

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

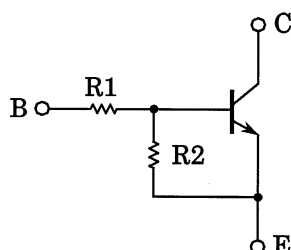
RN1201,RN1202,RN1203,RN1204,RN1205,RN1206

Switching, Inverter Circuit, Interface Circuit
and Driver Circuit Applications

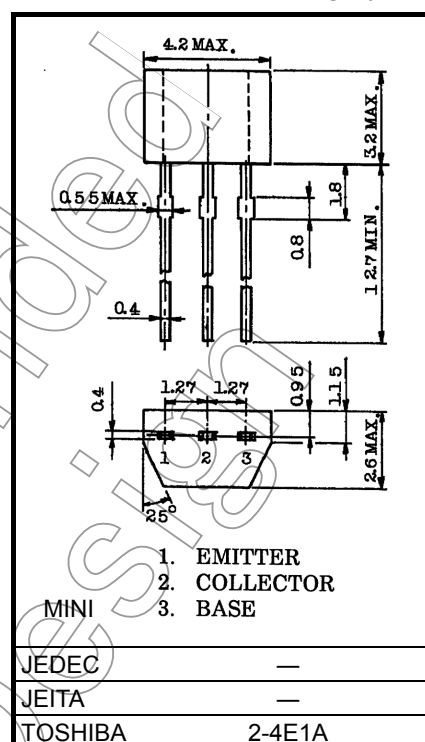
Unit: mm

- With built-in bias resistors.
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2201 to RN2206

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1201	4.7	4.7
RN1202	10	10
RN1203	22	22
RN1204	47	47
RN1205	2.2	47
RN1206	4.7	47



