

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

# HN1C03F

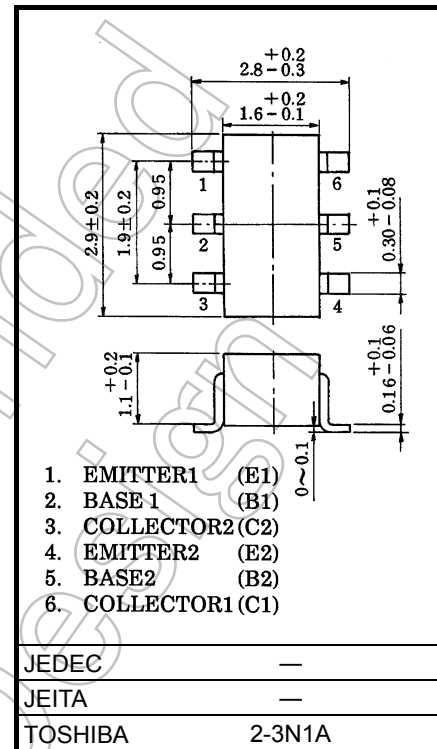
For Muting And Switching Applications

Unit: mm

- Including two devices in SM6 (Super mini type with 6 leads)
- High emitter-base voltage:  $V_{EBO} = 25V$  (min)
- High reverse  $h_{FE}$ : reverse  $h_{FE} = 150$  (typ.) ( $V_{CE} = -2V, I_C = -4mA$ )
- Low on resistance:  $R_{ON} = 1\Omega$  (typ.) ( $I_B = 5mA$ )

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

Characteristic	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	50	V
Collector-emitter voltage	$V_{CEO}$	20	V
Emitter-base voltage	$V_{EBO}$	25	V
Collector current	$I_C$	300	mA
Base current	$I_B$	60	mA
Collector power dissipation	$P_C^*$	300	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

Start of commercial production  
1988-11

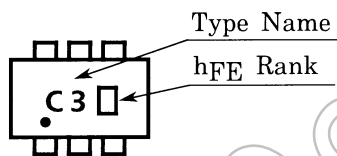
## Electrical Characteristics (Ta = 25°C) (Q1,Q2 Common)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	—	$V_{CB} = 50V, I_E = 0$	—	—	0.1	$\mu A$
Emitter cut-off current		$I_{EBO}$	—	$V_{EB} = 25V, I_C = 0$	—	—	0.1	$\mu A$
DC current gain		$h_{FE}$ (Note)	—	$V_{CE} = 2V, I_C = 4mA$	200	—	1200	
Collector-emitter saturation voltage		$V_{CE(sat)}$	—	$I_C = 30mA, I_B = 3mA$	—	0.042	0.1	V
Base-emitter voltage		$V_{BE}$	—	$V_{CE} = 2V, I_C = 4mA$	—	0.61	—	V
Transition frequency		$f_T$	—	$V_{CE} = 6V, I_C = 4mA$	—	30	—	MHz
Collector output capacitance		$C_{ob}$	—	$V_{CB} = 10V, I_E = 0, f = 1MHz$	—	4.8	7	pF
Switching time	Turn-on time	—	—	<p>DUTY CYCLE <math>\leq 2\%</math></p>	—	160	—	ns
	Storage Time	—	—		—	500	—	
	Fall time	—	—		—	—	130	

