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

HN1B01F

Audio-Frequency General-Purpose Amplifier Applications

Q1:

• High voltage and high current

 $: V_{CEO} = -50 \text{ V}, I_{C} = -150 \text{ mA (max)}$

• High h_{FE} : $h_{FE} = 120 \sim 400$

• Excellent hfe linearity

: h_{FE} ($I_{C} = -0.1 \text{ mA}$) / h_{FE} ($I_{C} = -2 \text{ mA}$) = 0.95 (typ.)

Q2:

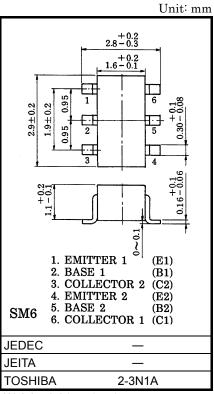
• High voltage and high current

 $: V_{CEO} = 50 \text{ V}, I_{C} = 150 \text{ mA (max)}$

• High hfE: hfE = $120 \sim 400$

• Excellent hFE linearity

: h_{FE} ($I_{C} = 0.1 \text{ mA}$) / h_{FE} ($I_{C} = 2 \text{ mA}$) = 0.95 (typ.)

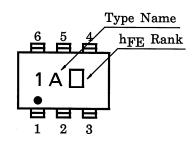


Weight: 0.015 g (typ.)

Q1 Absolute Maximum Ratings (Ta = 25°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	IC	-150	mA
Base current	ΙΒ	-50	mA

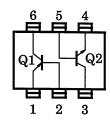
Marking



Q2 Absolute Maximum Ratings (Ta = 25°C)

Equivalent Circuit (Top View)

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	IC	150	mA
Base current	ΙΒ	30	mA



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

Characteristic	Symbol	Rating	Unit
Collector power dissipation	P _C *	300	mW
Junction temperature	Tj	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).

Q1 Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	I _{CBO}	_	$V_{CB} = -50 \text{ V}, I_{E} = 0$	_	_	-0.1	μΑ
Emitter cut-off current	I _{EBO}	_	$V_{EB} = -5 \text{ V}, I_C = 0$	_	_	-0.1	μΑ
DC current gain	h _{FE (Note)}	_	$V_{CE} = -6 \text{ V}, I_{C} = -2 \text{ mA}$	120	_	400	
Collector-emitter saturation voltage	V _{CE (sat)}	_	I _C = -100 mA, I _B = -10 mA	-	-0.1	-0.3	٧
Transition frequency	f _T	_	V _{CE} = −10 V, I _C = −1 mA	_	120	_	MHz
Collector output capacitance	C _{ob}	_	$V_{CB} = -10 \text{ V}, I_E = 0,$ f = 1 MHz	ı	4	_	pF

Q2 Electrical Characteristics (Ta = 25°C)

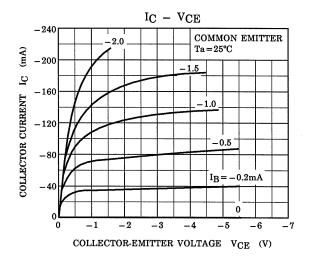
Characteristic	Symbol	Test Circuit	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	I _{CBO}	_	V _{CB} = 60 V, I _E = 0	-	_	0.1	μA
Emitter cut-off current	I _{EBO}	_	V _{EB} = 5 V, I _C = 0	_	_	0.1	μA
DC current gain	h _{FE (Note)}	_	V _{CE} = 6 V, I _C = 2 mA	120	_	400	
Collector-emitter saturation voltage	V _{CE} (sat)	_	I _C = 100 mA, I _B = 10 mA	_	0.1	0.25	٧
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, f = 1 MHz		2	_	pF

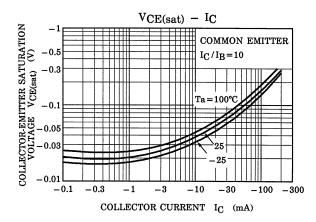
Note: hfe Classification Y (Y): 120~240, GR (G): 200~400

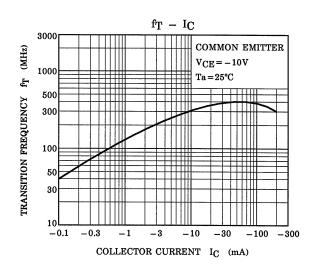
() Marking symbol

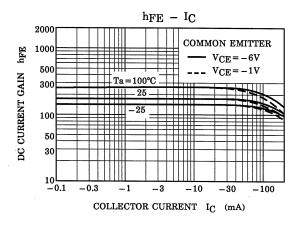
^{*:} Total rating

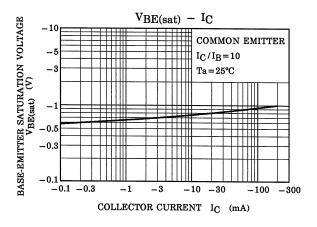
Q1 (PNP Transistor)

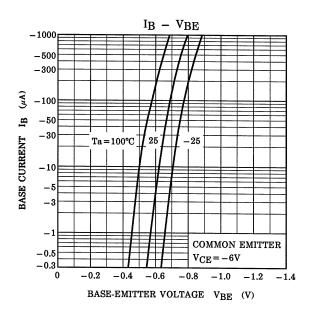




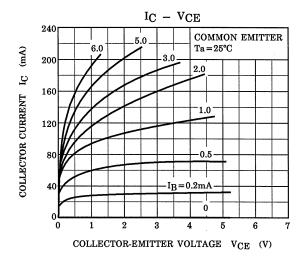


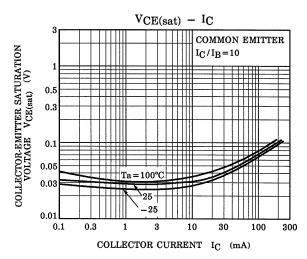


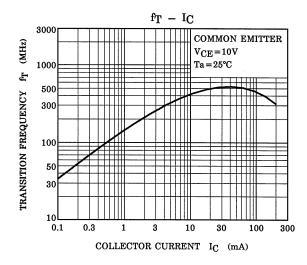


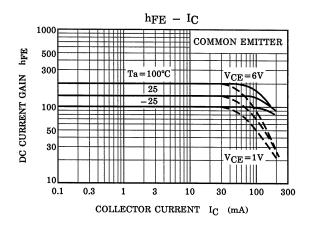


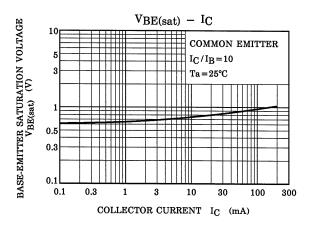
Q2 (NPN Transistor)

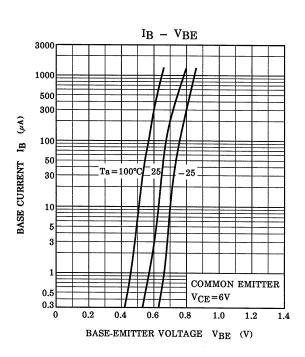




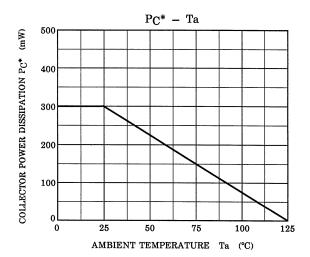








(Q1, Q2 Common)



* : Total Rating

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