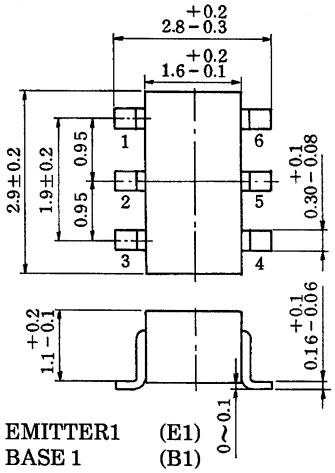
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

HN1C03F

For Muting And Switching Applications

- 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} = 1Ω (typ.)(IB = 5mA)

Unit in mm



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

JEDEC	—
JEITA	—
TOSHIBA	2-3N1A

Weight: 0.015g (typ.)

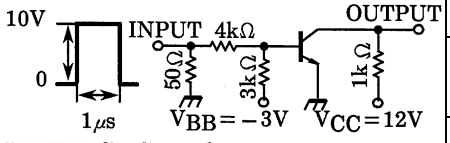
Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 Common)

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}	−55~150	°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).

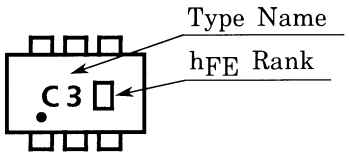
* Total rating

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

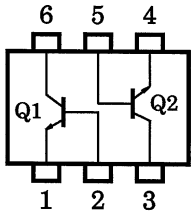
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	—	V_{CB} = 50V, I_E = 0	—	—	0.1	μA
Emitter cut-off current		I_{EBO}	—	V_{EB} = 25V, I_C = 0	—	—	0.1	μA
DC current gain		h_{FE} (Note)	—	V_{CE} = 2V, I_C = 4mA	200	—	1200	
Collector-emitter saturation 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	—	—	 DUTY CYCLE≦2%	—	160	—	ns
	Storage Time	—	—		—	500	—	
	Fall time	—	—		—	130	—	

Note: h_{FE} Classification
A: 200~700, B: 350~1200

Marking

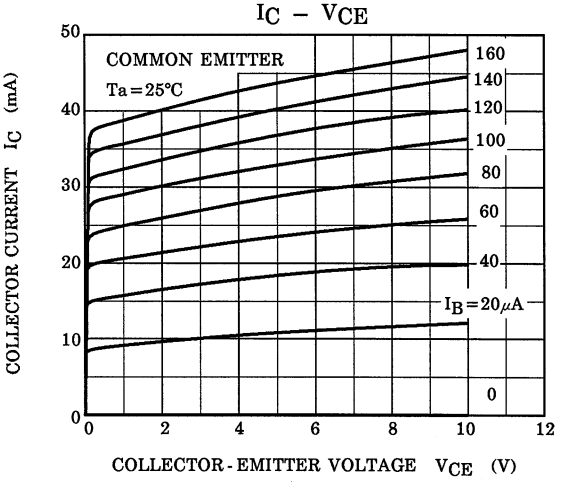


Equivalent Circuit (Top View)

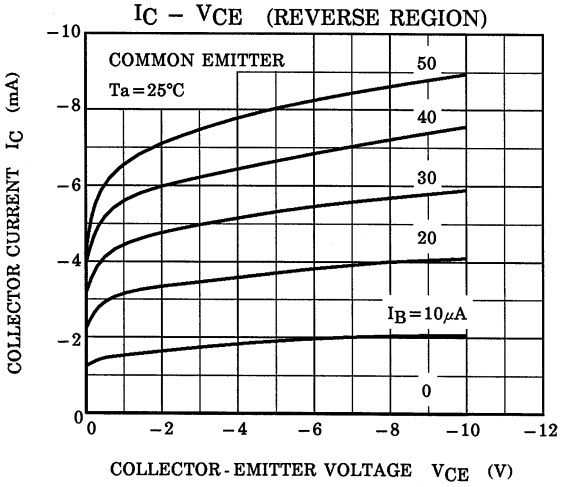


(Q1,Q2 Common)

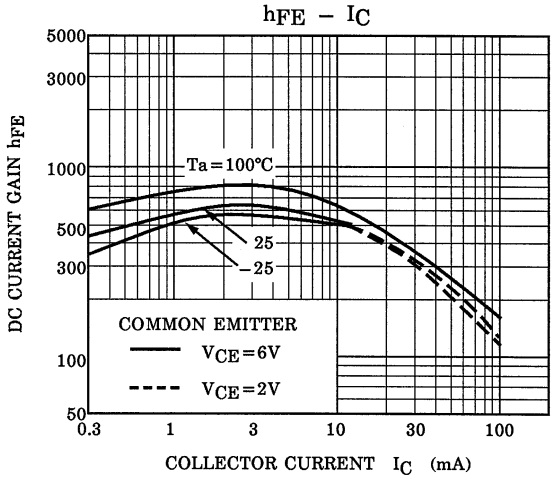
I_C – V_{CE}



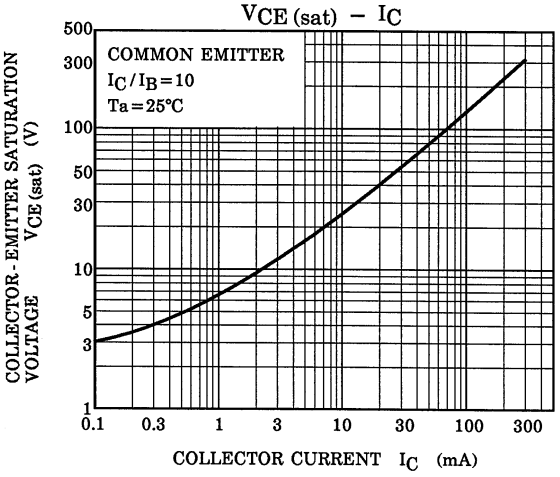
I_C – V_{CE} (REVERSE REGION)



