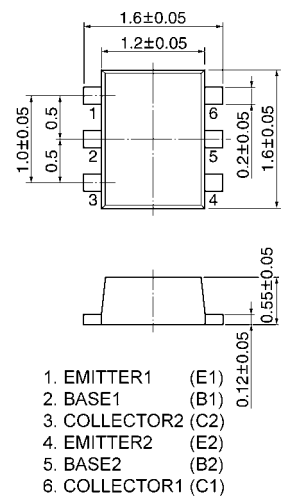
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

RN1901FE,RN1902FE,RN1903FE RN1904FE,RN1905FE,RN1906FE

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.
- Complementary to RN2901FE~RN2906FE

Unit: mm

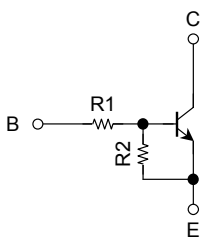


ES6

JEDEC	—
JEITA	—
TOSHIBA	—

Weight: 0.003 g (typ.)

Equivalent Circuit and Bias Resistor Values



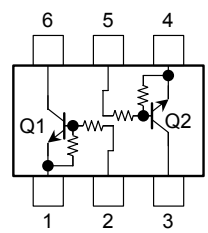
Type No.	R1 (kΩ)	R2 (kΩ)
RN1901FE	4.7	4.7
RN1902FE	10	10
RN1903FE	22	22
RN1904FE	47	47
RN1905FE	2.2	47
RN1906FE	4.7	47

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

Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN1901FE~ RN1906FE	V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1901FE~ RN1904FE	V_{EBO}	10	V
	RN1905FE, RN1906FE		5	
Collector current	RN1901FE~ RN1906FE	I_C	100	mA
Collector power dissipation		P_C (Note)	100	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55~150	°C

Note: Total rating

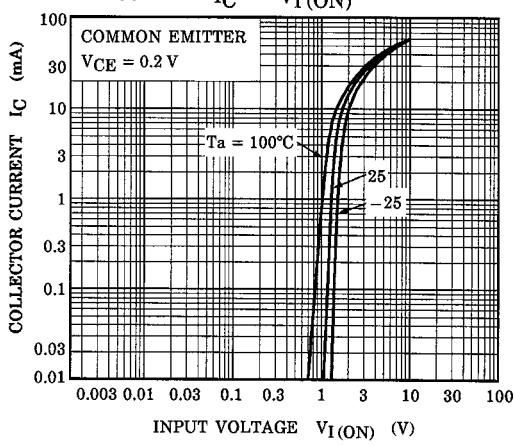
Equivalent Circuit (top view)



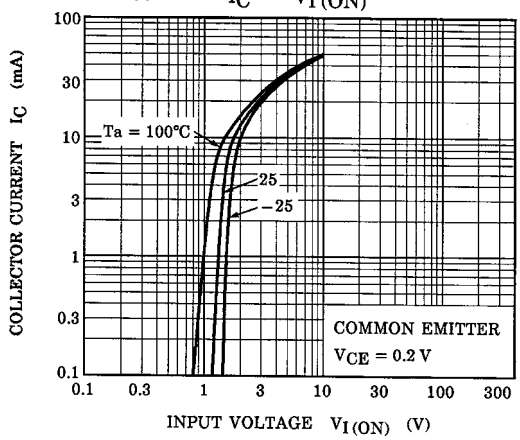
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1901FE~1906FE	I_{CBO}	V_{CB} = 50 V, I_E = 0	—	—	100	nA
		I_{CEO}	V_{CE} = 50 V, I_B = 0	—	—	500	
Emitter cut-off current	RN1901FE	I_{EBO}	V_{EB} = 10 V, I_C = 0	0.82	—	1.52	mA
	RN1902FE			0.38	—	0.71	
	RN1903FE			0.17	—	0.33	
	RN1904FE			0.082	—	0.15	
	RN1905FE		V_{EB} = 5 V, I_C = 0	0.078	—	0.145	
	RN1906FE			0.074	—	0.138	
DC current gain	RN1901FE	h_{FE}	V_{CE} = 5 V, I_C = 10 mA	30	—	—	
	RN1902FE			50	—	—	
	RN1903FE			70	—	—	
	RN1904FE			80	—	—	
	RN1905FE			80	—	—	
	RN1906FE			80	—	—	
Collector-emitter saturation voltage	RN1901FE~1906FE	$V_{CE\ (sat)}$	I_C = 5 mA, I_B = 0.25 mA	—	0.1	0.3	V
Input voltage (ON)	RN1901FE	$V_{I\ (ON)}$	V_{CE} = 0.2 V, I_C = 5 mA	1.1	—	2.0	V
	RN1902FE			1.2	—	2.4	
	RN1903FE			1.3	—	3.0	
	RN1904FE			1.5	—	5.0	
	RN1905FE			0.6	—	1.1	
	RN1906FE			0.7	—	1.3	
Input voltage (OFF)	RN1901FE~1904FE	$V_{I\ (OFF)}$	V_{CE} = 5 V, I_C = 0.1 mA	1.0	—	1.5	V
	RN1905FE, 1906FE			0.5	—	0.8	
Transition frequency	RN1901FE~1906FE	f_T	V_{CE} = 10 V, I_C = 5 mA	—	250	—	MHz
Collector output capacitance	RN1901FE~1906FE	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	3	6	pF
Input resistor	RN1901FE	R1	—	3.29	4.7	6.11	kΩ
	RN1902FE			7	10	13	
	RN1903FE			15.4	22	28.6	
	RN1904FE			32.9	47	61.1	
	RN1905FE			1.54	2.2	2.86	
	RN1906FE			3.29	4.7	6.11	
Resistor ratio	RN1901FE~1904FE	R1/R2	—	0.9	1.0	1.1	
	RN1905FE			0.0421	0.0468	0.0515	
	RN1906FE			0.09	0.1	0.11	

