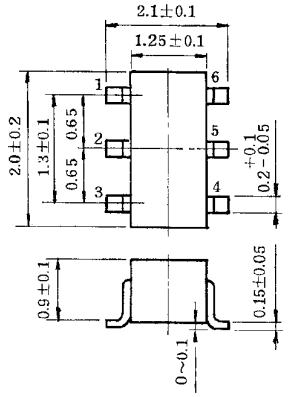
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

RN1961,RN1962,RN1963
RN1964,RN1965,RN1966

Switching, Inverter Circuit, Interface Circuit
And Driver Circuit Applications

- Including two devices in US6 (ultra super mini type 6 leads)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
  - Complementary to RN2961~RN2966

Unit: mm



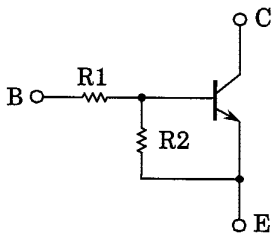
1. EMITTER 1 (E1)
2. EMITTER 2 (E2)
3. BASE 2 (B2)
4. COLLECTOR 2 (C2)
5. BASE 1 (B1)
6. COLLECTOR 1 (C1)

US6

JEDEC	—
EIAJ	—
TOSHIBA	2-2J1B

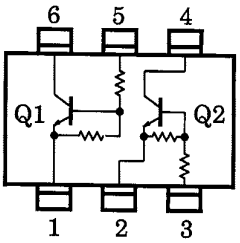
Weight: 6.8mg

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1961	4.7	4.7
RN1962	10	10
RN1963	22	22
RN1964	47	47
RN1965	2.2	47
RN1966	4.7	47

Equivalent Circuit (Top View)



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

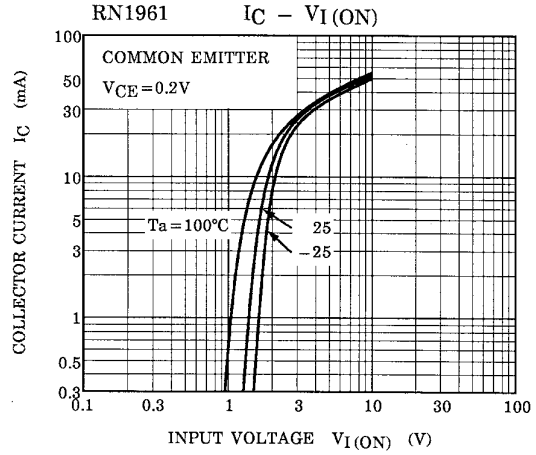
Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1961~1966	V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1961~1964	V_{EBO}	10	V
	RN1965, 1966		5	
Collector current	RN1961~1966	I_C	100	mA
Collector power dissipation		P_C*	200	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55~150	°C

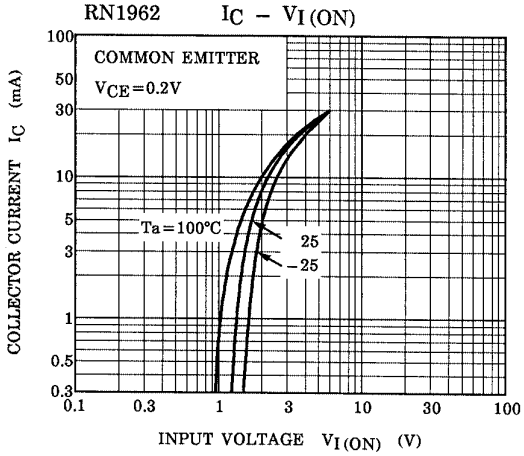
*: Total rating

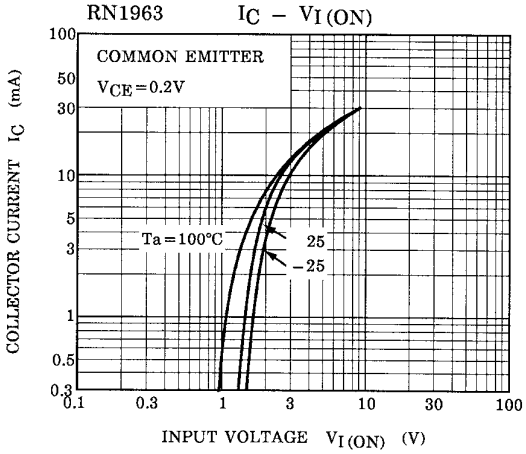
Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)

