

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

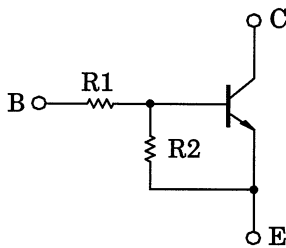
RN1001,RN1002,RN1003 RN1004,RN1005,RN1006

Switching, Inverter Circuit, Interface Circuit
and Driver Circuit Applications

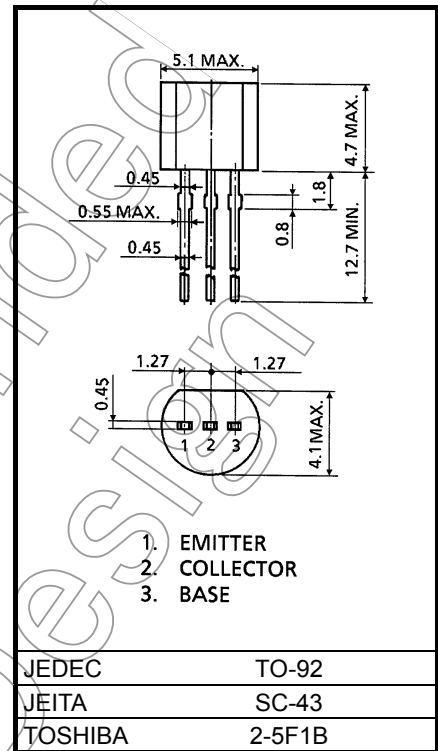
Unit: mm

- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2001~RN2006

Equivalent Circuit and Bias Resister Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1001	4.7	4.7
RN1002	10	10
RN1003	22	22
RN1004	47	47
RN1005	2.2	47
RN1006	4.7	47



Absolute Maximum Ratings (Ta = 25°C)

Weight: 0.21g (typ.)

