

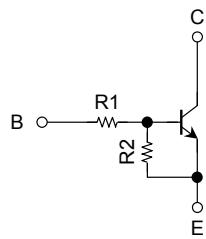
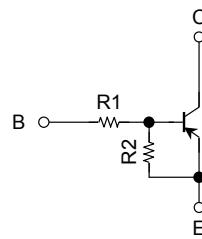
TOSHIBA Transistor Silicon NPN·PNP Epitaxial Type  
(PCT Process) (Bias Resistor Built-in Transistor)

# **RN47A2JE**

## 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.

## Equivalent Circuit and Bias Resistor Values

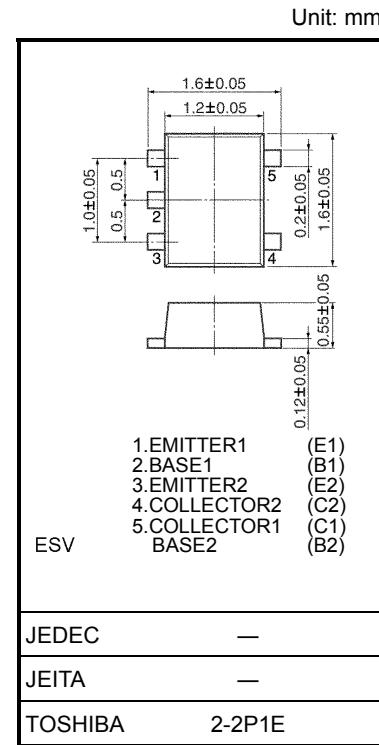
**Q1****Q2**

R1: 22 kΩ (Q1, Q2 common)

R2: 22 kΩ (Q1, Q2 common)

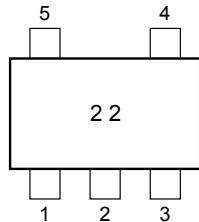
Q1: RN1103F

Q2: RN2103F

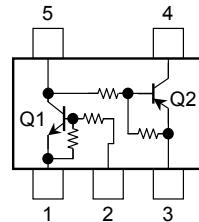


Weight: 0.003g (typ.)

## 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	$V_{EBO}$	-10	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

