TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

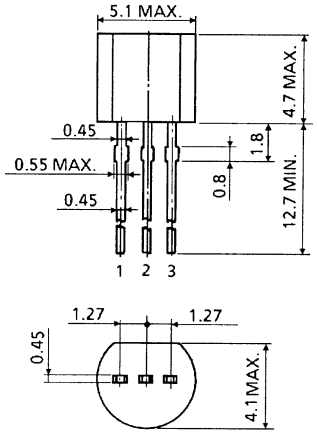
2SC2240

Low Noise Audio Amplifier Applications

Unit: mm

The 2SC2240 is a transistor for low frequency and low noise applications. This device is designed to lower noise figure in the region of low signal source impedance, and to lower the pulse noise. This is recommended for the first stages of Equalizer amplifiers.

- Low noise: NF = 4dB (typ.) R_G = 100 Ω, V_{CE} = 6 V, I_C = 100 μA, f = 1 kHz
  : NF = 0.5dB (typ.) R_G = 1 kΩ, V_{CE} = 6 V, I_C = 100 μA, f = 1 kHz
- Low pulse noise: Low 1/f noise
- High DC current gain: h_{FE} = 200~700
- High breakdown voltage: V_{CEO} = 120 V



1. EMITTER
2. COLLECTOR
3. BASE

JEDEC	TO-92
JEITA	SC-43
TOSHIBA	2-5F1B

Weight: 0.21 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	300	mW
Junction temperature	T_j	125	°C
Storage temperature range	T_{stg}	−55~125	°C

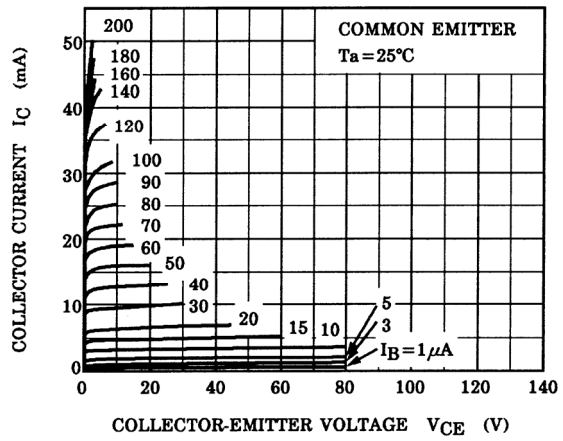
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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).

Electrical Characteristics (Ta = 25°C)

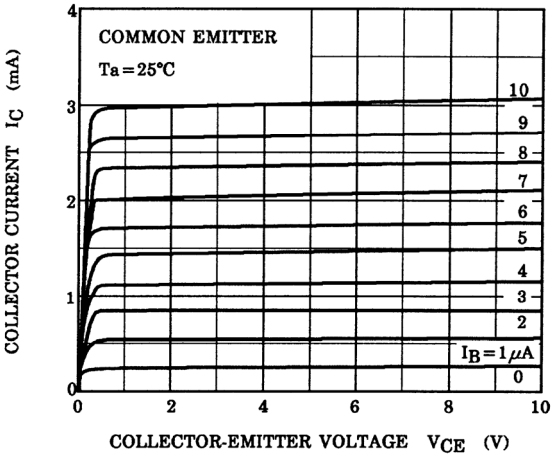
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = 120 V, I_E = 0	—	—	0.1	μA
Emitter cut-off current	I_{EBO}	V_{EB} = 5 V, I_C = 0	—	—	0.1	μA
Collector-emitter breakdown voltage	$V_{(BR)\ CEO}$	I_C = 1 mA, I_B = 0	120	—	—	V
DC current gain	h_{FE} (Note)	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
Base-emitter voltage	V_{BE}	V_{CE} = 6 V, I_C = 2 mA	—	0.65	—	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, f = 1 MHz	—	3.0	—	pF
Noise figure	NF	V_{CE} = 6 V, I_C = 0.1 mA, f = 10 Hz, R_G = 10 kΩ	—	—	6	dB
		V_{CE} = 6 V, I_C = 0.1 mA, f = 1 kHz, R_G = 10 kΩ	—	—	2	
		V_{CE} = 6 V, I_C = 0.1 mA, f = 1 kHz, R_G = 100 Ω	—	4	—	