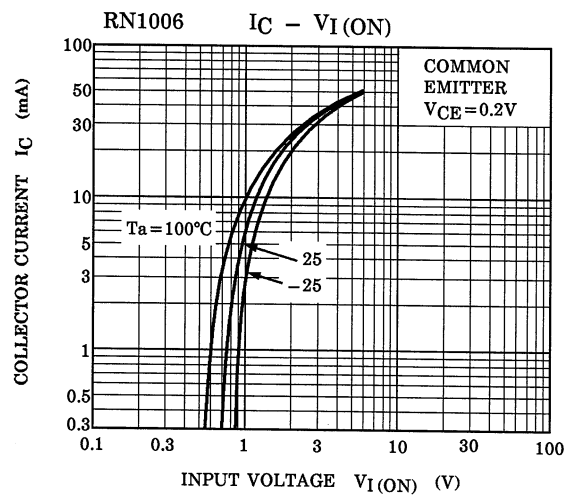
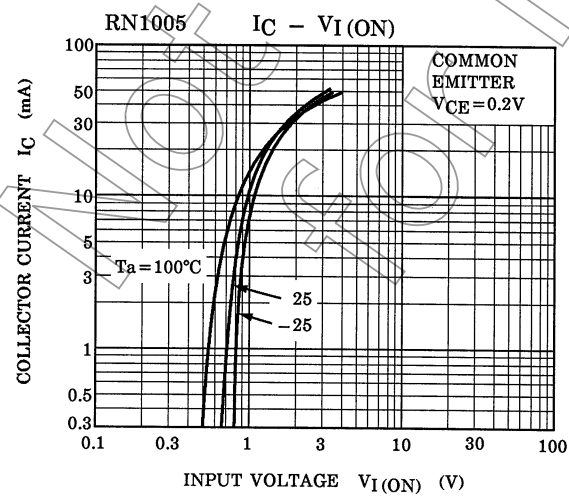
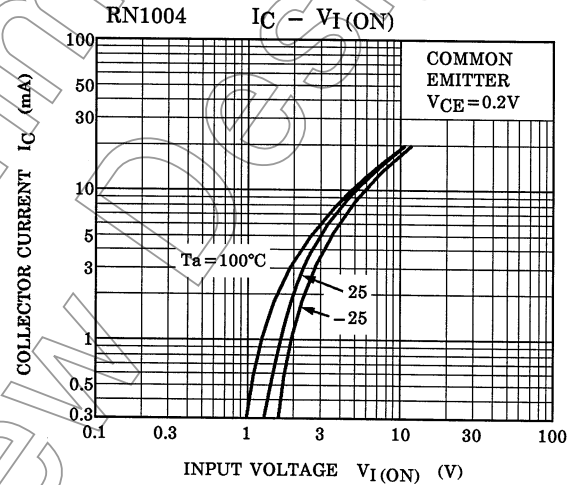
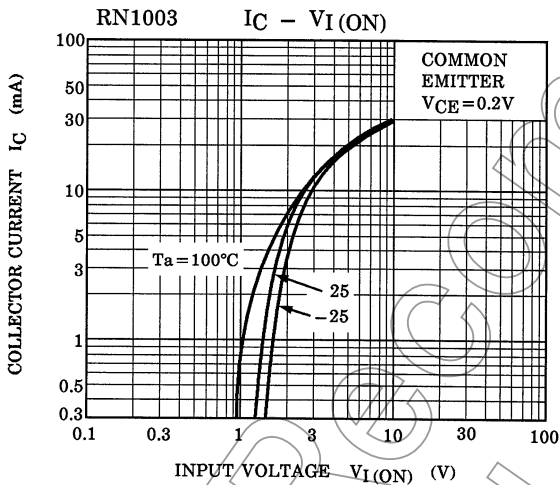
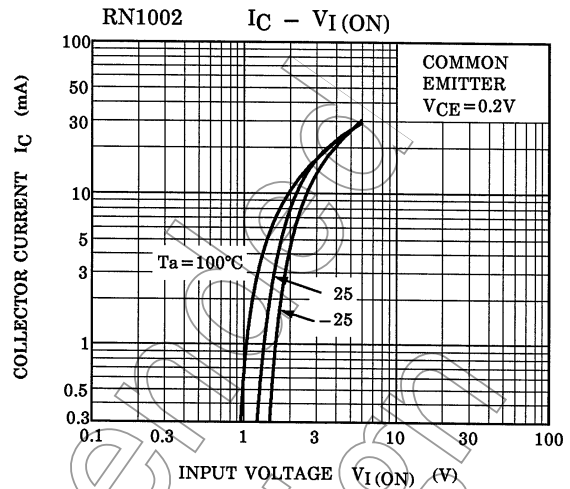
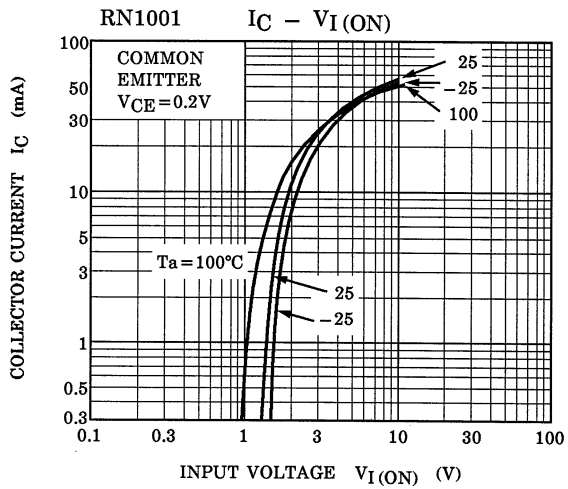
Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	10	V
		5	
Collector current	I_C	100	mA
Collector power dissipation	P_C	400	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	-55~150	°C