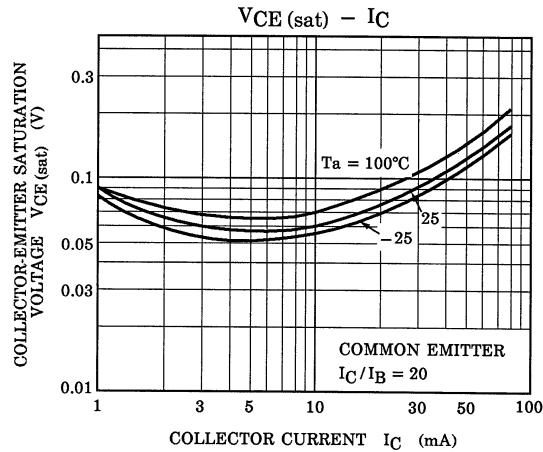
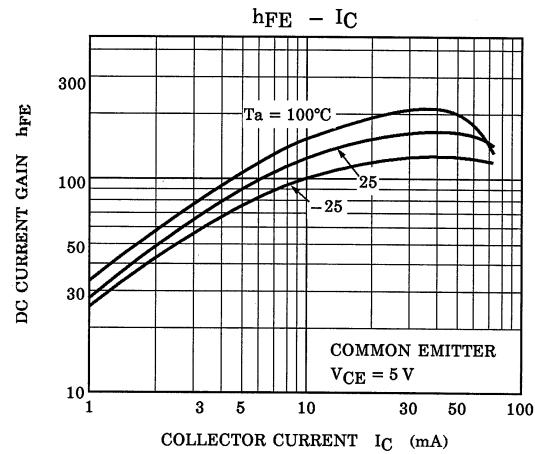
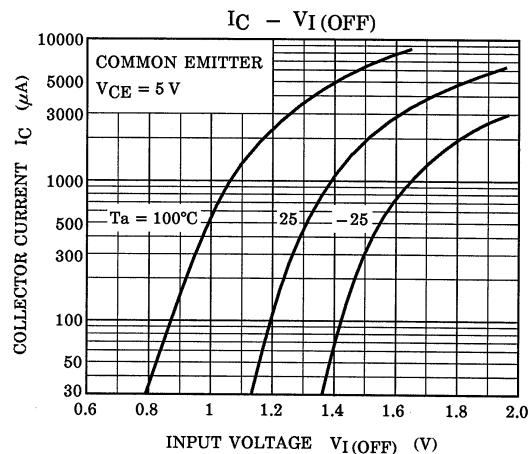
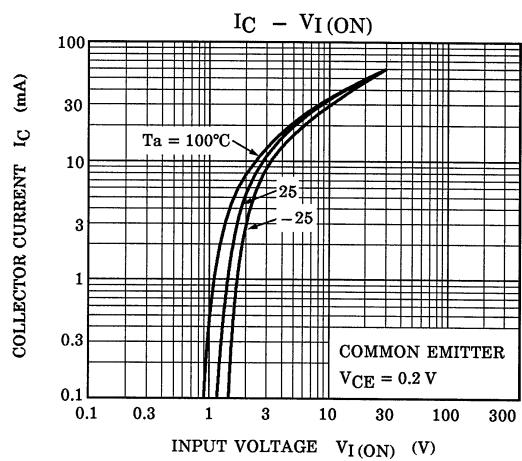
## Electrical Characteristics (Ta = 25°C) (Q1)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0	—	—	100	nA
	I <sub>CEO</sub>	V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0	—	—	500	
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> = 10 V, I <sub>C</sub> = 0	0.17	—	0.33	mA
DC current gain	h <sub>FE</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 10 mA	70	—	—	
Collector-emitter saturation voltage	V <sub>CE</sub> (sat)	I <sub>C</sub> = 5 mA, I <sub>B</sub> = 0.25 mA	—	0.1	0.3	V
Input voltage (ON)	V <sub>I</sub> (ON)	V <sub>CE</sub> = 0.2 V, I <sub>C</sub> = 5 mA	1.3	—	3.0	V
Input voltage (OFF)	V <sub>I</sub> (OFF)	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 0.1 mA	1.0	—	1.5	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 5 mA	—	250	—	MHz
Collector output capacitance	C <sub>ob</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0, f = 1 MHz	—	3	—	pF
Input resistor	R1	—	15.4	22	28.6	kΩ
Resistor ratio	R1/R2	—	0.8	1.0	1.2	