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

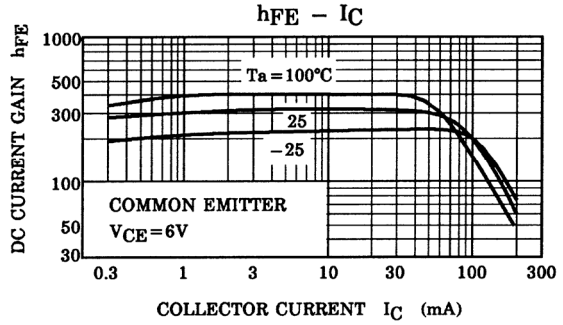
I_C – V_{CE}



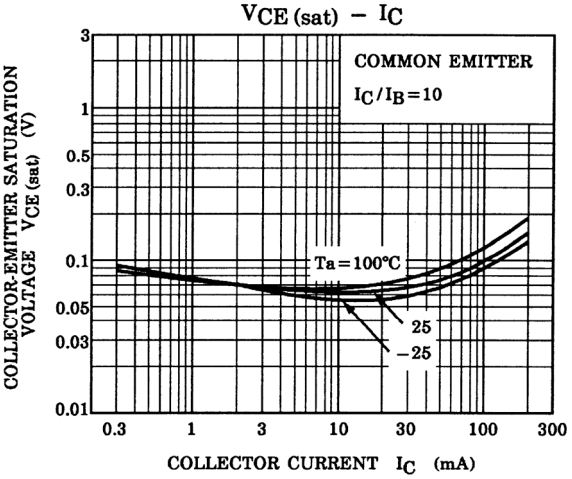
I_C – V_{CE}



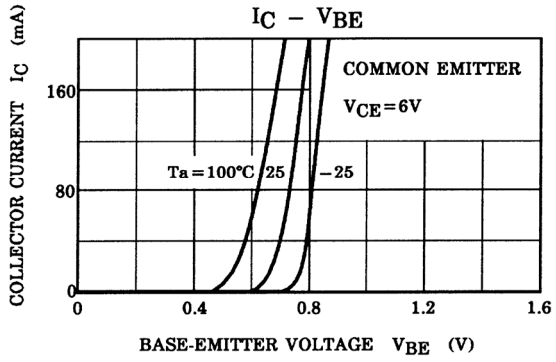
h_{FE} – I_C



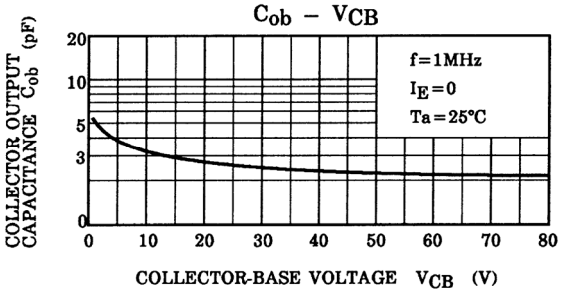
V_{CE} (sat) – I_C



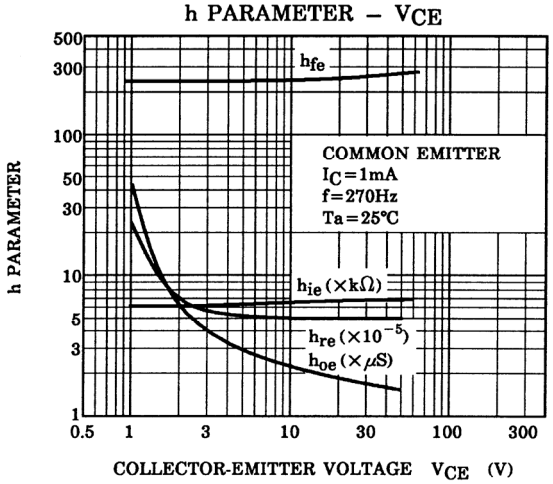
I_C – V_{BE}



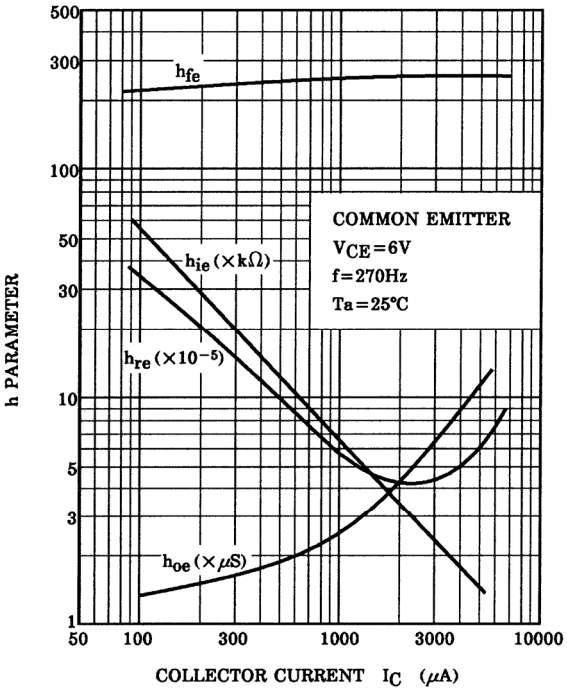
