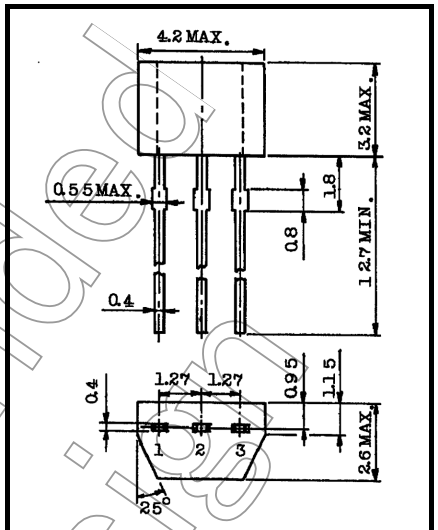
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

RN1201,RN1202,RN1203,RN1204,RN1205,RN1206

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

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

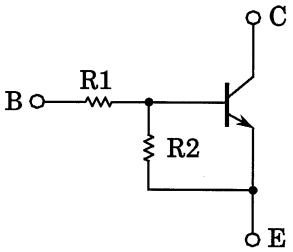
Unit: mm



MINI	
JEDEC	—
JEITA	—
TOSHIBA	2-4E1A

Weight: 0.13g (typ.)

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

Absolute Maximum Ratings (Ta = 25°C)

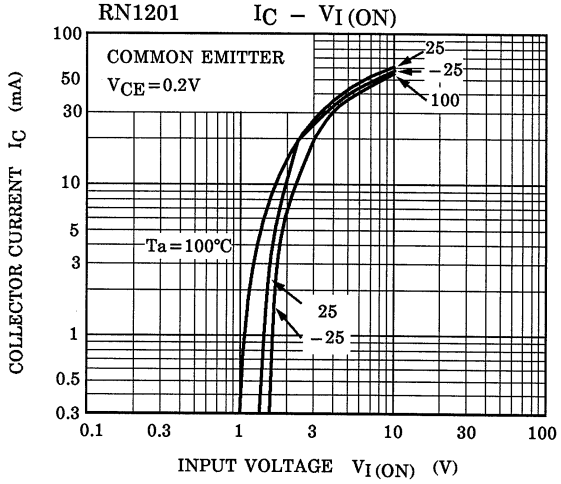
Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1201 to 1206	V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1201 to 1204	V_{EBO}	10	V
	RN1205, 1206		5	
Collector current	RN1201~1206	I_C	100	mA
Collector power dissipation		P_C	300	mW
Junction temperature		T_j	150	°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).

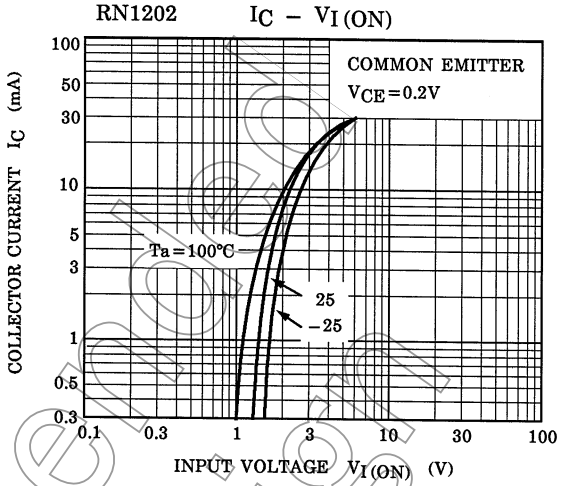
Electrical Characteristics (Ta = 25°C)

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		—		0.082	—	0.15	
	RN1205		—	V_{EB} = 5V, I_C = 0	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	R1	—	—	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	R1/R2	—	—	0.9	1.0	1.1	—
	RN1205		—		0.0421	0.0468	0.0515	
	RN1206		—		0.09	0.1	0.11	

