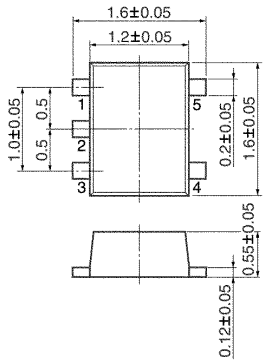
TOSHIBA Transistor Silicon NPN・PNP Epitaxial Type
(PCT Process) (Bias Resistor Built-in Transistor)

RN47A4JE

Switching, Inverter Circuit, Interface Circuit and
Driver Circuit Applications

- Two devices are incorporated into an Extreme-Super-Mini (5-pin) package.
- Incorporating a bias resistor into a transistor reduces parts count. Reducing the parts count enables the manufacture of ever more compact equipment and lowers assembly cost.

Unit: mm



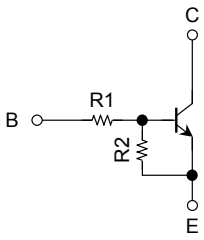
1.	EMITTER1 (E1)
2.	BASE1 (B1)
3.	EMITTER2 (E2)
4.	COLLECTOR2 (C2)
5.	COLLECTOR1 (C1)
ESV	BASE2 (B2)

JEDEC	—
JEITA	—
TOSHIBA	2-2P1E

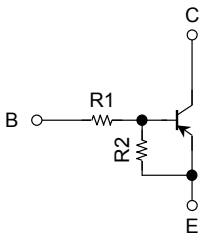
Weight: 0.003g (typ.)

Equivalent Circuit and Bias Resistor Values

Q1



Q2



Q1

R1: 47 kΩ, R2: 47 kΩ

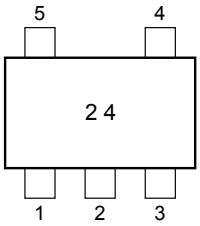
Q2

R1: 10 kΩ, R2: 47 kΩ

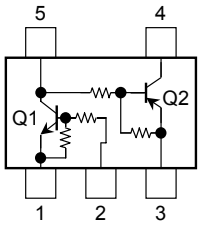
Q1: RN1104F

Q2: RN2107F

Marking



Equivalent Circuit (top view)



Maximum Ratings (Ta = 25°C) (Q1)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	10	V
Collector current	I_C	100	mA

Maximum Ratings (Ta = 25°C) (Q2)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	−50	V
Collector-emitter voltage	V_{CEO}	−50	V
Emitter-base voltage	V_{EBO}	−6	V
Collector current	I_C	−100	mA

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

Characteristics	Symbol	Rating	Unit
Collector power dissipation	P_C (Note)	100	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55~150	°C

Note: Total rating

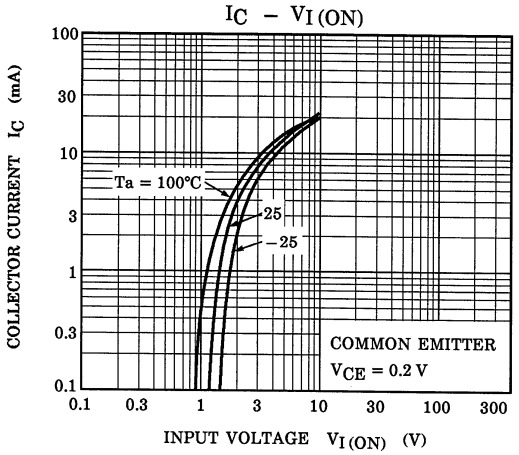
Electrical Characteristics (Ta = 25°C) (Q1)

