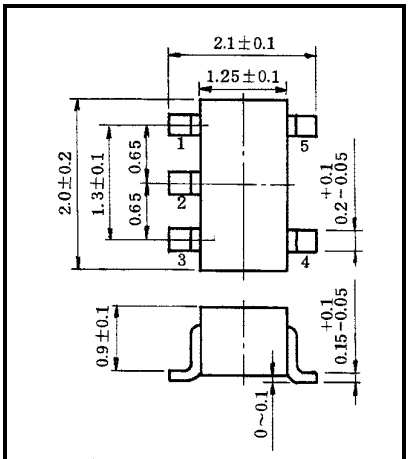
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

RN1701,RN1702,RN1703
RN1704,RN1705,RN1706

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~RN2706

Unit: mm

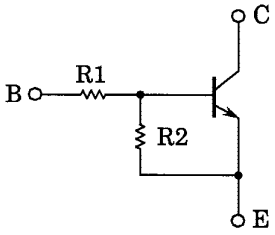


1. BASE 1 (B1)
2. EMITTER (E)
3. BASE 2 (B2)
4. COLLECTOR 2 (C2)
5. COLLECTOR 1 (C1)

JEDEC	—
EIAJ	—
TOSHIBA	2-2L1A

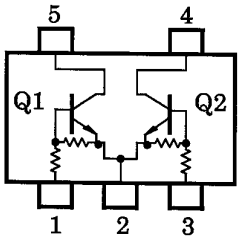
Weight: 6.2mg

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)



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

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1701~1706	V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1701~1704	V_{EBO}	10	V
	RN1705, 1706		5	
Collector current	RN1701~1706	I_C	100	mA
Collector power dissipation		P_C*	200	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55~150	°C

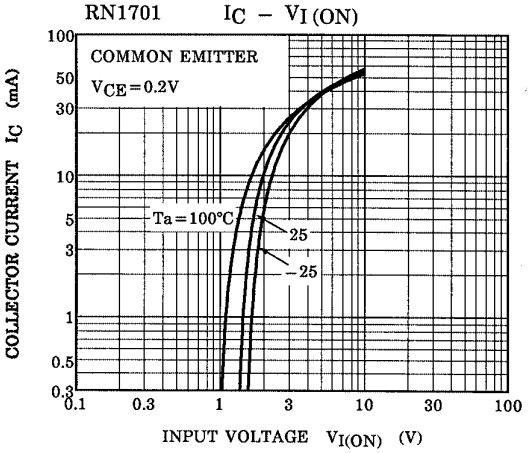
*: Total rating

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

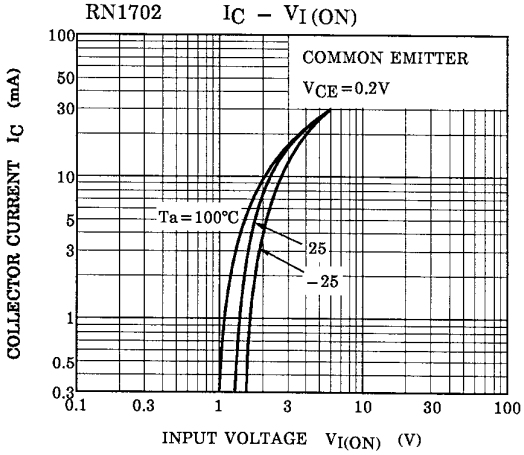
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1701~1706	I_{CBO}	—	V_{CB} = 50V, I_E = 0	—	—	100	nA
		I_{CEO}	—	V_{CE} = 50V, I_B = 0	—	—	500	
Emitter cut-off current	RN1701	I_{EBO}	—	V_{EB} = 10V, I_C = 0	0.82	—	1.52	mA
	RN1702		—		0.38	—	0.71	
	RN1703		—		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	RN1701~1706	$V_{CE\ (sat)}$	—	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)	RN1701~1704	$V_{I\ (OFF)}$	—	V_{CE} = 5V, I_C = 0.1mA	1.0	—	1.5	V
	RN1705, 1706		—		0.5	—	0.8	
Translation frequency	RN1701~1706	f_T	—	V_{CE} = 10V, I_C = 5mA	—	250	—	MHz
Collector output capacitance	RN1701~1706	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	RN1701~1705	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)

