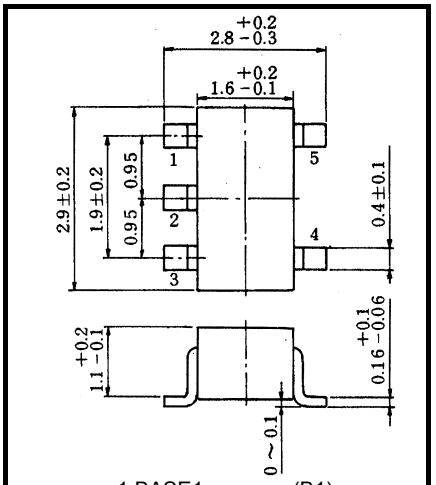
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

HN4A06J

Audio Frequency General Purpose Amplifier Applications

- High voltage : V_{CEO} = −120V
- High h_{FE} : h_{FE} = 200 to 700
- Excellent h_{FE} linearity
  : h_{FE} (I_C = −0.1mA) / h_{FE} (I_C = −2mA) = 0.95 (typ.)

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-3L1A

Weight: 0.014g (typ.)

Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 Common)

Characteristic	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	150	°C
Storage temperature range	T_{stg}	−55 to 150	°C

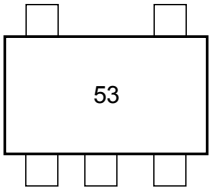
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

*Total rating. Power dissipation per element should not exceed 200mW.

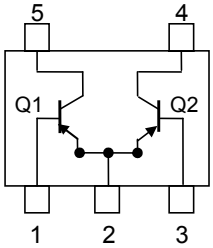
Electrical Characteristics (Ta = 25°C) (Q1,Q2 Common)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	—	V_{CB} = −120V, I_E = 0	—	—	−0.1	μA
Emitter cut-off current	I_{EBO}	—	V_{EB} = −5V, I_C = 0	—	—	−0.1	μA
DC current gain	h_{FE}	—	V_{CE} = −6V, I_C = −2mA	200	—	700	
Collector-emitter saturation voltage	$V_{CE\ (sat)}$	—	I_C = −10mA, I_B = −1mA	—	—	−0.3	V
Transition frequency	f_T	—	V_{CE} = −6V, I_C = −1mA	—	100	—	MHz
Collector output capacitance	C_{ob}	—	V_{CB} = −10V, I_E = 0, f = 1MHz	—	4	—	pF
Noise figure	NF	—	V_{CE} = 6 V, I_C = 0.1 mA f = 1 kHz, R_G = 10 kΩ	—	1.0	—	dB

Marking

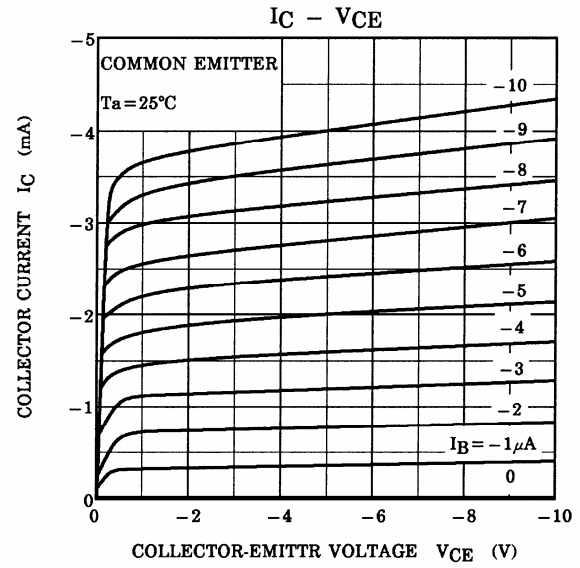


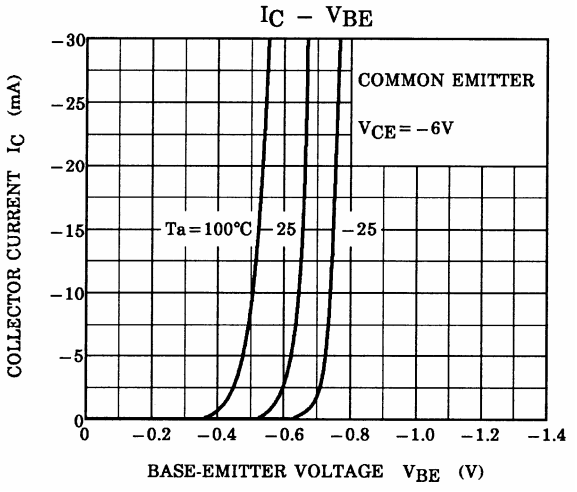
Equivalent Circuit (Top View)

