

**SS9015**

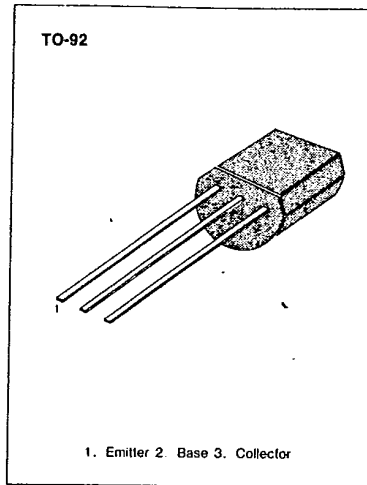
**PNP EPITAXIAL SILICON TRANSISTOR**

**LOW FREQUENCY, LOW NOISE AMPLIFIER**

• Complement to SS9014

**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub> = 25°C)**

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-50	V
Collector-Emitter Voltage	V <sub>CE0</sub>	-45	V
Emitter-Base Voltage	V <sub>EB0</sub>	-5	V
Collector Current	I <sub>c</sub>	-100	mA
Collector Dissipation	P <sub>c</sub>	450	mW
Junction Temperature	T <sub>j</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55~150	°C



**ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25°C)**

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	I <sub>c</sub> = -100μA, I <sub>E</sub> = 0	-50			V
Collector-Emitter Breakdown Voltage	BV <sub>CE0</sub>	I <sub>c</sub> = -1mA, I <sub>B</sub> = 0	-45			V
Emitter-Base Breakdown Voltage	BV <sub>EB0</sub>	I <sub>E</sub> = -100μA, I <sub>C</sub> = 0	-5			V
Collector Cutoff Current	I <sub>CB0</sub>	V <sub>CB</sub> = -50V, I <sub>E</sub> = 0			-50	nA
Emitter Cutoff Current	I <sub>EB0</sub>	V <sub>EB</sub> = -5V, I <sub>C</sub> = 0			-50	nA
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> = -5V, I <sub>C</sub> = -1mA	60	200	600	
Collector-Base Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = -100mA, I <sub>B</sub> = -5mA		-0.2	-0.7	V
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> = -100mA, I <sub>B</sub> = -5mA		-0.82	-1.0	V
Base-Emitter On Voltage	V <sub>BE(on)</sub>	V <sub>CE</sub> = -5V, I <sub>C</sub> = -2mA	-0.6	-0.65	-0.75	V
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> = -10V, I <sub>E</sub> = 0 f = 1MHz		4.5	7.0	pF
Current Gain-Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = -5V, I <sub>C</sub> = -10mA	100	190		MHz
Noise Figure	NF	V <sub>CE</sub> = -5V, I <sub>C</sub> = -0.2mA f = 1KHz, R <sub>s</sub> = 1KΩ		0.7	10	dB