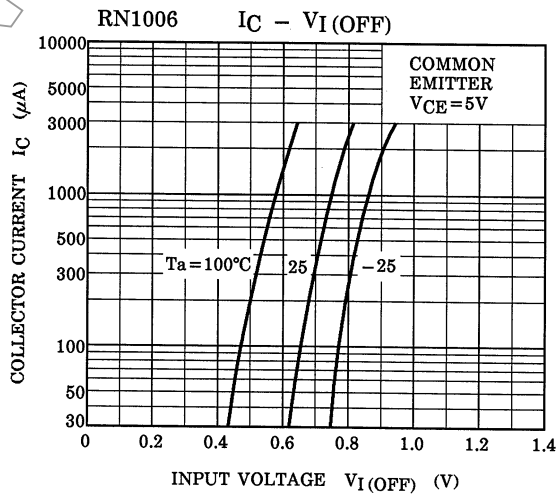
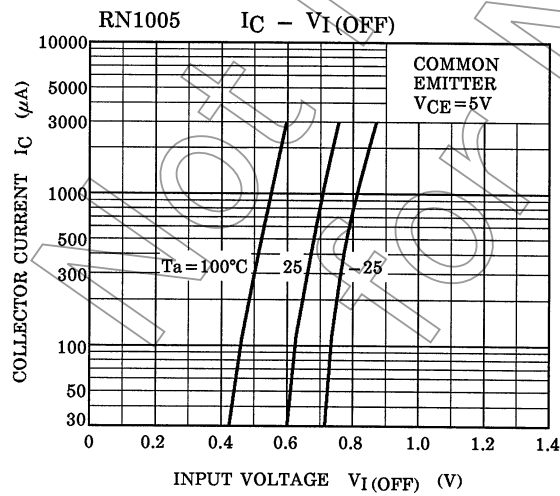
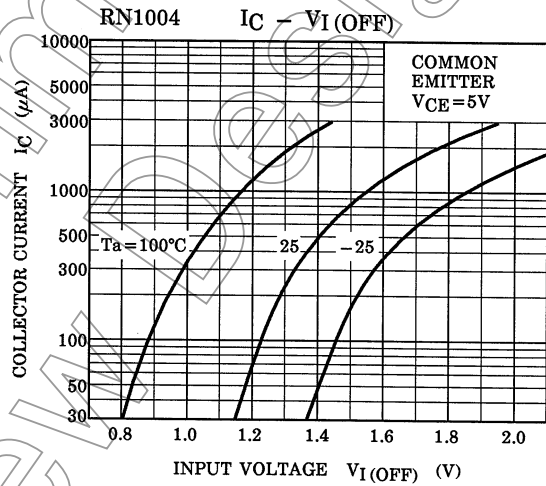
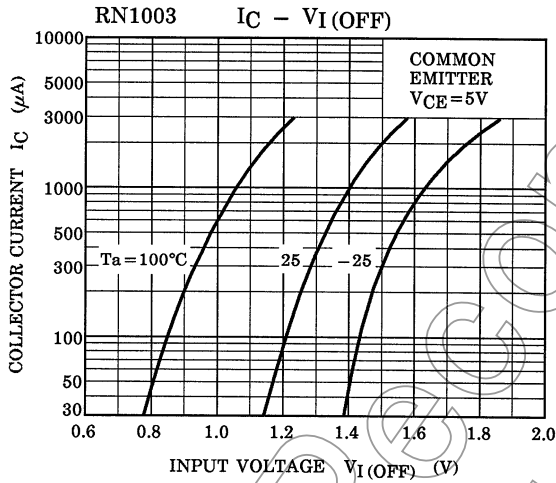
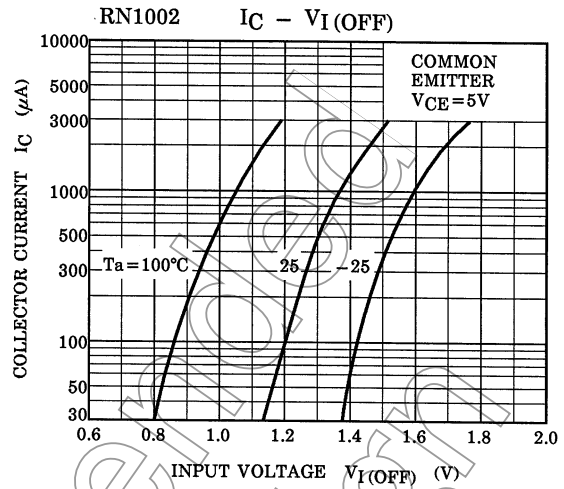
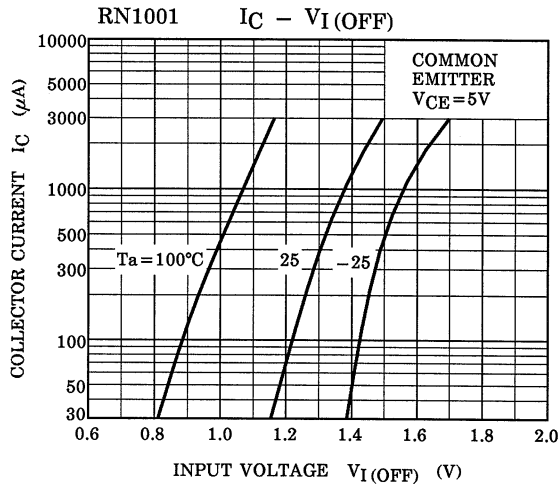
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