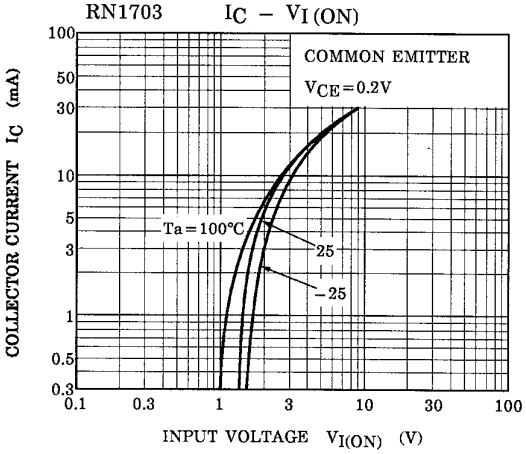
RN1701 I_C – $V_{I(ON)}$



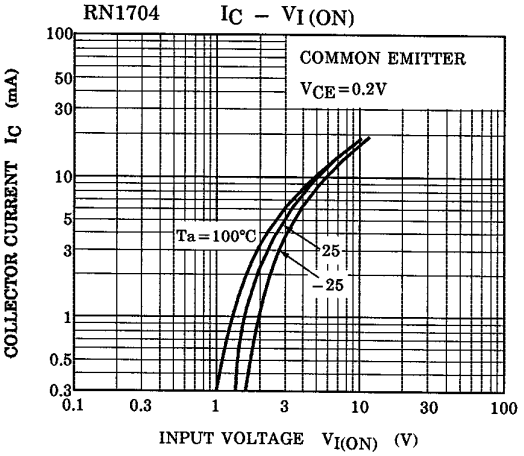
RN1702 I_C – $V_{I(ON)}$



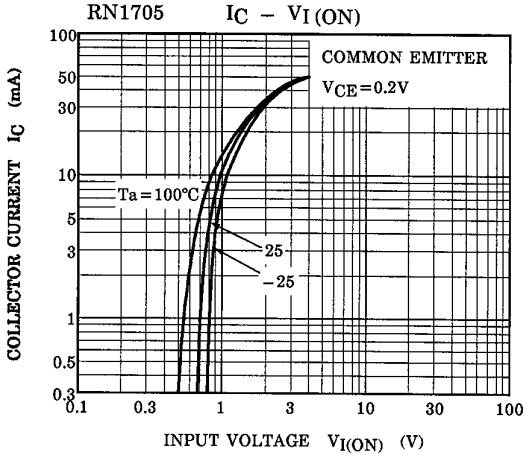
RN1703 I_C – $V_{I(ON)}$



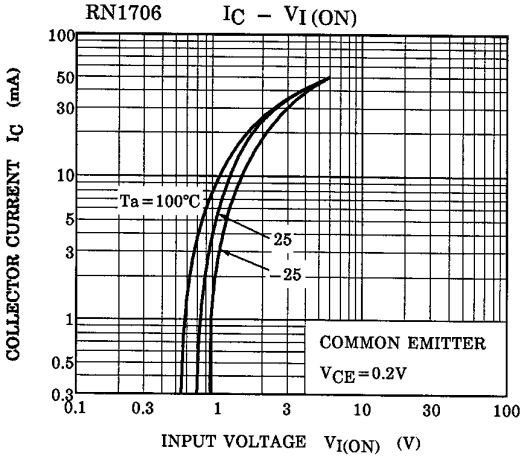
RN1704 I_C – $V_{I(ON)}$



RN1705 I_C – $V_{I(ON)}$

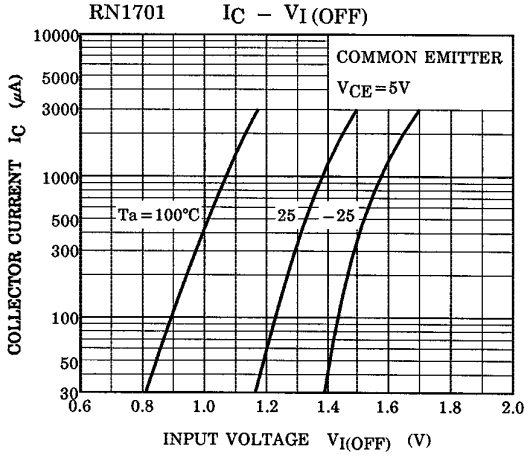


RN1706 I_C – $V_{I(ON)}$



(Q1, Q2 Common)

RN1701 I_C – $V_{I(OFF)}$



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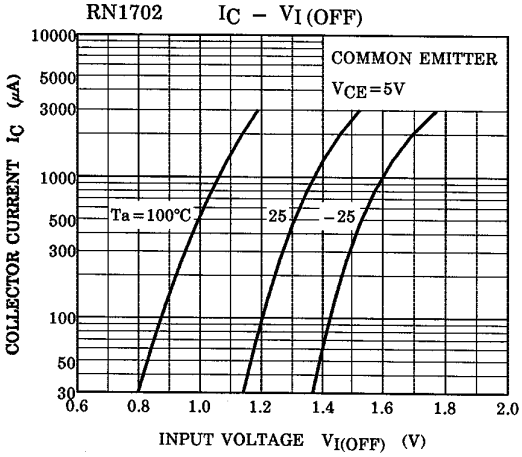