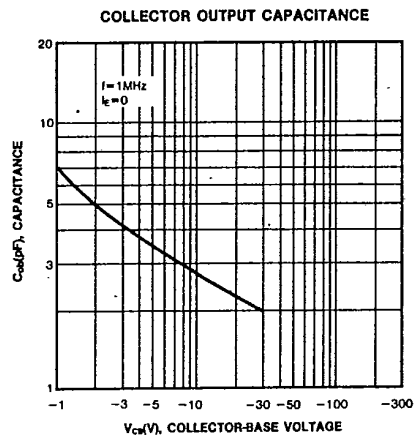
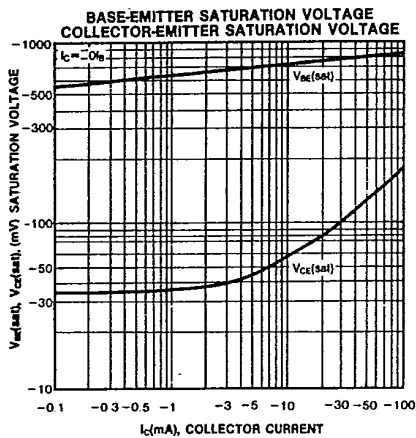
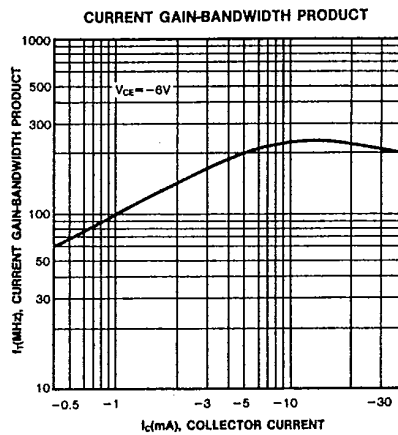
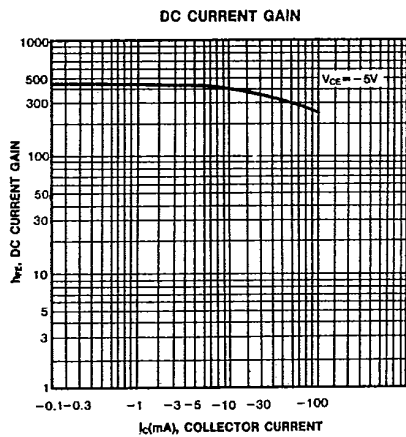
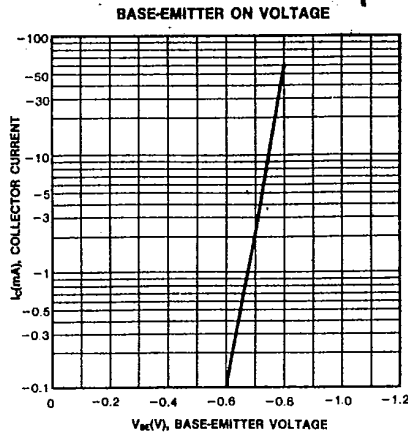
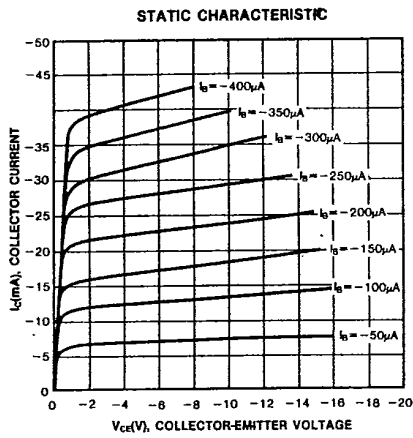
**h<sub>FE</sub> CLASSIFICATION**

Classification	A	B	C
h <sub>FE</sub>	60-150	100-300	200-600

SS9015

PNP EPTAXIAL SILICON TRANSISTOR

T-29-19



T-31-19

**SS9016**

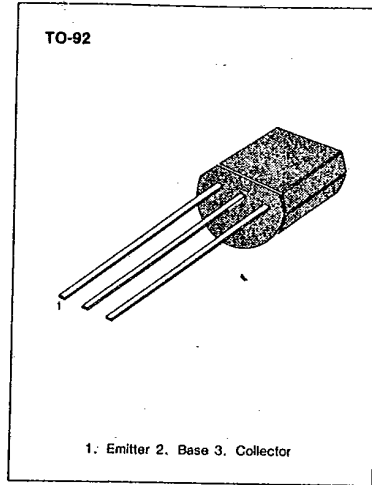
**NPN EPITAXIAL SILICON TRANSISTOR**

**AM CONVERTER, FM/RF AMPLIFIER OF LOW NOISE.**

• High total power dissipation. (PT=400mW)

**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub>=25°C)**

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V <sub>CB0</sub>	30	V
Collector-Emitter Voltage	V <sub>CE0</sub>	20	V
Emitter-Base Voltage	V <sub>EB0</sub>	4	V
Collector Current	I <sub>c</sub>	25	mA
Collector Dissipation	P <sub>c</sub>	400	mW
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55~150	°C



**ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C)**

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	I <sub>c</sub> =100μA, I <sub>E</sub> =0	30			V
Collector-Emitter Breakdown Voltage	BV <sub>CE0</sub>	I <sub>c</sub> =1mA, I <sub>B</sub> =0	20			V
Emitter-Base Breakdown Voltage	BV <sub>EB0</sub>	I <sub>E</sub> =100μA, I <sub>C</sub> =0	4			V
Collector Cutoff Current	I <sub>CB0</sub>	V <sub>CB</sub> =30V, I <sub>E</sub> =0			100	nA
Emitter Cutoff Current	I <sub>EB0</sub>	V <sub>EB</sub> =3V, I <sub>C</sub> =0			100	nA
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> =5V, I <sub>C</sub> =1mA	28	90	198	
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =10mA, I <sub>B</sub> =1mA		0.1	0.3	V
Base-Emitter On Voltage	V <sub>BE (on)</sub>	V <sub>CE</sub> =5V, I <sub>C</sub> =1mA		0.72		V
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =10V, I <sub>E</sub> =0 f=1MHz		1.2	1.6	pF
Current Gain-Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> =5V, I <sub>C</sub> =1mA	400	620		MHz
Noise Figure	NF	V <sub>CE</sub> =5V I <sub>C</sub> =1.0mA f=100MHz, R <sub>s</sub> =50Ω		3.0	5.0	dB

