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

HN1B04F

Audio Frequency General Purpose Amplifier Applications Driver Stage Amplifier Applications Switching application

Q1:

Excellent h_{FE} linearity

: $h_{FE(2)} = 25$ (min) at $V_{CE} = -6V$, $I_C = -400$ mA

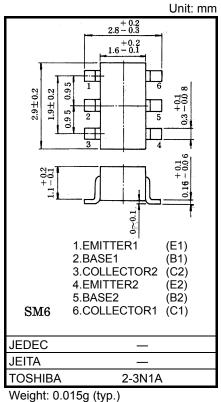
Q2:

• Excellent h_{FE} linearity

: $h_{FE(2)} = 25$ (min) at $V_{CE} = 6V$, $I_{C} = 400$ mA

Q1 Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V _{CBO}	-35	V
Collector-emitter voltage	V _{CEO}	-30	V
Emitter-base voltage	V _{EBO}	-5	V
Collector current	Ι _C	-500	mA



vveight: 0.0

Q2 Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V _{CBO}	35	V
Collector-emitter voltage	V _{CEO}	30	V
Emitter-base voltage	V _{EBO}	5	V
Collector current	ΙC	500	mA

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

Characteristic	Symbol	Rating	Unit
Collector power dissipation	P _C *	300	mW
Junction temperature	Тј	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. 200mW per element must be exceeded.

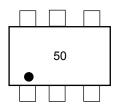
Q1 Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	I _{CBO}	_	V _{CB} = -35V, I _E = 0			-100	nA
Emitter cut-off current	I _{EBO}	_	V _{EB} = -5V, I _C = 0			-100	nA
DC current gain	h _{FE(1)}	_	V _{CE} = -1V, I _C = -100mA	70	_	400	
	h _{FE(2)}	_	V _{CE} = -6V, I _C = -400mA	25	_	_	
Collector-emitter saturation voltage	V _{CE (sat)}	_	I _C = –100mA, I _B = –10mA	_	-0.1	-0.25	V
Base-Emitter Voltage	V _{BE}	_	V _{CE} = -1V, I _C = -100mA	_	-0.8	-1.0	V
Transition frequency	fT	_	V _{CE} = -6V, I _C = -20mA	_	200	_	MHz
Collector output capacitance	C _{ob}	—	V _{CB} = –6V, I _E = 0, f = 1MHz		7	—	pF

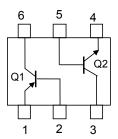
Q2 Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	I _{CBO}	_	V _{CB} = 35V, I _E = 0	—	_	100	nA
Emitter cut-off current	I _{EBO}	_	V _{EB} = 5V, I _C = 0		—	100	nA
DC current gain	h _{FE(1)}	_	V _{CE} = 1V, I _C = 100mA	70	—	400	
	h _{FE(2)}	_	V _{CE} = 6V, I _C = 400mA	25	_	_	
Collector-emitter saturation voltage	V _{CE (sat)}	_	I _C = 100mA, I _B = 10mA	_	0.1	0.25	V
Base-Emitter Voltage	V _{BE}	_	V _{CE} = 1V, I _C = 100mA	_	0.8	1.0	V
Transition frequency	f _T	_	V _{CE} = 6V, I _C = 20mA	_	300	_	MHz
Collector output capacitance	C _{ob}	_	V _{CB} = 6V, I _E = 0, f = 1MHz		7	_	pF

Marking

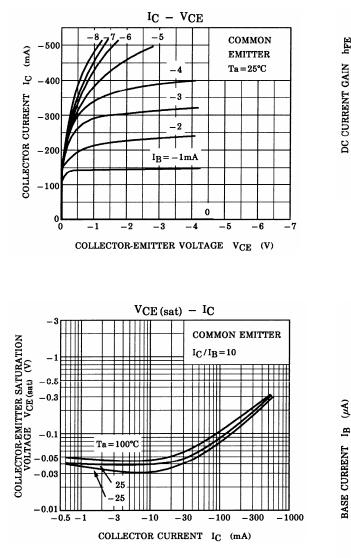


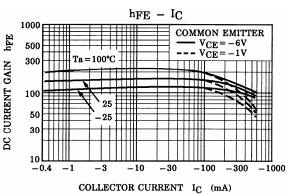
Equivalent Circuit (Top View)

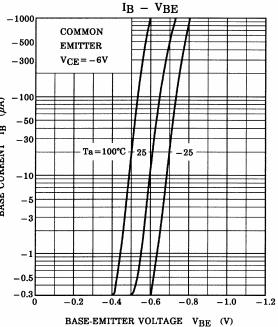


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Q1 (PNP transistor)

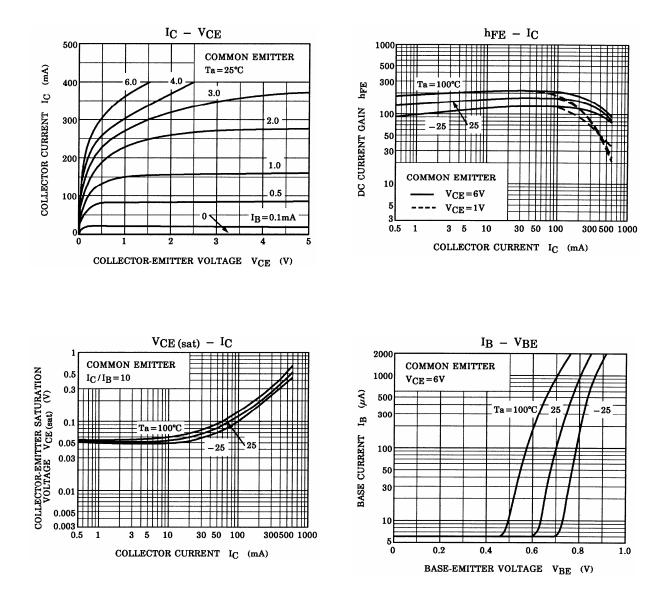






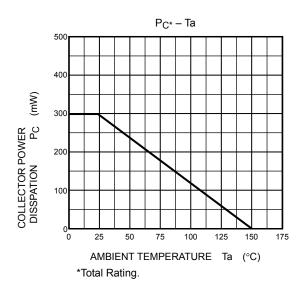
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Q2 (NPN transistor)



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(Q1, Q2 Common)



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