TOSHIBA Transistor Silicon NPN · PNP Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

# **RN47A3**

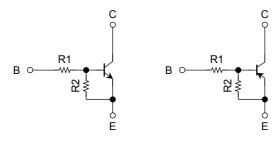
Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications.

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

#### **Equivalent Circuit and Bias Resistor Values**

Q1

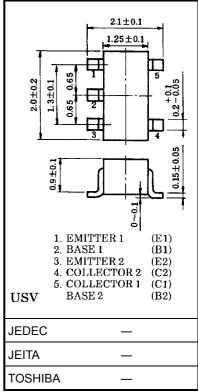
Q2



R1: 10 kΩ (Q1, Q2 common)

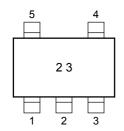
R2: 10 kΩ (Q1, Q2 common)

Q1: RN1102F Q2: RN2102F Unit: mm

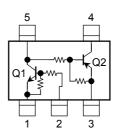


Weight: g (typ.)

#### **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 <sub>CEO</sub>	50	V
Emitter-base voltage	V <sub>EBO</sub>	10	V
Collector current	IC	100	mA

### Maximum Ratings (Ta = 25°C) (Q2)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	-50	V
Collector-emitter voltage	V <sub>CEO</sub>	-50	V
Emitter-base voltage	V <sub>EBO</sub>	-10	V
Collector current	I <sub>C</sub>	-100	mA

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

Characteristics	Symbol	Rating	Unit
Collector power dissipation	P <sub>C</sub> (Note)	200	mW
Junction temperature	Tj	150	°C
Storage temperature range	T <sub>stg</sub>	-55~150	°C

Note: Total rating

2

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

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	I <sub>CBO</sub>	$V_{CB} = 50 \text{ V}, I_{E} = 0$	_	_	100	nA
Collector cut-on current	I <sub>CEO</sub>	V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0	_	_	500	TIA .
Emitter cut-off current	I <sub>EBO</sub>	$V_{EB} = 10 \text{ V}, I_{C} = 0$	0.38	_	0.71	mA
DC current gain	h <sub>FE</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 10 mA	50	_	_	
Collector-emitter saturation voltage	V <sub>CE (sat)</sub>	$I_C = 5 \text{ mA}, I_B = 0.25 \text{ mA}$	_	0.1	0.3	V
Input voltage (ON)	V <sub>I (ON)</sub>	$V_{CE} = 0.2 \text{ V}, I_{C} = 5 \text{ mA}$	1.2	_	2.4	V
Input voltage (OFF)	V <sub>I (OFF)</sub>	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	6	pF
Input resistor	R1	_	7	10	13	kΩ
Resistor ratio	R1/R2	_	0.8	1.0	1.2	

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

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	I <sub>CBO</sub>	$V_{CB} = -50 \text{ V}, I_E = 0$	_	_	-100	nA
	I <sub>CEO</sub>	$V_{CE} = -50 \text{ V}, I_B = 0$	_	_	-500	ш
Emitter cut-off current	I <sub>EBO</sub>	$V_{EB} = -10 \text{ V}, I_{C} = 0$	-0.38	_	-0.71	mA
DC current gain	h <sub>FE</sub>	$V_{CE} = -5 \text{ V}, I_{C} = -10 \text{ mA}$	50	_	_	
Collector-emitter saturation voltage	V <sub>CE (sat)</sub>	$I_C = -5 \text{ mA}, I_B = -0.25 \text{ mA}$	_	-0.1	-0.3	V
Input voltage (ON)	V <sub>I (ON)</sub>	$V_{CE} = -0.2 \text{ V}, I_{C} = -5 \text{ mA}$	-1.2	_	-2.4	V
Input voltage (OFF)	V <sub>I (OFF)</sub>	$V_{CE} = -5 \text{ V}, I_{C} = -0.1 \text{ mA}$	-1.0	_	-1.5	V
Transition frequency	f <sub>T</sub>	$V_{CE} = -10 \text{ V}, I_{C} = -5 \text{ mA}$	_	200	_	MHz
Collector output capacitance	C <sub>ob</sub>	$V_{CB} = -10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	_	3	6	pF
Input resistor	R1	_	7	10	13	kΩ
Resistor ratio	R1/R2	_	0.8	1.0	1.2	

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