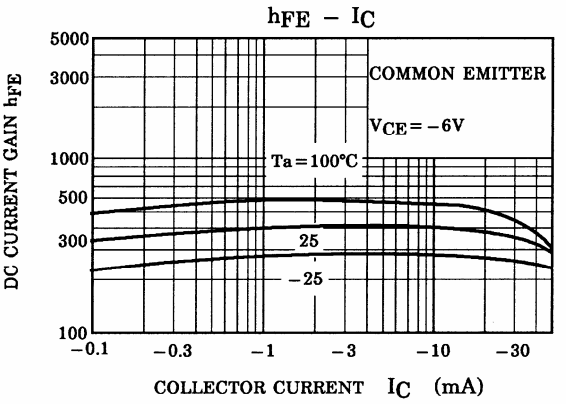


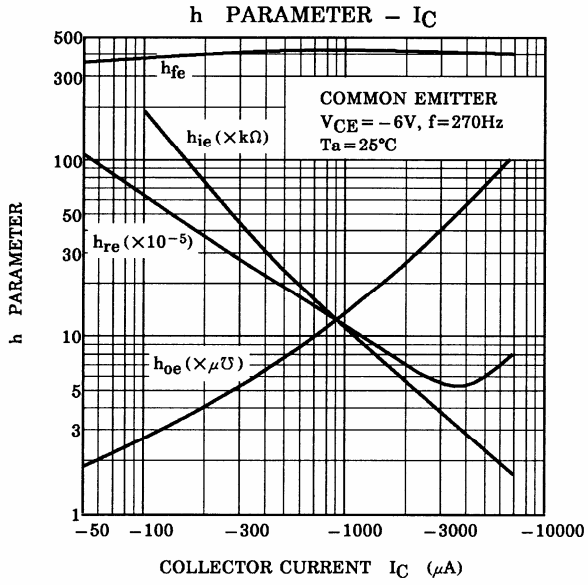
Start of commercial production
2001-07

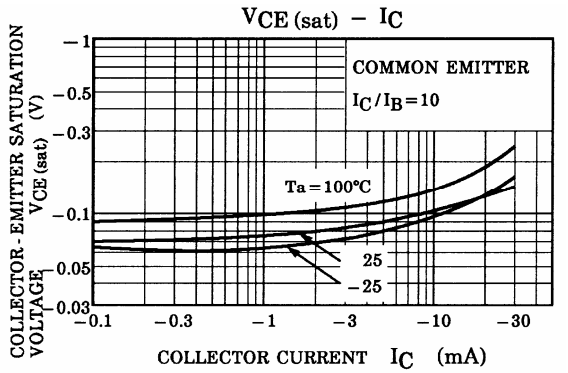
Q1,Q2 Common


I_C – V_{CE}
COMMON EMITTER
Ta = 25°C
−10
−9
−8
−7
−6
−5
−4
−3
−2
I_B = −1μA
0
COLLECTOR CURRENT I_C (mA)
COLLECTOR-EMITTR VOLTAGE V_{CE} (V)

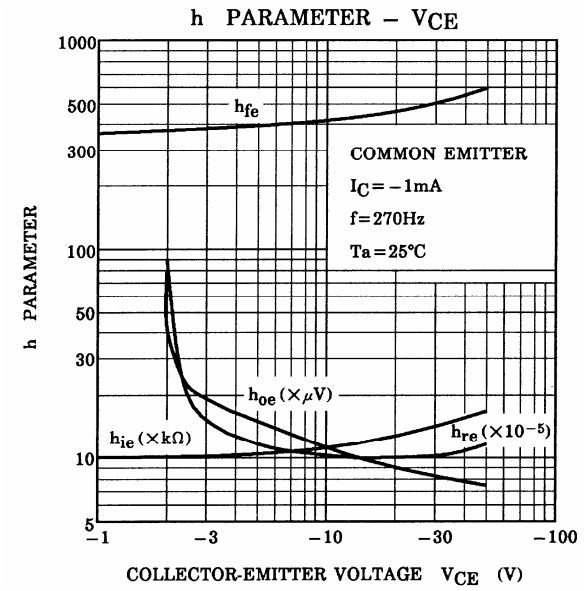

I_C – V_{BE}
COMMON EMITTER
V_{CE} = −6V
Ta = 100°C
25
−25
COLLECTOR CURRENT I_C (mA)
BASE-EMITTER VOLTAGE V_{BE} (V)