C_{ob} – V_{CB}



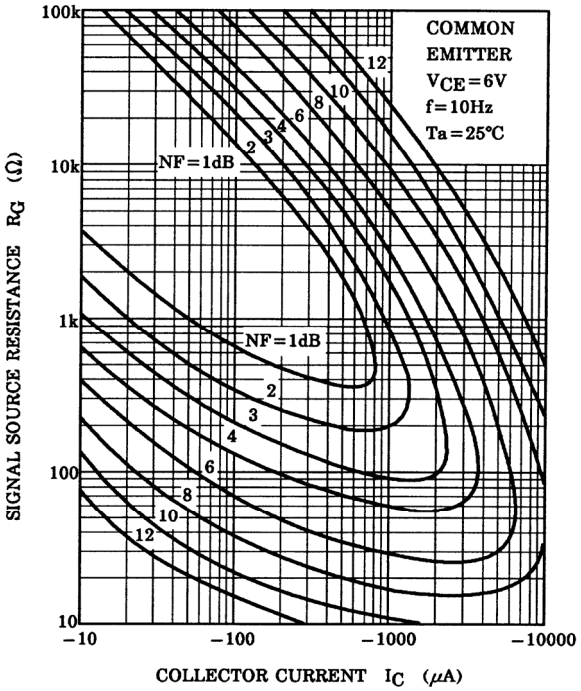
h PARAMETER – V_{CE}



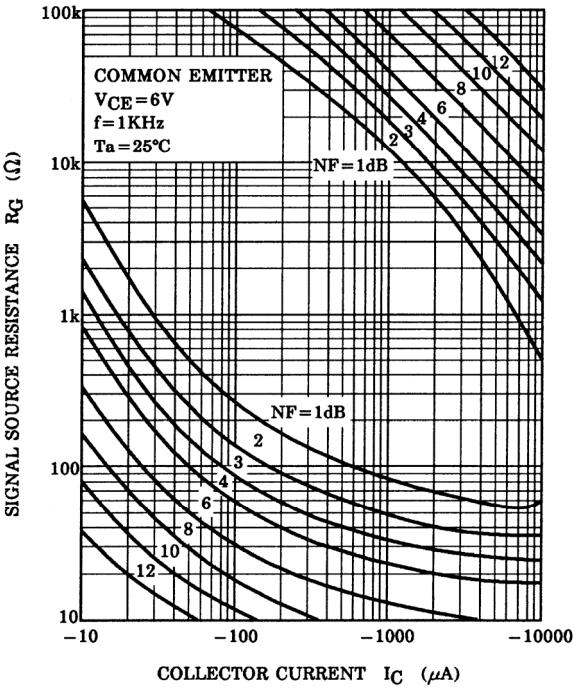
h PARAMETER – I_C



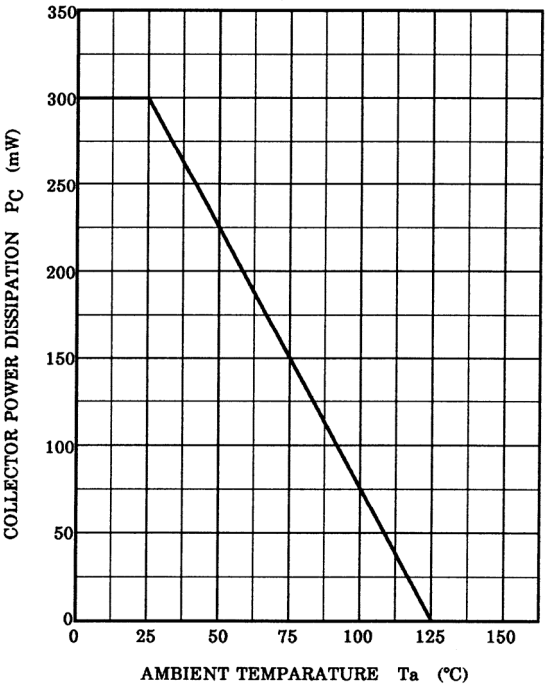
NF – R_G, I_C



NF – R_G, I_C



P_C – Ta



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20070701-EN GENERAL

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