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

RN4981FS

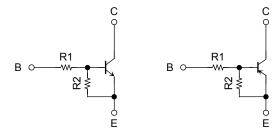
Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications.

- Two devices are incorporated into a fine pitch small mold (6-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

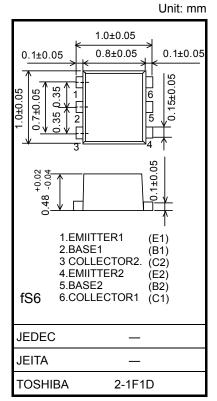
Q2



R1: $4.7 \text{ k}\Omega$

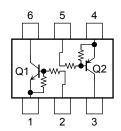
R2: $4.7 \text{ k}\Omega$

(Q1, Q2 common)

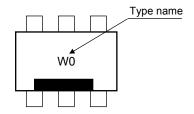


Weight: 0.001g (typ.)

Equivalent Circuit (top view)



Marking



RN4981FS

Absolute Maximum Ratings (Ta = 25°C) (Q1)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	20	V
Collector-emitter voltage	V _{CEO}	20	V
Emitter-base voltage	V _{EBO}	10	V
Collector current	IC	50	mA

Absolute Maximum Ratings (Ta = 25°C) (Q2)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	-20	V
Collector-emitter voltage	V _{CEO}	-20	V
Emitter-base voltage	V _{EBO}	-10	V
Collector current	IC	-50	mA

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

Characteristics	Symbol	Rating	Unit
Collector power dissipation	P _C (Note 1)	50	mW
Junction temperature	Tj	150	°C
Storage temperature range	T _{stg}	-55~150	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: Total rating

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

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	I _{CBO}	$V_{CB} = 20 \text{ V}, I_{E} = 0$	_	_	100	nA
	I _{CEO}	V _{CE} = 20 V, I _B = 0	_	_	500	IIA
Emitter cut-off current	I _{EBO}	V _{EB} = 10 V, I _C = 0	0.89	_	1.33	mA
DC current gain	h _{FE}	$V_{CE} = 5 \text{ V}, I_{C} = 10 \text{ mA}$	30	_	_	
Collector-emitter saturation voltage	V _{CE} (sat)	$I_C = 5 \text{ mA}, I_B = 0.25 \text{ mA}$	_	_	0.15	٧
Input voltage (ON)	V _{I (ON)}	$V_{CE} = 0.2 \text{ V}, I_{C} = 5 \text{ mA}$	1.0	_	2.0	V
Input voltage (OFF)	V _{I (OFF)}	$V_{CE} = 5 \text{ V}, I_{C} = 0.1 \text{ mA}$	0.8	_	1.5	V
Collector output capacitance	C _{ob}	V _{CB} = 10 V, I _E = 0, f = 1 MHz	_	1.2	_	pF

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

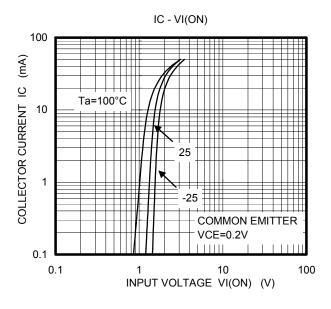
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	I _{CBO}	$V_{CB} = -20 \text{ V}, I_E = 0$	_	_	-100	nA
Collector cut-on current	I _{CEO}	$V_{CE} = -20 \text{ V}, I_B = 0$	_	_	-500	ш
Emitter cut-off current	I _{EBO}	$V_{EB} = -10 \text{ V}, I_{C} = 0$	-0.89	_	-1.33	mA
DC current gain	h _{FE}	$V_{CE} = -5 \text{ V}, I_{C} = -10 \text{ mA}$	30	_	_	
Collector-emitter saturation voltage	V _{CE} (sat)	$I_C = -5 \text{ mA}, I_B = -0.25 \text{ mA}$	_	_	-0.15	V
Input voltage (ON)	V _{I (ON)}	$V_{CE} = -0.2 \text{ V}, I_{C} = -5 \text{ mA}$	-1.0	_	-2.0	V
Input voltage (OFF)	V _{I (OFF)}	$V_{CE} = -5 \text{ V}, I_{C} = -0.1 \text{ mA}$	-0.8	_	-1.5	V
Collector output capacitance	C _{ob}	$V_{CB} = -10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	_	1.2	_	pF

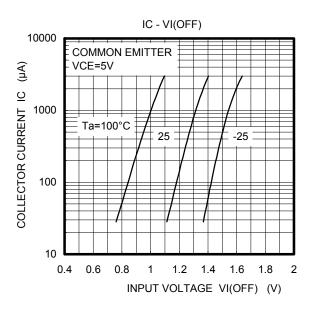
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

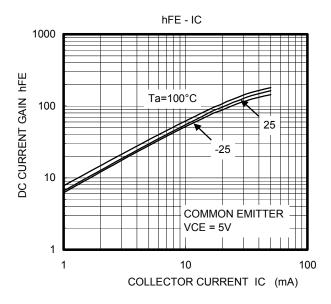
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Input resistor	R1	_	3.76	4.7	5.64	kΩ
Resistor ratio	R1/R2		0.8	1.0	1.2	

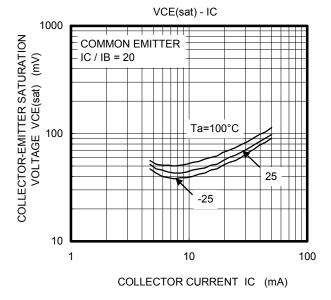
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Q1

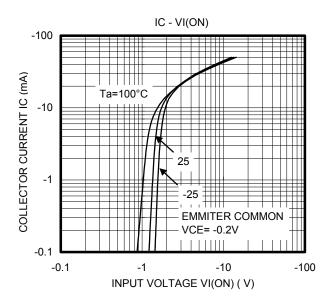


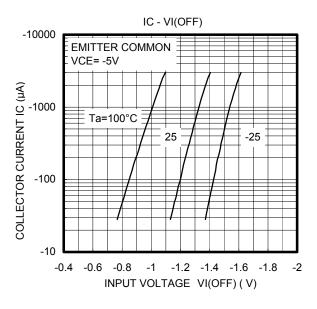


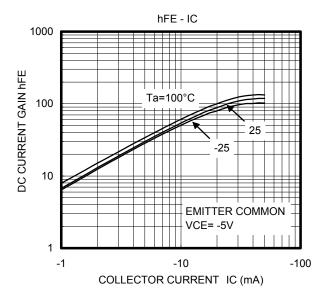


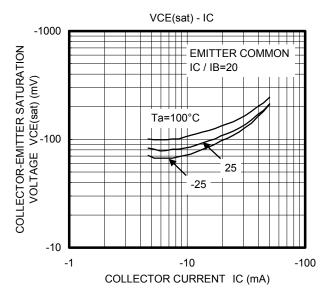


Q2









Handling Precaution

When handling individual devices (which are not yet mounted on a circuit board), be sure that the environment is protected against electrostatic discharge. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static materials.

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