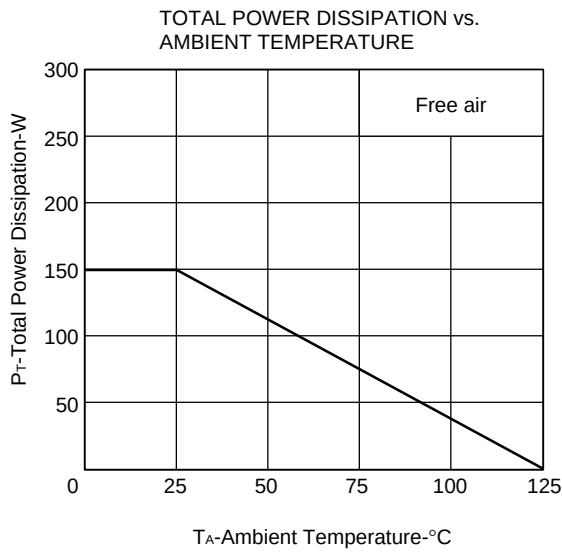
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I_{CBO}			0.1	μA	$V_{CB} = 12\text{ V}, I_E = 0$
DC Current Gain	h_{FE}	50	100	250		$V_{CE} = 10\text{ V}, I_C = 5.0\text{ mA}$
Collector Saturation Voltage	$V_{CE(sat)}$			0.5	V	$I_C = 10\text{ mA}, I_B = 1.0\text{ mA}$
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	$C_C \cdot r_{bb'}$		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 ($T_A = 25^\circ\text{C}$)



S-PARAMETER

$V_{CE} = 10 \text{ V}$, $I_C = 5 \text{ mA}$, $Z_O = 50 \Omega$

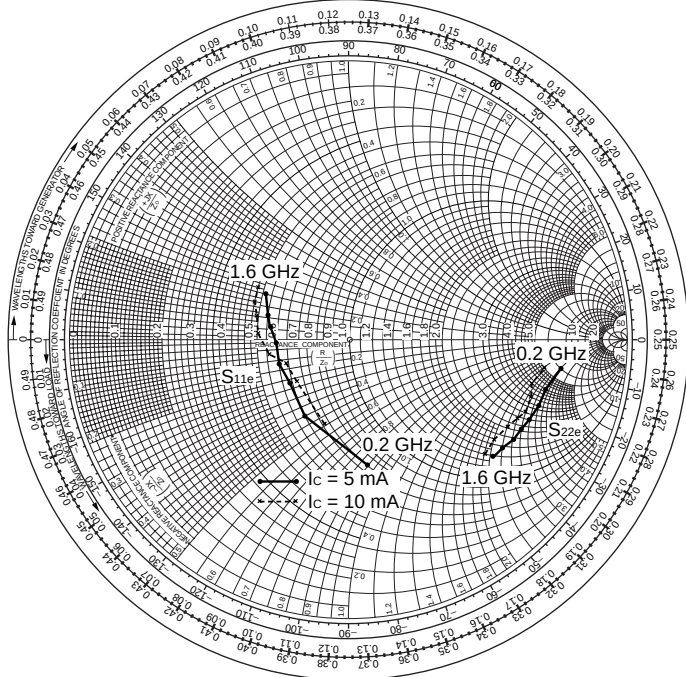
f (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.472	-80.6	7.581	114.1	0.037	60.2	0.780	-8.2
400	0.310	-117.3	4.029	92.9	0.055	55.5	0.723	-15.1
600	0.261	-139.9	2.926	81.7	0.077	60.2	0.721	-18.8
800	0.262	-160.4	2.118	70.2	0.098	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

$V_{CE} = 10 \text{ V}$, $I_C = 10 \text{ mA}$, $Z_O = 50 \Omega$

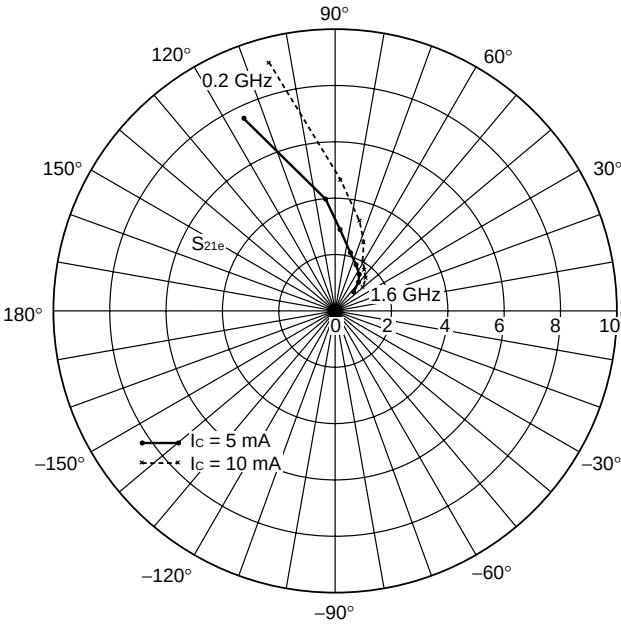
f (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.323	-101.4	8.735	104.9	0.037	49.5	0.711	-8.5
400	0.246	-136.2	4.383	87.4	0.052	65.2	0.693	-13.8
600	0.247	-158.8	3.120	78.0	0.074	67.3	0.696	-16.8
800	0.273	-173.7	2.259	67.2	0.086	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

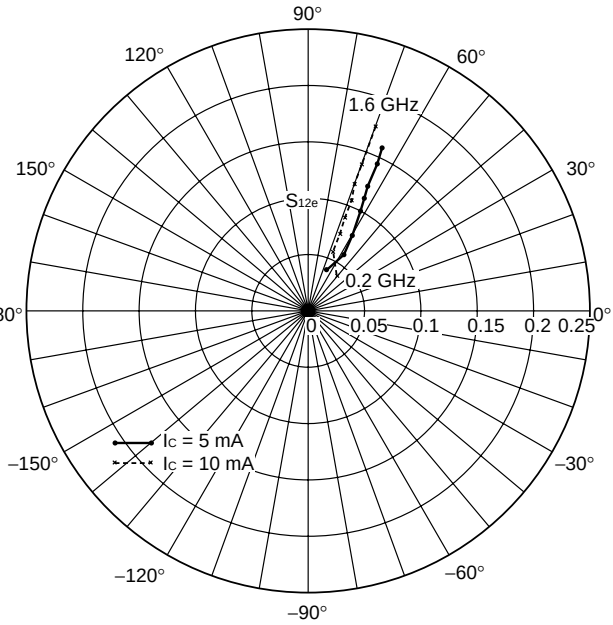
S_{11e} , S_{22e} -FREQUENCY CONDITION $V_{CE} = 10\text{ V}$, 200 MHz Step



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



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



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Anti-radioactive design is not implemented in this product.