

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) Silicon PNP Epitaxial Type (PCT Process)

HN1B04FU

Audio Frequency General Purpose Amplifier Applications

Unit: mm

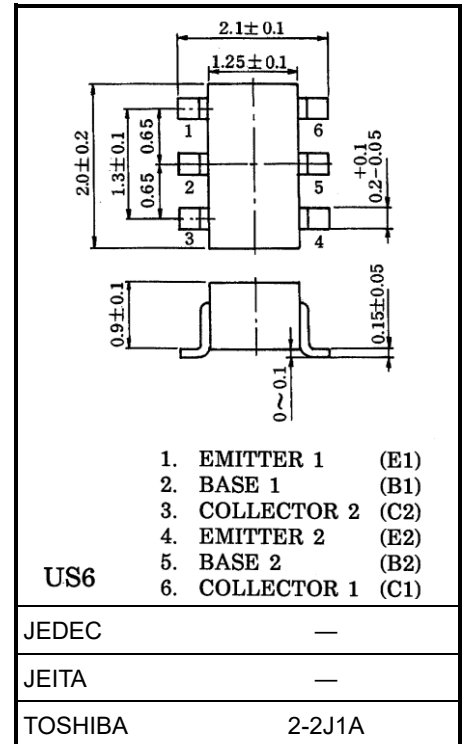
Q1:

- AEC-Q101 Qualified (Note1).
- High voltage and high current
: $V_{CEO} = 50\text{ V}$, $I_C = 150\text{ mA}$ (max)
- High h_{FE} : $h_{FE} = 120$ to 400
- Excellent h_{FE} linearity
: $h_{FE}(I_C = 0.1\text{ mA}) / h_{FE}(I_C = 2\text{ mA}) = 0.95$ (typ.)

Q2:

- AEC-Q101 Qualified (Note1).
- High voltage and high current
: $V_{CEO} = -50\text{ V}$, $I_C = -150\text{ mA}$ (max)
- High h_{FE} : $h_{FE} = 120$ to 400
- Excellent h_{FE} linearity
: $h_{FE}(I_C = -0.1\text{ mA}) / h_{FE}(I_C = -2\text{ mA}) = 0.95$ (typ.)

Note1: For detail information, please contact our sales.

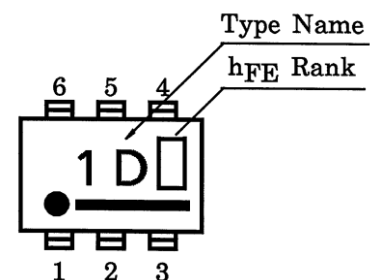


Weight: 6.8mg

Q1 Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	60	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	5	V
Collector current	I_C	150	mA
Base current	I_B	30	mA

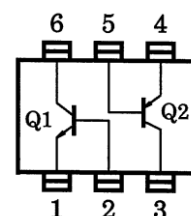
Marking



Q2 Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	-50	V
Collector-emitter voltage	V_{CEO}	-50	V
Emitter-base voltage	V_{EBO}	-5	V
Collector current	I_C	-150	mA
Base current	I_B	-30	mA

Equivalent Circuit (Top View)



Start of commercial production
1992-10

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

Characteristic	Symbol	Rating	Unit
Collector power dissipation	P _C (Note 1)	200	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).

Note 1: Total rating, Mounted on a FR4 board. (25.4 mm × 25.4 mm × 1.6 mm, Cu pad: 0.32 mm² × 6)

Q1 Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I _{CBO}	—	V _{CB} = 60 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	120	—	400	—
Collector-emitter saturation voltage	V _{CE (sat)}	—	I _C = 100 mA, I _B = 10 mA	—	0.1	0.25	V
Transition frequency	f _T	—	V _{CE} = 10 V, I _C = 1 mA	—	150	—	MHz
Collector output capacitance	C _{ob}	—	V _{CB} = 10 V, I _E = 0 A, f = 1 MHz	—	2	—	pF

