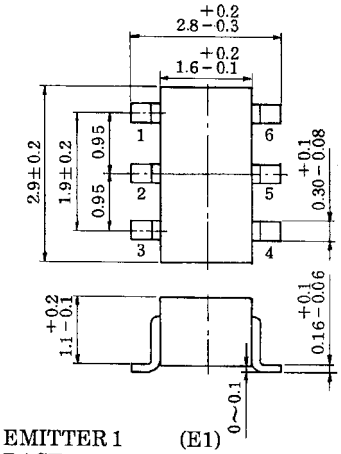
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

RN1601,RN1602,RN1603
RN1604,RN1605,RN1606

Switching, Inverter Circuit, Interface Circuit
And Driver Circuit Applications

- Including two devices in SM6 (super mini type with 6 leads)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2601~RN2606

Unit in mm

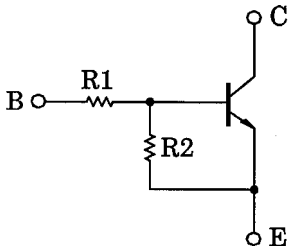


1. EMITTER 1 (E1)
2. BASE 1 (B1)
3. COLLECTOR 2 (C2)
4. EMITTER 2 (E2)
5. BASE 2 (B2)
6. COLLECTOR 1 (C1)

JEDEC	—
EIAJ	—
TOSHIBA	2-3N1A

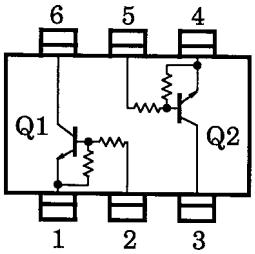
Weight: 0.015g

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1601	4.7	4.7
RN1602	10	10
RN1603	22	22
RN1604	47	47
RN1605	2.2	47
RN1606	4.7	47

Equivalent Circuit (Top View)



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

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1601~1606	V_{CBO}	50	V
Collector-emitter voltage	RN1601~1606	V_{CEO}	50	V
Emitter-base voltage	RN1601~1604	V_{EBO}	10	V
	RN1605, 1606		5	
Collector current	RN1601~1606	I_C	100	mA
Collector power dissipation	RN1601~1606	P_C*	300	mW
Junction temperature	RN1601~1606	T_j	150	°C
Storage temperature range	RN1601~1606	T_{stg}	−55~150	°C