Weight: 0.13g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

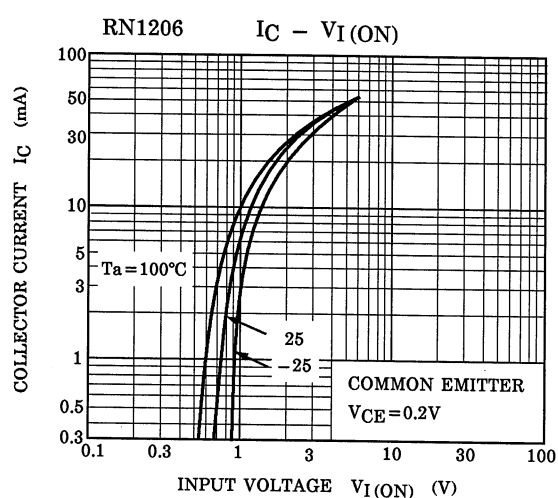
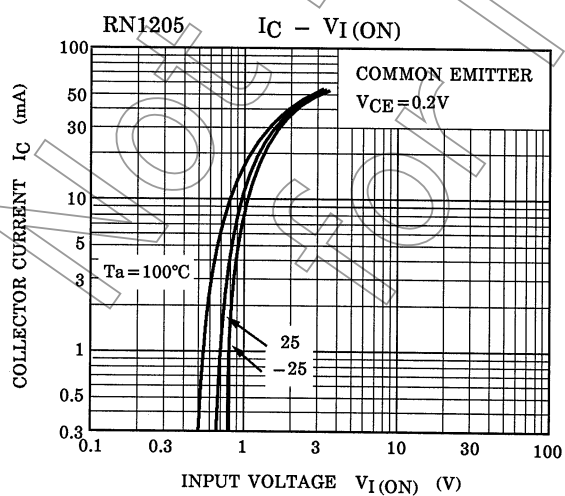
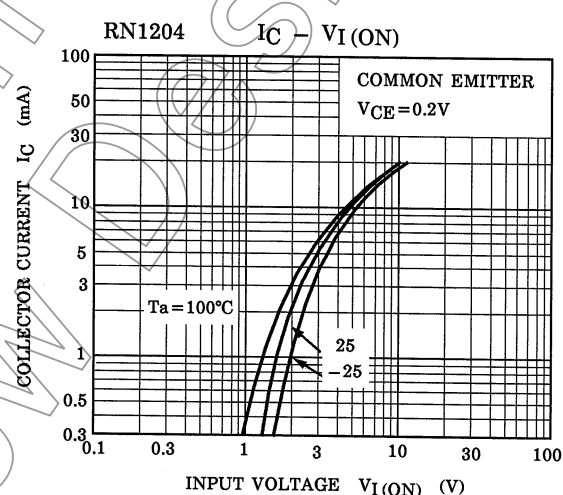
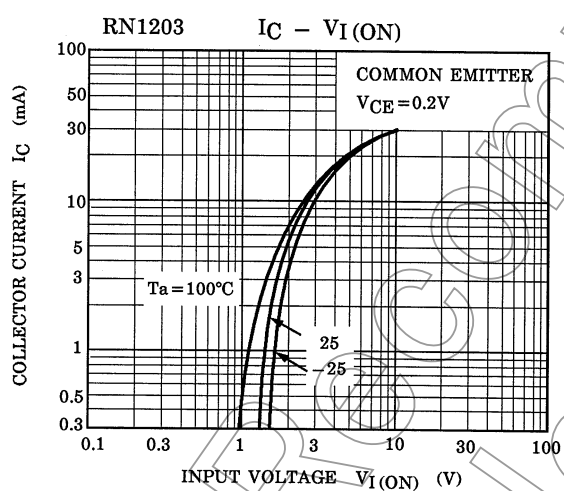
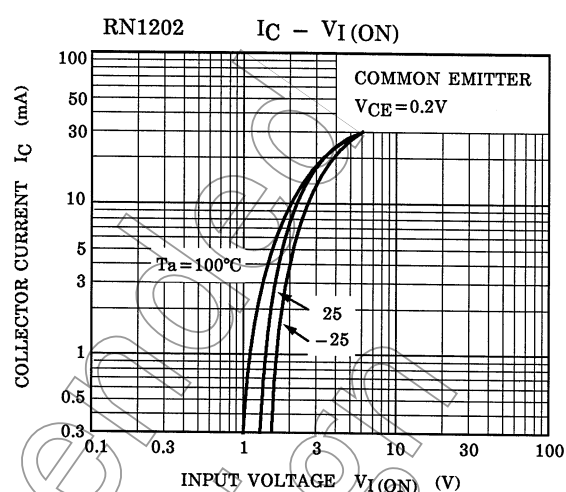
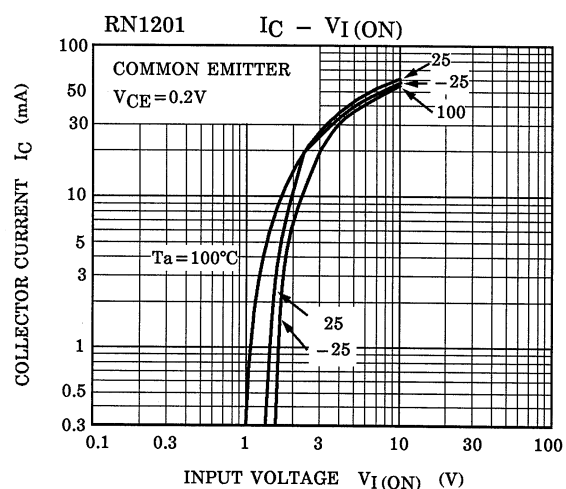
Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage	V_{CEQ}	50	V
Emitter-base voltage	V_{EBO}	10	V
		5	V
Collector current	I_C	100	mA
Collector power dissipation	P_C	300	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	-55 to 150	°C

