NEC
ELECTRON DEVICE

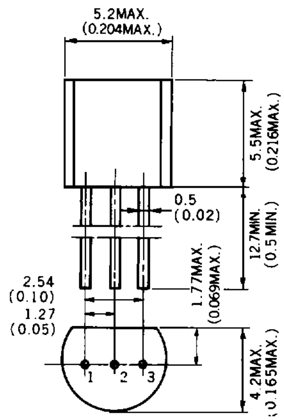
NPN SILICON TRANSISTOR
2SC1222

DESCRIPTION The 2SC1222 is designed for use in AF low noise amplifier of a high-class STEREO SET, RADIO and TAPE RECORDER.

FEATURES

- High h_{FE} and Excellent h_{FE} Linearity
  - h_{FE} (I_C = 0.5mA, V_{CE} = 3V) : 500 TYP.
  - h_{FE1} (0.1mA) / h_{FE2} (1.0mA) (V_{CE} = 3V) : 0.92 TYP.
- Low Noise Voltage
  - NV : 22 mV TYP.

PACKAGE DIMENSIONS
in millimeters (inches)



1. EMITTER
2. COLLECTOR
3. BASE

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

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

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
- V_{CBO} Collector to Base Voltage . . . . 60 V
- V_{CEO} Collector to Emitter Voltage . . . . 50 V
- V_{EBO} Emitter to Base Voltage . . . . 5.0 V
- I_C Collector Current . . . . 100 mA
- I_B Base Current . . . . 20 mA

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
h_{FE1}	DC Current Gain	170	470		–	V_{CE}=3.0V, I_C=0.1mA
h_{FE2}	DC Current Gain	225	500	1000	–	V_{CE}=3.0V, I_C=0.5mA
NF_1	Noise Figure		2.8	10	dB	V_{CE}=6.0V, I_C=0.3mA, R_G=10kΩ, f=10Hz
NF_2	Noise Figure		0.8	3.0	dB	V_{CE}=6.0V, I_C=0.3mA, R_G=10kΩ, f=100Hz
NV	Noise Voltage		22	30	mV	See test circuit
I_{CBO}	Collector Cutoff Current			50	nA	V_{CB}=60V, I_E=0
I_{CEO}	Collector Cutoff Current			1.0	μA	V_{CE}=40V, I_B=0
I_{EBO}	Emitter Cutoff Current			50	nA	V_{EB}=5.0V, I_C=0
V_{BE}	Base to Emitter Voltage	0.55	0.58	0.65	V	V_{CE}=3.0V, I_C=0.5mA
$V_{CE(sat)}$	Collector Saturation Voltage		0.13	0.3	V	I_C=100mA, I_B=10mA
$V_{BE(sat)}$	Base Saturation Voltage		0.86	1.0	V	I_C=100mA, I_B=10mA
f_T	Gain Bandwidth Product	50	100		MHz	V_{CE}=6.0V, I_E=-1.0mA
C_{ob}	Output Capacitance		3.5	5.0	pF	V_{CB}=6.0V, I_E=0, f=1.0MHz

Classification of h_{FE}

Rank	F	E	U
Range	225 – 450	350 – 700	500 – 1000

h_{FE} Test Conditions : V_{CE} = 3.0V, I_C = 0.5mA

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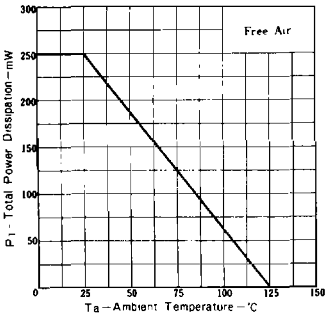
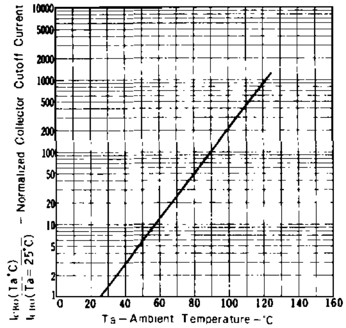
TYPICAL CHARACTERISTICS (Ta = 25°C unless otherwise noted)

