

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

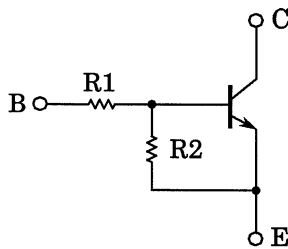
## RN1701, RN1702, RN1703 RN1704, RN1705, RN1706

Unit: mm

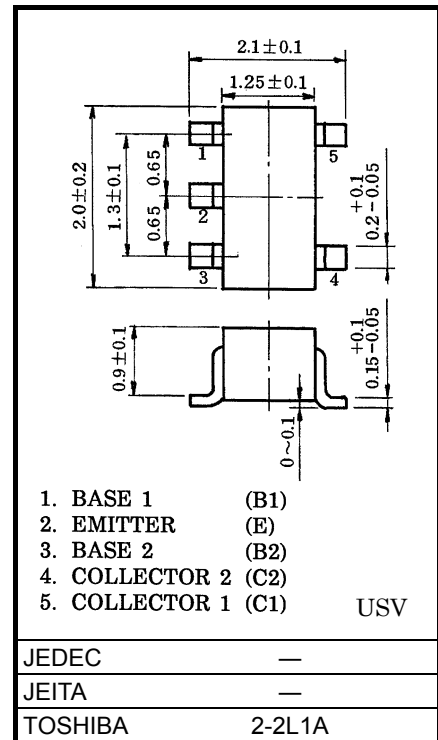
Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- Including two devices in USV (ultra super mini type with 5 leads)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2701 to RN2706

### Equivalent Circuit and Bias Resistor Values



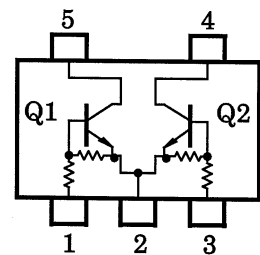
Type No.	R1 (kΩ)	R2 (kΩ)
RN1701	4.7	4.7
RN1702	10	10
RN1703	22	22
RN1704	47	47
RN1705	2.2	47
RN1706	4.7	47



### Equivalent Circuit (Top View)

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

Characteristic	Symbol	Rating	Unit	
Collector-base voltage	RN1701 to 1706	$V_{CB0}$	50	V
Collector-emitter voltage		$V_{CEO}$	50	V
Emitter-base voltage	RN1701 to 1704	$V_{EBO}$	10	V
	RN1705, 1706		5	
Collector current	RN1701 to 1706	$I_c$	100	mA
Collector power dissipation		$P_c^*$	200	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.