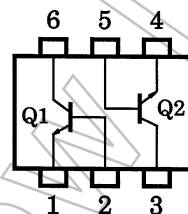
Note:  $h_{FE}$  Classification

A: 200 to 700, B: 350 to 1200

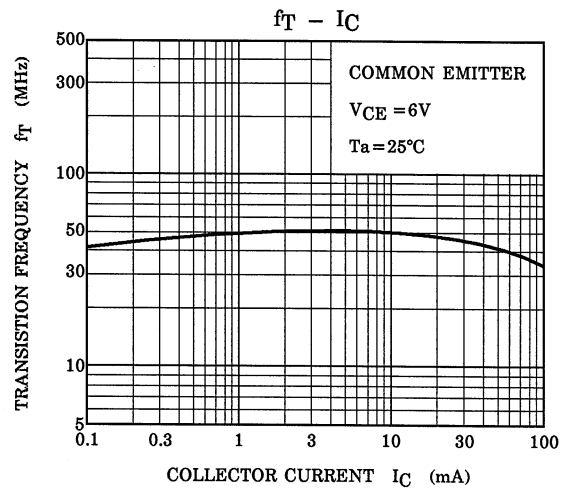
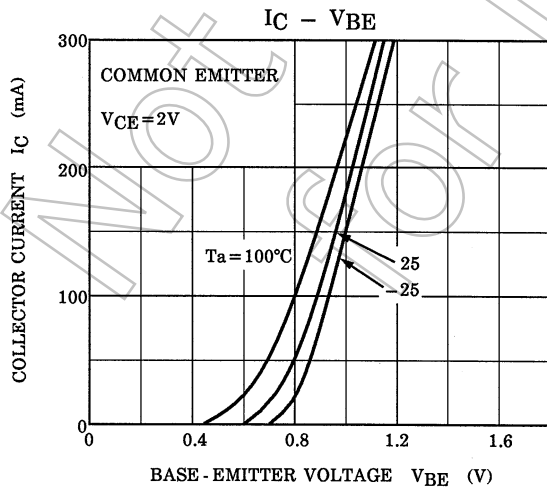
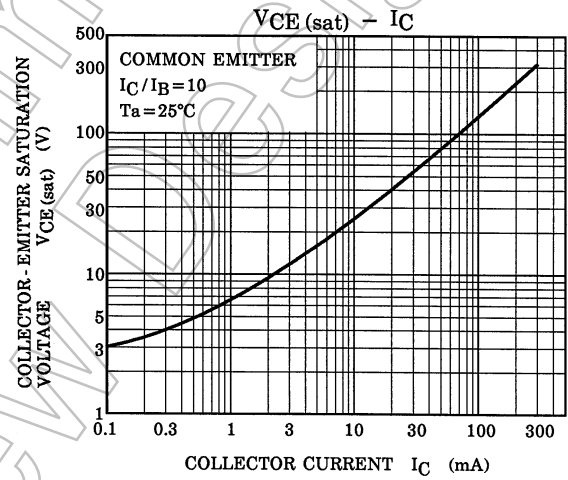
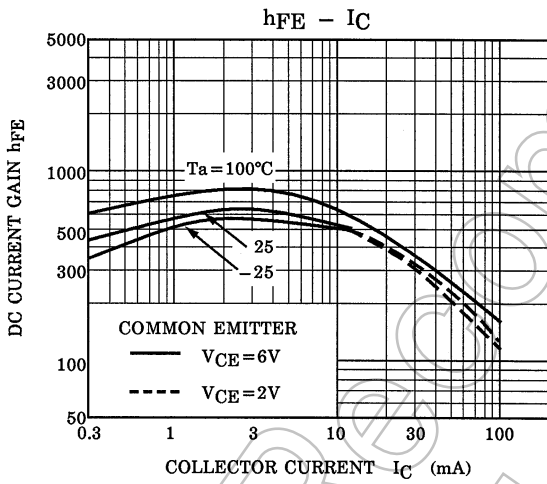
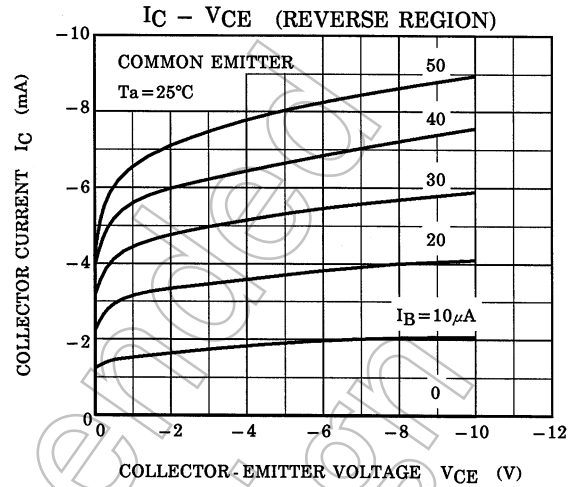
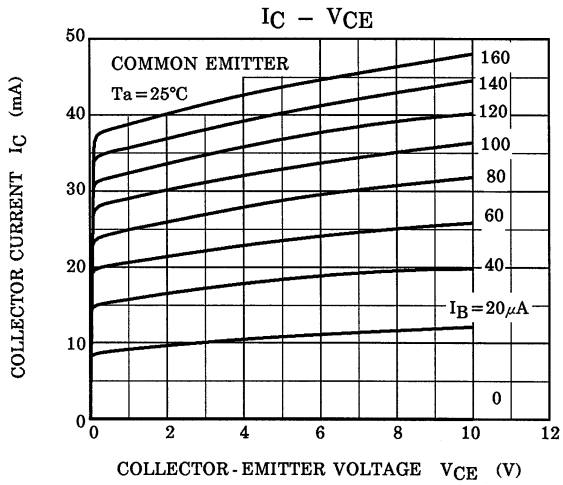
## Marking