**h<sub>FE</sub> CLASSIFICATION**

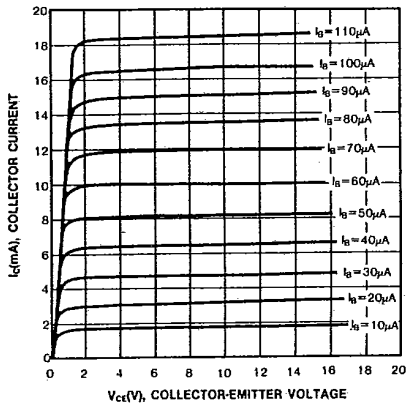
Classification	D	E	F	G	H	I
h <sub>FE</sub>	28-45	39-60	54-80	72-108	97-146	132-198

SS9016

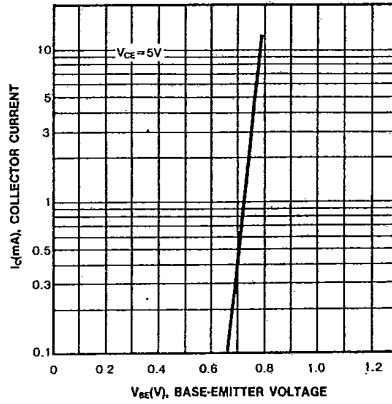
NPN EPITAXIAL SILICON TRANSISTOR

T-31-19

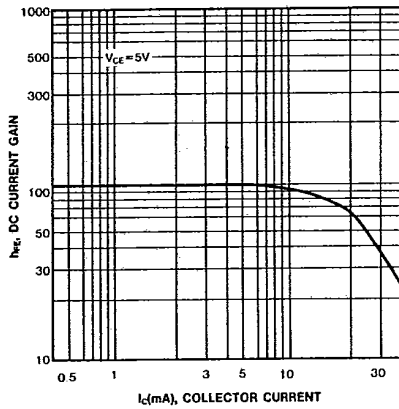
STATIC CHARACTERISTIC



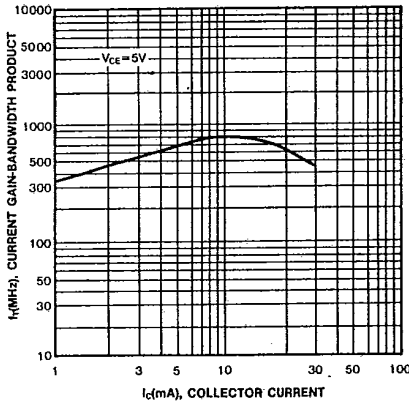
BASE-EMITTER ON VOLTAGE



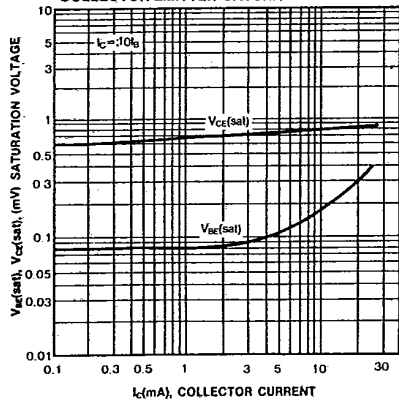
DC CURRENT GAIN



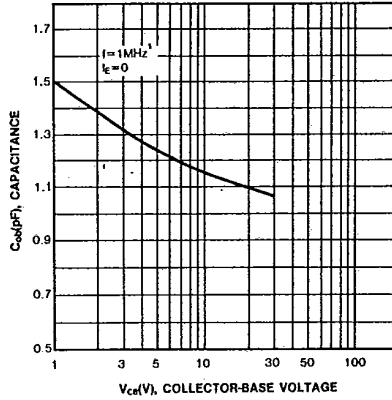
CURRENT GAIN-BANDWIDTH PRODUCT



BASE-EMITTER SATURATION VOLTAGE  
COLLECTOR-EMITTER SATURATION VOLTAGE



COLLECTOR OUTPUT CAPACITANCE



**SS9018**

**NPN EPITAXIAL SILICON TRANSISTOR**

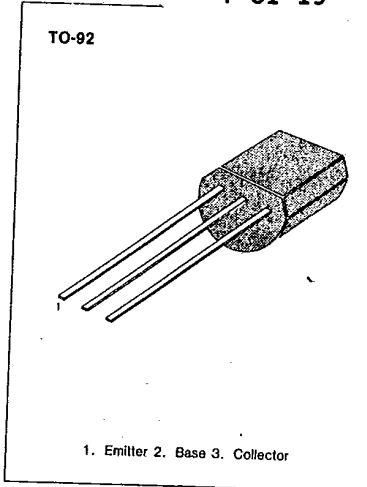
AM/FM IF AMPLIFIER, LOCAL OSCILLATOR OF FM/VHF TUNER

• High Current Gain Bandwidth Product  $f_T=1,100$  MHz (Typ)

