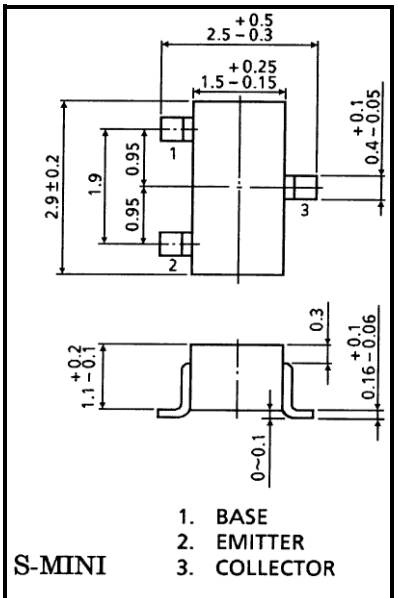
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process)

2SA1312

Audio Frequency Low Noise Amplifier Applications

- High voltage: V_{CEO} = −120 V
- Excellent h_{FE} linearity: h_{FE} (I_C = −0.1 mA)/ h_{FE} (I_C = −2 mA)
  h= 0.95 (typ.)
- High h_{FE}: h_{FE} = 200 to 700
- Low noise: NF (2) = 0.2dB (typ.), 3dB (max) at f = 1 kHz
- Complementary to 2SC3324
- Small package

Unit: mm



JEDEC	TO-236MOD
JEITA	SC-59
TOSHIBA	2-3F1A

Weight: 0.012 g (typ.)

Absolute 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 (Note 1, 3)	200	mW
	P_C (Note 2)	150	
Junction temperature	T_j (Note 1)	150	°C
	T_j (Note 2)	125	
Storage temperature range	T_{stg} (Note 1)	−55 to 150	°C
	T_{stg} (Note 2)	−55 to 125	

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: For devices with the ordering part number ending in LF(T.
Note 2: For devices with the ordering part number in other than LF(T.
Note 3: Mounted on a FR4 board. (25.4 mm × 25.4 mm × 1.6 mm, Cu pad: 0.8 mm^2 × 3)

Start of commercial production
1982-12

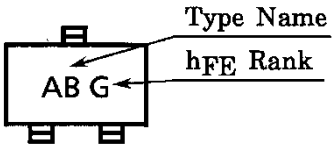
Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = −120 V, I_E = 0 A	—	—	−0.1	μA
Emitter cut-off current	I_{EBO}	V_{EB} = −5 V, I_C = 0 A	—	—	−0.1	μA
DC current gain	h_{FE} (Note)	V_{CE} = −6 V, I_C = −2 mA	200	—	700	—
Collector-emitter saturation voltage	$V_{CE\ (sat)}$	I_C = −10 mA, I_B = −1 mA	—	—	−0.3	V
Transition frequency	f_T	V_{CE} = −6 V, I_C = −1 mA	—	100	—	MHz
Collector output capacitance	C_{ob}	V_{CB} = −10 V, I_E = 0 A, f = 1 MHz	—	4	—	pF
Noise figure	NF (1)	V_{CE} = −6 V, I_C = −0.1 mA, f = 100 Hz, R_G = 10 kΩ	—	0.5	6	dB
	NF (2)	V_{CE} = −6 V, I_C = −0.1 mA, f = 1 kHz, R_G = 10 kΩ	—	0.2	3	