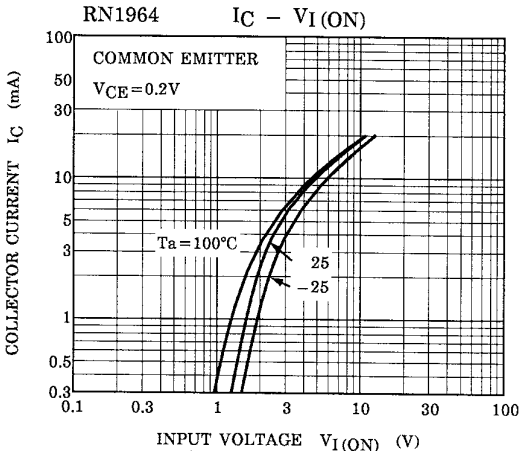
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1961~1966	I_{CBO}	—	V_{CB} = 50V, I_E = 0	—	—	100	nA
		I_{CEO}	—	V_{CE} = 50V, I_B = 0	—	—	500	
Emitter cut-off current	RN1961	I_{EBO}	—	V_{EB} = 10V, I_C = 0	0.82	—	1.52	mA
	RN1962		—		0.38	—	0.71	
	RN1963		—		0.17	—	0.33	
	RN1964		—		0.082	—	0.15	
	RN1965		—	V_{EB} = 5V, I_C = 0	0.078	—	0.145	
	RN1966		—		0.074	—	0.138	
DC current gain	RN1961	h_{FE}	—	V_{CE} = 5V, I_C = 10mA	30	—	—	—
	RN1962		—		50	—	—	
	RN1963		—		70	—	—	
	RN1964		—		80	—	—	
	RN1965		—		80	—	—	
	RN1966		—		80	—	—	
Collector-emitter saturation voltage	RN1961~1966	$V_{CE\ (sat)}$	—	I_C = 5mA, I_B = 0.25mA	—	0.1	0.3	V
Input voltage (ON)	RN1961	$V_{I\ (ON)}$	—	V_{CE} = 0.2V, I_C = 5mA	1.1	—	2.0	V
	RN1962		—		1.2	—	2.4	
	RN1963		—		1.3	—	3.0	
	RN1964		—		1.5	—	5.0	
	RN1965		—		0.6	—	1.1	
	RN1966		—		0.7	—	1.3	
Input voltage (OFF)	RN1961~1964	$V_{I\ (OFF)}$	—	V_{CE} = 5V, I_C = 0.1mA	1.0	—	1.5	V
	RN1965, 1966		—		0.5	—	0.8	
Translation frequency	RN1961~1966	f_T	—	V_{CE} = 10V, I_C = 5mA	—	250	—	MHz
Collector output capacitance	RN1961~1966	C_{ob}	—	V_{CB} = 10V, I_E = 0, f = 1MHz	—	3	6	pF
Input resistor	RN1961	R1	—	—	3.29	4.7	6.11	kΩ
	RN1962		—		7	10	13	
	RN1963		—		15.4	22	28.6	
	RN1964		—		32.9	47	61.1	
	RN1965		—		1.54	2.2	2.86	
	RN1966		—		3.29	4.7	6.11	
Resistor ratio	RN1961~1965	R1/R2	—	—	0.9	1.0	1.1	—
	RN1965		—		0.0421	0.0468	0.0515	
	RN1966		—		0.09	0.1	0.11	

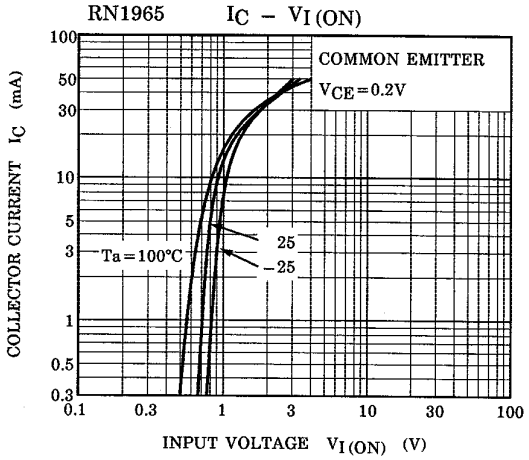
(Q1, Q2 Common)