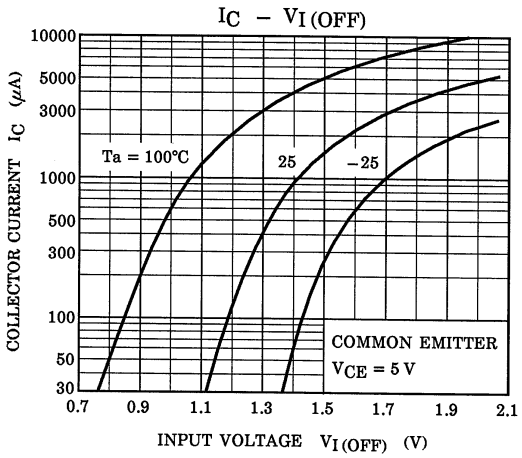
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = 50 V, I_E = 0	—	—	100	nA
	I_{CEO}	V_{CE} = 50 V, I_B = 0	—	—	500	
Emitter cut-off current	I_{EBO}	V_{EB} = 10 V, I_C = 0	0.082	—	0.15	mA
DC current gain	h_{FE}	V_{CE} = 5 V, I_C = 10 mA	80	—	—	
Collector-emitter saturation voltage	$V_{CE\ (sat)}$	I_C = 5 mA, I_B = 0.25 mA	—	0.1	0.3	V
Input voltage (ON)	$V_{I\ (ON)}$	V_{CE} = 0.2 V, I_C = 5 mA	1.5	—	5.0	V
Input voltage (OFF)	$V_{I\ (OFF)}$	V_{CE} = 5 V, I_C = 0.1 mA	1.0	—	1.5	V
Transition frequency	f_T	V_{CE} = 10 V, I_C = 5 mA	—	250	—	MHz
Collector output capacitance	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	3	—	pF
Input resistor	R1	—	32.9	47	61.1	kΩ
Resistor ratio	R1/R2	—	0.8	1.0	1.2	

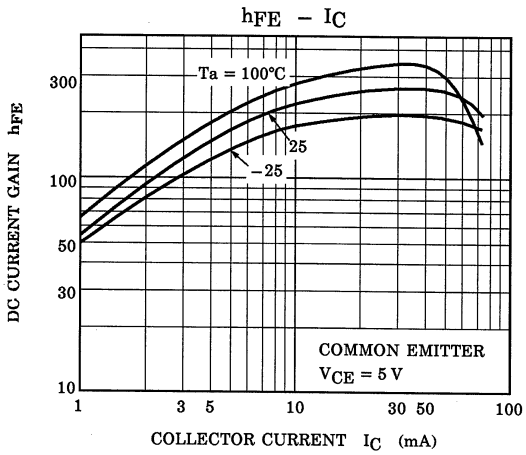
Electrical Characteristics (Ta = 25°C) (Q2)

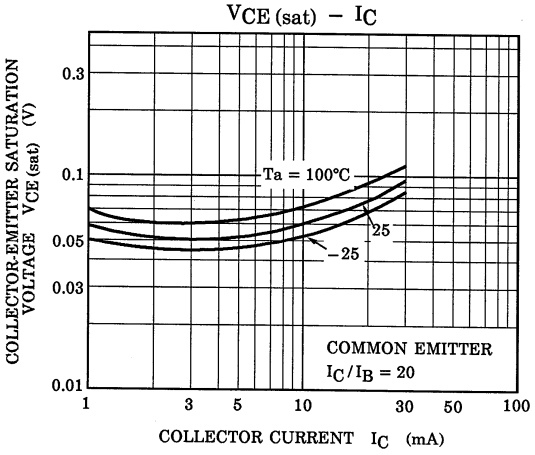
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = −50 V, I_E = 0	—	—	−100	nA
	I_{CEO}	V_{CE} = −50 V, I_B = 0	—	—	−500	
Emitter cut-off current	I_{EBO}	V_{EB} = −6 V, I_C = 0	−0.081	—	−0.15	mA
DC current gain	h_{FE}	V_{CE} = −5 V, I_C = −10 mA	80	—	—	
Collector-emitter saturation voltage	$V_{CE\ (sat)}$	I_C = −5 mA, I_B = −0.25 mA	—	−0.1	−0.3	V
Input voltage (ON)	$V_{I\ (ON)}$	V_{CE} = −0.2 V, I_C = −5 mA	−0.7	—	−1.8	V
Input voltage (OFF)	$V_{I\ (OFF)}$	V_{CE} = −5 V, I_C = −0.1 mA	−0.5	—	−1.0	V
Transition frequency	f_T	V_{CE} = −10 V, I_C = −5 mA	—	200	—	MHz
Collector output capacitance	C_{ob}	V_{CB} = −10 V, I_E = 0, f = 1 MHz	—	3	—	pF
Input resistor	R1	—	7	10	13	kΩ
Resistor ratio	R1/R2	—	0.171	0.213	0.255	

