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

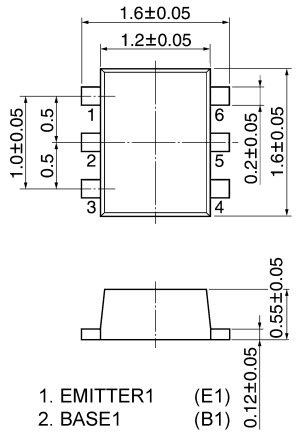
RN2910FE,RN2911FE

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 enables the manufacture of ever more compact equipment and lowers assembly cost.
- Complementary to RN1910FE, RN1911FE

Unit: mm



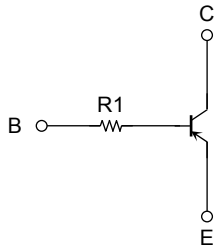
1. EMITTER1 (E1)
2. BASE1 (B1)
3. COLLECTOR2 (C2)
4. EMITTER2 (E2)
5. BASE2 (B2)
6. COLLECTOR1 (C1)

ES6

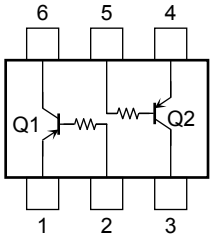
JEDEC	—
JEITA	—
TOSHIBA	2-2N1G

Weight: 0.003g (typ.)

Equivalent Circuit and Bias Resistor Values



Equivalent Circuit (top view)



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

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
Collector power dissipation	P_C (Note 1)	100	mW
Junction temperature	T_j	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).

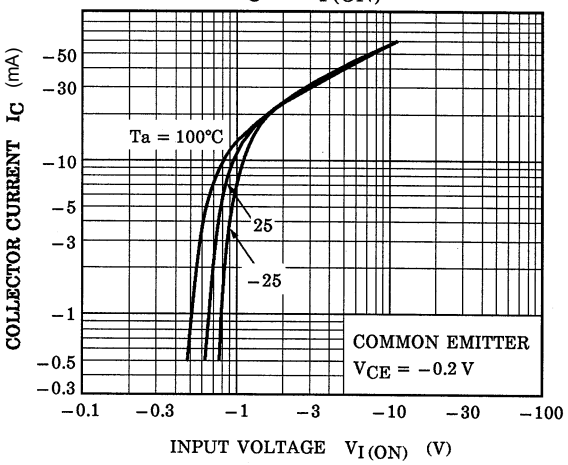
Note 1: Total rating

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

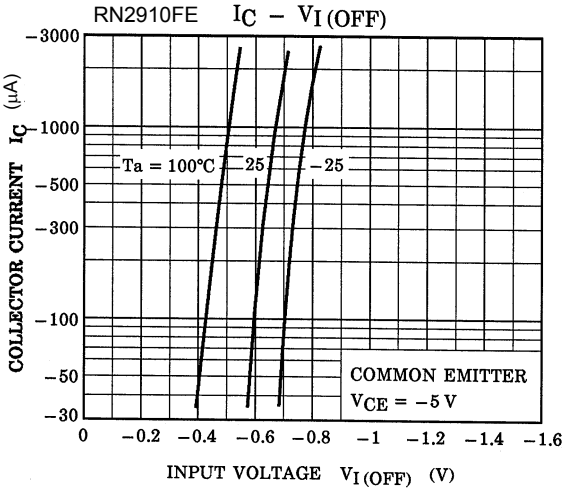
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = −50 V, I_E = 0	—	—	−100	nA
Emitter cut-off current		I_{EBO}	V_{EB} = −5 V, I_C = 0	—	—	−100	nA
DC current gain		h_{FE}	V_{CE} = −5 V, I_C = −1 mA	120	—	400	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = −5 mA, I_B = −0.25 mA	—	−0.1	−0.3	V
Transition frequency		f_T	V_{CE} = −10 V, I_C = −5 mA	—	200	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = −10 V, I_E = 0, f = 1 MHz	—	3	6	pF
Input resistor	RN2910FE	R1	—	3.29	4.7	6.11	kΩ
	RN2911FE			7	10	13	