* Total rating

961001EAA2

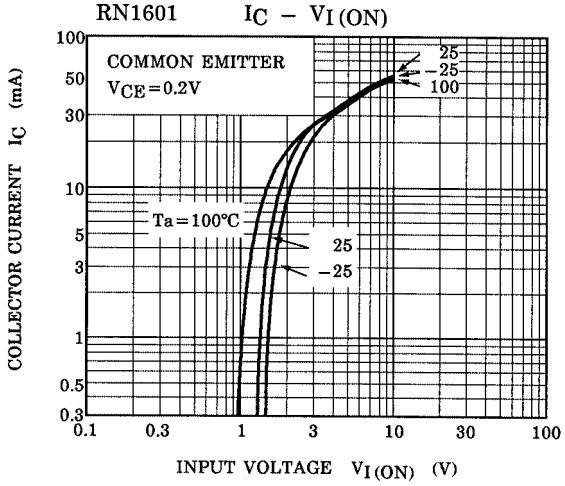
Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1601~1606	I_{CBO}	—	V_{CB} = 50V, I_E = 0	—	—	100	nA
		I_{CEO}	—	V_{CE} = 50V, I_B = 0	—	—	500	
Emitter cut-off current	RN1601	I_{EBO}	—	V_{EB} = 10V, I_C = 0	0.82	—	1.52	mA
	RN1602		—		0.38	—	0.71	
	RN1603		—		0.17	—	0.33	
	RN1604		—		0.082	—	0.15	
	RN1605		—	V_{EB} = 5V, I_C = 0	0.078	—	0.145	
	RN1606		—		0.074	—	0.138	
DC current gain	RN1601	h_{FE}	—	V_{CE} = 5V, I_C = 10mA	30	—	—	—
	RN1602		—		50	—	—	
	RN1603		—		70	—	—	
	RN1604		—		80	—	—	
	RN1605		—		80	—	—	
	RN1606		—		80	—	—	
Collector-emitter saturation voltage	RN1601~1606	$V_{CE\ (sat)}$	—	I_C = 5mA, I_B = 0.25mA	—	0.1	0.3	V
Input voltage (ON)	RN1601	$V_{I\ (ON)}$	—	V_{CE} = 0.2V, I_C = 5mA	1.1	—	2.0	V
	RN1602		—		1.2	—	2.4	
	RN1603		—		1.3	—	3.0	
	RN1604		—		1.5	—	5.0	
	RN1605		—		0.6	—	1.1	
	RN1606		—		0.7	—	1.3	
Input voltage (OFF)	RN1601~1604	$V_{I\ (OFF)}$	—	V_{CE} = 5V, I_C = 0.1mA	1.0	—	1.5	V
	RN1605~1606		—		0.5	—	0.8	
Translation frequency	RN1601~1606	f_T	—	V_{CE} = 10V, I_C = 5mA	—	250	—	MHz
Collector output capacitance	RN1601~1606	C_{ob}	—	V_{CB} = 10V, I_E = 0, f = 1MHz	—	3	6	pF
Input resistor	RN1601	R1	—	—	3.29	4.7	6.11	kΩ
	RN1602		—		7	10	13	
	RN1603		—		15.4	22	28.6	
	RN1604		—		32.9	47	61.1	
	RN1605		—		1.54	2.2	2.86	
	RN1606		—		3.29	4.7	6.11	
Resistor ratio	RN1601~1605	R1/R2	—	—	0.9	1.0	1.1	—
	RN1605		—		0.0421	0.0468	0.0515	
	RN1606		—		0.09	0.1	0.11	

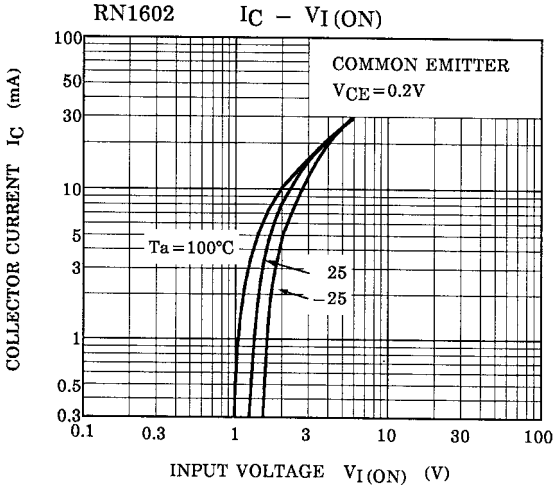
961001EAA2'

(Q1 Q2 Common)

