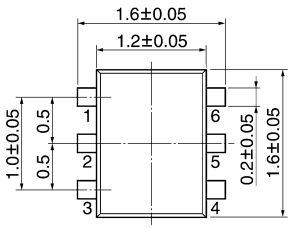
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

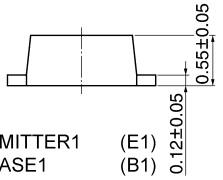
HN1C05FE

Low Frequency Amplifier Applications
Muting Application
Switching Application

- Low Saturation Voltage: VCE(sat)(1) = 15mV (typ.)
  :@ I_C = 10mA/ I_B = 0.5mA
- High Collector Current : I_C = 400mA (max)

Unit: mm





1. EMITTER1 (E1)
2. BASE1 (B1)
3. COLLECTOR2 (C2)
4. EMITTER2 (E2)
5. BASE2 (B2)
6. COLLECTOR1 (C1)

ES6

JEDEC	—
JEITA	—
TOSHIBA	2-2N1G

Weight: 3.0 mg (typ.)

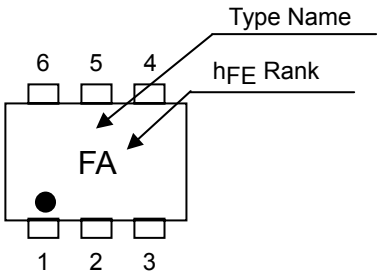
Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 Common)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	15	V
Collector-emitter voltage	V_{CEO}	12	V
Emitter-base voltage	V_{EBO}	5	V
Collector current	I_C	400	mA
Base current	I_B	50	mA
Collector power dissipation	P_C*	100	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55 to 150	°C

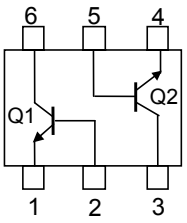
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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.

Marking

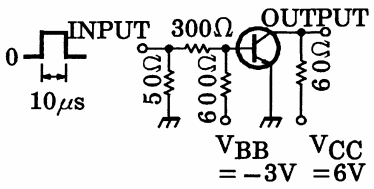


Equivalent Circuit (Top View)



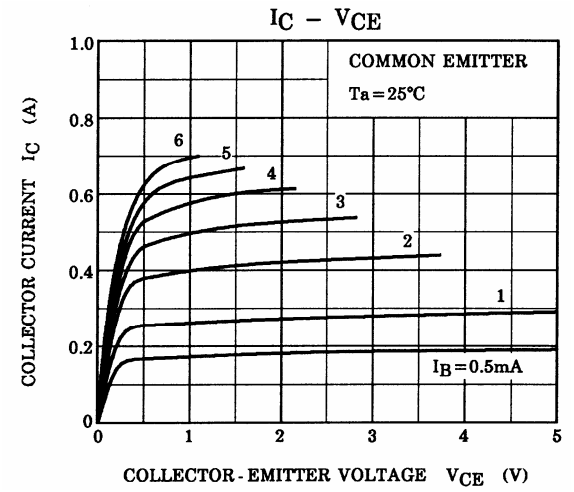
Start of commercial production
2003-02

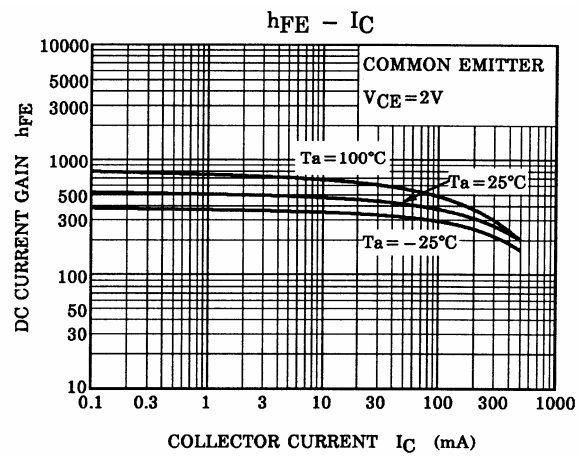
Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)

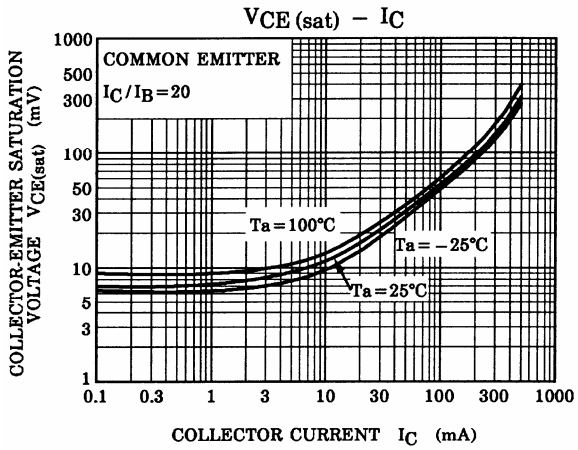
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} =15V, I_E = 0	—	—	100	nA
Emitter cut-off current		I_{EBO}	V_{EB} = 5V, I_C = 0	—	—	100	nA
DC current gain		$h_{FE\ (Note)}$	V_{CE} = 2V, I_C = 10mA	300	—	1000	
Collector-emitter saturation voltage		$V_{CE\ (sat)(1)}$	I_C = 10mA, I_B = 0.5mA	—	15	30	mV
		$V_{CE\ (sat)(2)}$	I_C = 200mA, I_B = 10mA	—	110	250	
Collector-emitter saturation voltage		$V_{BE(sat)}$	V_{CE} = 200mA, I_C = 10mA	—	0.87	1.2	V
Transition frequency		f_T	V_{CE} = 2V, I_C = 10mA	—	130	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = 10V, I_E = 0, f = 1MHz	—	4.2	—	pF
"ON" resistance		R_{on}	I_B = 1mA, V_{in} = 1V_{rms}, f = 1kHz	—	0.9	—	Ω
Switching time	Turn on time	t_{on}		—	85	—	ns
	Storage time	t_{stg}		—	170	—	
	Fall down time	t_f	Duty cycle ≤ 2% I_{B1} = − I_{B2} = 5 mA	—	40	—	