Note: h_{FE} classification GR (G): 200 to 400, BL (L): 350 to 700

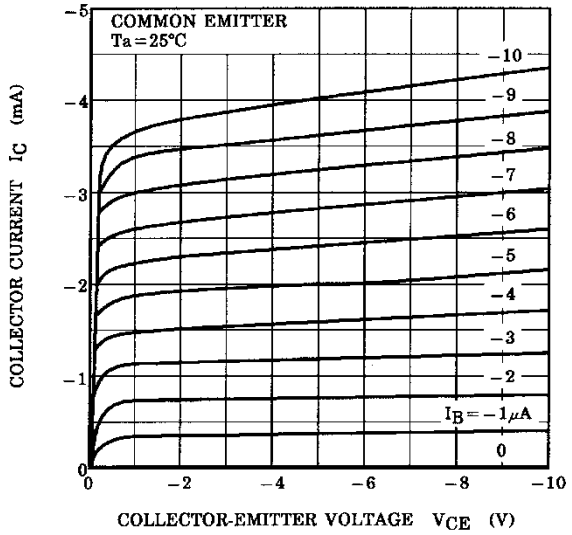
( ) marking symbol

Marking

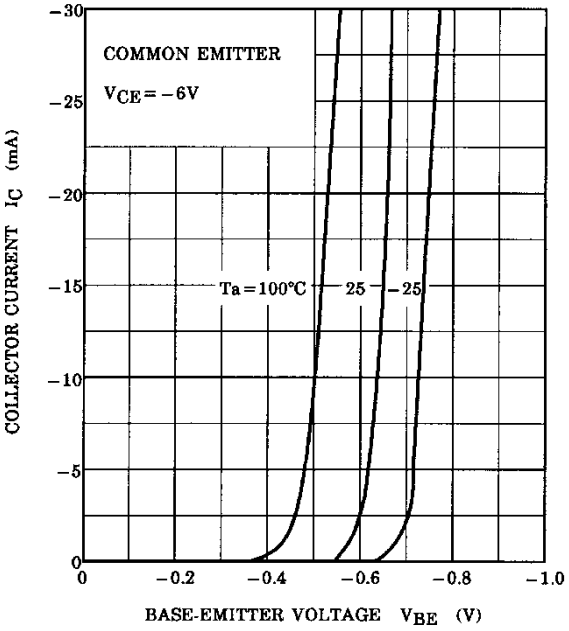


Characteristics Curves

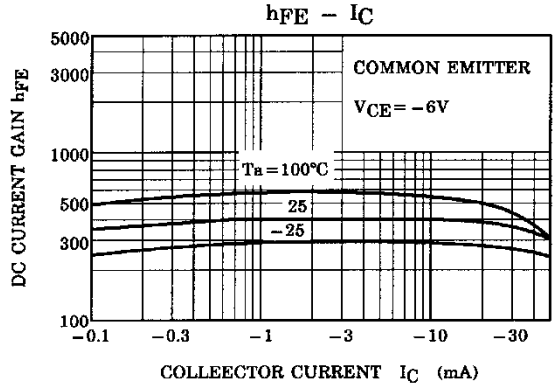
I_C – V_{CE}



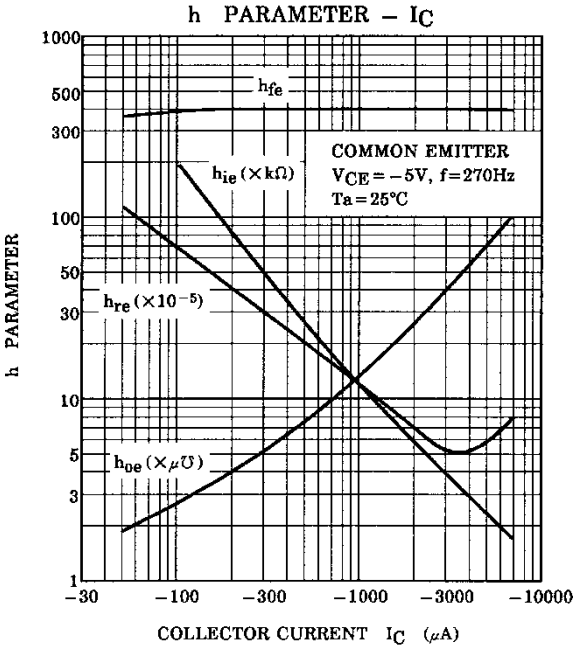
I_C – V_{BE}