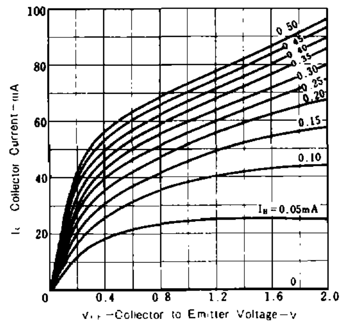
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



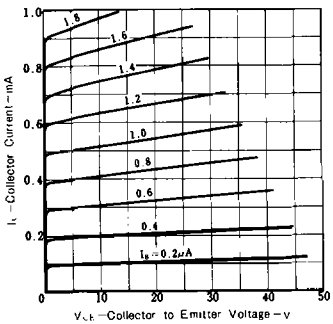
NORMALIZED COLLECTOR CUTOFF CURRENT vs. AMBIENT TEMPERATURE



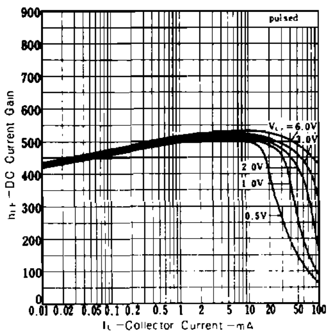
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



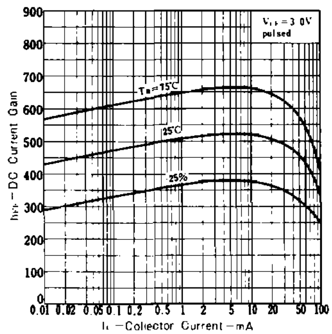
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



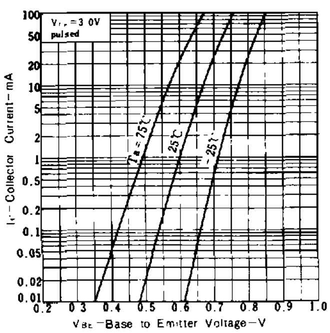
DC CURRENT GAIN vs. COLLECTOR CURRENT



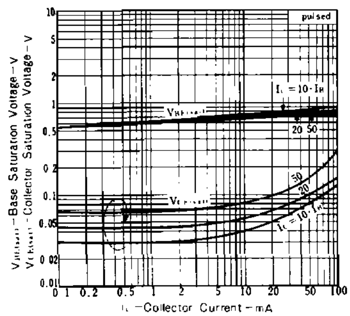
DC CURRENT GAIN vs. COLLECTOR CURRENT



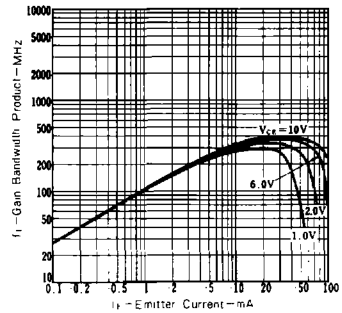
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



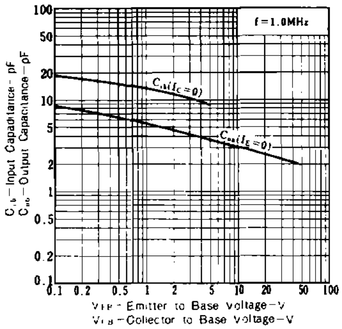
COLLECTOR AND BASE SATURATION VOLTAGE vs. COLLECTOR CURRENT



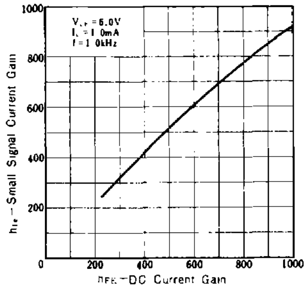
GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