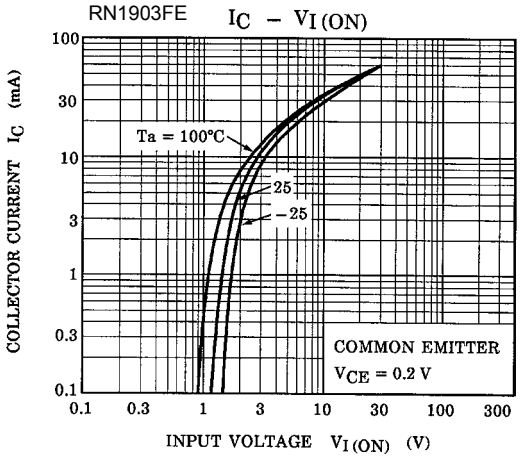
RN1901FE $I_C - V_{I(ON)}$



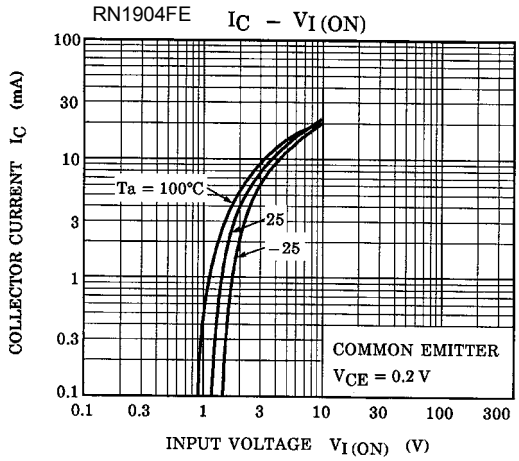
RN1902FE $I_C - V_{I(ON)}$



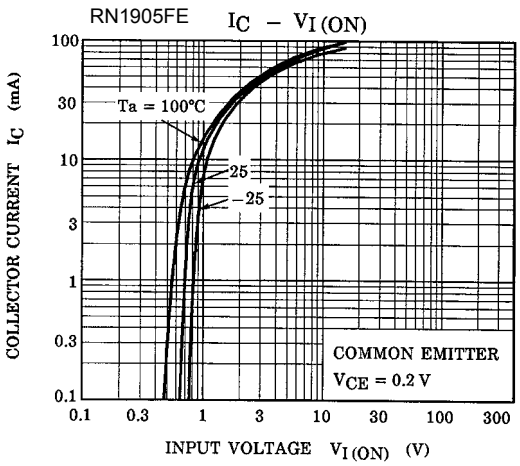
RN1903FE $I_C - V_{I(ON)}$



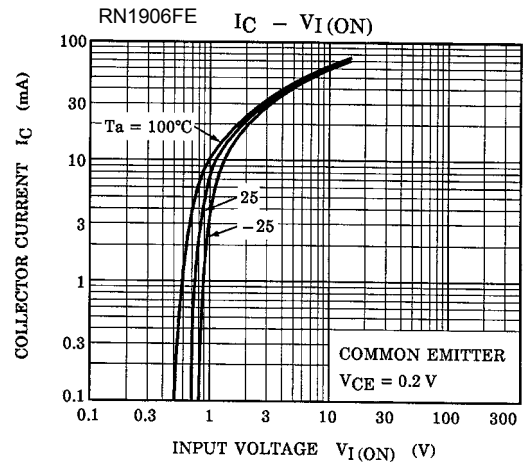
RN1904FE $I_C - V_{I(ON)}$



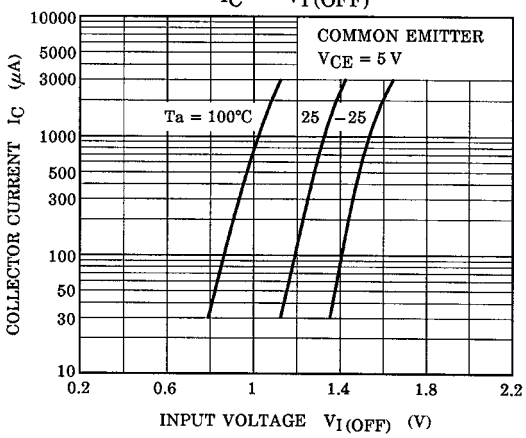
RN1905FE $I_C - V_{I(ON)}$



