

TOSHIBA Multichip Discrete Device

# HN7G06FU

- Power Management Switch Applications, Inverter Circuit Applications, Driver Circuit Applications and Interface Circuit Applications
- Combining transistor and BRT reduces the parts count, enabling the design of more compact equipment with a simpler system configuration.

Q1: 2SA1955F equivalent  
 Q2: RN1104F 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>	-500	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>	10	V
Collector current	I <sub>C</sub>	100	mA

### Q1, Q2 Common Ratings (Ta = 25°C)

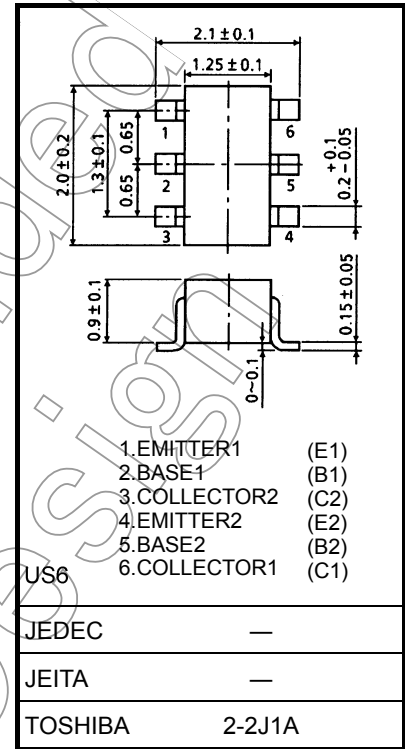
Characteristic	Symbol	Rating	Unit
Collector power dissipation	P <sub>C</sub> *	200	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature range	T <sub>stg</sub>	-55~150	°C

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).

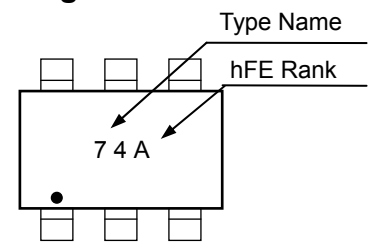
\*: Total rating. 130 mW per element should not be exceeded.

Unit: mm

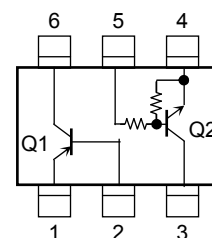


Weight: 0.0068 g (typ.)

