

TOSHIBA Multichip Discrete Device

# HN7G08FE

General-Purpose Amplifier Applications  
Switching and Muting Switch Applications

Unit: mm

**Q1**

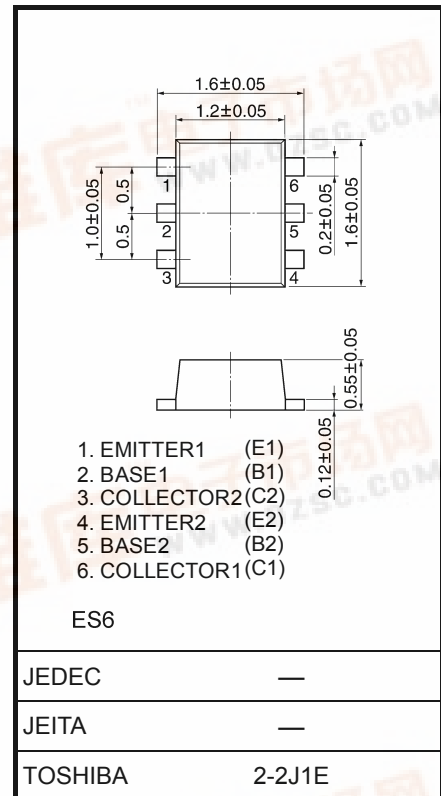
Low saturation voltage:  $V_{CE(sat)}(1) = -15\text{ mV (typ.)}$   
@ $I_C = -10\text{ mA}/I_B = -0.5\text{ mA}$   
Large collector current:  $I_C = -400\text{ mA (max)}$

Q1: 2SA1955F

Q2: RN1106F

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

Characteristic	Symbol	Rating	Unit
Collector-base voltage	$V_{CB0}$	-15	V
Collector-emitter voltage	$V_{CE0}$	-12	V
Emitter-base voltage	$V_{EB0}$	-5	V
Collector current	$I_C$	-400	mA
Base current	$I_B$	-50	mA



Weight: 0.003 g (typ.)

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

Characteristic	Symbol	Rating	Unit
Collector-base voltage	$V_{CB0}$	50	V
Collector-emitter voltage	$V_{CE0}$	50	V
Emitter-base voltage	$V_{EB0}$	5	V
Collector current	$I_C$	100	mA

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

Characteristic	Symbol	Rating	Unit
Collector power dissipation	$P_C^*$	100	mW
Junction temperature	$T_j$	150	°C
Storage temperature range	$T_{stg}$	-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.



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

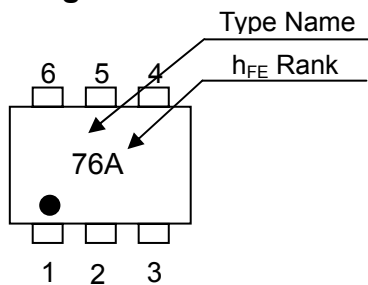
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current		$I_{CBO}$	—	$V_{CB} = -15\text{ V}, I_E = 0$	—	—	-100	nA
Emitter cutoff current		$I_{EBO}$	—	$V_{EB} = -5\text{ V}, I_C = 0$	—	—	-100	nA
DC current gain (Note)		$h_{FE}$	—	$V_{CE} = -2\text{ V}, I_C = -10\text{ mA}$	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	$t_{on}$	—		—	40	—	ns
	Storage time	$t_{stg}$	—		—	280	—	
	Fall time	$t_f$	—		$I_{B1} = -I_{B2} = 5\text{ mA}$	—	65	

Note:  $h_{FE}$  classification A(A): 300~600, B(B): 500~1000  
( ) marking symbol

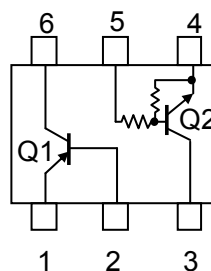
**Q2 Electrical Characteristics (Ta = 25°C)**