Q1



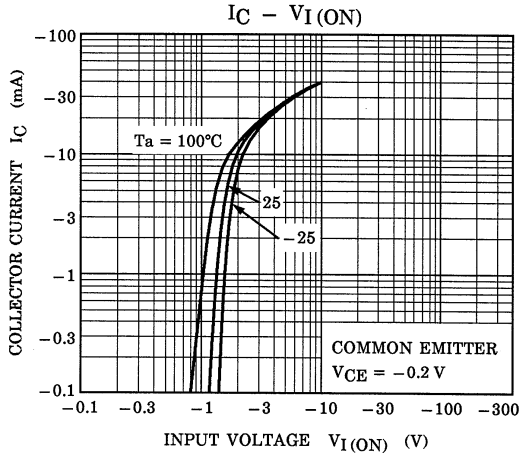




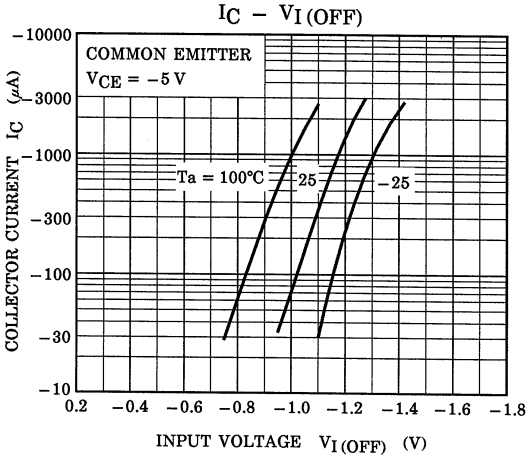


Q2

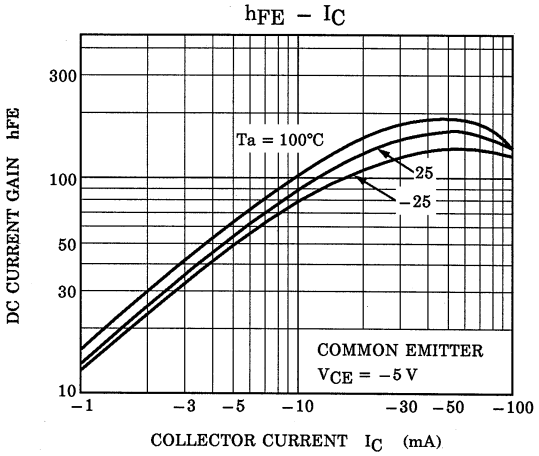
$I_C - V_{I(ON)}$



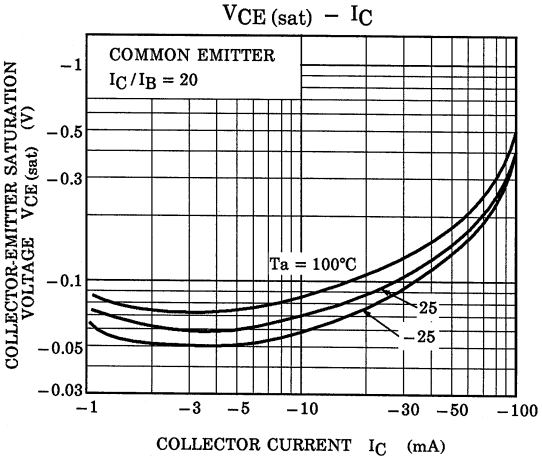
$I_C - V_{I(OFF)}$



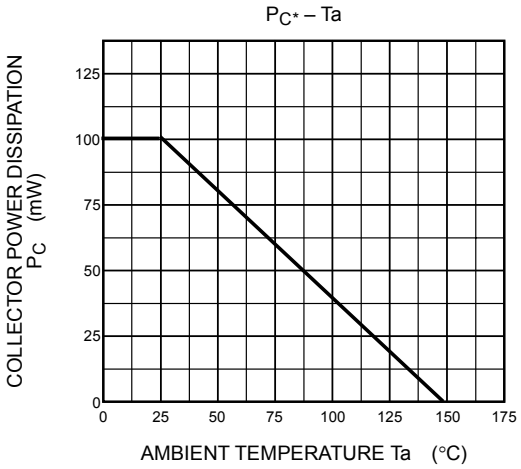
$h_{FE} - I_C$



$V_{CE(sat)} - I_C$



Q1, Q2 Common



*Total Rating.

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