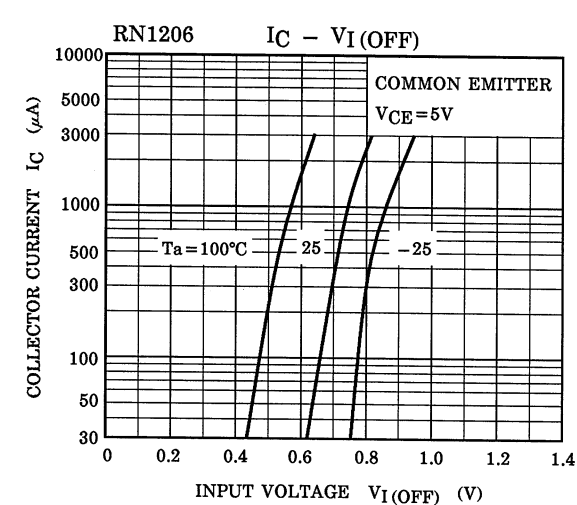
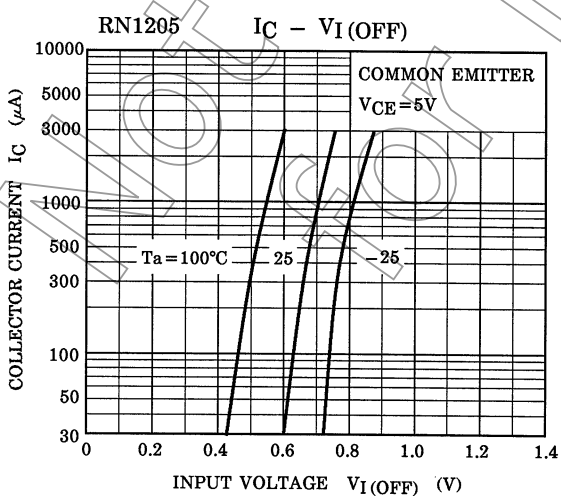
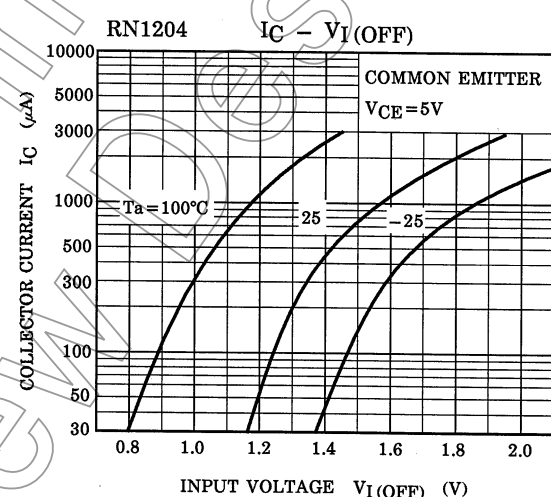
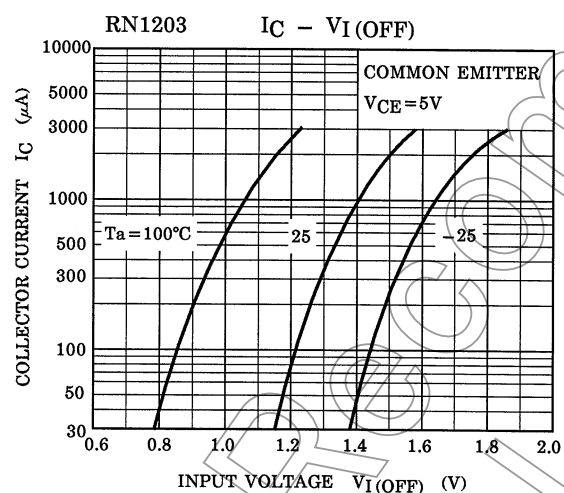
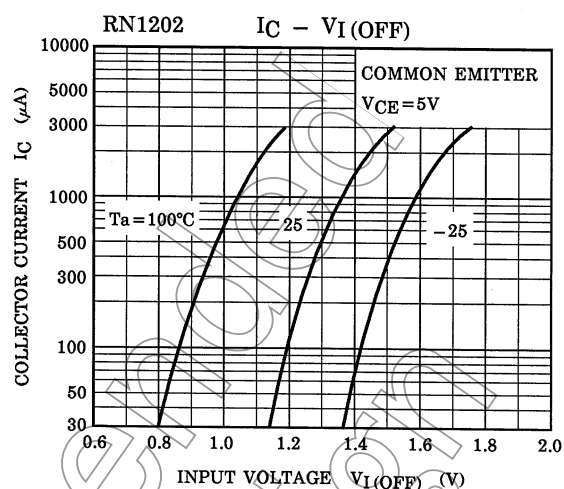
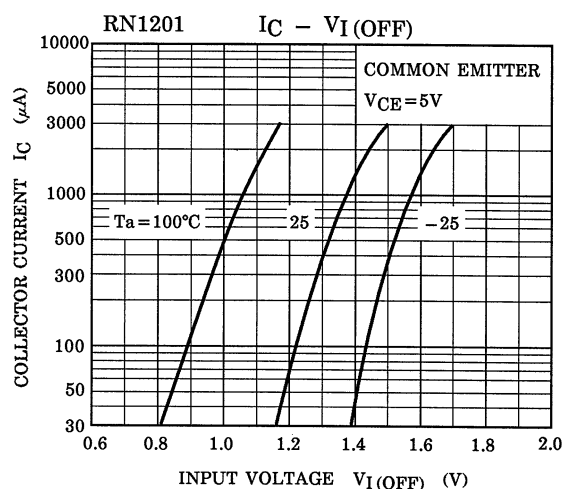
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