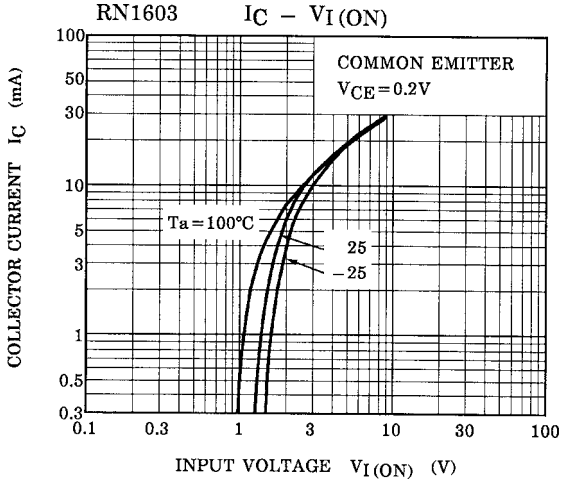
RN1601 $I_C - V_{I(ON)}$



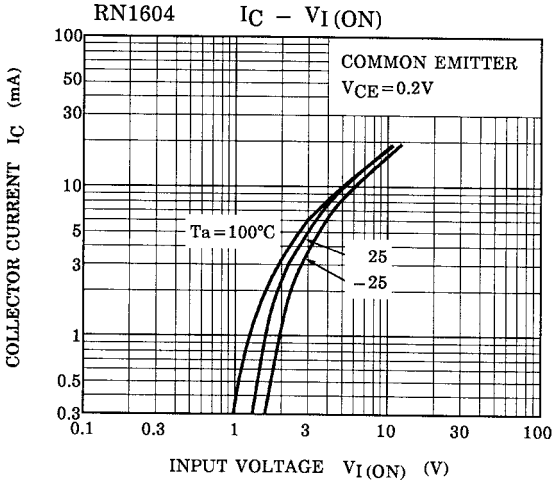
RN1602 $I_C - V_{I(ON)}$



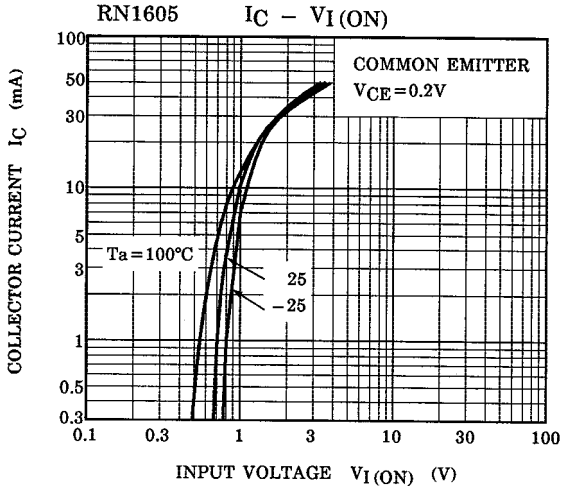
RN1603 $I_C - V_{I(ON)}$



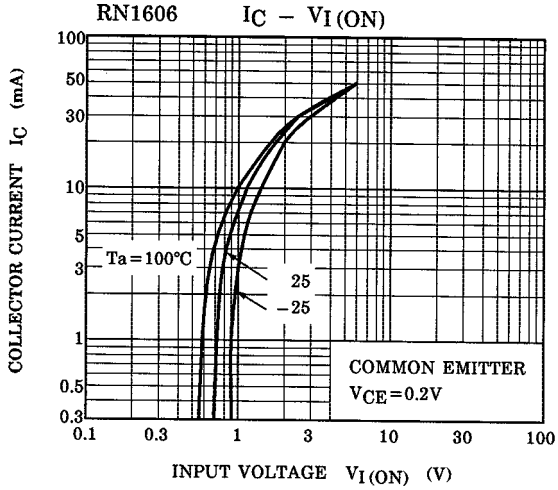
RN1604 $I_C - V_{I(ON)}$



RN1605 $I_C - V_{I(ON)}$

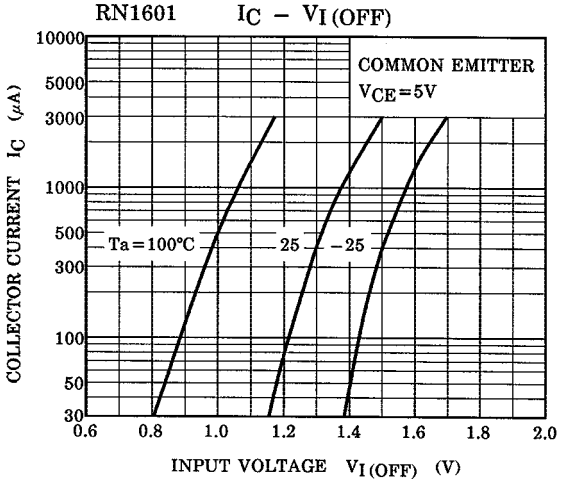


RN1606 $I_C - V_{I(ON)}$



(Q1, Q2 Common)