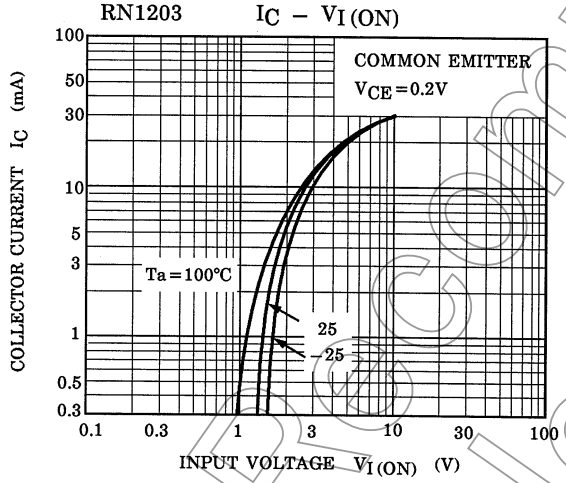
RN1201 I_C – $V_{I(ON)}$



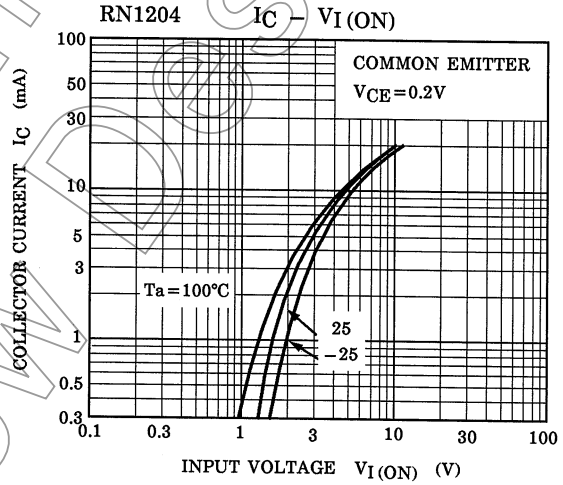
RN1202 I_C – $V_{I(ON)}$



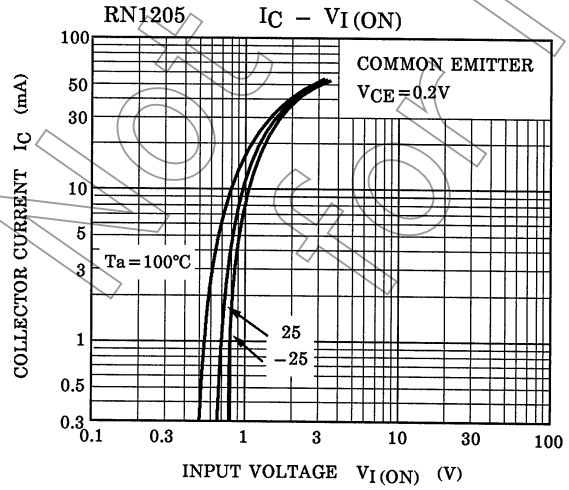
RN1203 I_C – $V_{I(ON)}$



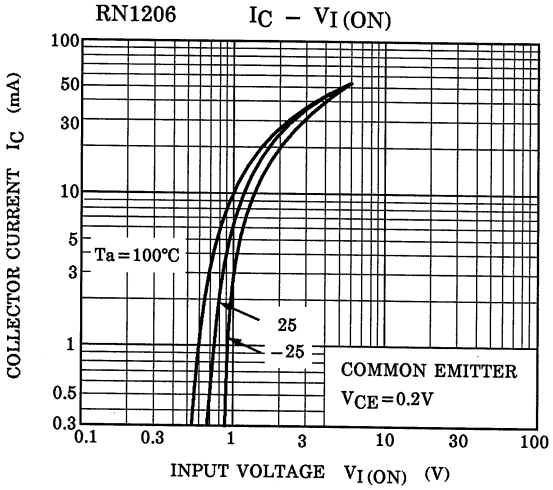
RN1204 I_C – $V_{I(ON)}$



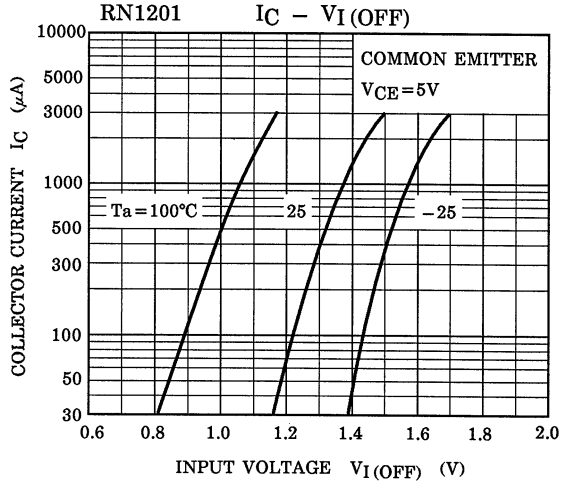