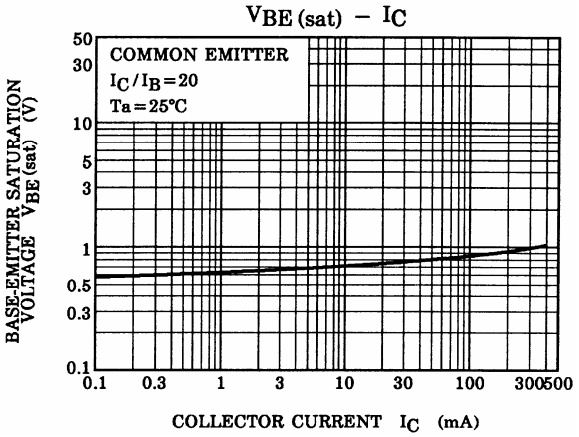
(Note) h_{FE} Classifications A:300 to 600, B:500 to 1000

(Q1, Q2 Common)

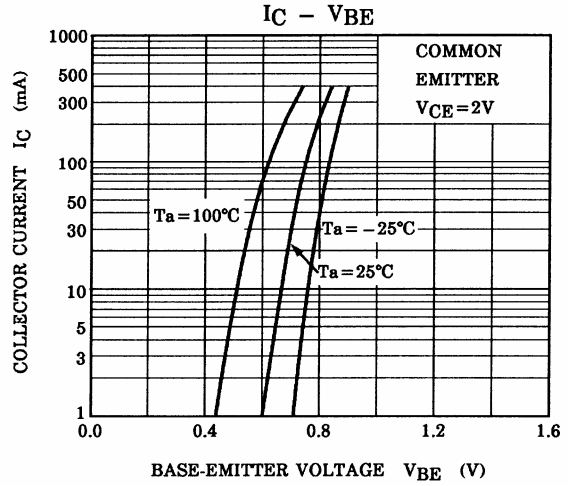

I_C – V_{CE}
COMMON EMITTER
Ta = 25°C
I_B = 0.5mA
COLLECTOR CURRENT I_C (A)
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)

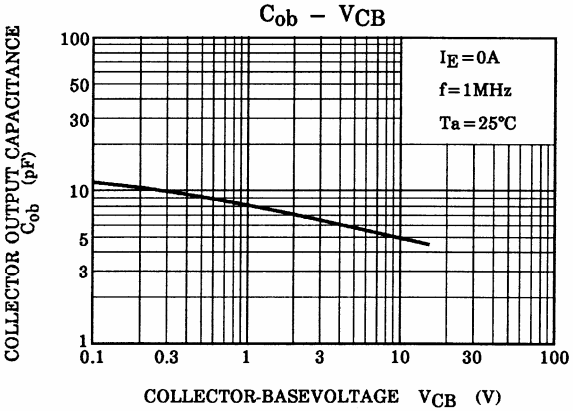

h_{FE} – I_C
COMMON EMITTER
V_{CE} = 2V
Ta = 100°C
Ta = 25°C
Ta = −25°C
DC CURRENT GAIN h_{FE}
COLLECTOR CURRENT I_C (mA)

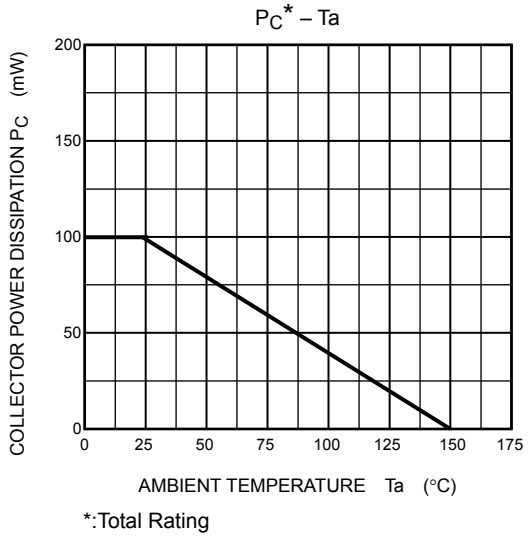

$V_{CE\,(sat)}$ – I_C
COMMON EMITTER
I_C / I_B = 20
Ta = 100°C
Ta = −25°C
Ta = 25°C
COLLECTOR-EMITTER SATURATION VOLTAGE $V_{CE(sat)}$ (mV)
COLLECTOR CURRENT I_C (mA)


$V_{BE\,(sat)}$ – I_C
COMMON EMITTER
I_C / I_B = 20
Ta = 25°C
BASE-EMITTER SATURATION VOLTAGE $V_{BE(sat)}$ (V)
COLLECTOR CURRENT I_C (mA)

(Q1, Q2 Common)







*:Total Rating

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