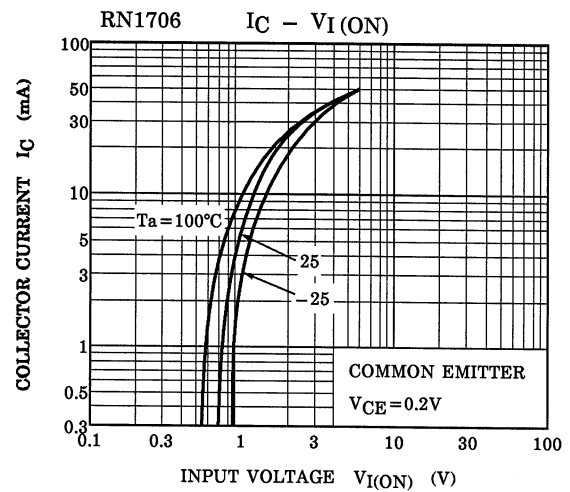
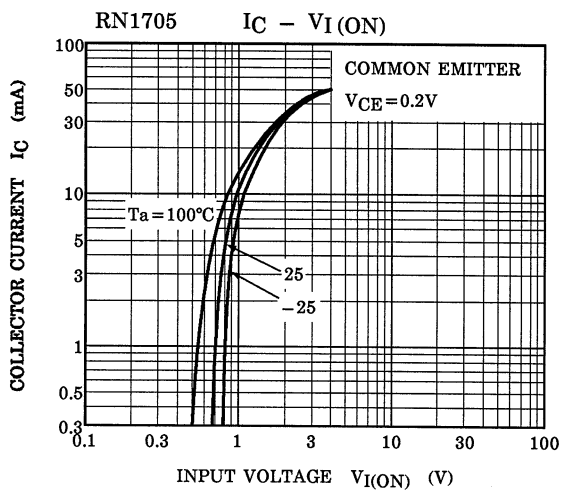
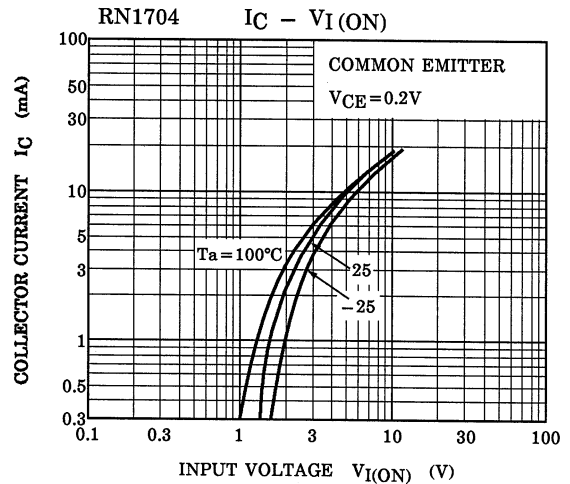
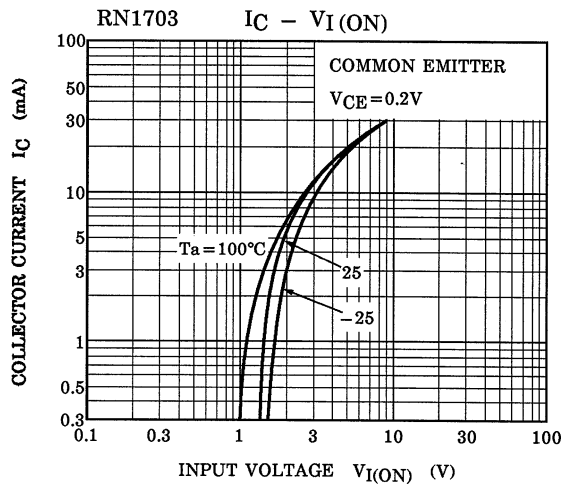
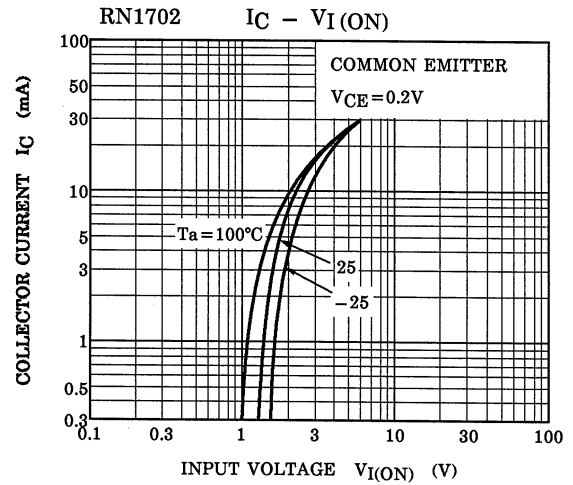
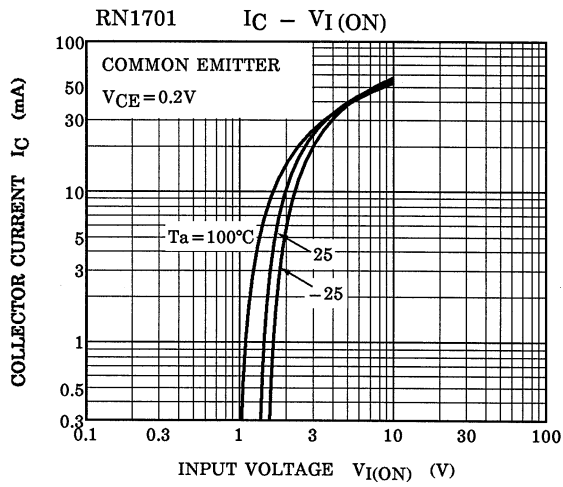
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