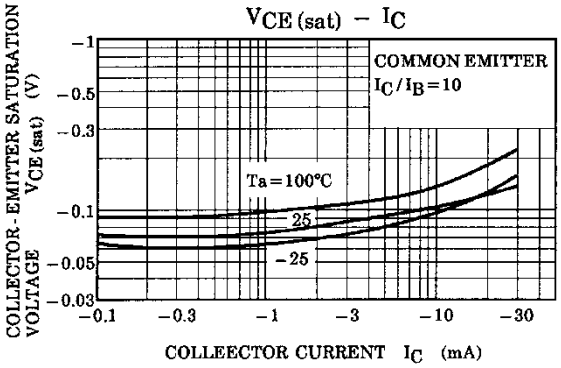
h_{FE} – I_C



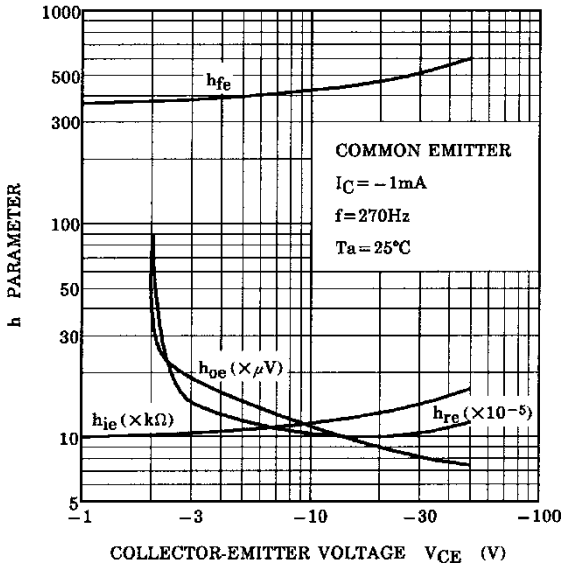
h PARAMETER – I_C



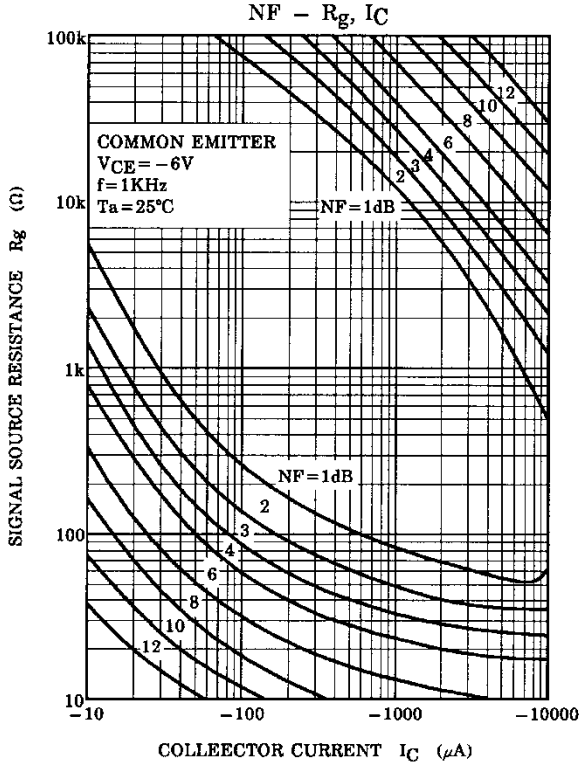
$V_{CE\,(sat)}$ – I_C



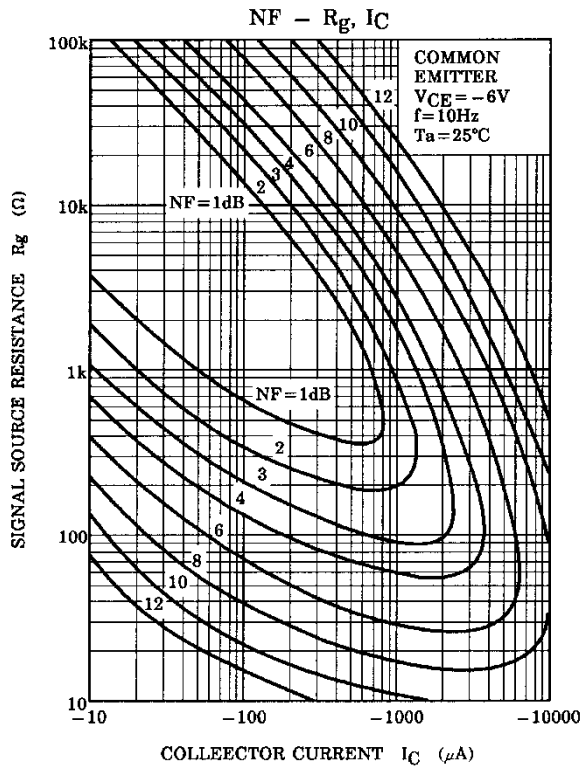
h PARAMETER – V_{CE}



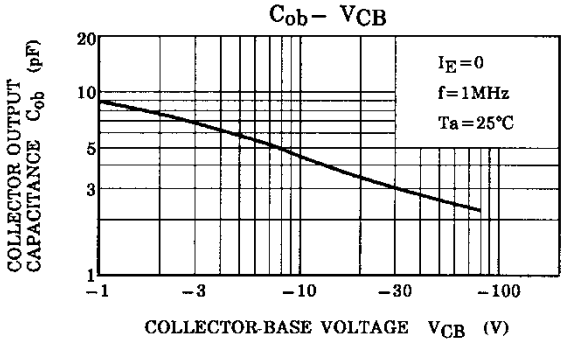
NF – R_g, I_C