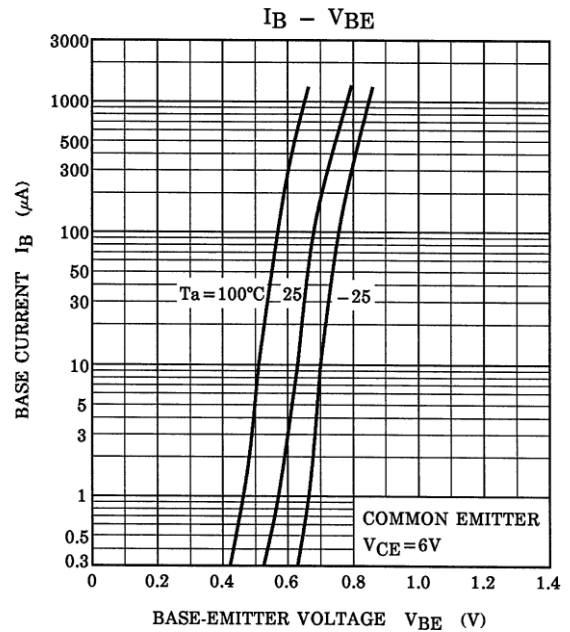
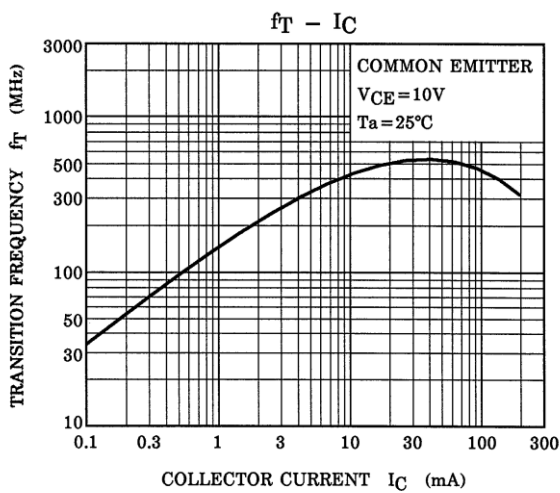
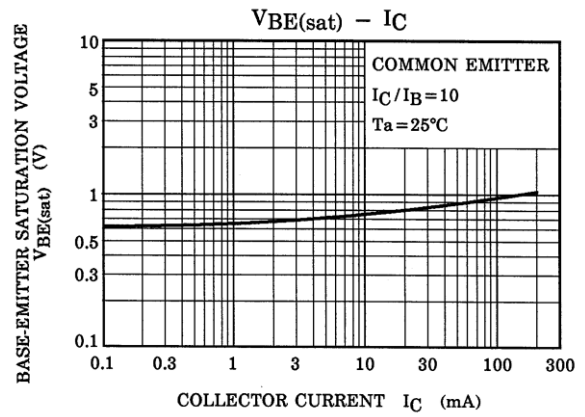
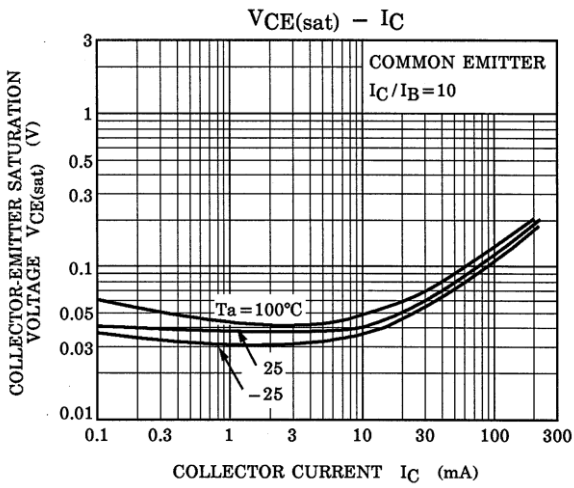
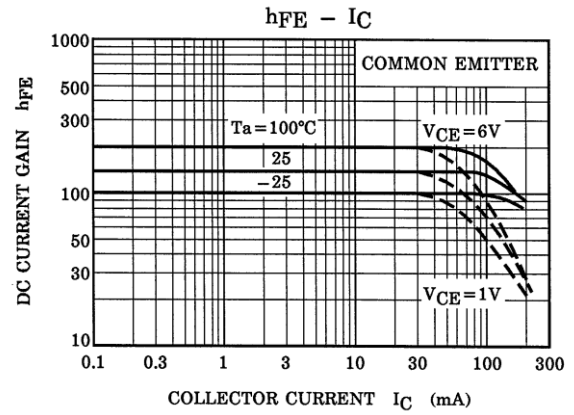
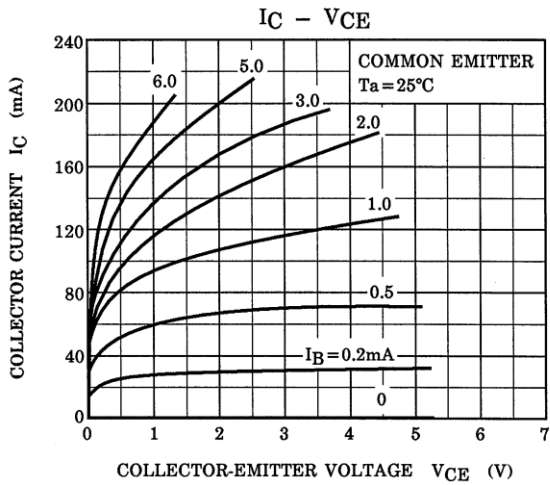
Q2 Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I _{CBO}	—	V _{CB} = -50 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	120	—	400	—
Collector-emitter saturation voltage	V _{CE (sat)}	—	I _C = -100 mA, I _B = -10 mA	—	-0.1	-0.3	V
Transition frequency	f _T	—	V _{CE} = -10 V, I _C = -1 mA	—	120	—	MHz
Collector output capacitance	C _{ob}	—	V _{CB} = -10 V, I _E = 0 A, f = 1 MHz	—	4	—	pF