RN1205 I_C – $V_{I(ON)}$



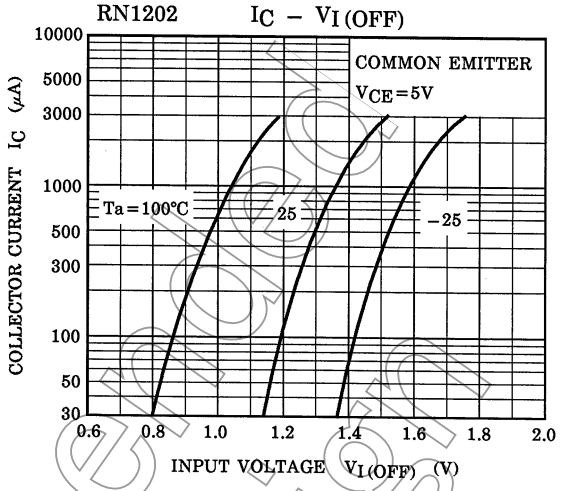
RN1206 I_C – $V_{I(ON)}$



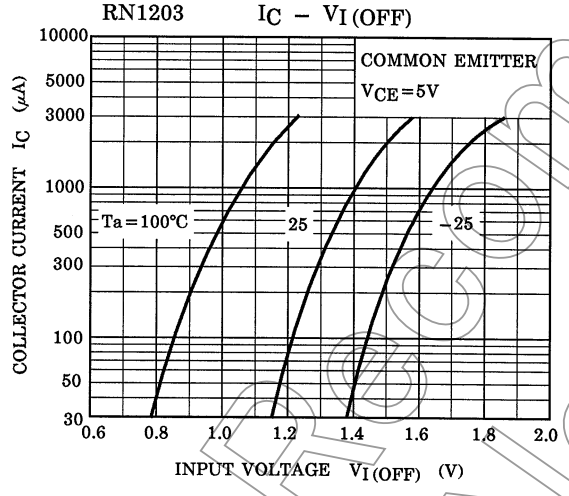
RN1201 $I_C - V_{I(OFF)}$



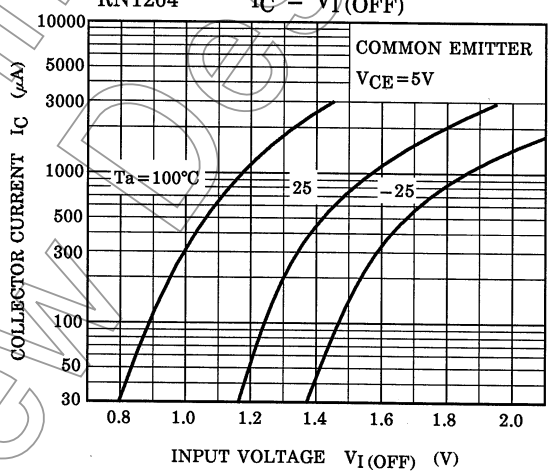
RN1202 $I_C - V_{I(OFF)}$



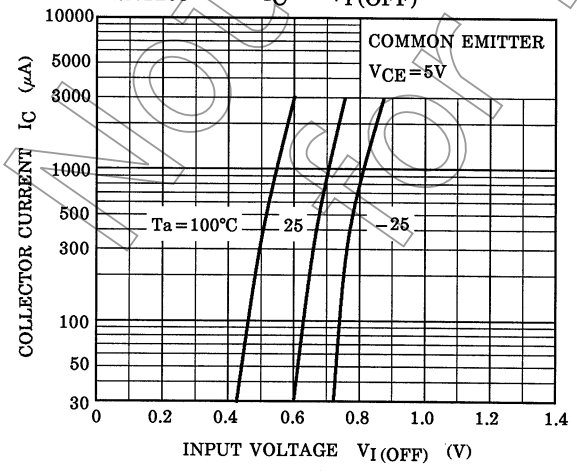
