

TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process)

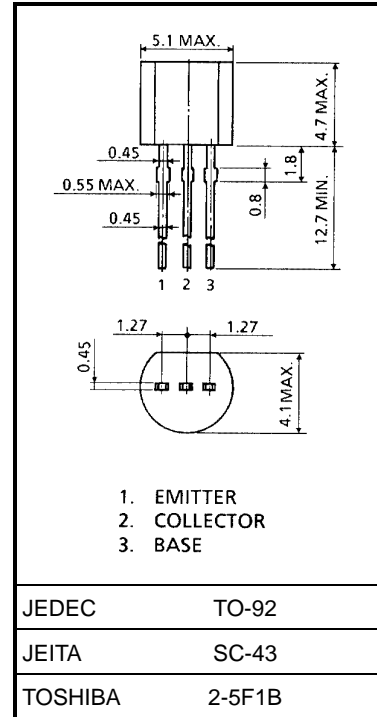
2SA970

Low Noise Audio Amplifier Applications

- Low noise: $NF = 3\text{dB (typ.)}$ $R_G = 100\ \Omega$, $V_{CE} = -6\ \text{V}$, $I_C = -100\ \mu\text{A}$, $f = 1\ \text{kHz}$
 : $NF = 0.5\text{dB (typ.)}$ $R_G = 1\ \text{k}\Omega$, $V_{CE} = -6\ \text{V}$, $I_C = -100\ \mu\text{A}$, $f = 1\ \text{kHz}$
- High DC current gain: $h_{FE} = 200\sim 700$
- High breakdown voltage: $V_{CEO} = -120\ \text{V}$
- Low pulse noise. Low $1/f$ noise

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	-120	V
Collector-emitter voltage	V_{CEO}	-120	V
Emitter-base voltage	V_{EBO}	-5	V
Collector current	I_C	-100	mA
Base current	I_B	-20	mA
Collector power dissipation	P_C	300	mW
Junction temperature	T_j	125	°C
Storage temperature range	T_{stg}	-55~125	°C

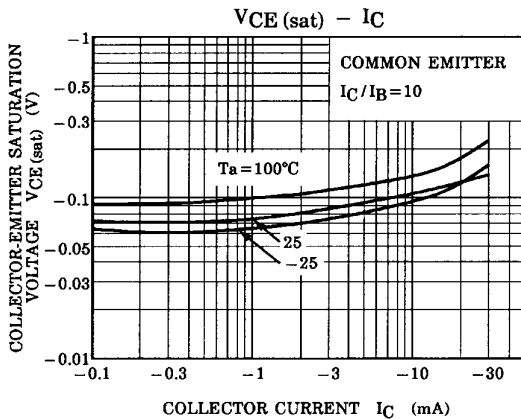
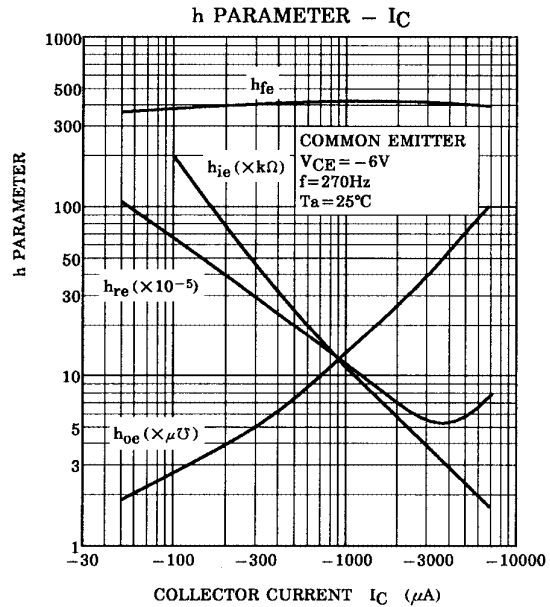
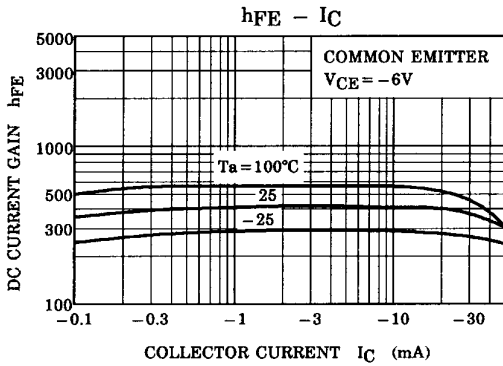
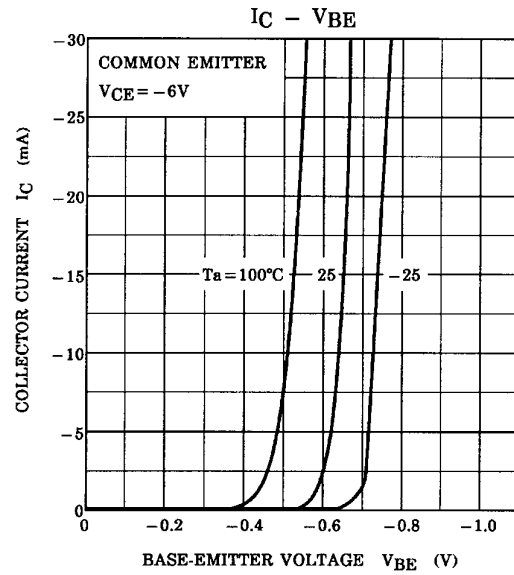
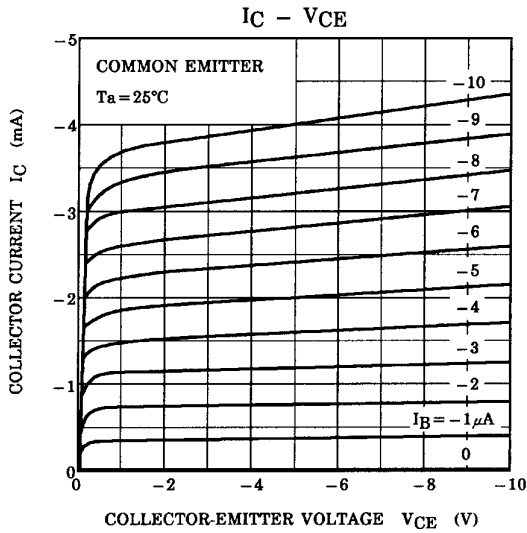