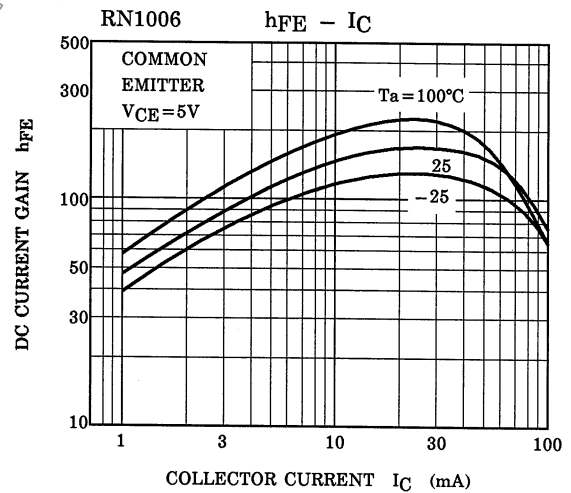
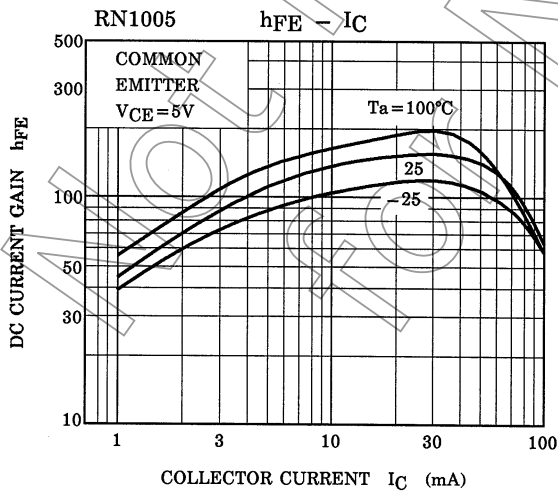
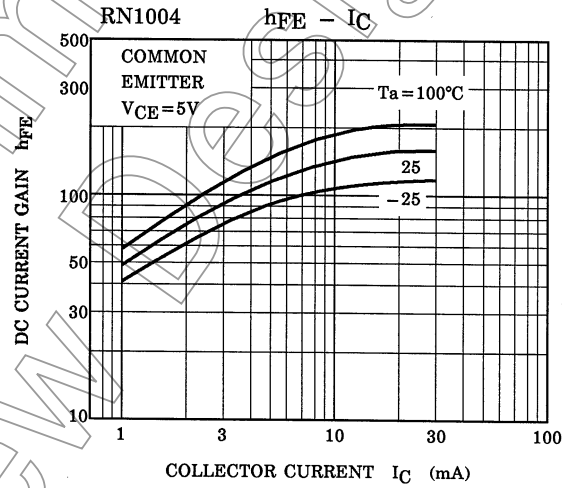
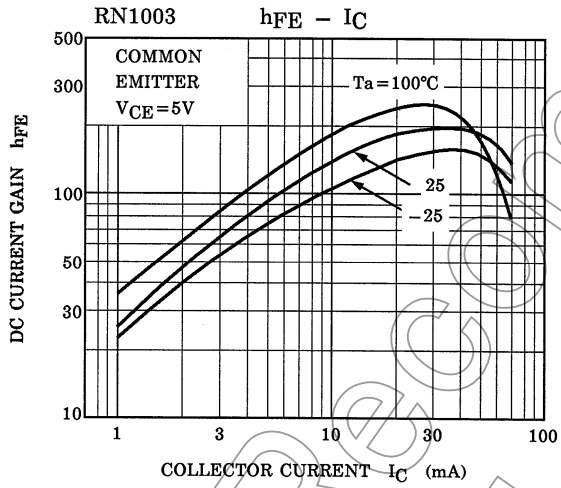
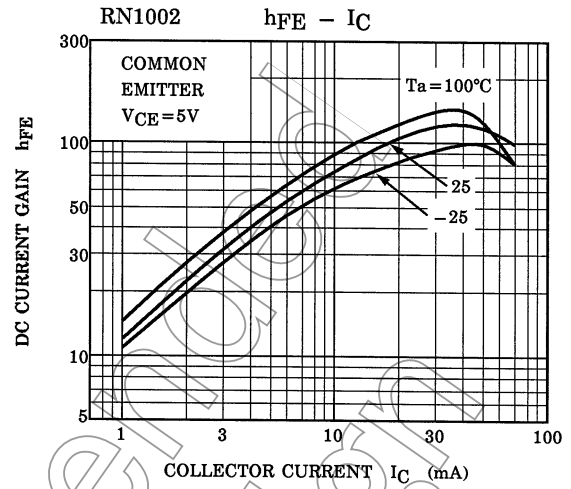
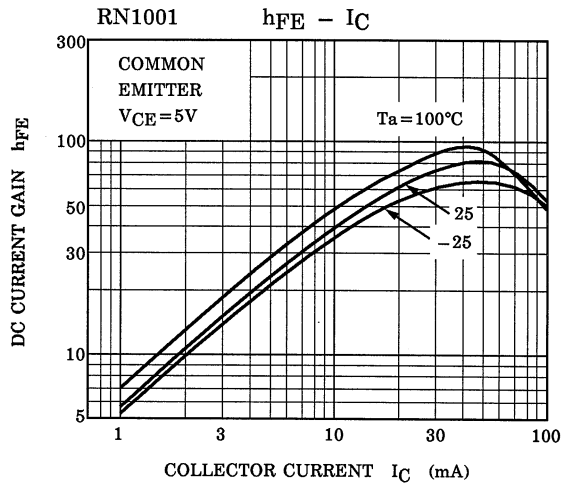
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1001~1006	I_{CBO}	—	$V_{CB} = 50V, I_E = 0$	—	—	100	nA
		I_{CEO}		$V_{CE} = 50V, I_B = 0$	—	—	500	
Emitter cut-off current	RN1001	I_{EBO}	—	$V_{EB} = 10V, I_C = 0$	0.82	—	1.52	mA
	RN1002				0.38	—	0.71	
	RN1003				0.17	—	0.33	
	RN1004			0.082	—	0.15		
	RN1005			0.078	—	0.145		
	RN1006			0.074	—	0.138		
DC current gain	RN1001	h_{FE}	—	$V_{CE} = 5V, I_C = 10mA$	30	—	—	—
	RN1002				50	—	—	
	RN1003				70	—	—	
	RN1004				80	—	—	
	RN1005				80	—	—	
	RN1006				80	—	—	
Collector-emitter saturation voltage	RN1001~1006	$V_{CE(sat)}$	—	$I_C = 5mA, I_B = 0.25mA$	—	0.1	0.3	V
