

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

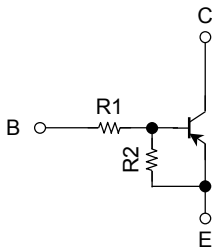
RN4909FE

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

- Two devices are incorporated into an Extreme-Super-Mini (6 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.

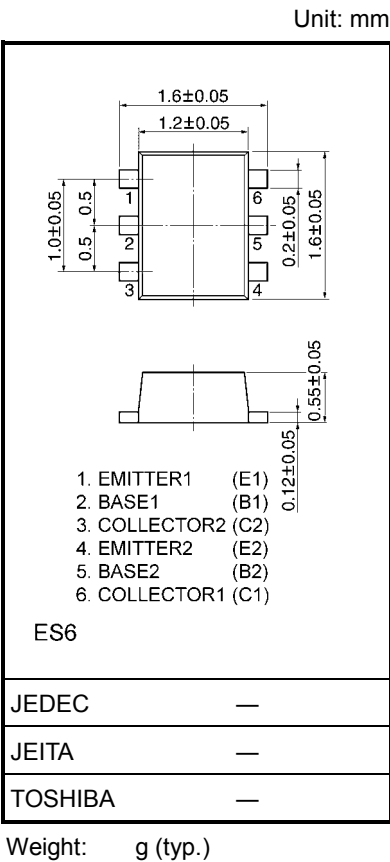
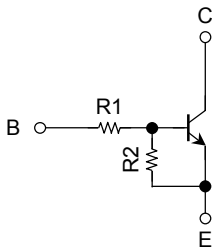
Equivalent Circuit and Bias Resistor Values

Q1

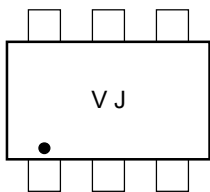


R1: 47 kΩ  
R2: 22 kΩ  
(Q1, Q2 common)

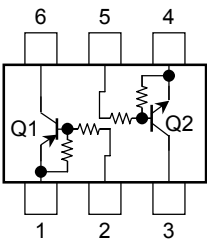
Q2



Marking



Equivalent Circuit (top view)



**Maximum Ratings (Ta = 25°C) (Q1)**

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V <sub>CBO</sub>	–50	V
Collector-emitter voltage	V <sub>CEO</sub>	–50	V
Emitter-base voltage	V <sub>EBO</sub>	–15	V
Collector current	I <sub>C</sub>	–100	mA

**Maximum Ratings (Ta = 25°C) (Q2)**

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V <sub>CBO</sub>	50	V
Collector-emitter voltage	V <sub>CEO</sub>	50	V
Emitter-base voltage	V <sub>EBO</sub>	15	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)	100	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature range	T <sub>stg</sub>	–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	$I_{EBO}$	$V_{EB} = -15\text{ V}, I_C = 0$	-0.167	—	-0.311	mA
DC current gain	$h_{FE}$	$V_{CE} = -5\text{ V}, I_C = -10\text{ mA}$	70	—	—	
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)	$V_I(ON)$	$V_{CE} = -0.2\text{ V}, I_C = -5\text{ mA}$	-2.2	—	-5.8	V
Input voltage (OFF)	$V_I(OFF)$	$V_{CE} = -5\text{ V}, I_C = -0.1\text{ mA}$	-1.5	—	-2.6	V
Transition frequency	$f_T$	$V_{CE} = -10\text{ V}, I_C = -5\text{ mA}$	—	200	—	MHz
Collector output capacitance	$C_{ob}$	$V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	3	6	pF

## 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	$I_{EBO}$	$V_{EB} = 15\text{ V}, I_C = 0$	0.167	—	0.311	mA
DC current gain	$h_{FE}$	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	70	—	—	
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)	$V_I(ON)$	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	2.2	—	5.8	V
Input voltage (OFF)	$V_I(OFF)$	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	1.5	—	2.6	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	6	pF

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Input resistor	R1	—	32.9	47	61.1	k $\Omega$
Resistor ratio	R1/R2	—	1.92	2.14	2.35	

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