\*: Total rating

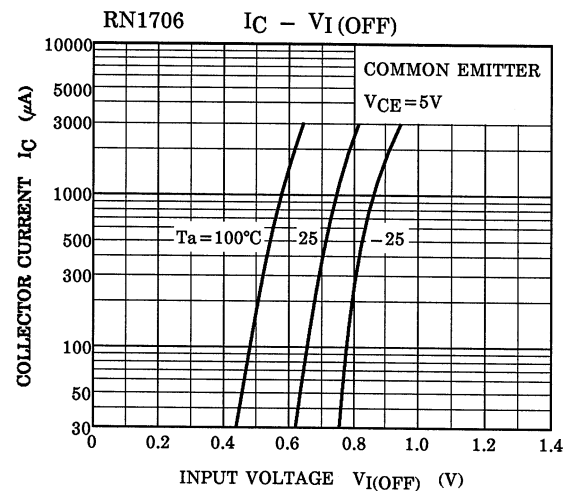
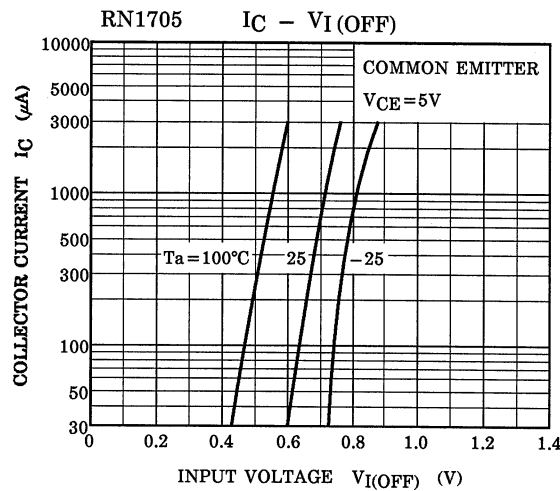
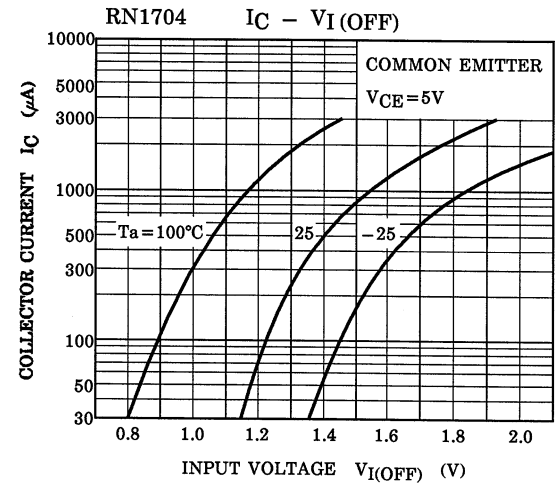
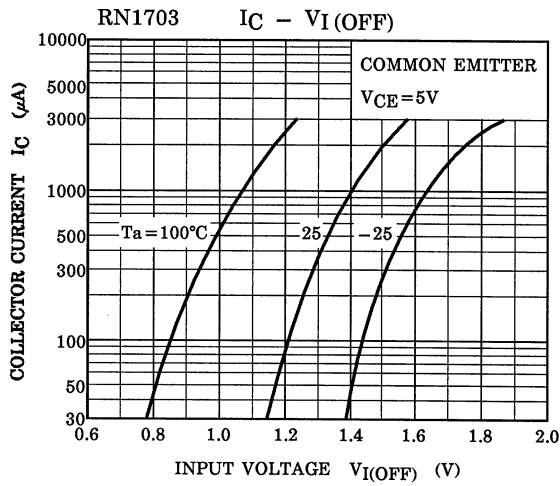
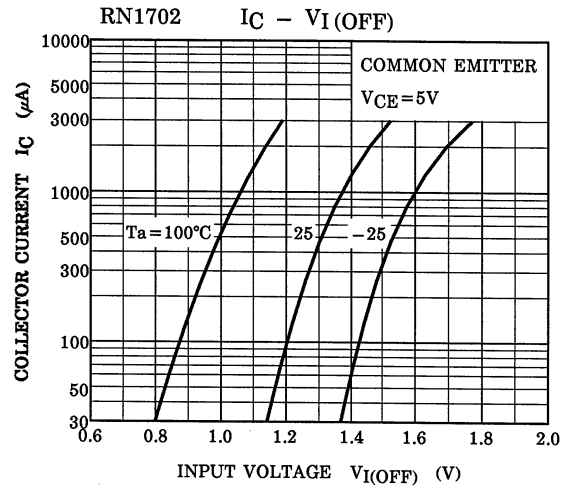
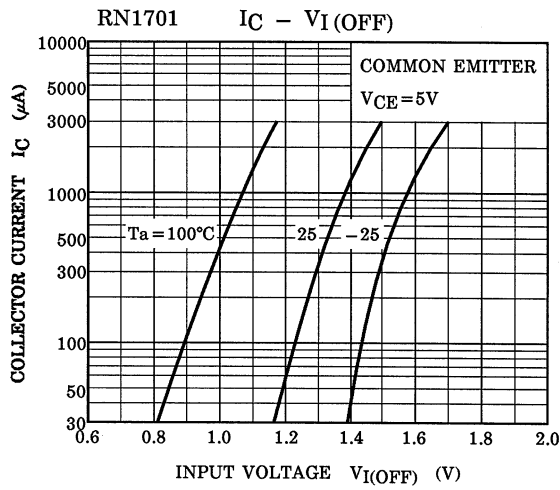
## Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1701 to 1706	$I_{CBO}$	—	$V_{CB} = 50V, I_E = 0$	—	—	100	nA
		$I_{CEO}$	—	$V_{CE} = 50V, I_B = 0$	—	—	500	
Emitter cut-off current	RN1701	$I_{EBO}$	—	$V_{EB} = 10V, I_C = 0$	0.82	—	1.52	mA
	RN1702		—		0.38	—	0.71	
	RN1703		—		0.17	—	0.33	
	RN1704		—	0.082	—	0.15		
	RN1705		—	$V_{EB} = 5V, I_C = 0$	0.078	—	0.145	
	RN1706		—		0.074	—	0.138	
DC current gain	RN1701	$h_{FE}$	—	$V_{CE} = 5V, I_C = 10mA$	30	—	—	—
	RN1702		—		50	—	—	
	RN1703		—		70	—	—	
	RN1704		—		80	—	—	
	RN1705		—		80	—	—	
	RN1706		—		80	—	—	