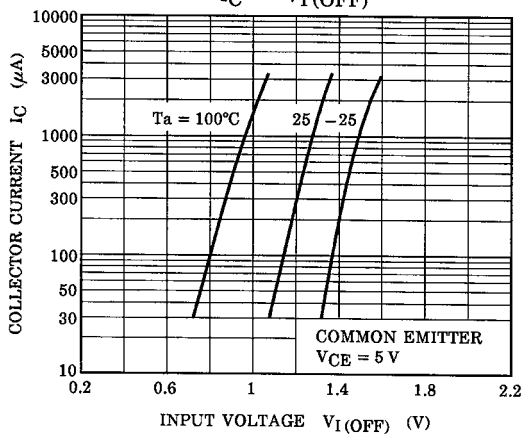
RN1906FE $I_C - V_{I(ON)}$



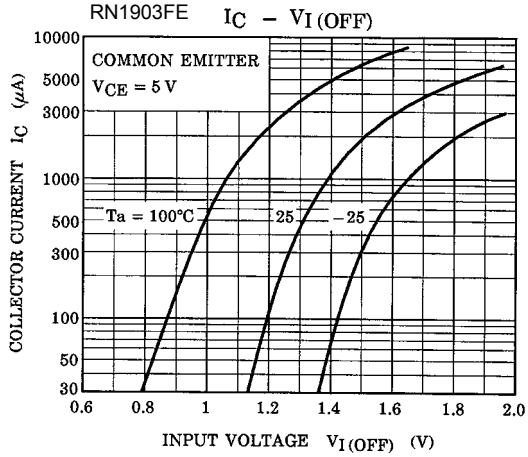
RN1901FE $I_C - V_{I(OFF)}$



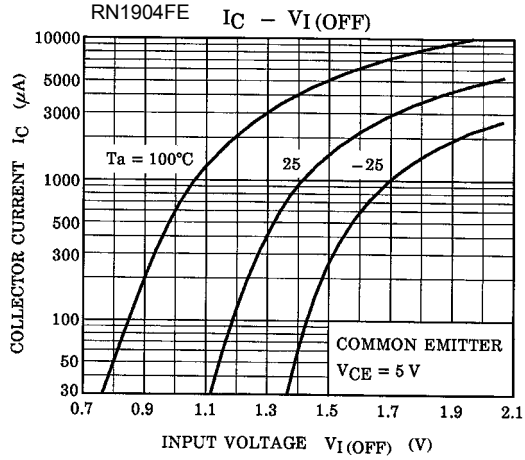
RN1902FE $I_C - V_{I(OFF)}$



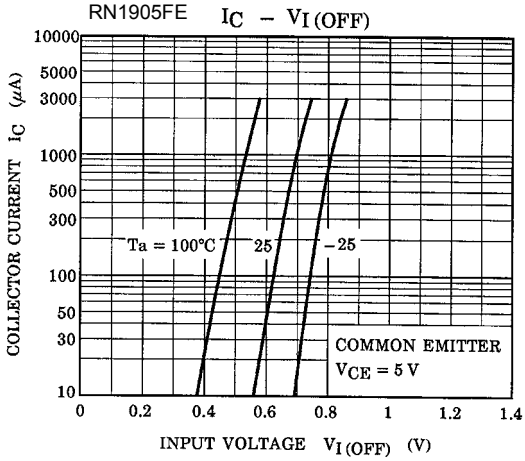
RN1903FE $I_C - V_{I(OFF)}$



RN1904FE $I_C - V_{I(OFF)}$



RN1905FE $I_C - V_{I(OFF)}$



RN1906FE $I_C - V_{I(OFF)}$