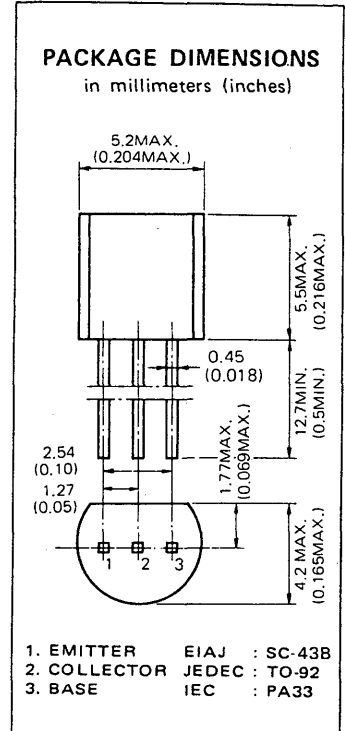


**DESCRIPTION** The 2SA990 is designed for use in driver stage of AF amplifier.

**FEATURE** • High  $h_{FE}$ .  $h_{FE}$  : 400 TYP. ( $V_{CE} = -6.0$  V,  $I_C = -1.0$  mA)

**ABSOLUTE MAXIMUM RATINGS**

- Maximum Temperatures
  - Storage Temperature . . . . . -55 to +125 °C
  - Junction Temperature . . . . . +125 °C Maximum
- Maximum Power Dissipation ( $T_a = 25$  °C)
  - Total Power Dissipation . . . . . 250 mW
- Maximum Voltages and Currents ( $T_a = 25$  °C)
  - $V_{CBO}$  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 ( $T_a = 25$  °C)**

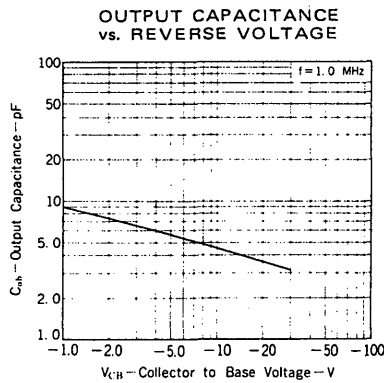
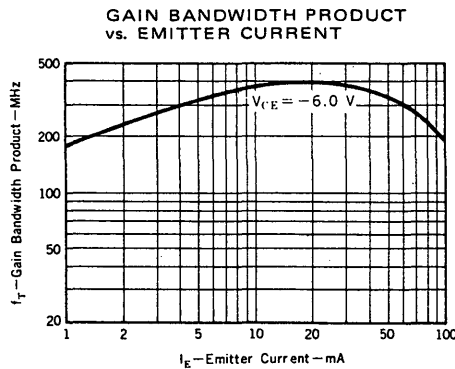
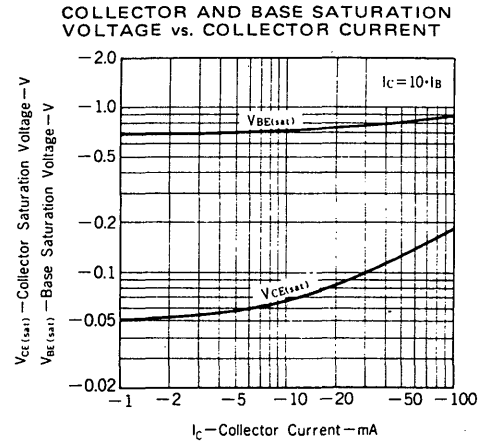
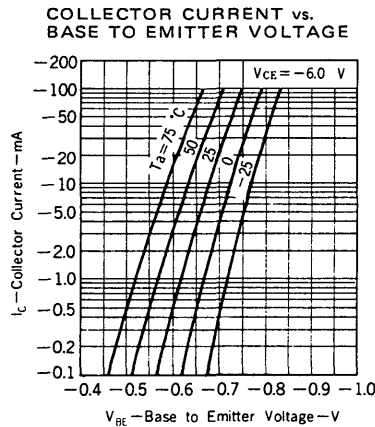
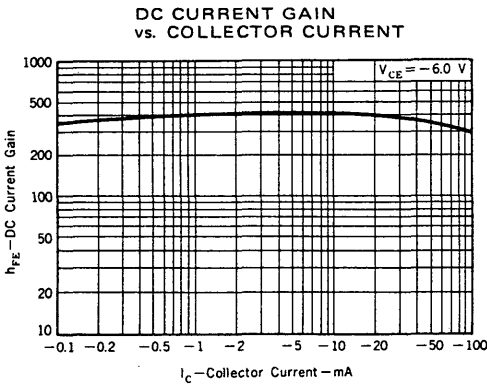
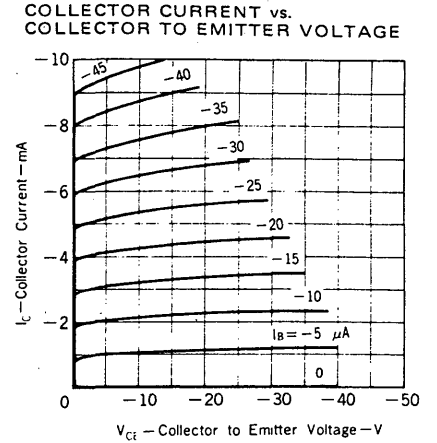
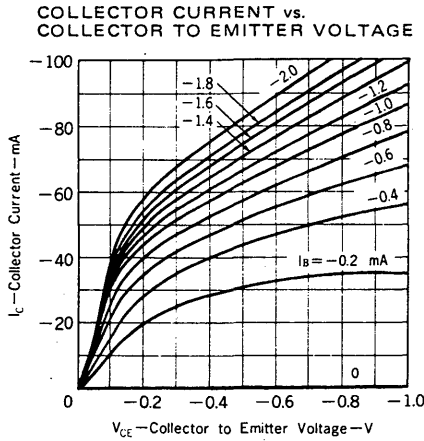
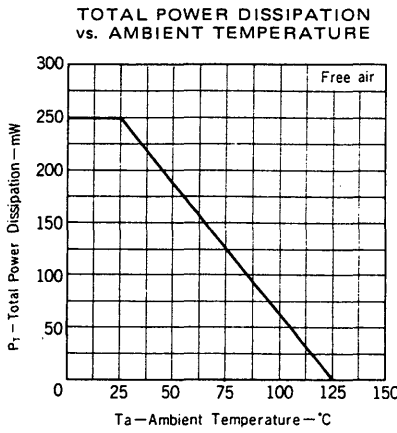
SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
$h_{FE1}$	DC Current Gain	150	380		—	$V_{CE} = -6.0$ V, $I_C = -0.1$ mA
$h_{FE2}$	DC Current Gain	200	400	800	—	$V_{CE} = -6.0$ V, $I_C = -1.0$ mA
$f_T$	Gain Bandwidth Product	50	180		MHz	$V_{CE} = -6.0$ V, $I_E = 1.0$ mA
$C_{ob}$	Output Capacitance		4.5	6.0	pF	$V_{CB} = -10$ V, $I_E = 0$ , $f = 1.0$ MHz
NV	Noise Voltage		25	40	mV	$V_{CE} = -5.0$ V, $I_C = -1.0$ mA, $R_G = 100$ k $\Omega$ , $G_V = 80$ dB, $f = 10$ Hz to 1.0 kHz
$I_{CBO}$	Collector Cutoff Current			-100	nA	$V_{CB} = -60$ V, $I_E = 0$
$I_{EBO}$	Emitter Cutoff Current			-100	nA	$V_{EB} = -5.0$ V, $I_C = 0$
$V_{BE}$	Base to Emitter Voltage	-0.58	-0.62	-0.68	V	$V_{CE} = -6.0$ V, $I_C = -1.0$ mA
$V_{CE(sat)}$	Collector Saturation Voltage		-0.18	-0.30	V	$I_C = -100$ mA, $I_B = -10$ mA