T-31-19

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

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CBO}$	30	V
Collector-Emitter Voltage	$V_{CEO}$	15	V
Emitter-Base Voltage	$V_{EBO}$	5	V
Collector Current	$I_C$	50	mA
Collector Dissipation	$P_C$	400	mW
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55~150	$^\circ\text{C}$



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

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage	$BV_{CBO}$	$I_C=100\mu\text{A}, I_E=0$	30			V
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	$I_C=1.0\text{mA}, I_B=0$	15			V
Emitter-Base Breakdown Voltage	$BV_{EBO}$	$I_E=100\mu\text{A}, I_C=0$	5			V
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=12\text{V}, I_E=0$			50	nA
DC Current Gain	$h_{FE}$	$V_{CE}=5\text{V}, I_C=1.0\text{mA}$	28	100	198	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=10\text{mA}, I_B=1\text{mA}$			0.5	V
Output Capacitance	$C_{ob}$	$V_{CB}=10\text{V}, I_E=0$ $f=1\text{MHz}$		1.3	1.7	pF
Current Gain-Bandwidth Product	$f_T$	$V_{CE}=5\text{V}, I_C=5\text{mA}$	700	1100		MHz

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**$h_{FE}$  CLASSIFICATION**

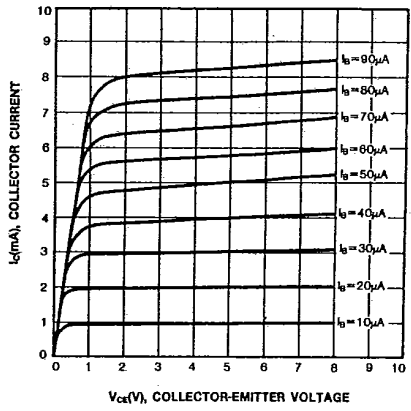
Classification	D	E	F	G	H	I
$h_{FE}$	28-45	39-60	54-80	72-108	97-146	132-198

SS9018

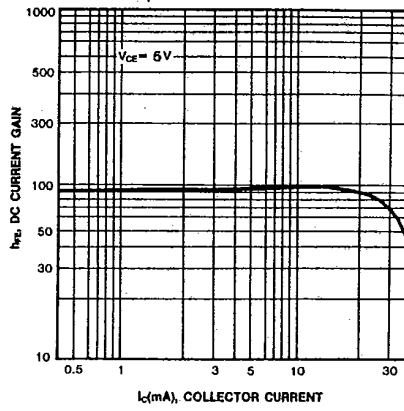
NPN EPITAXIAL SILICON TRANSISTOR

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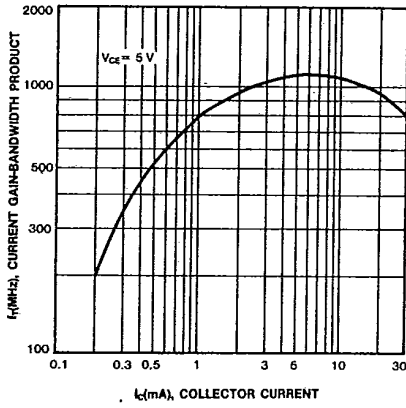
STATIC CHARACTERISTIC



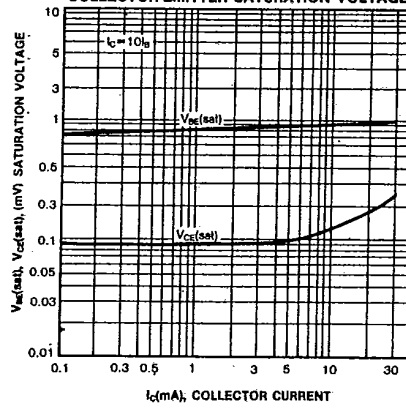
DC CURRENT GAIN



CURRENT GAIN-BANDWIDTH PRODUCT



BASE-EMITTER SATURATION VOLTAGE  
COLLECTOR-EMITTER SATURATION VOLTAGE



OUTPUT CAPACITANCE

