

TOSHIBA Multichip Discrete Device

## HN7G04FU

General-Purpose Amplifier Applications

Driver Circuit Applications

Switching and Muting Switch Applications

Unit: mm

Q1: 2SA1954 equivalent

Q2: RN1307 equivalent

## Q1 Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V <sub>CBO</sub>	-15	V
Collector-emitter voltage	V <sub>CEO</sub>	-12	V
Emitter-base voltage	V <sub>EBO</sub>	-5	V
Collector current	I <sub>C</sub>	-400	mA
Base current	I <sub>B</sub>	-50	mA

## Q2 Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V <sub>CBO</sub>	50	V
Collector-emitter voltage	V <sub>CEO</sub>	50	V
Emitter-base voltage	V <sub>EBO</sub>	6	V
Collector current	I <sub>C</sub>	100	mA

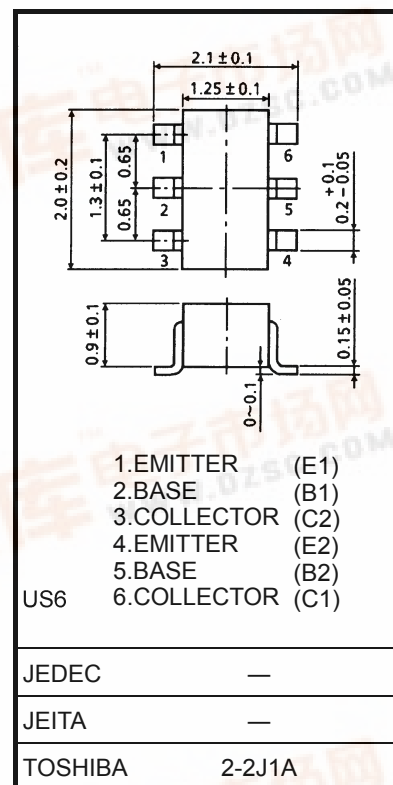
## Q1, Q2 Common Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector power dissipation	P <sub>C</sub> (Note 1)	200	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature range	T <sub>stg</sub>	-55~150	°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.

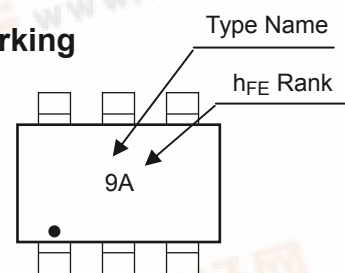
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: Total rating. 130 mW per element should not be exceeded.

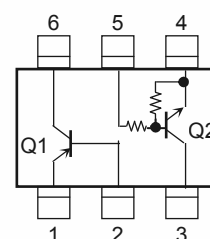


Weight: 0.0068 g (typ.)