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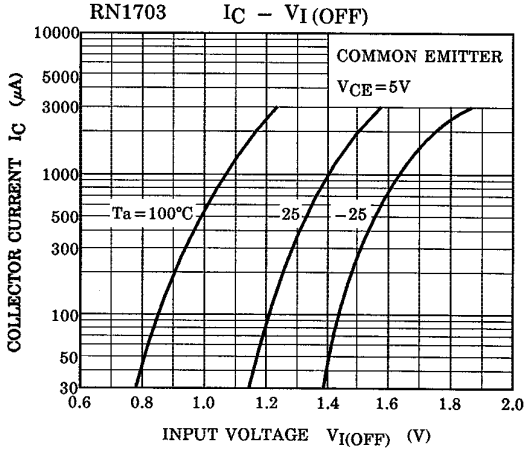

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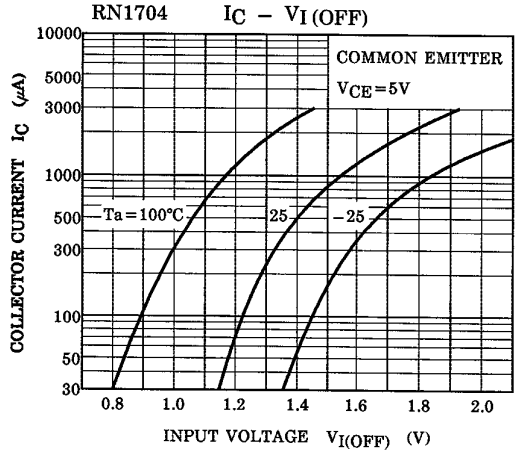

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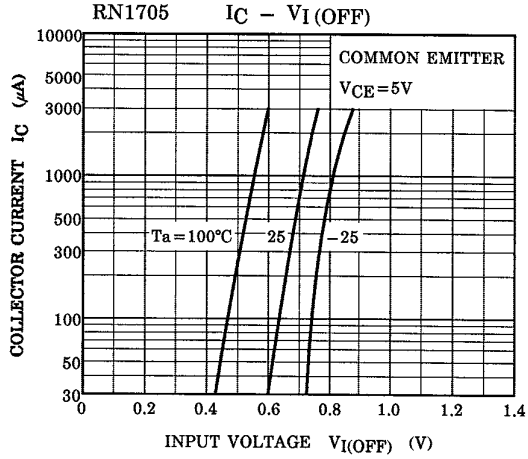
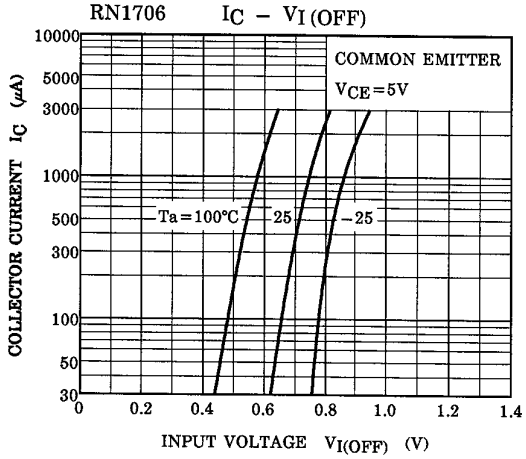
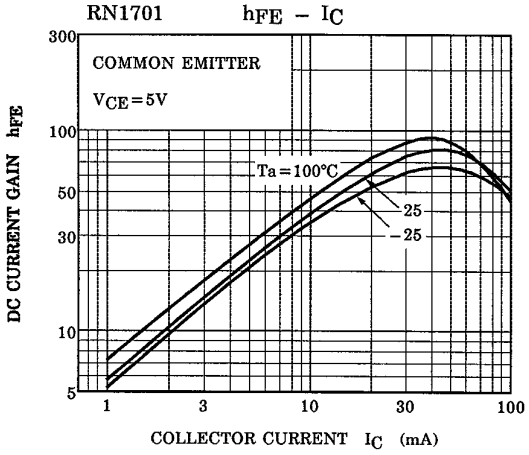


RN1706 I_C – $V_{I(OFF)}$

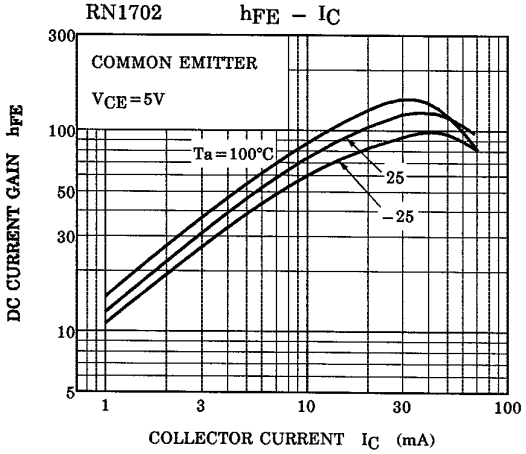


(Q1, Q2 Common)