Q1, Q2 Common

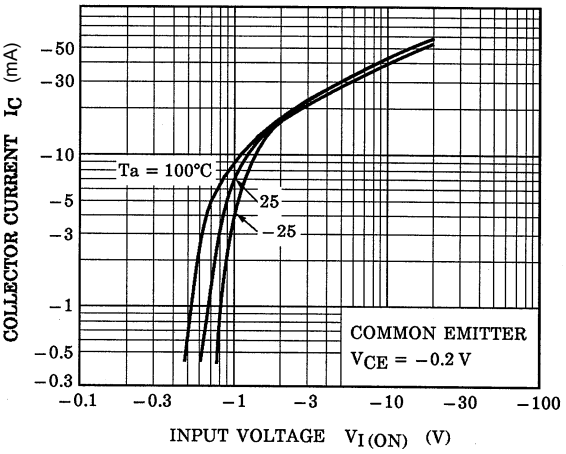
RN2910FE $I_C - V_{I(ON)}$



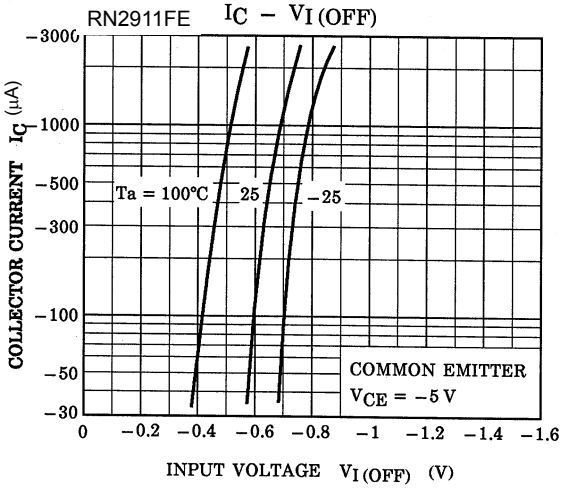
RN2910FE $I_C - V_{I(OFF)}$



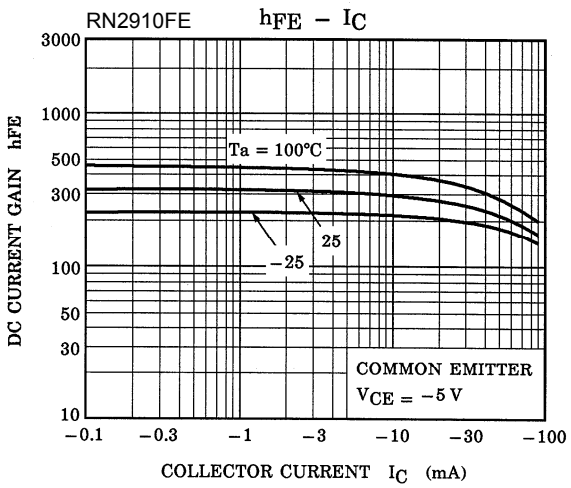
RN2911FE $I_C - V_{I(ON)}$

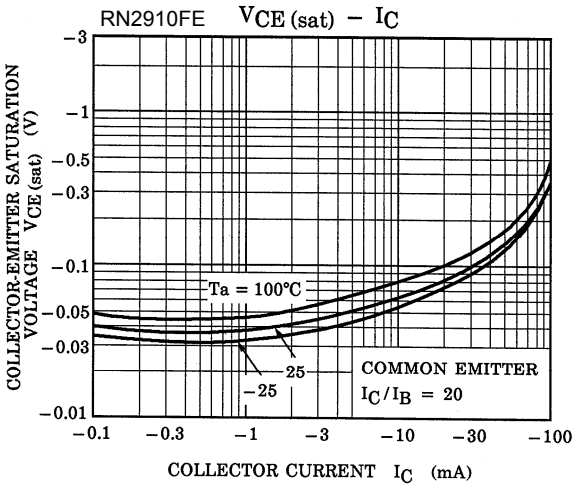


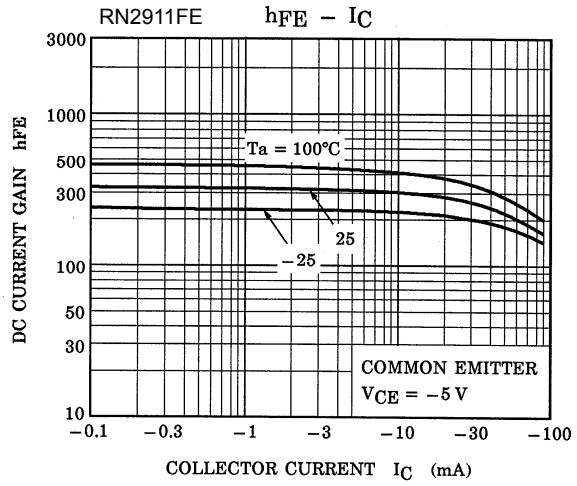
RN2911FE $I_C - V_{I(OFF)}$

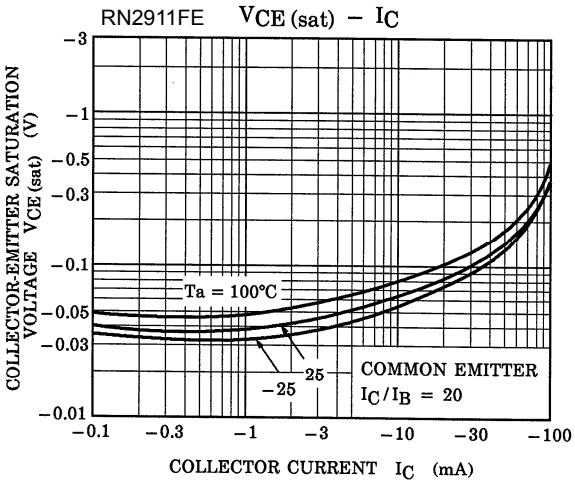


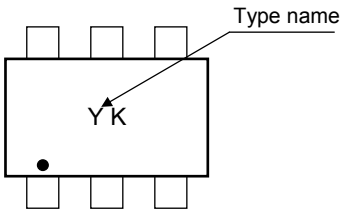
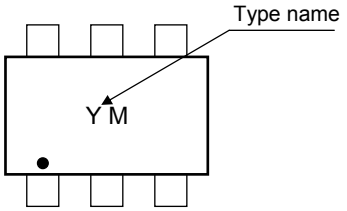
Q1, Q2 Common


RN2910FE
h_{FE} – I_C
DC CURRENT GAIN hFE
3000
1000
500
300
100
50
30
10
Ta = 100°C
25
−25
COMMON EMITTER
V_{CE} = −5 V
−0.1
−0.3
−1
−3
−10
−30
−100
COLLECTOR CURRENT I_C (mA)


RN2910FE
$V_{CE\,(sat)}$ – I_C
COLLECTOR-EMITTER SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)
−3
−1
−0.5
−0.3
−0.1
−0.05
−0.03
−0.01
Ta = 100°C
25
−25
COMMON EMITTER
I_C/I_B = 20
−0.1
−0.3
−1
−3
−10
−30
−100
COLLECTOR CURRENT I_C (mA)


RN2911FE
h_{FE} – I_C
DC CURRENT GAIN hFE
3000
1000
500
300
100
50
30
10
Ta = 100°C
25
−25
COMMON EMITTER
V_{CE} = −5 V
−0.1
−0.3
−1
−3
−10
−30
−100
COLLECTOR CURRENT I_C (mA)


RN2911FE
$V_{CE\,(sat)}$ – I_C
COLLECTOR-EMITTER SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)
−3
−1
−0.5
−0.3
−0.1
−0.05
−0.03
−0.01
Ta = 100°C
25
−25
COMMON EMITTER
I_C/I_B = 20
−0.1
−0.3
−1
−3
−10
−30
−100
COLLECTOR CURRENT I_C (mA)

Type Name	Marking
RN2910FE	
RN2911FE	

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