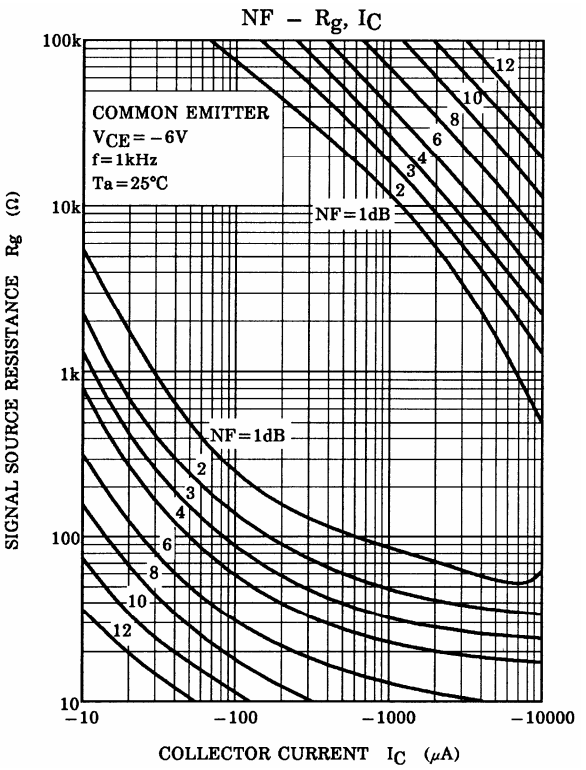

h_{FE} – I_C
COMMON EMITTER
V_{CE} = −6V
Ta = 100°C
25
−25
DC CURRENT GAIN h_{FE}
COLLECTOR CURRENT I_C (mA)

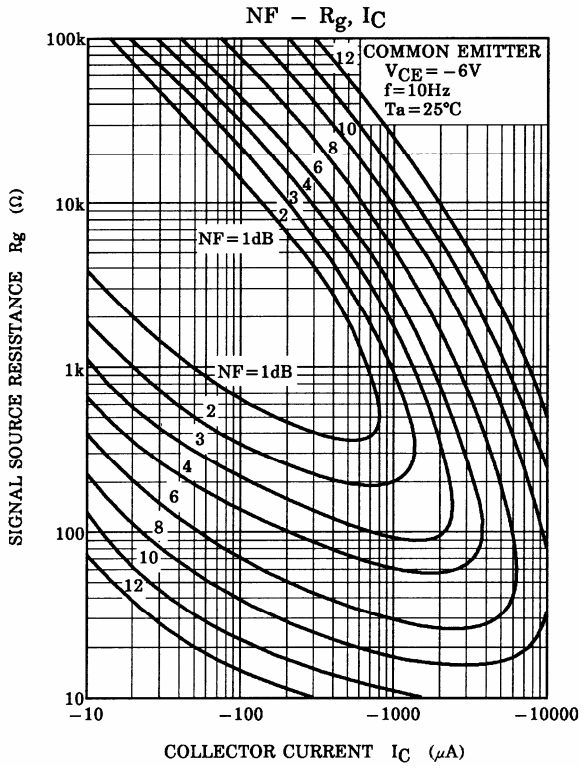

h PARAMETER – I_C
COMMON EMITTER
V_{CE} = −6V, f = 270Hz
Ta = 25°C
h_{fe}
h_{ie} (×kΩ)
h_{re} (×10^{-5})
h_{oe} (×μ℧)
h PARAMETER
COLLECTOR CURRENT I_C (μA)

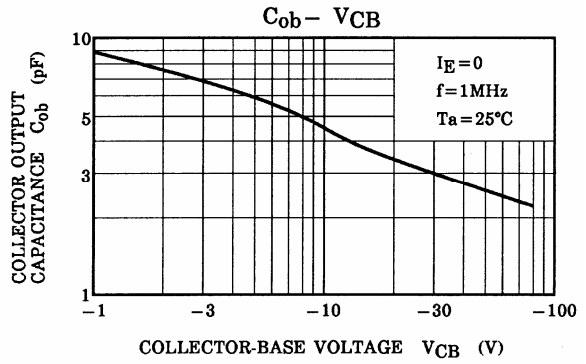

$V_{CE\,(sat)}$ – I_C
COMMON EMITTER
I_C / I_B = 10
Ta = 100°C
25
−25
COLLECTOR - EMITTER SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)
COLLECTOR CURRENT I_C (mA)

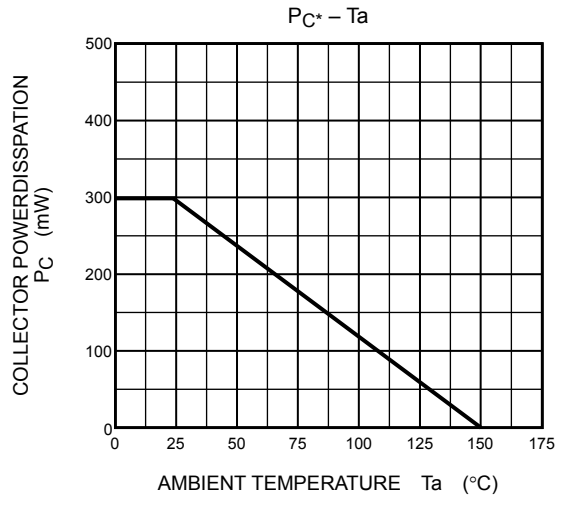
Q1,Q2 Common











*Total Rating.

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