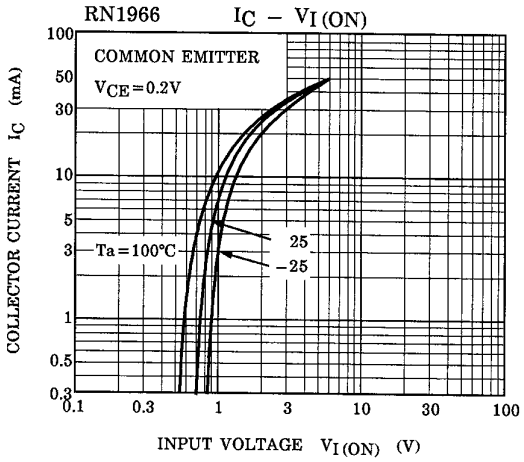






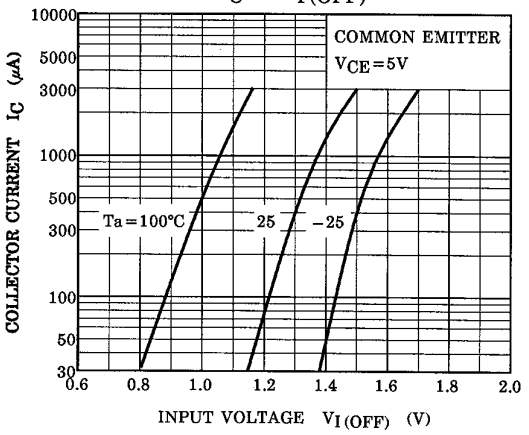




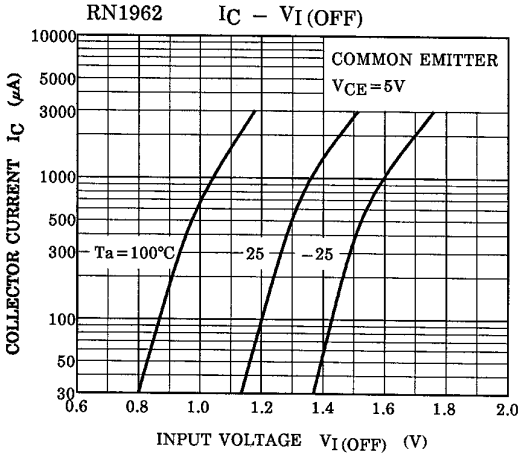


(Q1, Q2 Common)