**Classification of  $h_{FE2}$**

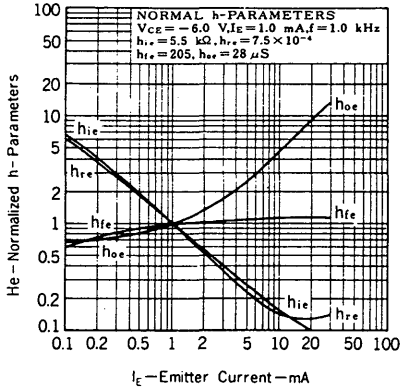
Rank	P	F	E
Range	200 - 400	300 - 600	400 - 800

$h_{FE2}$  Test Conditions :  $V_{CE} = -6.0$  V,  $I_C = -1.0$  mA

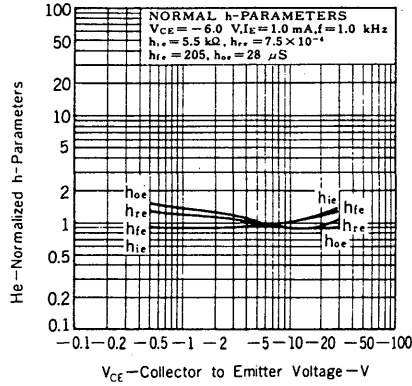
TYPICAL CHARACTERISTICS (Ta = 25 °C unless otherwise noted)



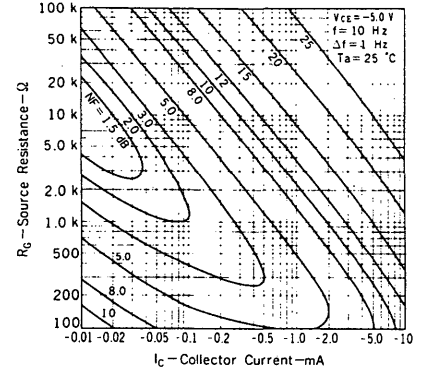
NORMALIZED h-PARAMETERS vs. EMITTER CURRENT



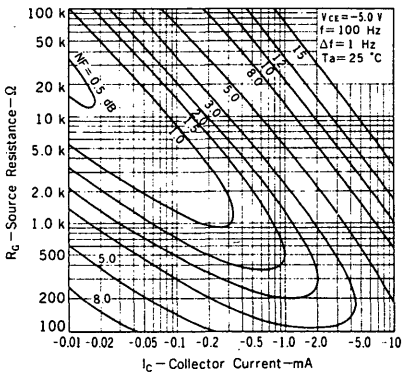
NORMALIZED h-PARAMETERS vs. COLLECTOR TO EMITTER VOLTAGE



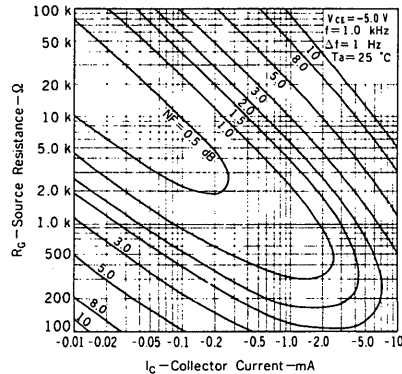
NOISE FIGURE MAP 1



NOISE FIGURE MAP 2



NOISE FIGURE MAP 3



NOISE FIGURE MAP 4