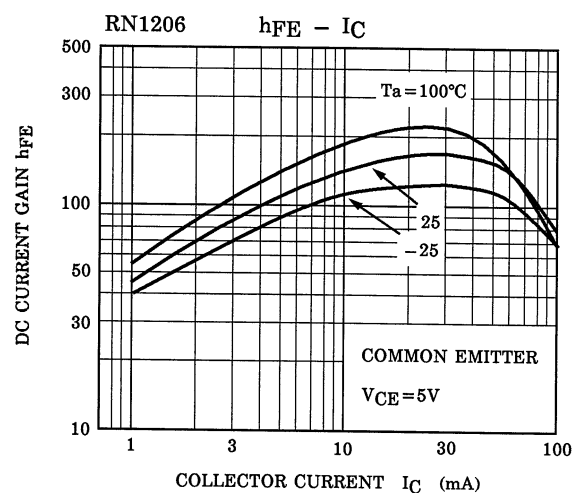
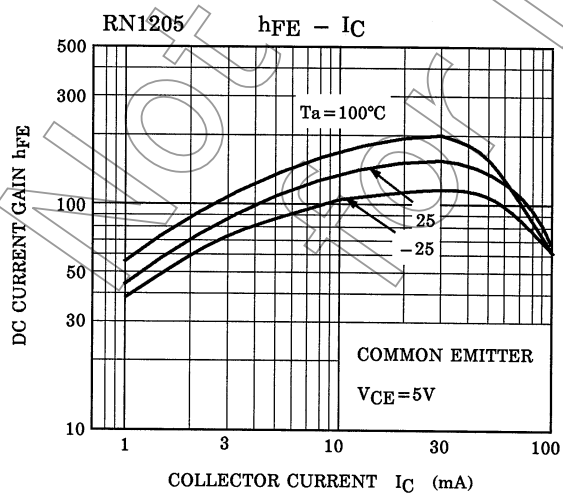
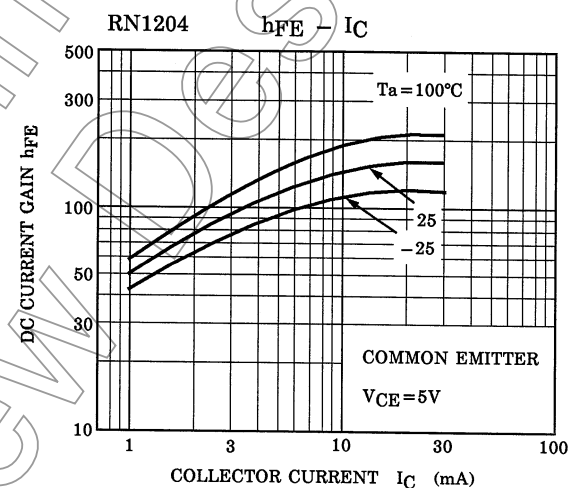
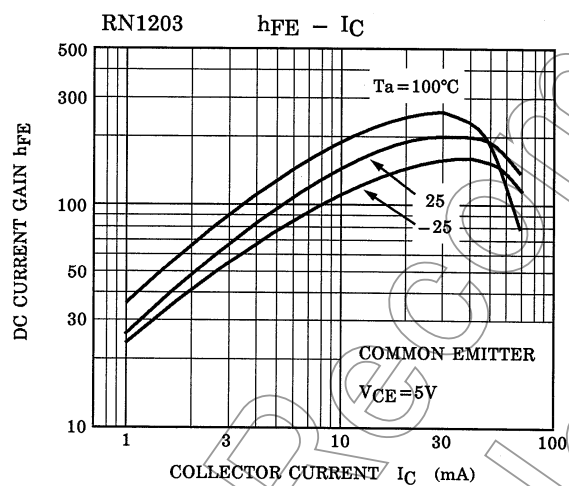
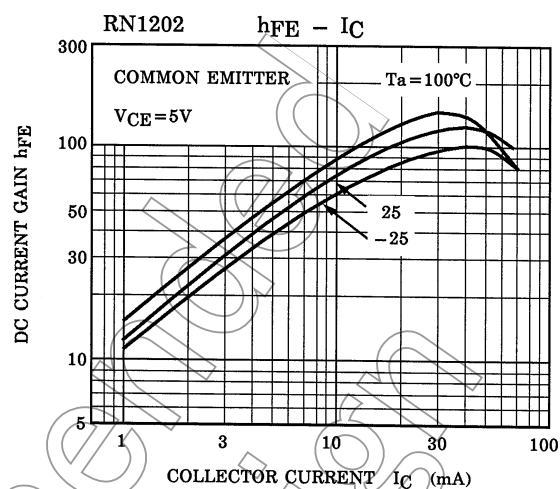
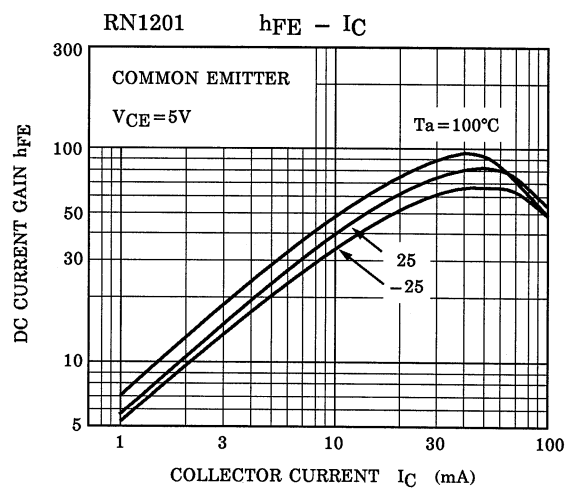
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1201 to 1206	I_{CBO}	—	$V_{CB} = 50V, I_E = 0$	—	—	100	nA
		I_{CEO}	—	$V_{CE} = 50V, I_B = 0$	—	—	500	nA
Emitter cut-off current	RN1201	I_{EBO}	—	$V_{EB} = 10V, I_C = 0$	0.82	—	1.52	mA
	RN1202		—		0.38	—	0.71	
	RN1203		—		0.17	—	0.33	
	RN1204		—	$V_{EB} = 5V, I_C = 0$	0.082	—	0.15	
	RN1205		—		0.078	—	0.145	
	RN1206		—		0.074	—	0.138	
DC current gain	RN1201	h_{FE}	—	$V_{CE} = 5V, I_C = 10mA$	30	—	—	—
	RN1202		—		50	—	—	
	RN1203		—		70	—	—	
	RN1204		—		80	—	—	
	RN1205		—		80	—	—	
	RN1206		—		80	—	—	
Collector-emitter saturation voltage	RN1201 to 1206	$V_{CE(sat)}$	—	$I_C = 5mA, I_B = 0.25mA$	—	0.1	0.3	V