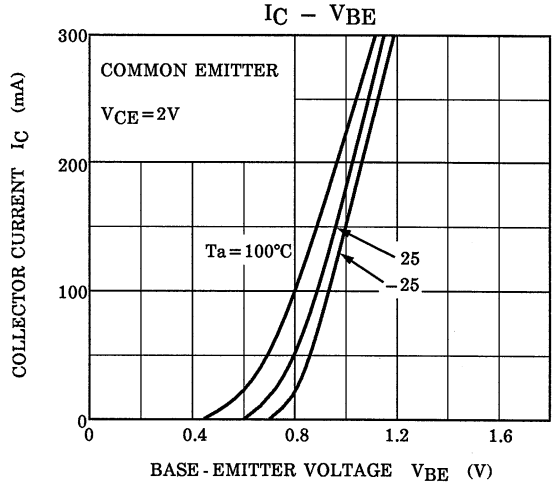
h_{FE} – I_C



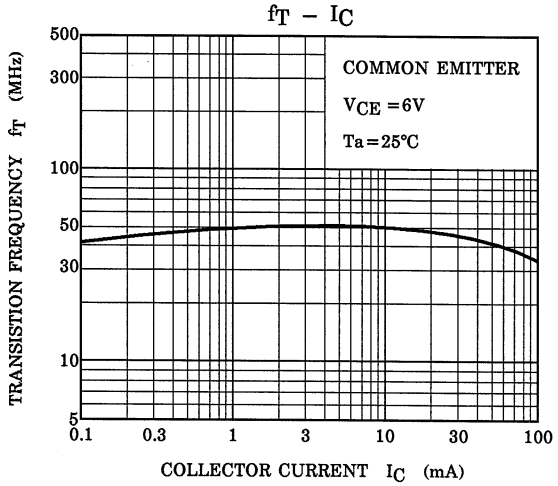
$V_{CE\,(sat)}$ – I_C



I_C – V_{BE}

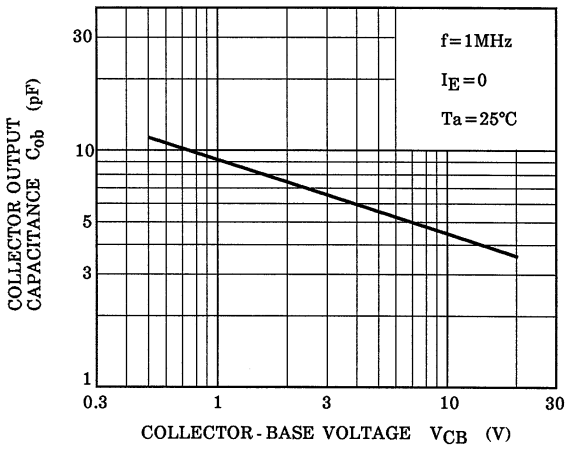


f_T – I_C

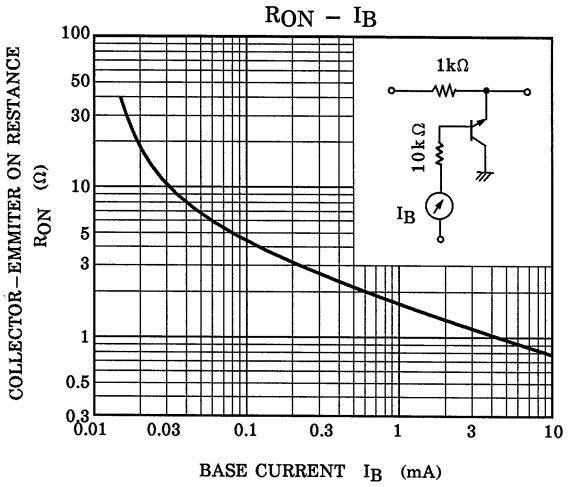


(Q1,Q2 Common)

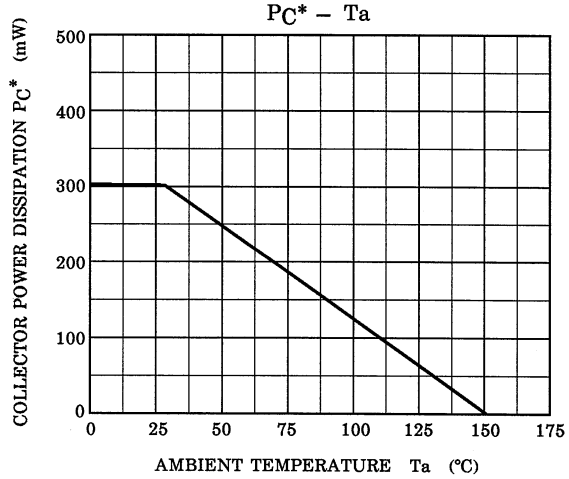
C_{ob} – V_{CB}



R_{ON} – I_B



P_C* – Ta



*: Total Rating

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