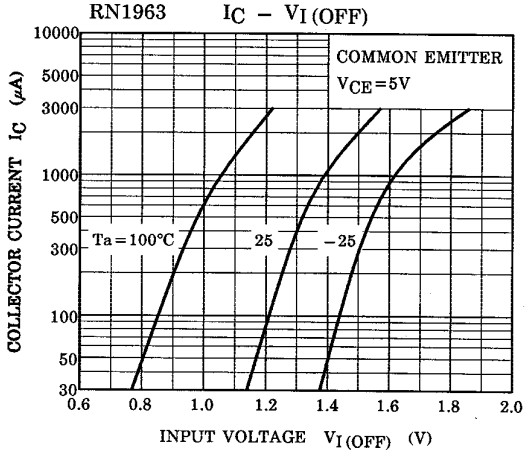
RN1961 I_C – $V_{I(OFF)}$



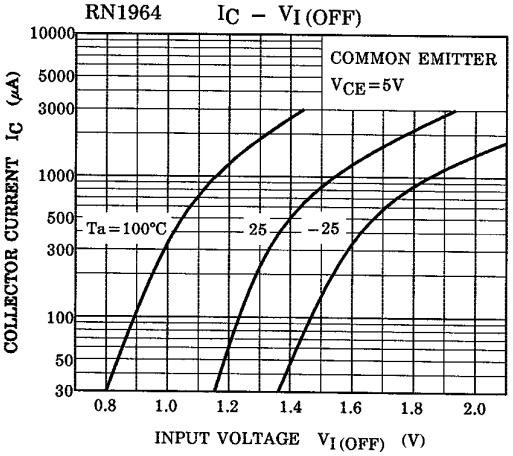
RN1962 I_C – $V_{I(OFF)}$



RN1963 I_C – $V_{I(OFF)}$



RN1964 I_C – $V_{I(OFF)}$



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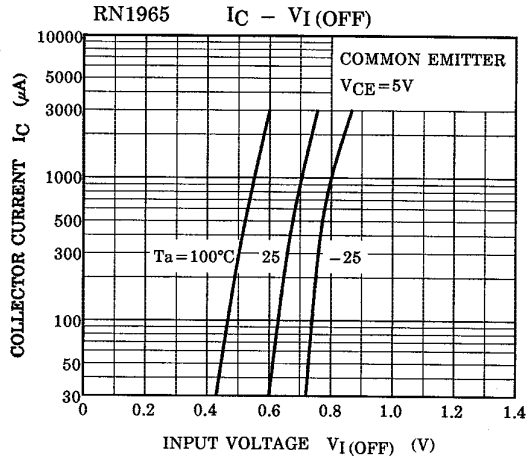
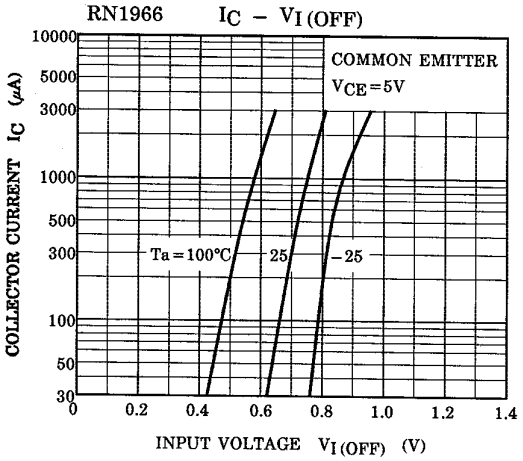
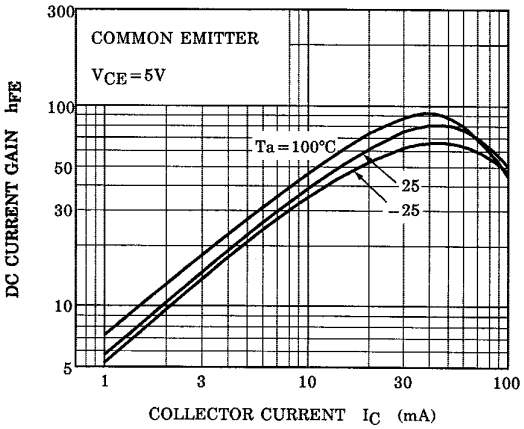


RN1966 I_C – $V_{I(OFF)}$

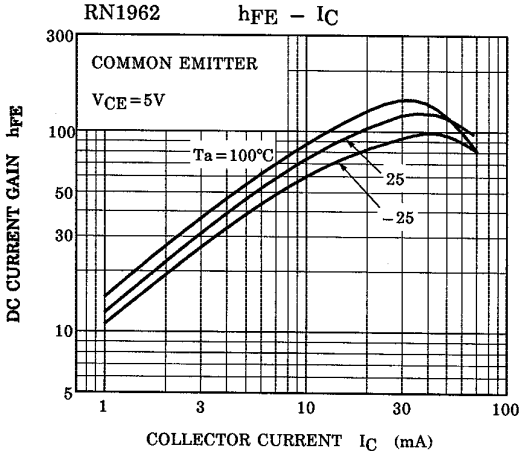


(Q1, Q2 Common)