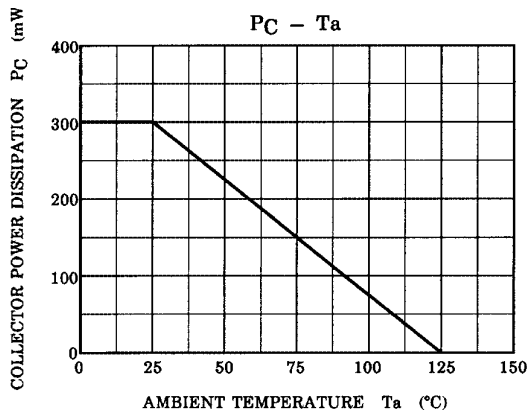
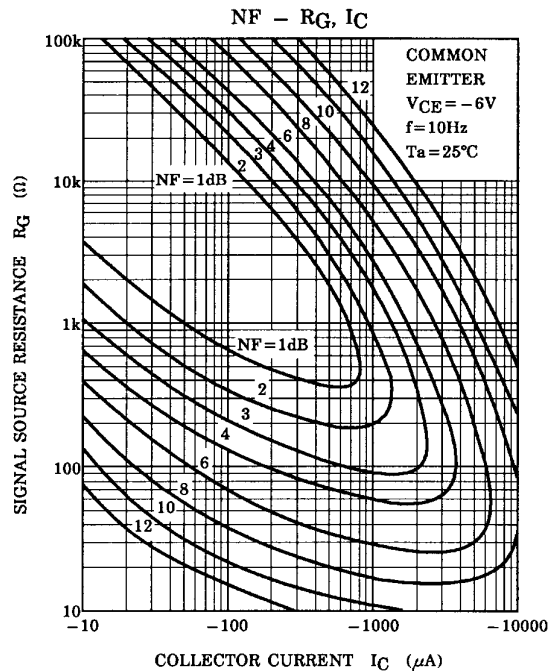
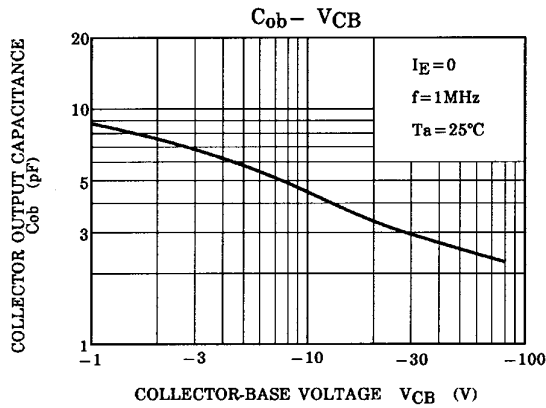
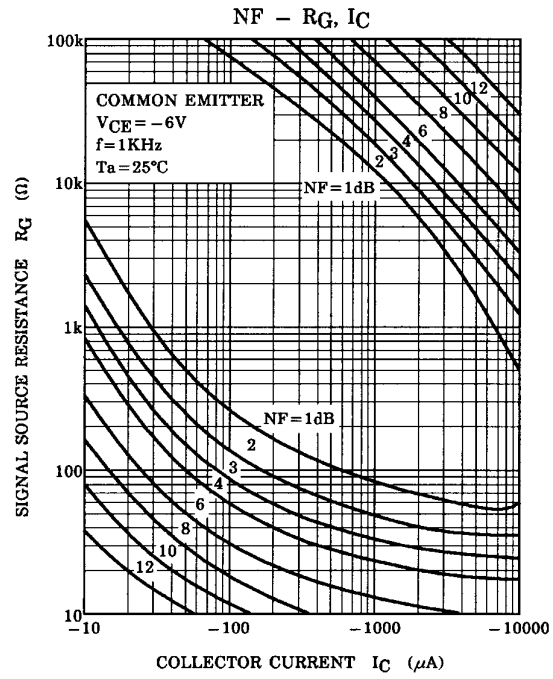
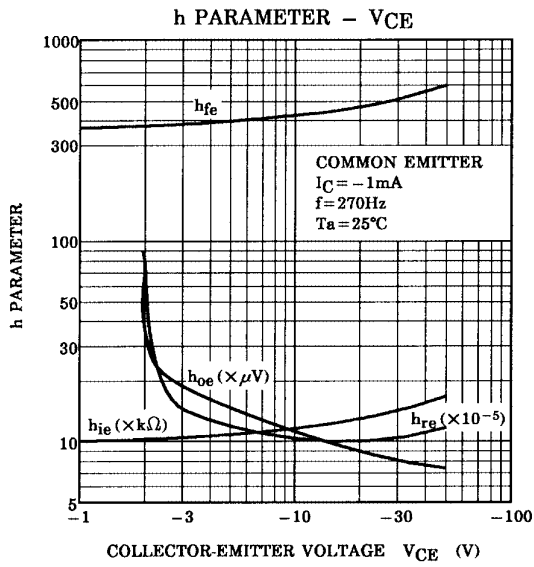
Weight: 0.21 g (typ.)