RN1601 $I_C - V_{I(OFF)}$



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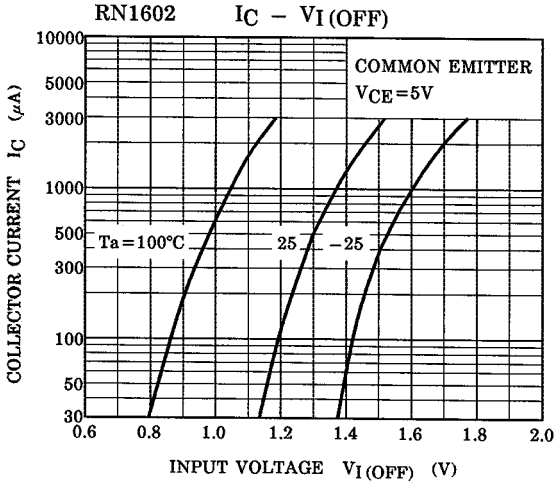
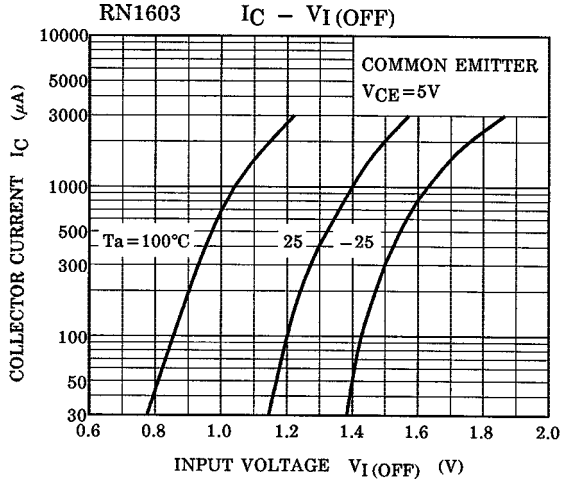


RN1603 $I_C - V_{I(OFF)}$



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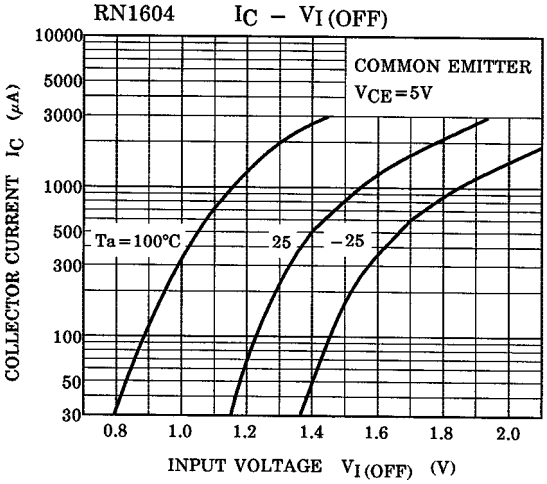
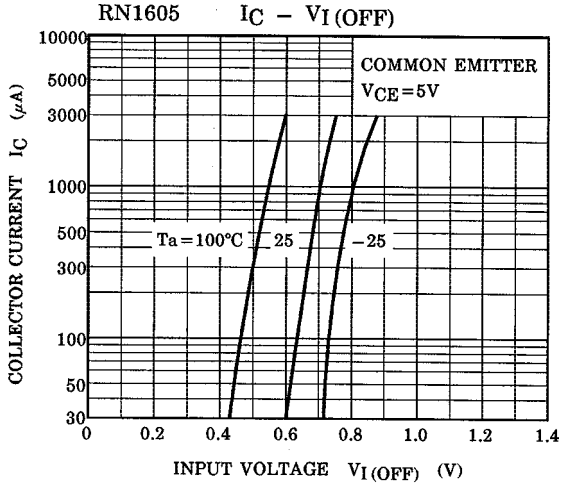
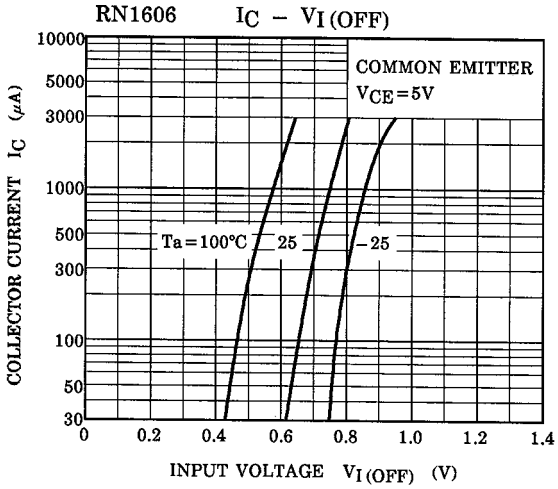