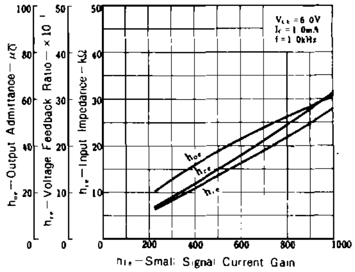
INPUT AND OUTPUT CAPACITANCE vs. REVERSE VOLTAGE



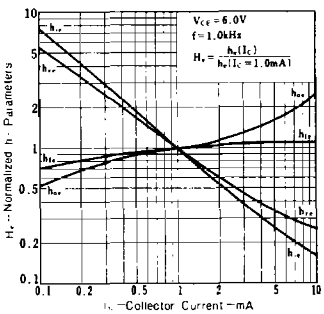
SMALL SIGNAL CURRENT GAIN vs. DC CURRENT GAIN



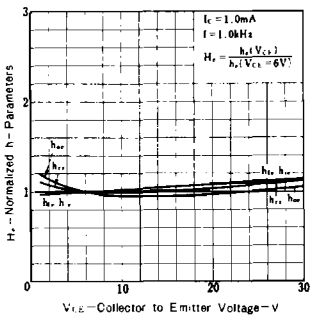
INPUT IMPEDANCE, VOLTAGE FEEDBACK RATIO AND OUTPUT ADMITTANCE vs. SMALL SIGNAL CURRENT GAIN



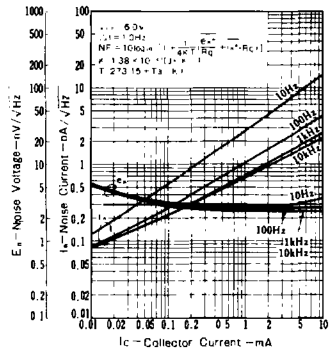
NORMALIZED h-PARAMETERS vs. COLLECTOR CURRENT



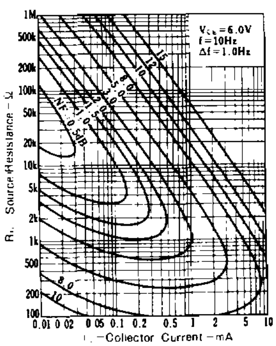
NORMALIZED h-PARAMETERS vs. COLLECTOR TO EMITTER VOLTAGE



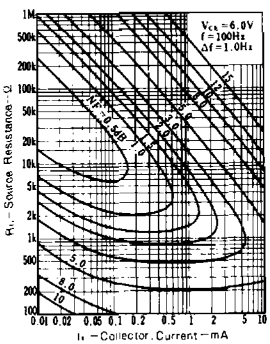
E_n AND I_n vs. COLLECTOR CURRENT



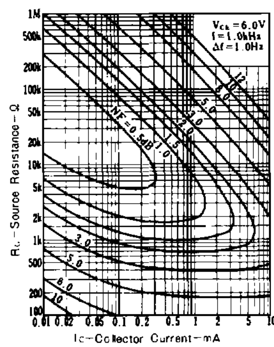
NOISE FIGURE MAP 1



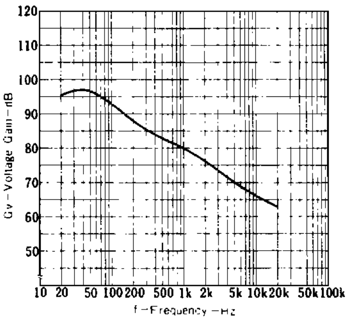
NOISE FIGURE MAP 2



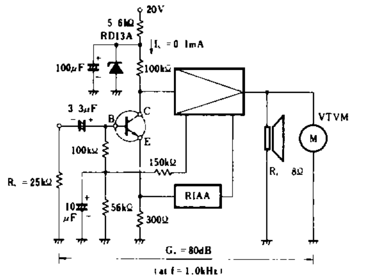
NOISE FIGURE MAP 3



VOLTAGE GAIN vs. FREQUENCY



NOISE VOLTAGE TEST CIRCUIT



$V_{CE} \doteqdot 3V$, $I_C = 0.1mA$, $R_G = 25k\Omega$, $G_V = 80dB$ at $f = 1.0kHz$ · RIAA