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = -120\ \text{V}$, $I_E = 0$	—	—	-0.1	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = -5\ \text{V}$, $I_C = 0$	—	—	-0.1	μA
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = -1\ \text{mA}$, $I_B = 0$	-120	—	—	V
DC current gain	h_{FE} (Note)	$V_{CE} = -6\ \text{V}$, $I_C = -2\ \text{mA}$	200	—	700	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -10\ \text{mA}$, $I_B = -1\ \text{mA}$	—	—	-0.3	V
Base-emitter voltage	V_{BE}	$V_{CE} = -6\ \text{V}$, $I_C = -2\ \text{mA}$	—	0.65	—	V
Transition frequency	f_T	$V_{CE} = -6\ \text{V}$, $I_C = -1\ \text{mA}$	—	100	—	MHz
Collector output capacitance	C_{ob}	$V_{CB} = -10\ \text{V}$, $I_E = 0$, $f = 1\ \text{MHz}$	—	4.0	—	pF
Noise figure	NF	$V_{CE} = -6\ \text{V}$, $I_C = -0.1\ \text{mA}$, $f = 10\ \text{Hz}$, $R_G = 10\ \text{k}\Omega$	—	—	6	dB
		$V_{CE} = -6\ \text{V}$, $I_C = -0.1\ \text{mA}$, $f = 1\ \text{kHz}$, $R_G = 10\ \text{k}\Omega$	—	—	2	
		$V_{CE} = -6\ \text{V}$, $I_C = -0.1\ \text{mA}$, $f = 1\ \text{kHz}$, $R_G = 100\ \Omega$	—	3	—	

Note: h_{FE} classification GR: 200~400, BL: 350~700





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