### Marking



### Equivalent Circuit



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

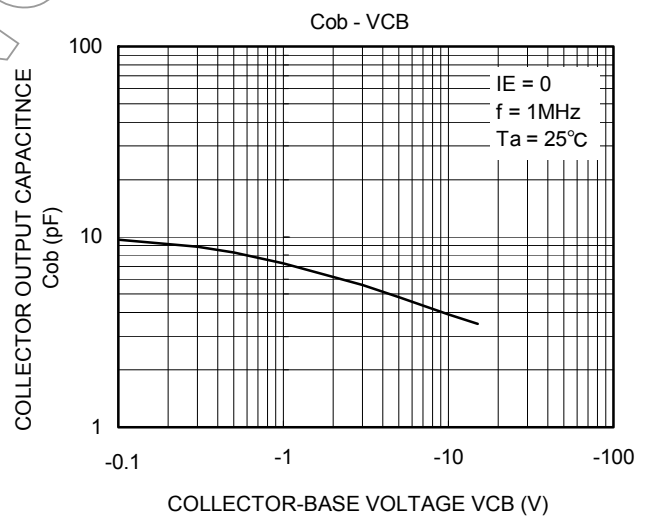
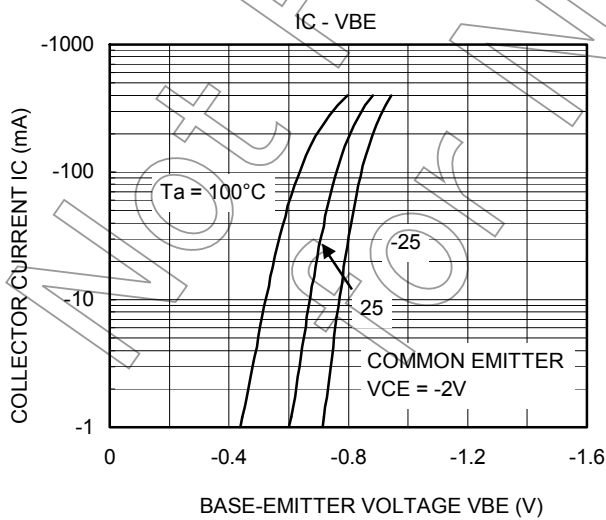
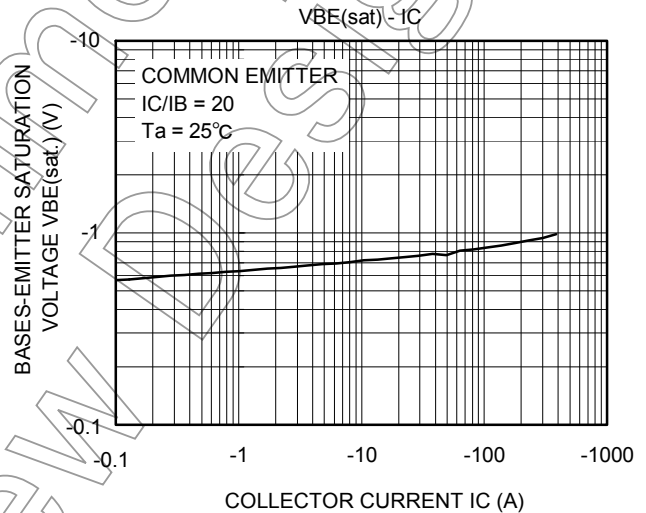
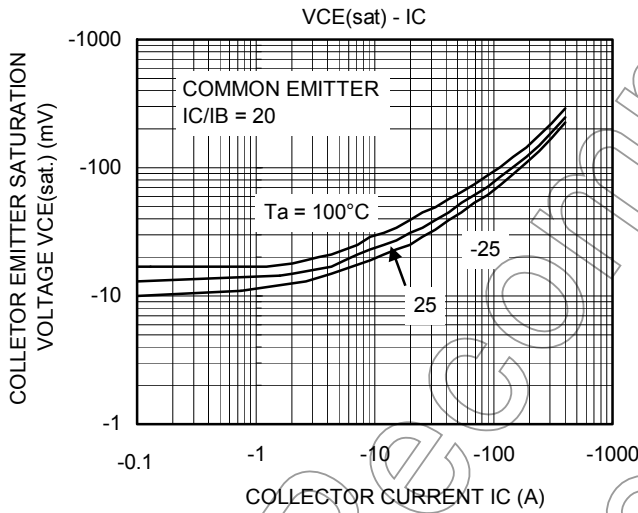
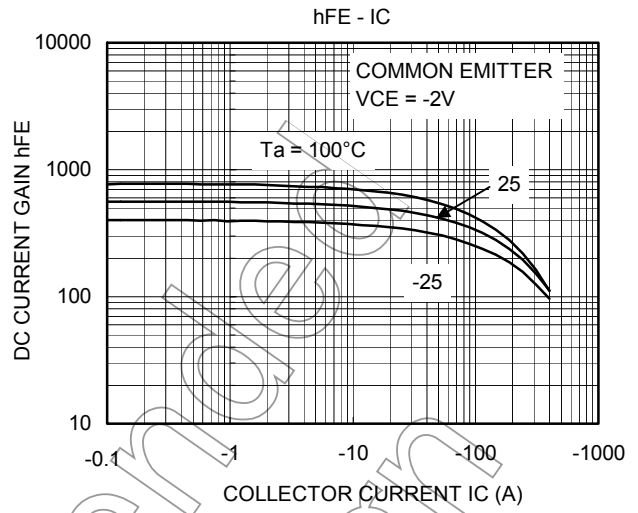
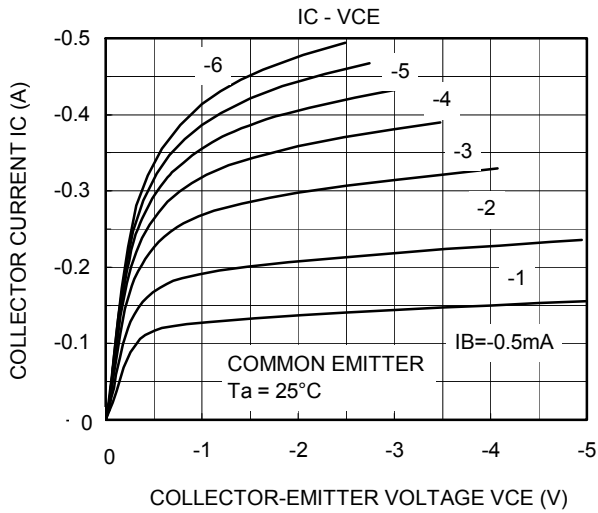
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current		$I_{CBO}$	$V_{CB} = -15\text{ V}, I_E = 0$	—	—	-100	nA
Emitter cutoff current		$I_{EBO}$	$V_{EB} = -5\text{ V}, I_C = 0$	—	—	-100	nA
DC current gain		$h_{FE}^{**}$	$V_{CE} = -2\text{ V}, I_C = -10\text{ mA}$	300	—	1000	
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
Switching time	Turn-on time	$t_{on}$	<p>Duty cycle <math>\leq 2\%</math> <math>I_{B1} = -I_{B2} = -5\text{ mA}</math></p>	—	40	—	ns
	Storage time	$t_{stg}$		—	280	—	ns
	Fall time	$t_f$		—	65	—	ns