RN1203 $I_C - V_{I(OFF)}$



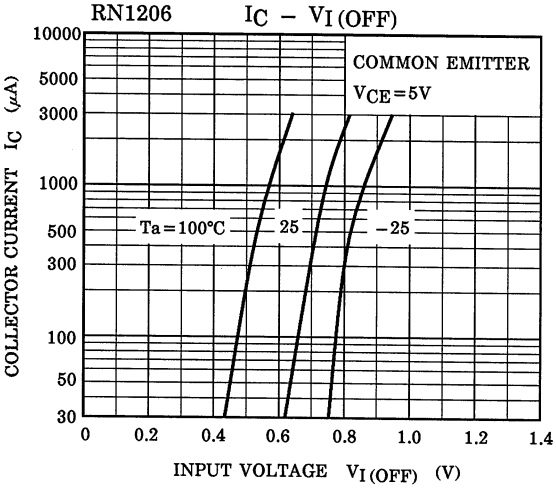
RN1204 $I_C - V_{I(OFF)}$



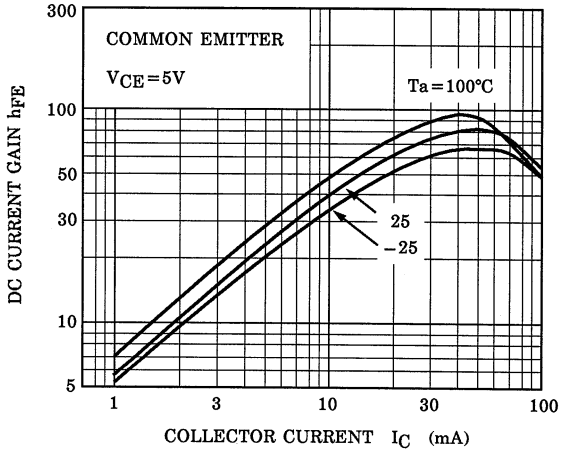
RN1205 $I_C - V_{I(OFF)}$



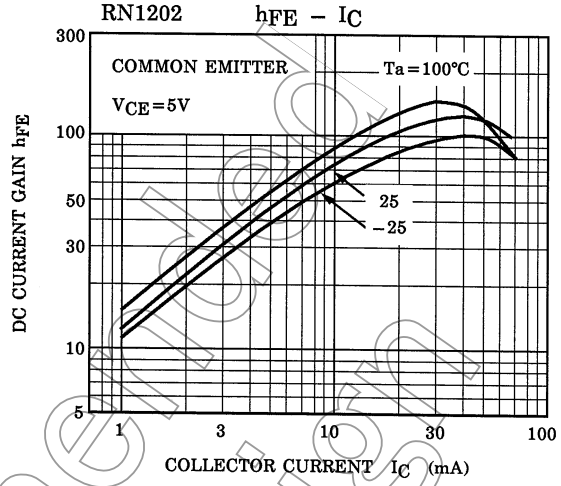
RN1206 $I_C - V_{I(OFF)}$



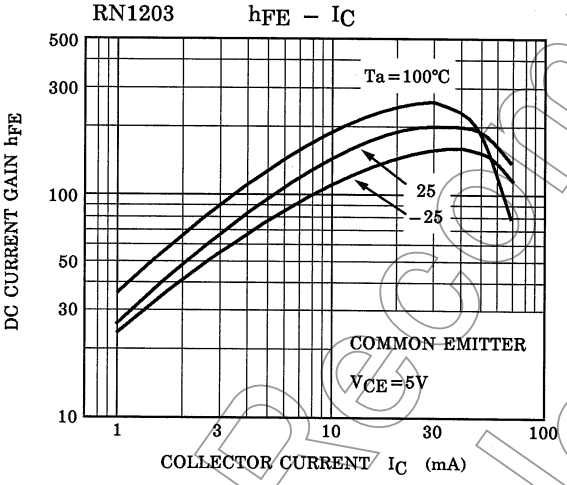
RN1201 h_{FE} – I_C