Note: h_{FE} Classification Y (Y): 120 to 240, GR (G): 200 to 400

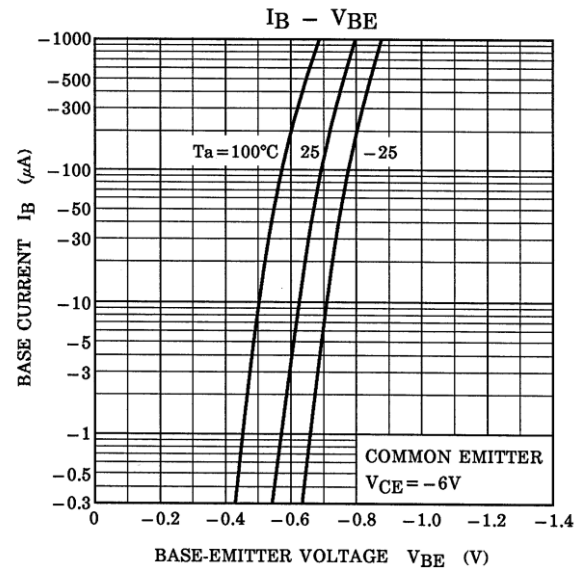
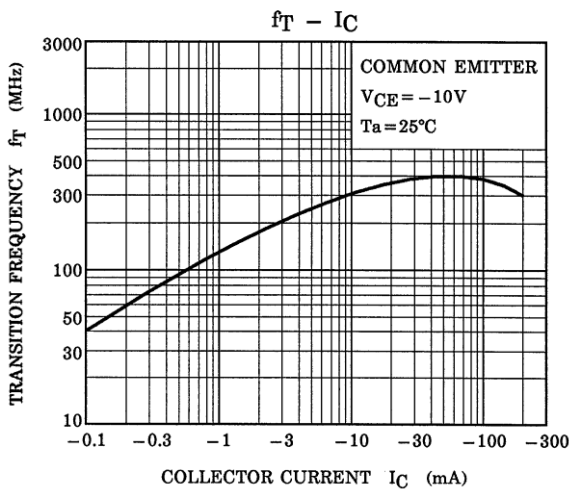
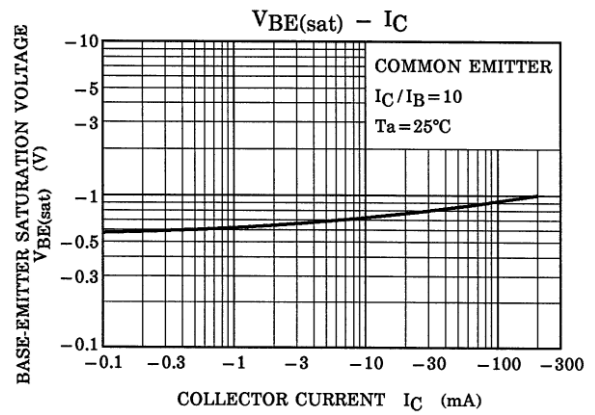
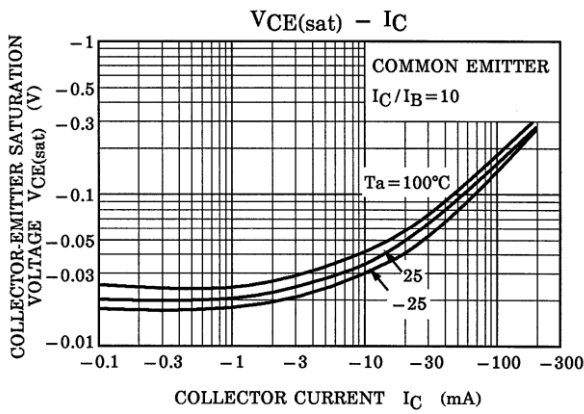
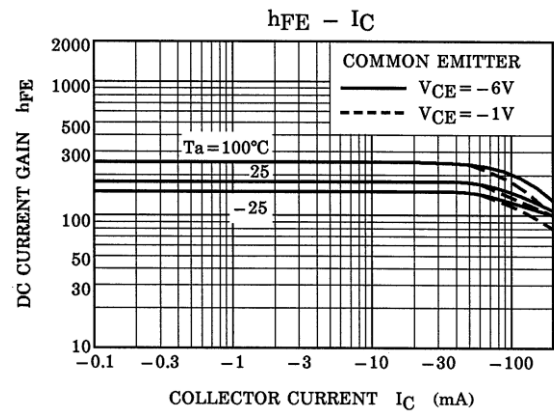
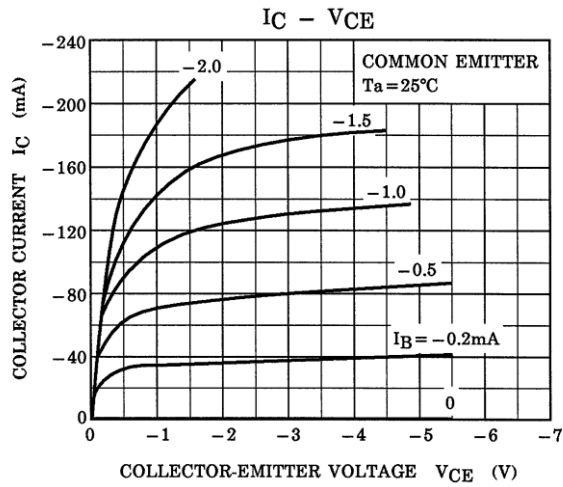
() Marking Symbol