\*\* $h_{FE}$  Classification    A:300~600, B:500~1000

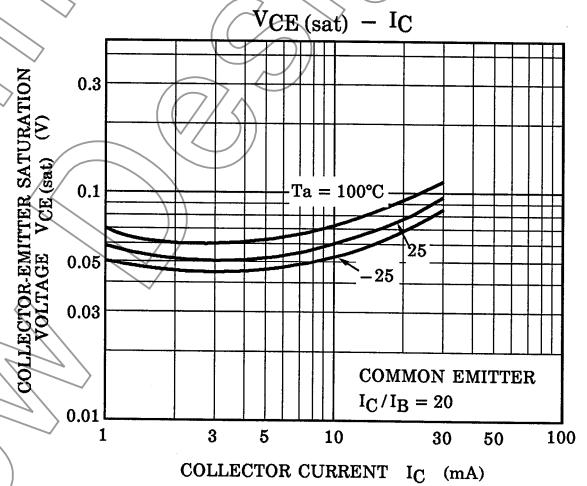
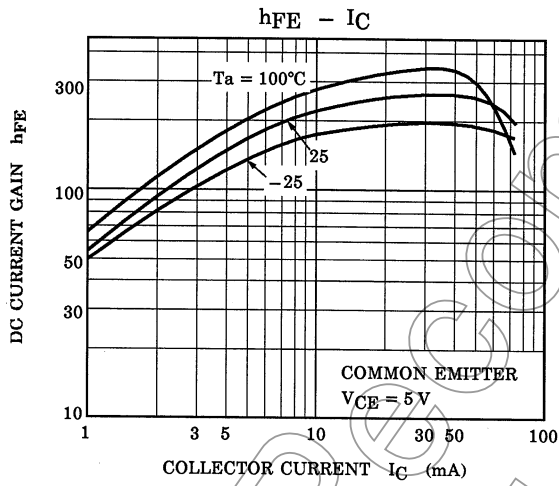
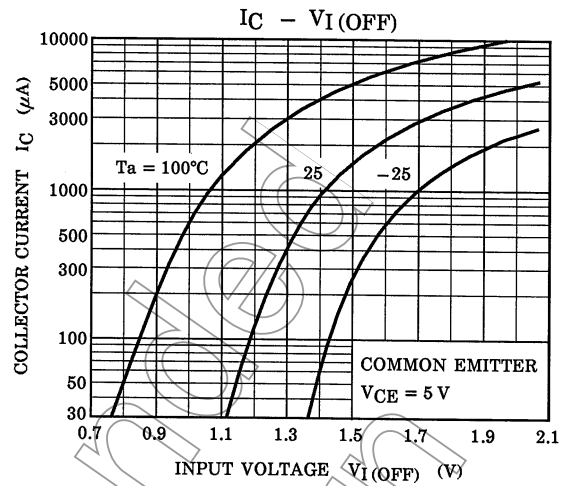
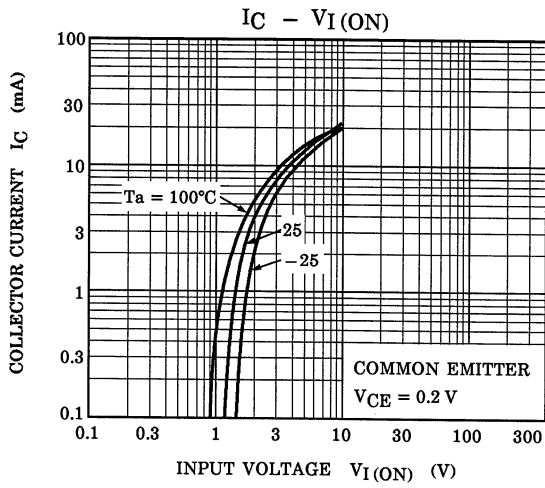
**Q2 Electrical Characteristics (Ta = 25°C)**

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current		$I_{CBO}$	$V_{CB} = 50\text{ V}, I_E = 0$	—	—	100	nA
		$I_{CEO}$	$V_{CE} = 50\text{ V}, I_E = 0$	—	—	500	nA
Emitter cutoff current		$I_{EBO}$	$V_{EB} = 10\text{ V}, I_C = 0$	0.082	—	0.15	mA
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)		$V_{I(ON)}$	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	1.5	—	5.0	V
Input voltage (OFF)		$V_{I(OFF)}$	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	1.0	—	1.5	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	—	32.9	47	61.1	k $\Omega$
Resistor ratio		R1/R2	—	0.9	1.0	1.1	

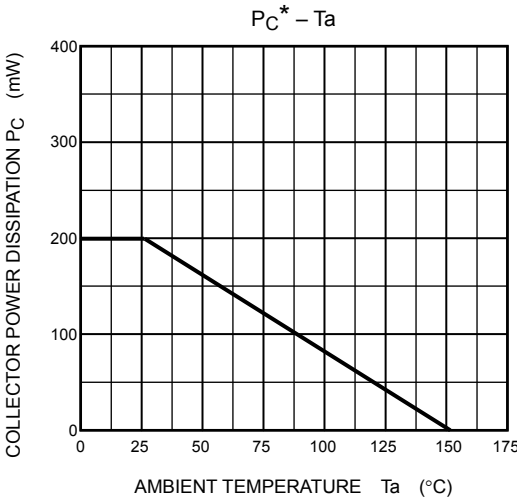
**Q1**



Q2



Q1, Q2 common



\*:Total rating

Not Recommended for New Design

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