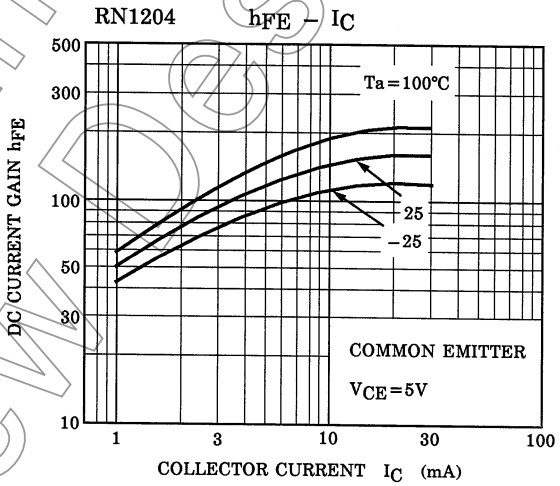
RN1202 h_{FE} – I_C



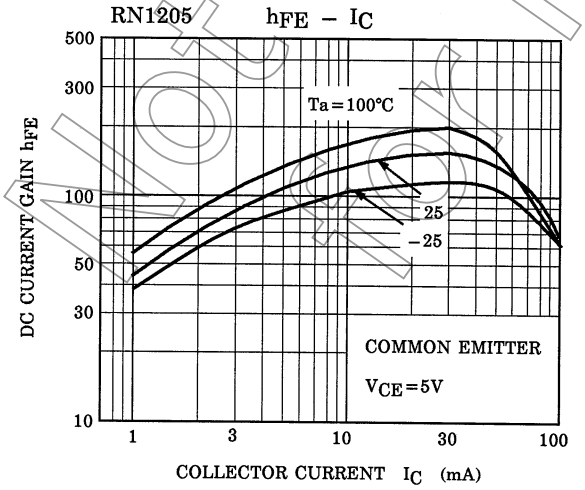
RN1203 h_{FE} – I_C



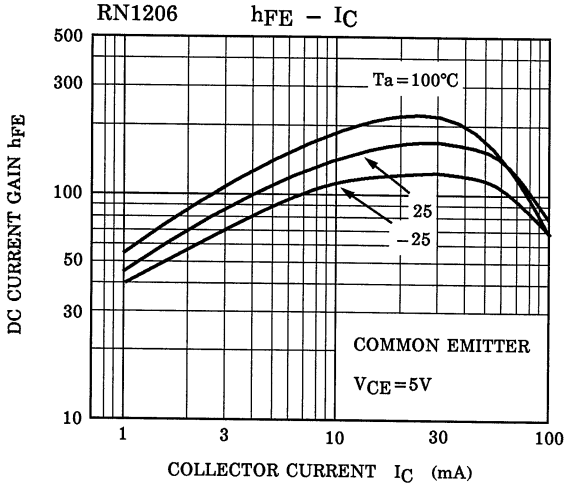
RN1204 h_{FE} – I_C



RN1205 h_{FE} – I_C



RN1206 h_{FE} – I_C



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