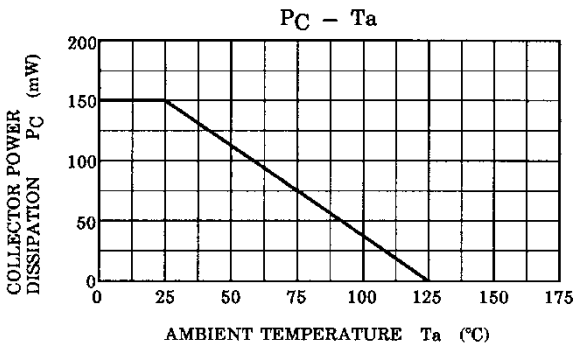


NF – R_g, I_C

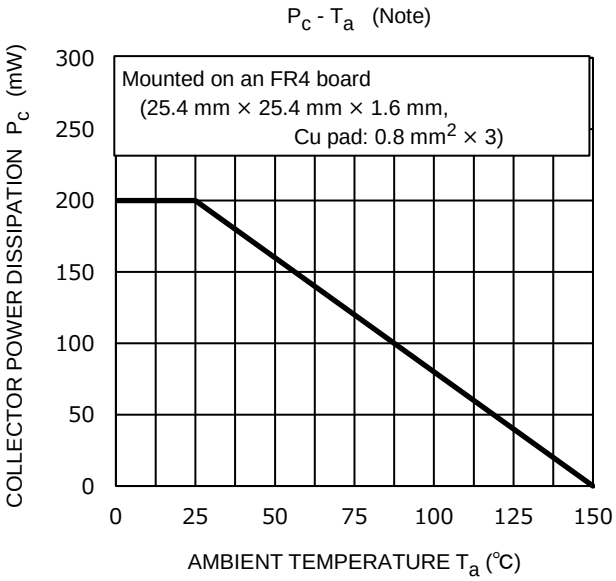


C_{ob} – V_{CB}





Note: Reference only with T_j of 125 ℃.



Note: Reference only with T_j of 150 ℃.

The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

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