RN1605 $I_C - V_{I(OFF)}$

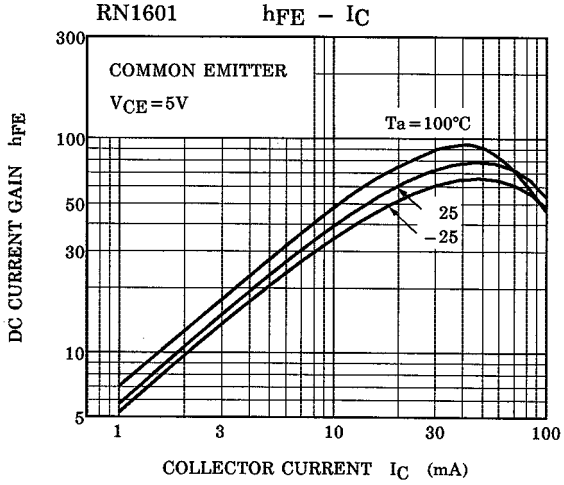


RN1606 $I_C - V_{I(OFF)}$

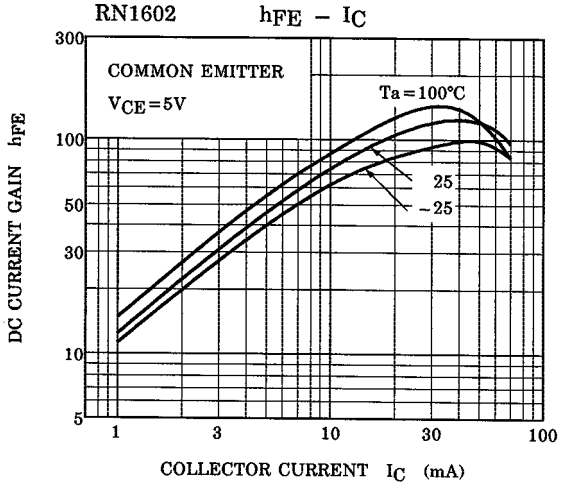


(Q1, Q2 Common)