Input voltage (ON)	RN1001	$V_I(ON)$	—	$V_{CE} = 0.2V, I_C = 5mA$	1.1	—	2.0	V
	RN1002				1.2	—	2.4	
	RN1003				1.3	—	3.0	
	RN1004				1.5	—	5.0	
	RN1005				0.6	—	1.1	
	RN1006				0.7	—	1.3	
Input voltage (OFF)	RN1001~1004	$V_I(OFF)$	—	$V_{CE} = 5V, I_C = 0.1mA$	1.0	—	1.5	V
	RN1005, 1006				0.5	—	0.8	
Transition frequency	RN1001~1006	f_T	—	$V_{CE} = 10V, I_C = 5mA$	—	250	—	MHz
Collector Output capacitance	RN1001~1006	C_{ob}	—	$V_{CB} = 10V, I_E = 0, f = 1MHz$	—	3	6	pF
Input resistor	RN1001	R1	—		3.29	4.7	6.11	kΩ
	RN1002				7	10	13	
	RN1003				15.4	22	28.6	
	RN1004				32.9	47	61.1	
	RN1005				1.54	2.2	2.86	
	RN1006				3.29	4.7	6.11	
Resistor ratio	RN1001~1004	R1/R2	—		0.9	1.0	1.1	—
	RN1005				0.0421	0.0468	0.0515	
	RN1006				0.09	0.1	0.11	







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