## Marking



## Equivalent Circuit (top view)



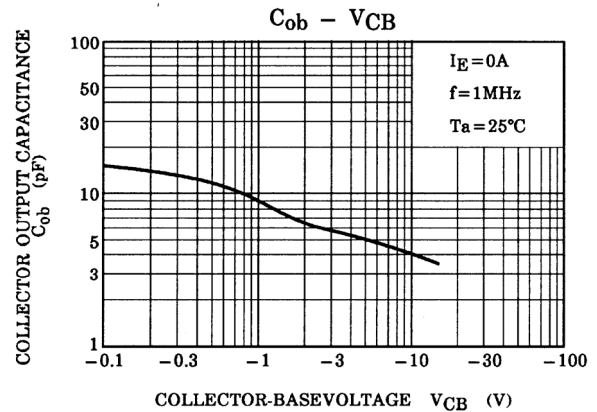
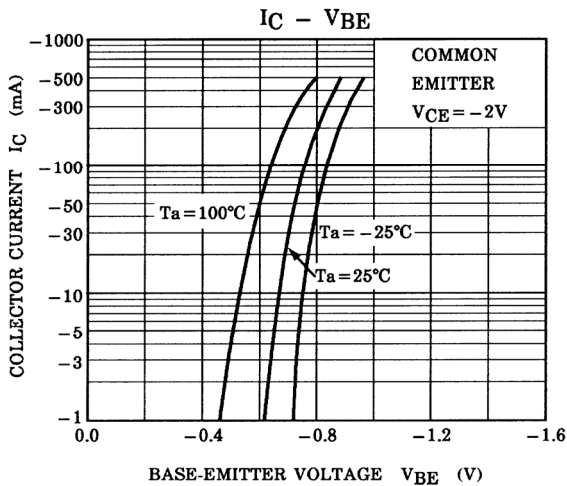
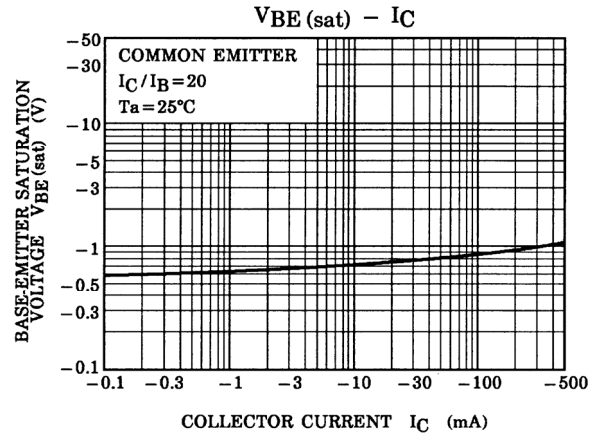
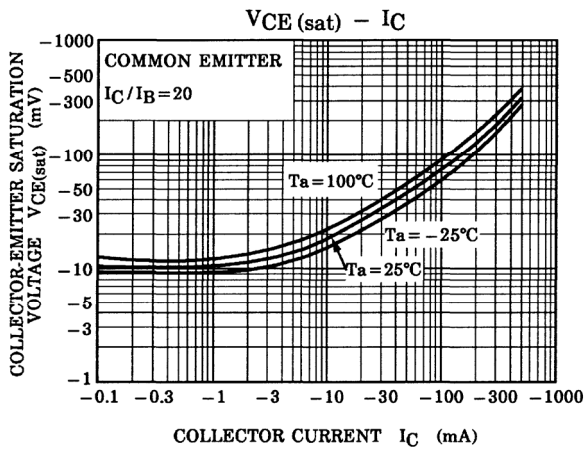
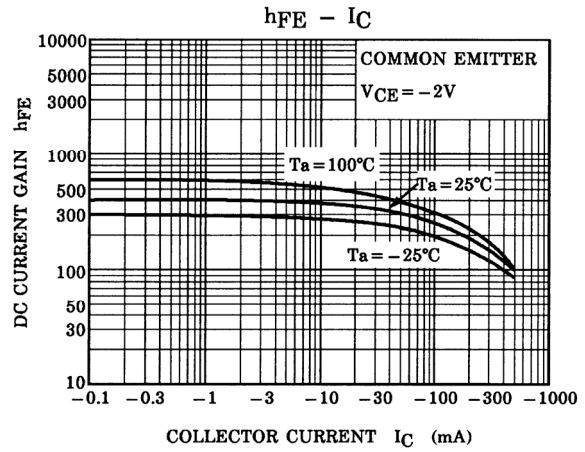
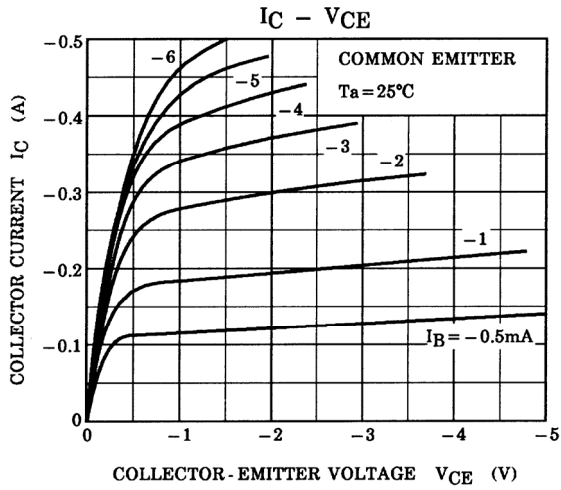
**Q1 Electrical Characteristics (Ta = 25°C)**

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB} = -15\text{ V}, I_E = 0$	—	—	-100	nA
Emitter cutoff current	$I_{EBO}$	$V_{EB} = -5\text{ V}, I_C = 0$	—	—	-100	nA
DC current gain	$h_{FE}$ (Note)	$V_{CE} = -2\text{ V}, I_C = -10\text{ mA}$	300	—	1000	
Collector-emitter saturation voltage	$V_{CE(sat)(1)}$	$I_C = -10\text{ mA}, I_B = -0.5\text{ mA}$	—	-15	-30	mV
	$V_{CE(sat)(2)}$	$I_C = -200\text{ mA}, I_B = -10\text{ mA}$	—	-110	-250	
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = -200\text{ mA}, I_B = -10\text{ mA}$	—	-0.87	-1.2	V
Transition frequency	$f_T$	$V_{CE} = -2\text{ V}, I_C = -10\text{ mA}$	—	130	—	MHz
Collector output capacitance	$C_{ob}$	$V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	4.2	—	pF