Collector-emitter saturation voltage	RN1701 to 1706	$V_{CE(sat)}$	—	$I_C = 5mA, I_B = 0.25mA$	—	0.1	0.3	V
Input voltage (ON)	RN1701	$V_I(ON)$	—	$V_{CE} = 0.2V, I_C = 5mA$	1.1	—	2.0	V
	RN1702		—		1.2	—	2.4	
	RN1703		—		1.3	—	3.0	
	RN1704		—		1.5	—	5.0	
	RN1705		—		0.6	—	1.1	
	RN1706		—		0.7	—	1.3	
Input voltage (OFF)	RN1701 to 1704	$V_I(OFF)$	—	$V_{CE} = 5V, I_C = 0.1mA$	1.0	—	1.5	V
	RN1705, 1706		—		0.5	—	0.8	
Transition frequency	RN1701 to 1706	$f_T$	—	$V_{CE} = 10V, I_C = 5mA$	—	250	—	MHz
Collector output capacitance	RN1701 to 1706	$C_{ob}$	—	$V_{CB} = 10V, I_E = 0, f = 1MHz$	—	3	6	pF
Input resistor	RN1701	R1	—	—	3.29	4.7	6.11	kΩ
	RN1702		—		7	10	13	
	RN1703		—		15.4	22	28.6	
	RN1704		—		32.9	47	61.1	
	RN1705		—		1.54	2.2	2.86	
	RN1706		—		3.29	4.7	6.11	
Resistor ratio	RN1701 to 1704	R1/R2	—	—	0.9	1.0	1.1	—
	RN1705		—		0.0421	0.0468	0.0515	
	RN1706		—		0.09	0.1	0.11	