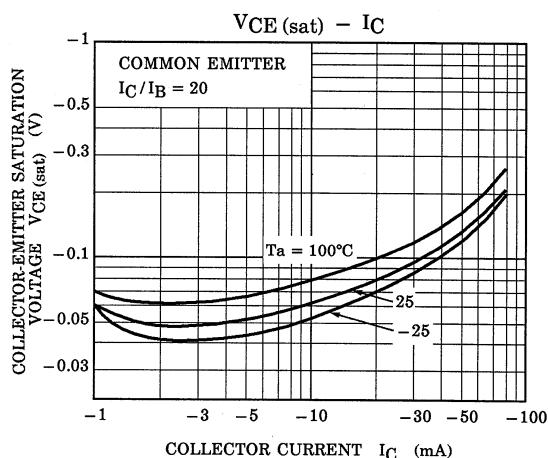
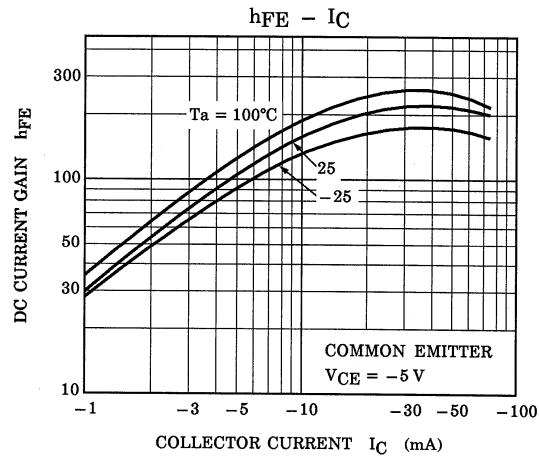
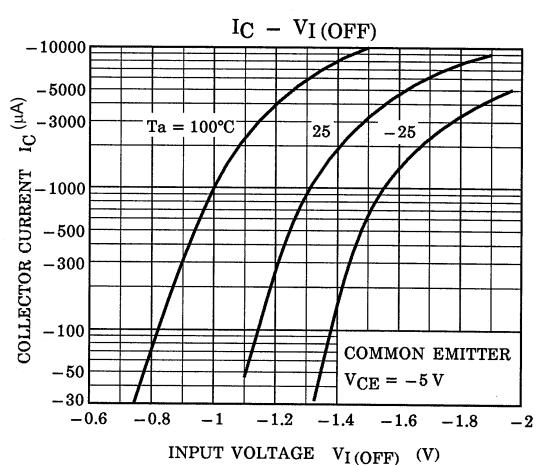
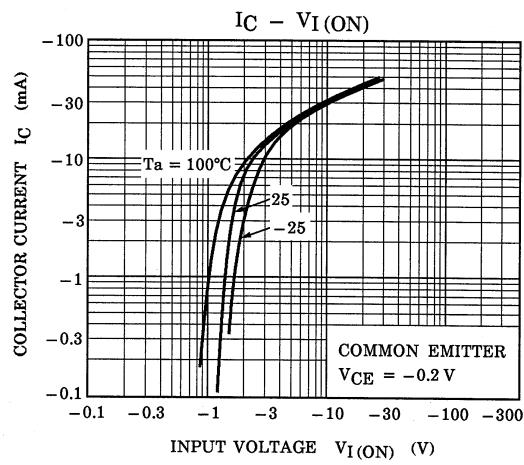
## Electrical Characteristics (Ta = 25°C) (Q2)

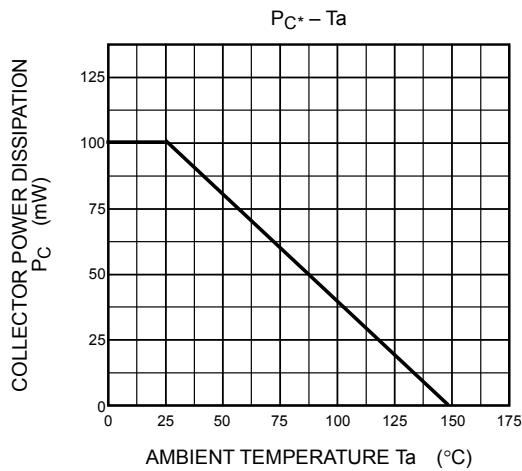
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> = -50 V, I <sub>E</sub> = 0	—	—	-100	nA
	I <sub>CEO</sub>	V <sub>CE</sub> = -50 V, I <sub>B</sub> = 0	—	—	-500	
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> = -10 V, I <sub>C</sub> = 0	-0.17	—	-0.33	mA
DC current gain	h <sub>FE</sub>	V <sub>CE</sub> = -5 V, I <sub>C</sub> = -10 mA	70	—	—	
Collector-emitter saturation voltage	V <sub>CE</sub> (sat)	I <sub>C</sub> = -5 mA, I <sub>B</sub> = -0.25 mA	—	-0.1	-0.3	V
Input voltage (ON)	V <sub>I</sub> (ON)	V <sub>CE</sub> = -0.2 V, I <sub>C</sub> = -5 mA	-1.3	—	-3.0	V
Input voltage (OFF)	V <sub>I</sub> (OFF)	V <sub>CE</sub> = -5 V, I <sub>C</sub> = -0.1 mA	-1.0	—	-1.5	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> = -10 V, I <sub>C</sub> = -5 mA	—	200	—	MHz
Collector output capacitance	C <sub>ob</sub>	V <sub>CB</sub> = -10 V, I <sub>E</sub> = 0, f = 1 MHz	—	3	—	pF
Input resistor	R1	—	15.4	22	28.6	kΩ
Resistor ratio	R1/R2	—	0.8	1.0	1.2	

Q1



Q2



**Q1, Q2 Common**

\*Total Rating.

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