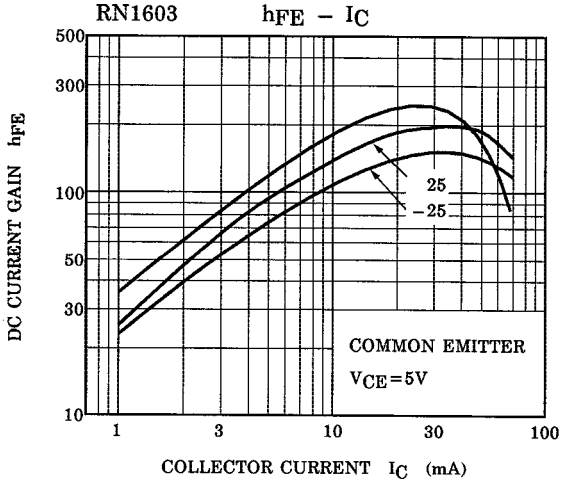
RN1601 h_{FE} – I_C



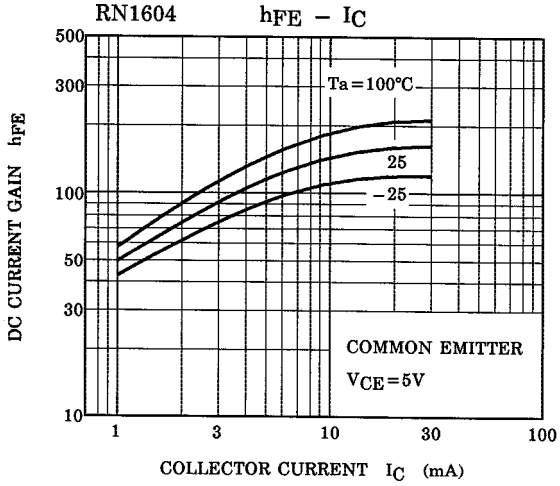
RN1602 h_{FE} – I_C



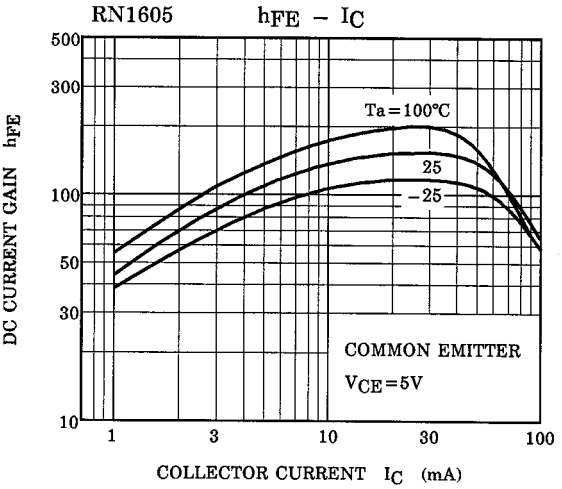
RN1603 h_{FE} – I_C



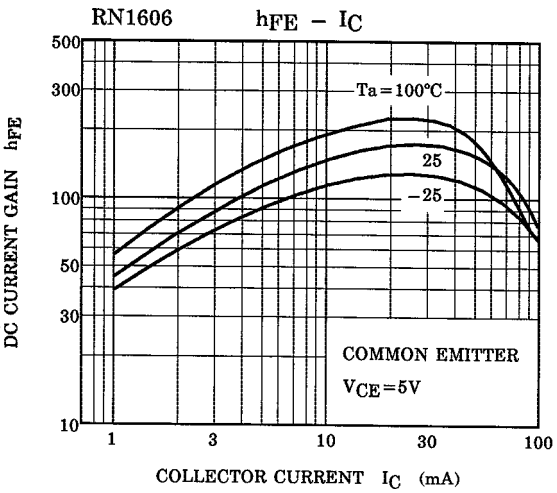
RN1604 h_{FE} – I_C

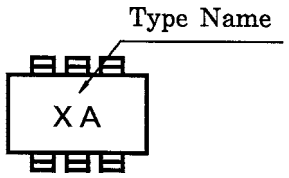
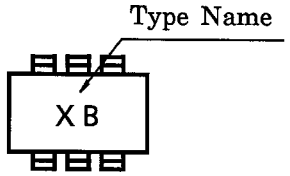
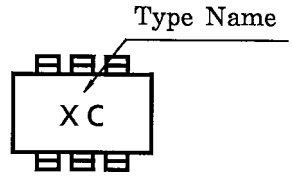
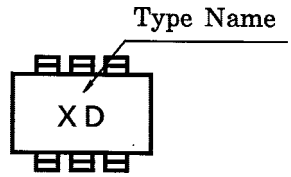
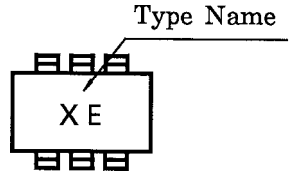


RN1605 h_{FE} – I_C



RN1606 h_{FE} – I_C



Type Name	Marking
RN1601	
RN1602	
RN1603	
RN1604	
RN1605	
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