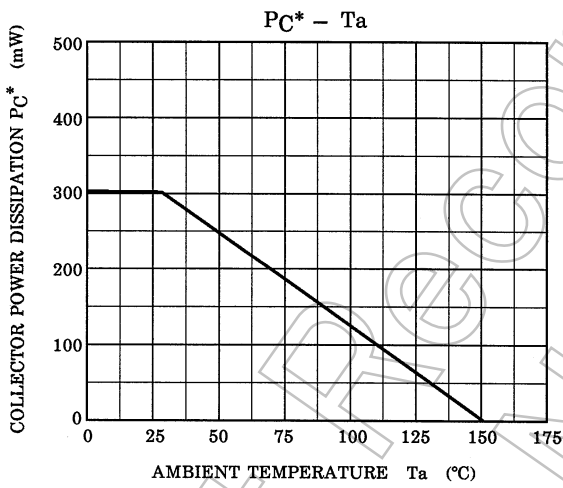
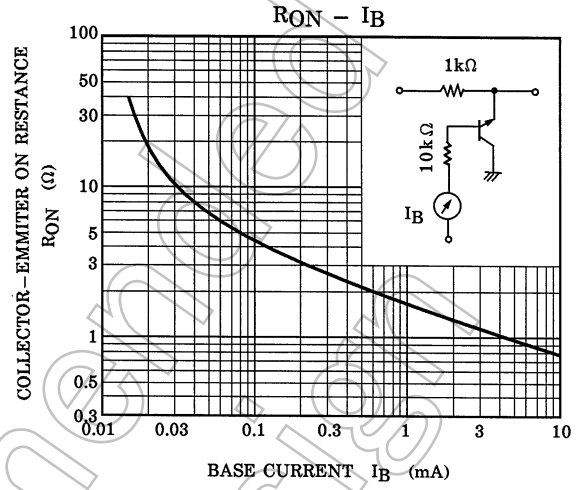
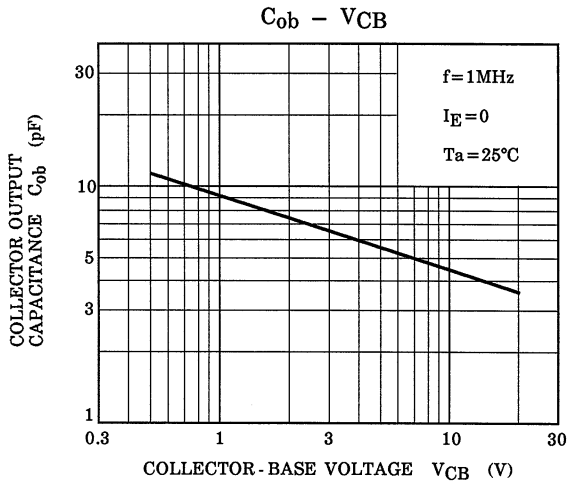
## Equivalent Circuit (Top View)



(Q1, Q2 Common)



(Q1, Q2 Common)



\*: Total Rating

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