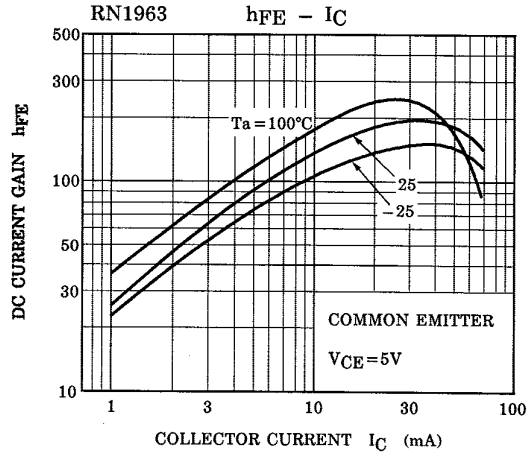
RN1961 h_{FE} – I_C



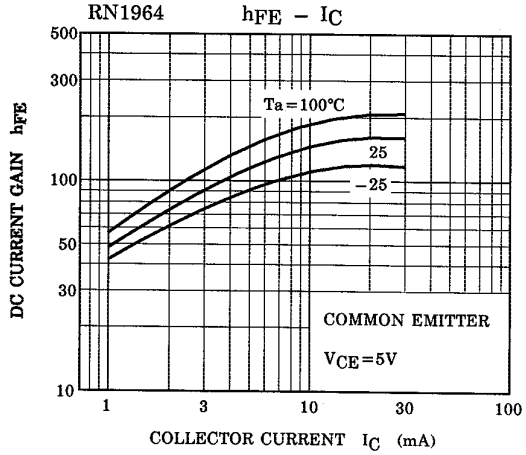
RN1962 h_{FE} – I_C



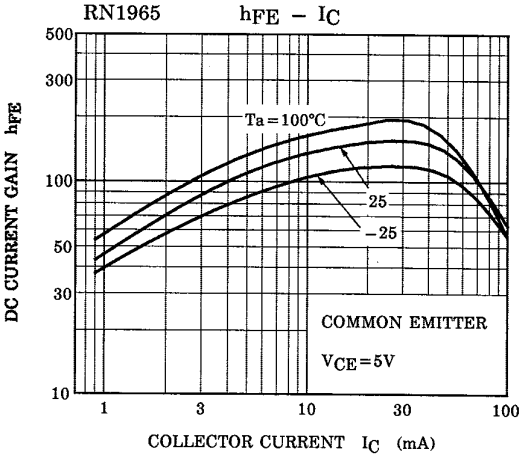
RN1963 h_{FE} – I_C



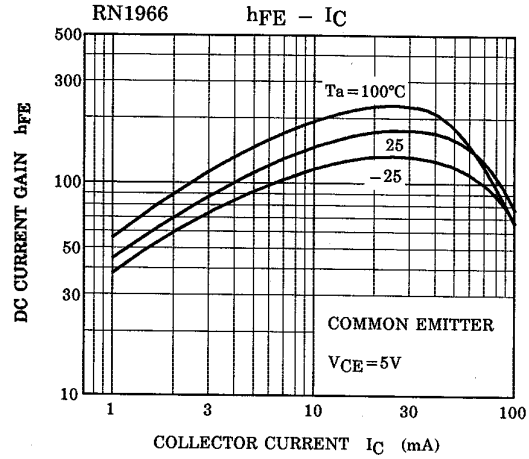
RN1964 h_{FE} – I_C

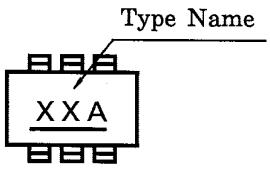
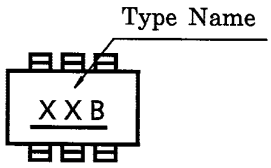
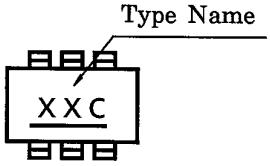
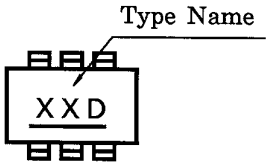
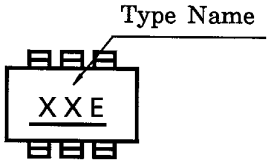
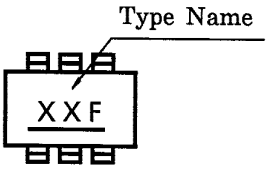


RN1965 h_{FE} – I_C



RN1966 h_{FE} – I_C



Type Name	Marking
RN1961	
RN1962	
RN1963	
RN1964	
RN1965	
RN1966	

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