RN1701 h_{FE} – I_C



RN1702 h_{FE} – I_C



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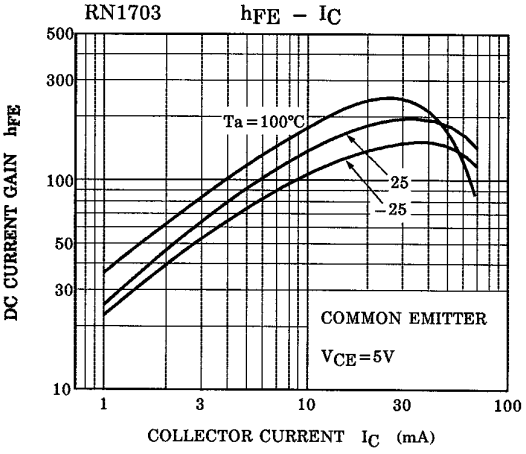
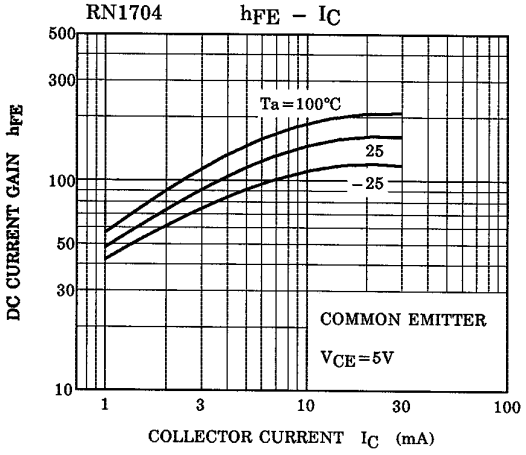
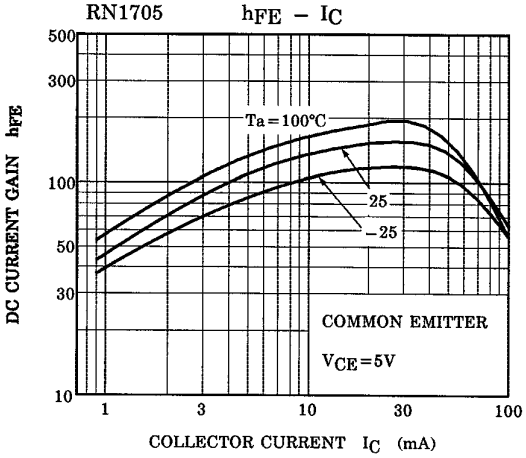


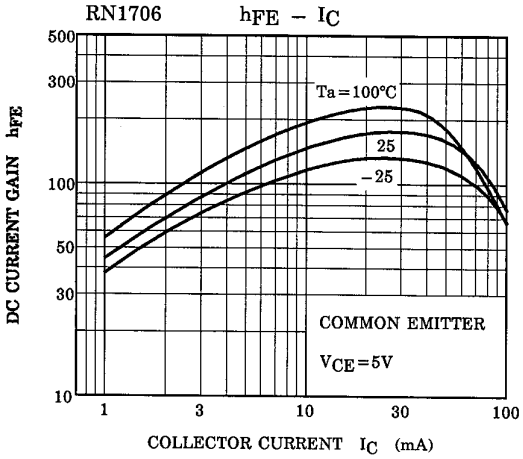
RN1704 h_{FE} – I_C

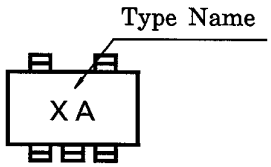
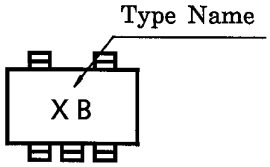
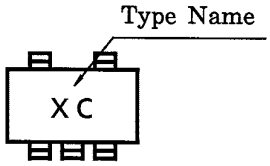
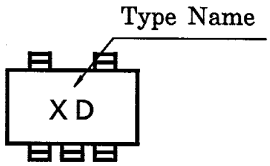
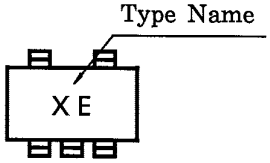
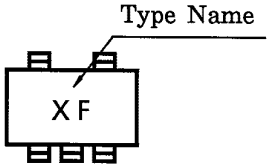


RN1705 h_{FE} – I_C



RN1706 h_{FE} – I_C



Type Name	Marking
RN1701	
RN1702	
RN1703	
RN1704	
RN1705	
RN1706	

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