

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

RN49A2

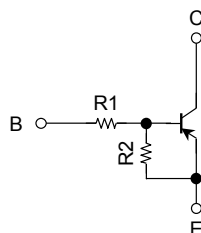
Switching, Inverter Circuit, Interface Circuit and
Driver Circuit Applications

Unit: mm

- Two devices are incorporated into an Ultra-Super-Mini (6-pin) package.
- Incorporating a bias resistor into a transistor reduces the 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



Q1

R1: 47 k Ω , R2: 47 k Ω

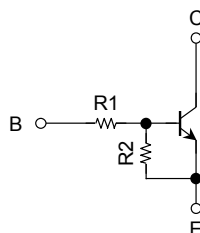
Q2

R1: 2.2 k Ω , R2: 47 k Ω

Q1: RN1104F equivalent

Q2: RN2105F equivalent

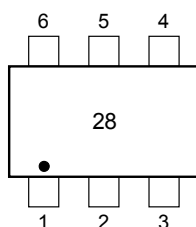
Q2



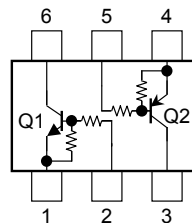
1. EMITTER 1	(E1)
2. BASE 1	(B1)
3. COLLECTOR 2	(C2)
4. EMITTER 2	(E2)
5. BASE 2	(B2)
6. COLLECTOR 1	(C1)
US6	
JEDEC	—
JEITA	—
TOSHIBA	2-2J1A

Weight: 0.006g (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}	-5	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)	200	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}	$V_{CB} = 50 \text{ V}, I_E = 0$	—	—	100	nA
	I_{CEO}	$V_{CE} = 50 \text{ V}, I_B = 0$	—	—	500	
Emitter cut-off current	I_{EBO}	$V_{EB} = 10 \text{ V}, I_C = 0$	0.082	—	0.15	mA
DC current gain	h_{FE}	$V_{CE} = 5 \text{ V}, I_C = 10 \text{ mA}$	80	—	—	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 5 \text{ mA}, I_B = 0.25 \text{ mA}$	—	0.1	0.3	V
Input voltage (ON)	$V_I(ON)$	$V_{CE} = 0.2 \text{ V}, I_C = 5 \text{ mA}$	1.5	—	5.0	V
Input voltage (OFF)	$V_I(OFF)$	$V_{CE} = 5 \text{ V}, I_C = 0.1 \text{ mA}$	1.0	—	1.5	V
Transition frequency	f_T	$V_{CE} = 10 \text{ V}, I_C = 5 \text{ mA}$	—	250	—	MHz
Collector output capacitance	C_{ob}	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	—	3	—	pF
Input resistance	R1	—	32.9	47	61.1	k Ω
Resistance ratio	R1/R2	—	0.9	1.0	1.1	—

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = -50 \text{ V}, I_E = 0$	—	—	100	nA
	I_{CEO}	$V_{CE} = -50 \text{ V}, I_B = 0$	—	—	500	
Emitter cut-off current	I_{EBO}	$V_{EB} = -5 \text{ V}, I_C = 0$	-0.078	—	-0.145	mA
DC current gain	h_{FE}	$V_{CE} = -5 \text{ V}, I_C = -10 \text{ mA}$	80	—	—	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -5 \text{ mA}, I_B = -0.25 \text{ mA}$	—	-0.1	-0.3	V
Input voltage (ON)	$V_I(ON)$	$V_{CE} = -0.2 \text{ V}, I_C = -5 \text{ mA}$	-0.6	—	-1.1	V
Input voltage (OFF)	$V_I(OFF)$	$V_{CE} = -5 \text{ V}, I_C = -0.1 \text{ mA}$	-0.5	—	-0.8	V
Transition frequency	f_T	$V_{CE} = -10 \text{ V}, I_C = -5 \text{ mA}$	—	200	—	MHz
Collector output capacitance	C_{ob}	$V_{CB} = -10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$ $f=1\text{MHz}$	—	3	—	pF
Input resistance	R1	—	1.54	2.2	2.86	k Ω
Resistance ratio	R1/R2	—	0.0421	0.0468	0.0515	—