Characteristic	Symbol	Test Circuit	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	$I_{EBO}$	—	$V_{EB} = 5\text{ V}, I_C = 0$	0.074	—	0.138	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)	$V_I (ON)$	—	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	0.7	—	1.3	V
Input voltage (OFF)	$V_I (OFF)$	—	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	0.5	—	0.8	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	—	—	3.29	4.7	6.11	kΩ
Resistor ratio	R1/R2	—	—	0.09	0.1	0.11	

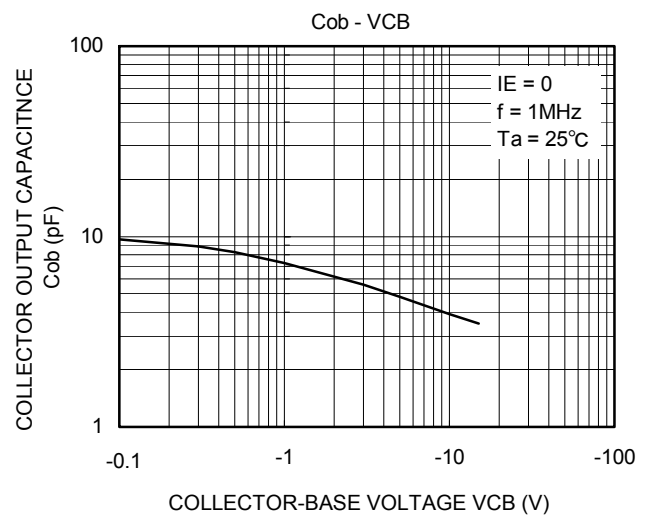
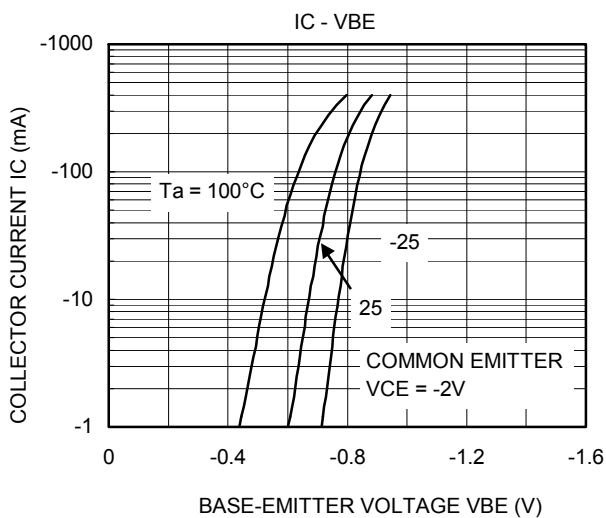
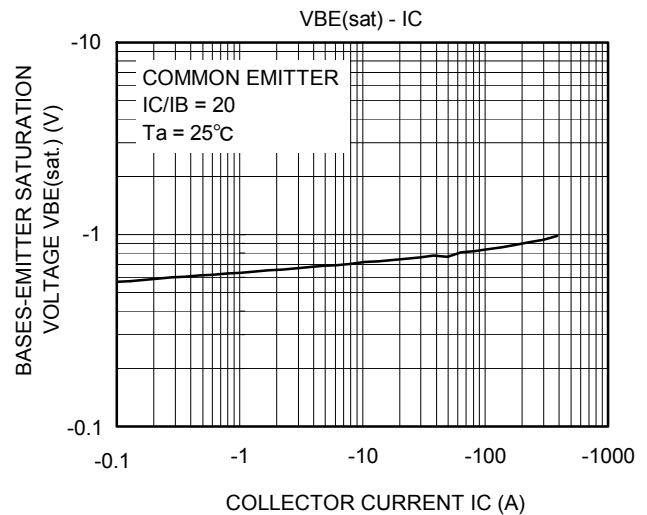
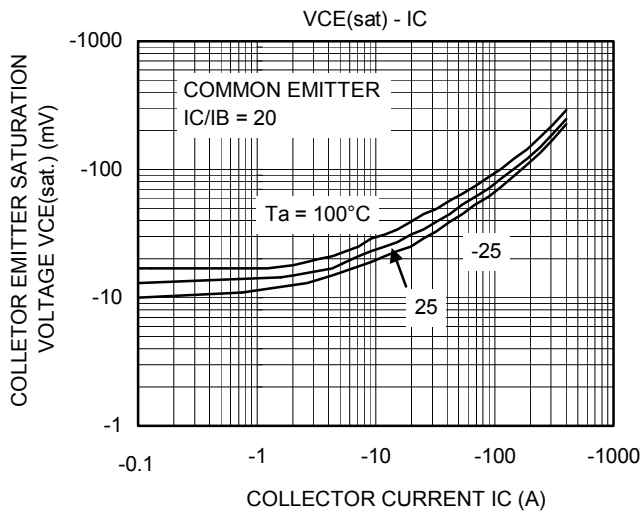
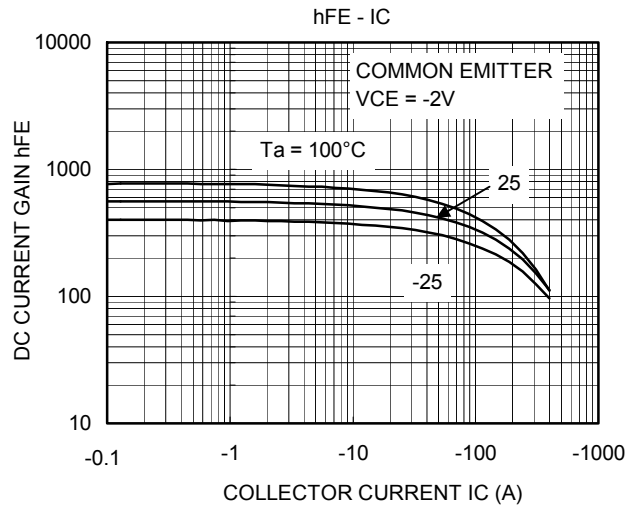
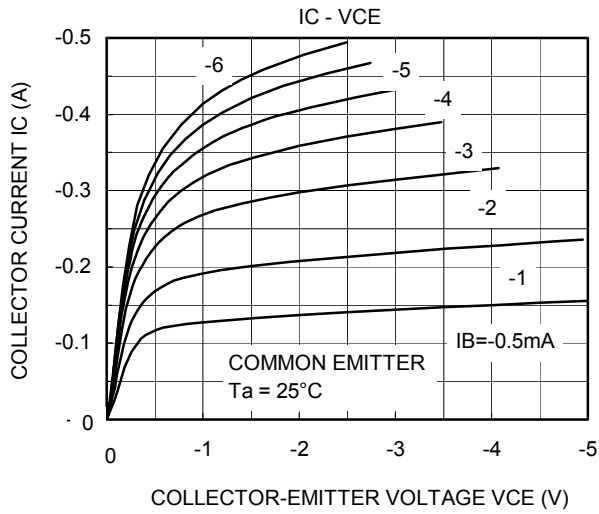
**Marking**