Input voltage (ON)	RN1201	$V_{I(ON)}$	—	$V_{CE} = 0.2V, I_C = 5mA$	1.1	—	2.0	V
	RN1202		—		1.2	—	2.4	
	RN1203		—		1.3	—	3.0	
	RN1204		—		1.5	—	5.0	
	RN1205		—		0.6	—	1.1	
	RN1206		—		0.7	—	1.3	
Input voltage (OFF)	RN1201 to 1204	$V_{I(OFF)}$	—	$V_{CE} = 5V, I_C = 0.1mA$	1.0	—	1.5	V
	RN1205 to 1206		—		0.5	—	0.8	
Transition frequency	RN1201 to 1206	f_T	—	$V_{CE} = 10V, I_C = 5mA$	—	250	—	MHz
Collector output capacitance	RN1201 to 1206	C_{ob}	—	$V_{CB} = 10V, I_E = 0, f = 1MHz$	—	3	6	pF
Input Resistor	RN1201	R_1	—	—	3.29	4.7	6.11	kΩ
	RN1202		—		7	10	13	
	RN1203		—		15.4	22	28.6	
	RN1204		—		32.9	47	61.1	
	RN1205		—		1.54	2.2	2.86	
	RN1206		—		3.29	4.7	6.11	
Resistor Ratio	RN1201 to 1204	R_1/R_2	—	—	0.9	1.0	1.1	—
	RN1205		—		0.0421	0.0468	0.0515	
	RN1206		—		0.09	0.1	0.11	







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