Characteristics Curves Q1 (NPN transistor)



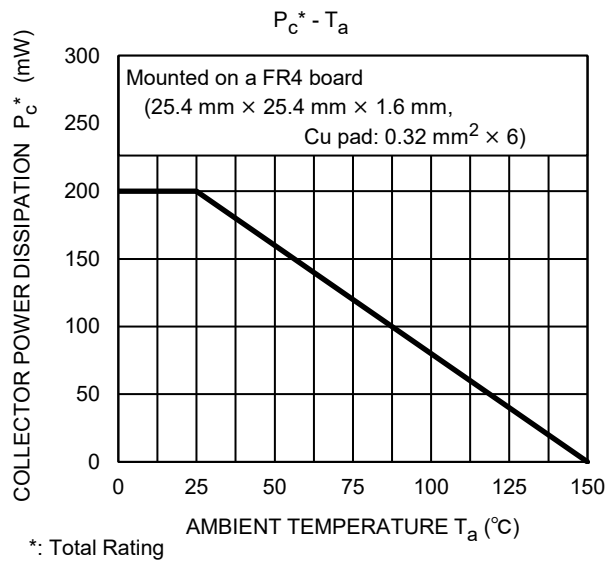
The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

Characteristics Curves Q2 (PNP transistor)



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

Characteristics Curves (Q1, Q2 Common)



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