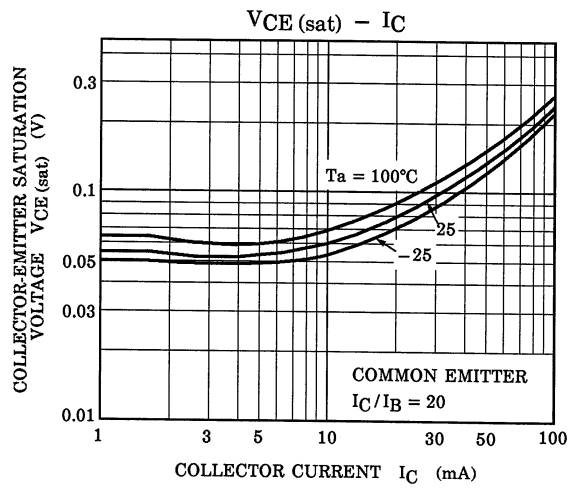
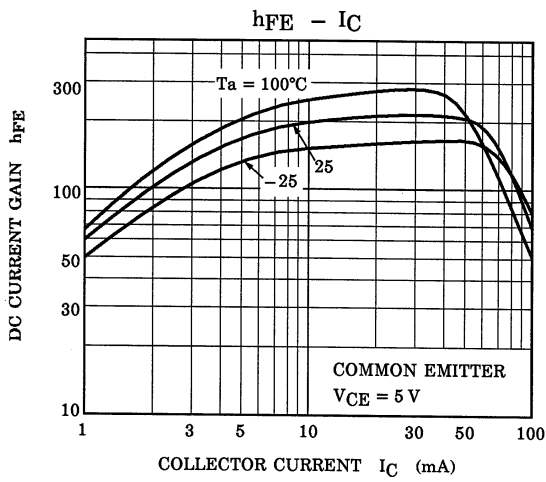
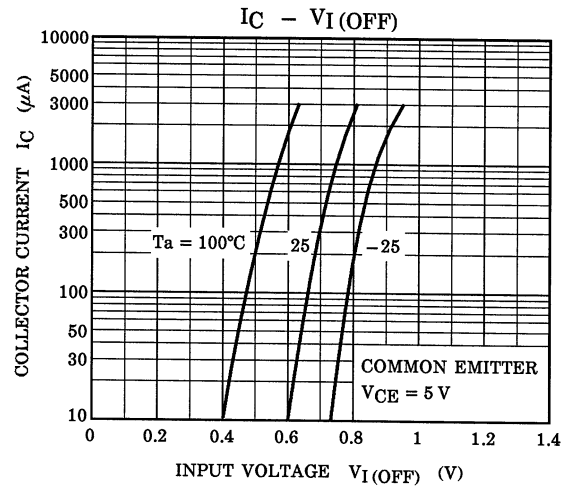
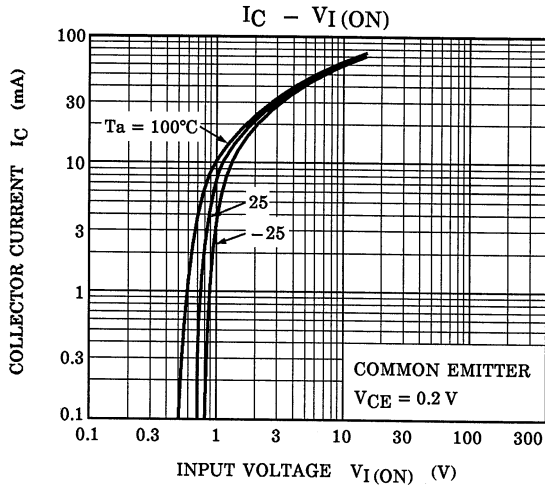
**Equivalent Circuit (Top View)**



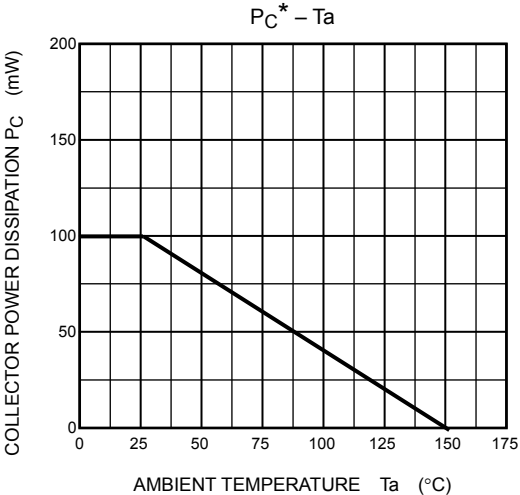
**Q1**



Q2



(Q1, Q2 common)



\*:Total rating

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20070701-EN GENERAL

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