NEC
ELECTRON DEVICE

PNP SILICON TRANSISTOR
2SA1005

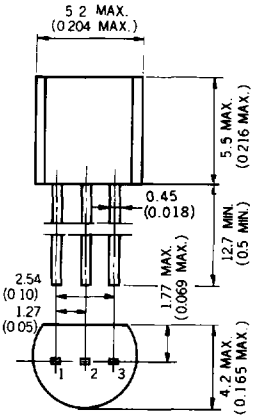
2

DESCRIPTION The 2SA1005 is designed for use in RF amplifier, conv., and oscillator of FM tuner.

FEATURES

- High gain bandwidth product: f_T = 400 MHz TYP.
  @V_{CE} = −10 V, I_E = 1.0 mA
- Small output capacitance: C_{ob} = 1.1 pF TYP.
  @V_{CB} = −10 V, f = 1.0 MHz
- Low noise figure: NF = 3.5 dB TYP.

PACKAGE DIMENSIONS
in millimeters (inches)



1. EMITTER
2. COLLECTOR
3. BASE

EIAJ : SC-43
JEDEC : TO-92
IEC : PA33

ABSOLUTE MAXIMUM RATINGS

Maximum Temperatures

Storage Temperature . . . . . −55 to +125 °C

Junction Temperature . . . . . +125 °C Maximum

Maximum Power Dissipation (Ta = 25 °C)

Total Power Dissipation . . . . . 250 mW

Maximum Voltages and Currents (Ta = 25 °C)

V_{CBO}	Collector to Base Voltage	−40	V
V_{CEO}	Collector to Emitter Voltage	−40	V
V_{EBO}	Emitter to Base Voltage	−5.0	V
I_C	Collector Current	−30	mA
I_B	Base Current	−20	mA

ELECTRICAL CHARACTERISTICS (Ta = 25 °C)

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
I_{CBO}	Collector Cutoff Current			−100	nA	V_{CB} = −40 V, I_E = 0
I_{EBO}	Emitter Cutoff Current			−100	nA	V_{EB} = −4.0 V, I_C = 0
h_{FE}	DC Current Gain	40	90	180	−	V_{CE} = −10 V, I_C = −1.0 mA
V_{BE}	Base to Emitter Voltage	−0.67	−0.72		V	V_{CE} = −10 V, I_C = −1.0 mA
$V_{CE(sat)}$	Collector Saturation Voltage		−0.09	−0.3	V	I_C = −10 mA, I_B = −1.0 mA
f_T	Gain Bandwidth Product	250	400		MHz	V_{CE} = −10 V, I_E = 1.0 mA
C_{ob}	Output Capacitance		1.1	2.0	pF	V_{CB} = −10 V, I_E = 0, f = 1.0 MHz
$C_{c\cdot rb'b}$	Collector to Base Time Constant			20	ps	V_{CE} = −10 V, I_E = 1.0 mA, f = 31.9 MHz
NF	Noise Figure		3.5		dB	V_{CE} = −10 V, I_C = −1.0 mA, R_G = 500 Ω, f = 1.0 MHz

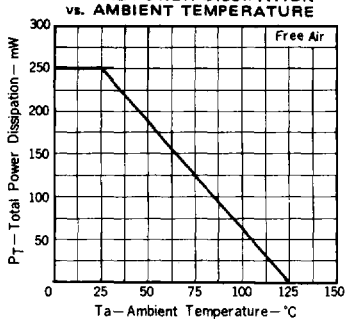
Classification of h_{FE}

Rank	M	L	K
Range	40 − 80	60 − 120	90 − 180

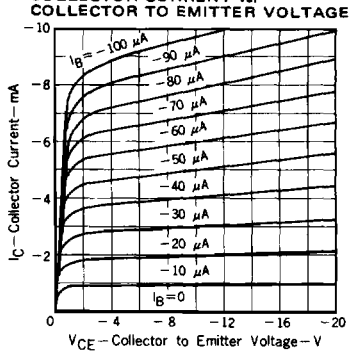
h_{FE} Test Conditions : V_{CE} = −10 V, I_C = −1.0 mA

TYPICAL CHARACTERISTICS (Ta = 25 °C unless otherwise noted)

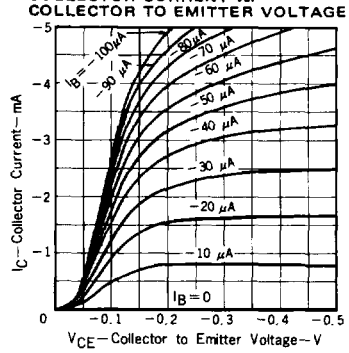
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



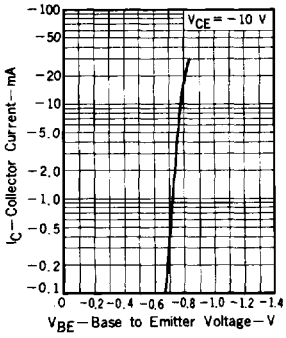
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



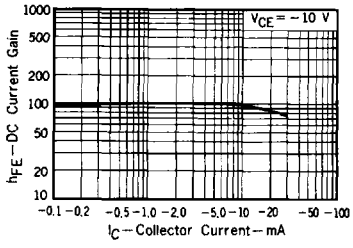
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



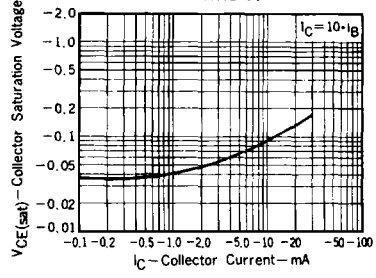
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



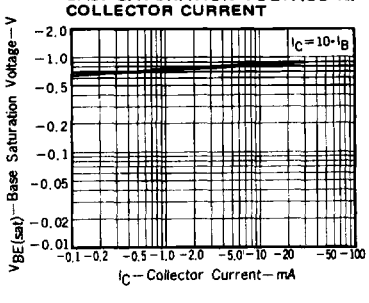
DC CURRENT GAIN vs. COLLECTOR CURRENT



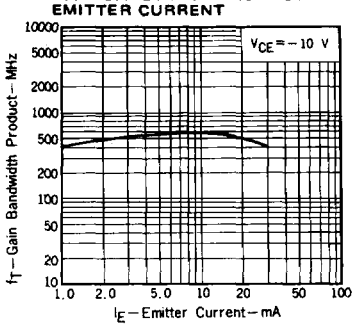
COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



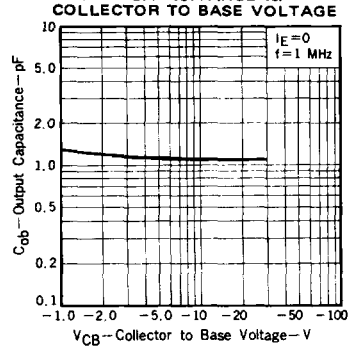
BASE SATURATION VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



INPUT CAPACITANCE vs.
EMITTER TO BASE VOLTAGE