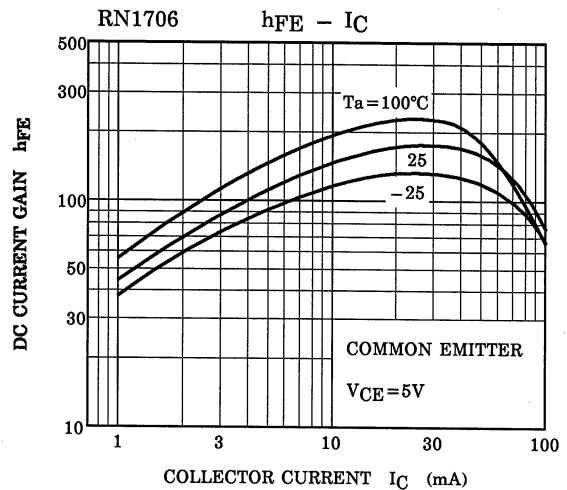
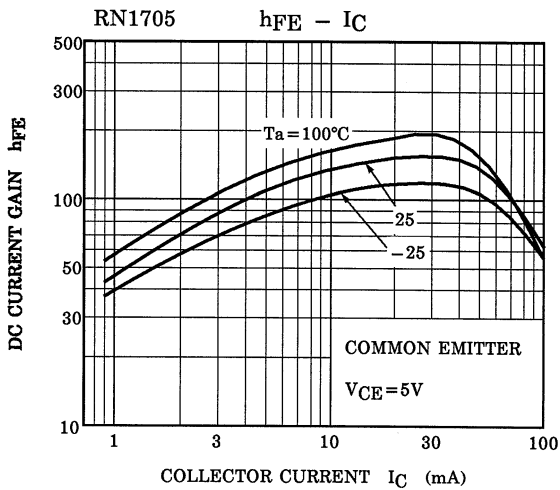
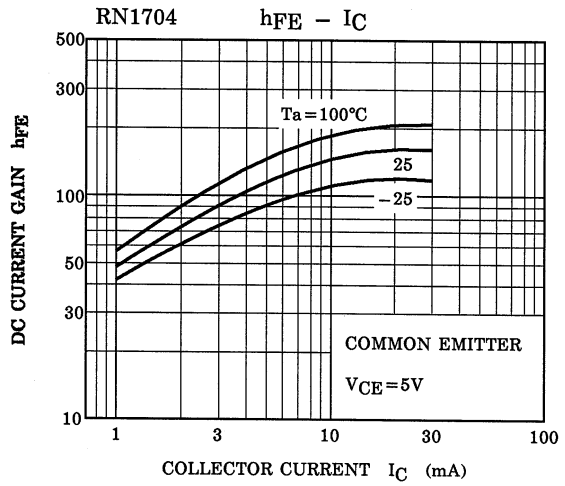
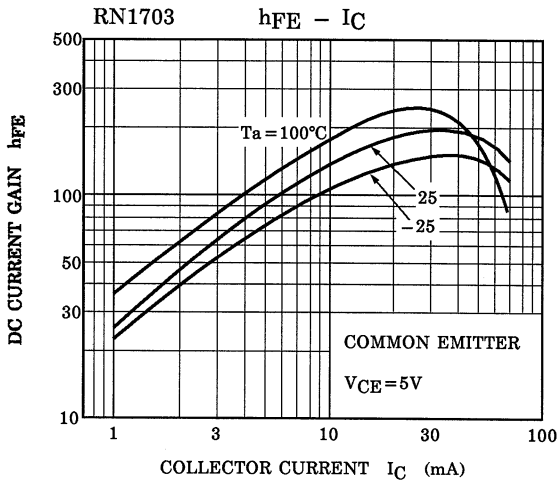
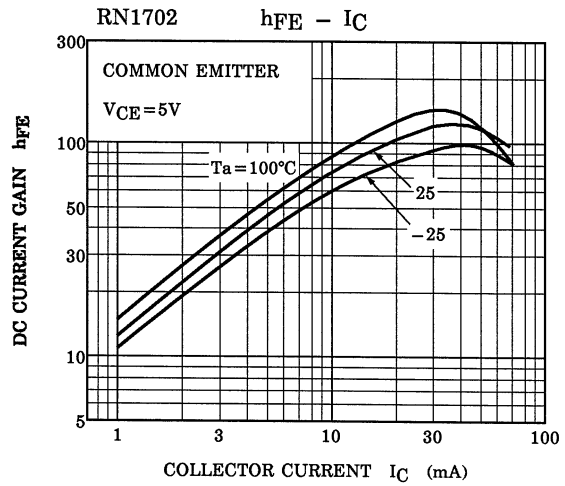
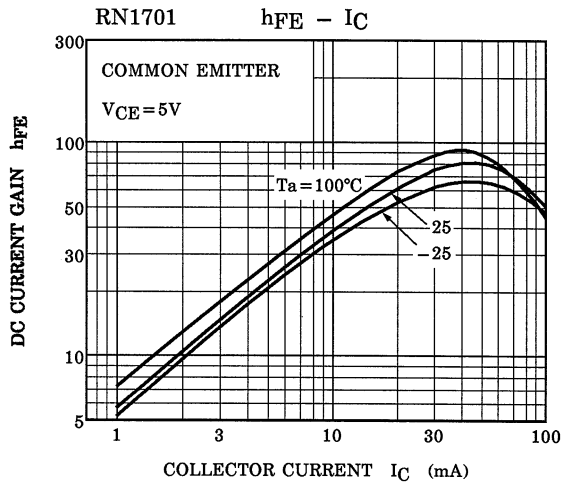
(Q1, Q2 Common)

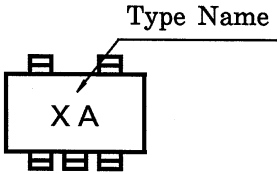
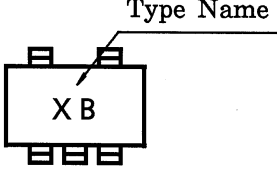
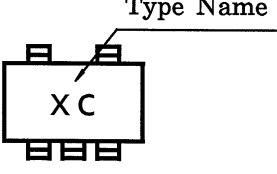
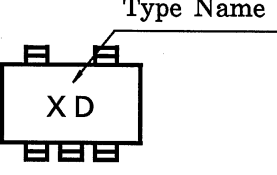
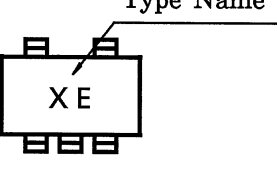
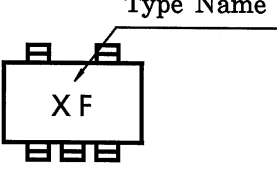


(Q1, Q2 Common)



(Q1, Q2 Common)



Type Name	Marking
RN1701	
RN1702	
RN1703	
RN1704	
RN1705	
RN1706	

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