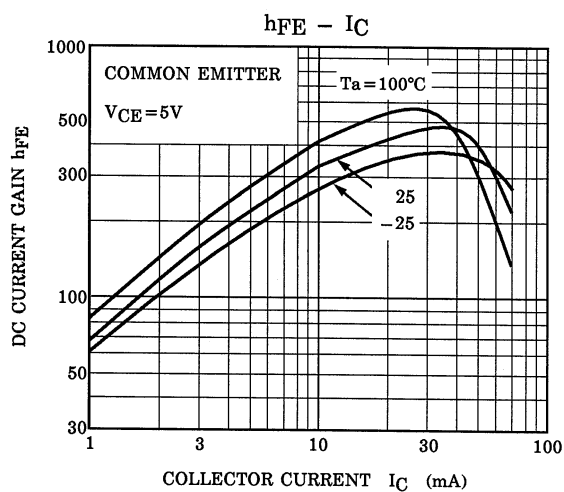
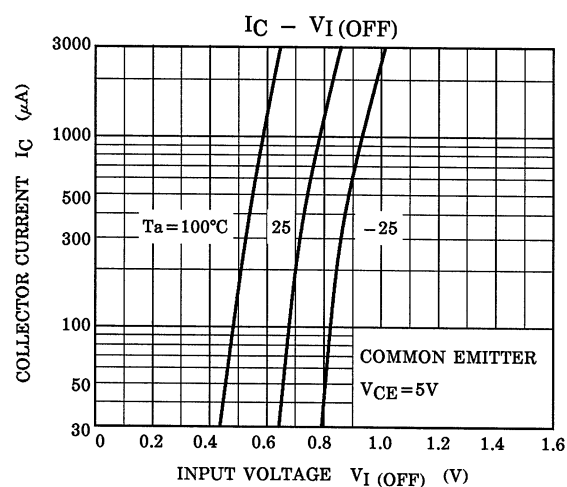
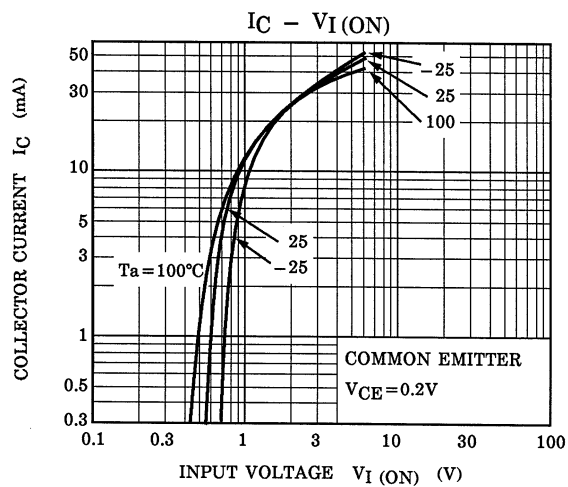
(Note)  $h_{FE}$  Classification A : 300~600, B : 500~1000**Q2 Electrical Characteristics (Ta = 25°C)**

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB} = 50\text{ V}, I_E = 0$	—	—	100	nA
	$I_{CEO}$	$V_{CE} = 50\text{ V}, I_B = 0$	—	—	500	
Emitter cutoff current	$I_{EBO}$	$V_{EB} = 6\text{ V}, I_C = 0$	0.081	—	0.15	nA
DC current gain	$h_{FE}$	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	80	—	—	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 5\text{ mA}, I_B = 0.25\text{ mA}$	—	0.1	0.3	V
Input voltage (ON)	$V_{I(ON)}$	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	0.7	—	1.8	V
Input voltage (OFF)	$V_{I(OFF)}$	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	0.5	—	1.0	V
Transition frequency	$f_T$	$V_{CE} = 10\text{ V}, I_C = 5\text{ mA}$	—	250	—	MHz
Collector output capacitance	$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	3	—	pF
Input resistor	R1	—	7	10	13	k $\Omega$
Resistor ratio	R1/R2	—	0.191	0.213	0.232	

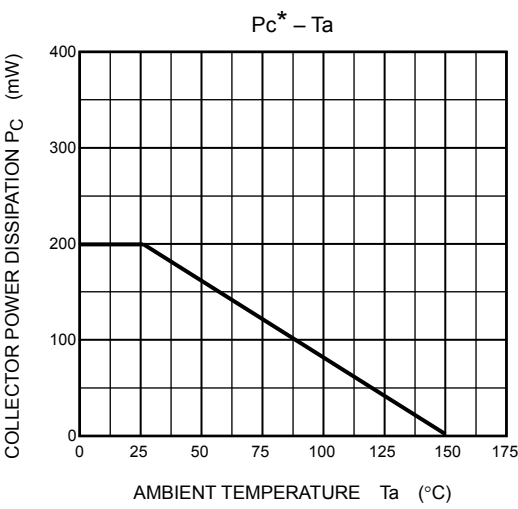
Q1



Q2



Q1, Q2 common



\*:Total rating

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20070701-EN GENERAL

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