

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

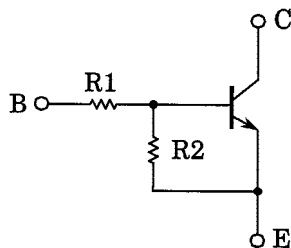
RN1961,RN1962,RN1963 RN1964,RN1965,RN1966

Switching, Inverter Circuit, Interface Circuit
And Driver Circuit Applications

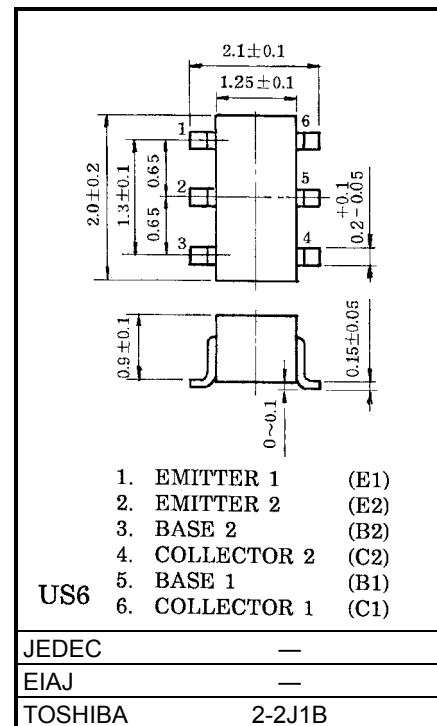
Unit: mm

- 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

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



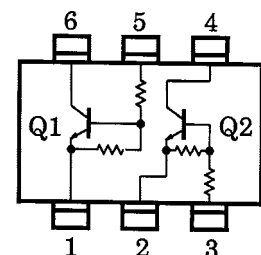
Weight: 6.8mg

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

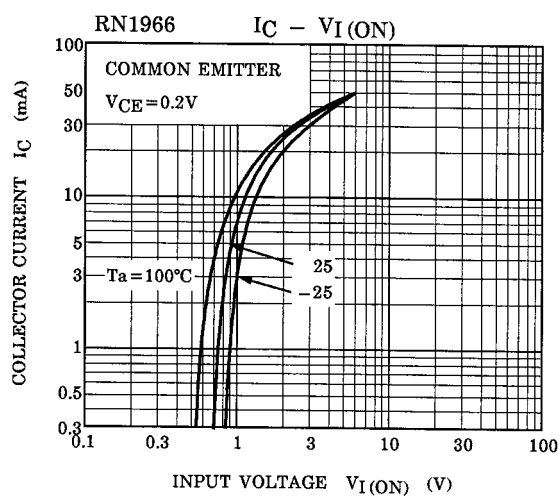
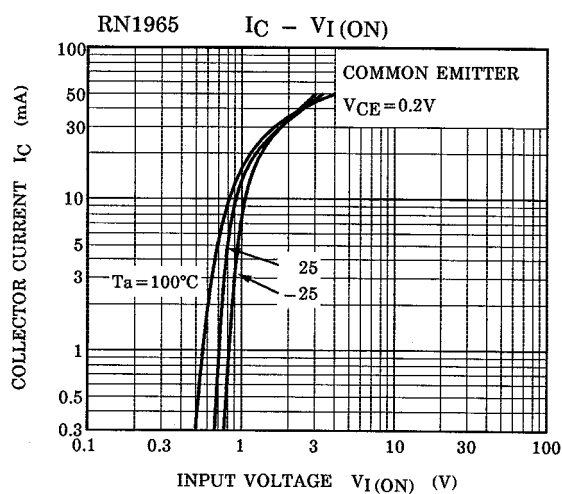
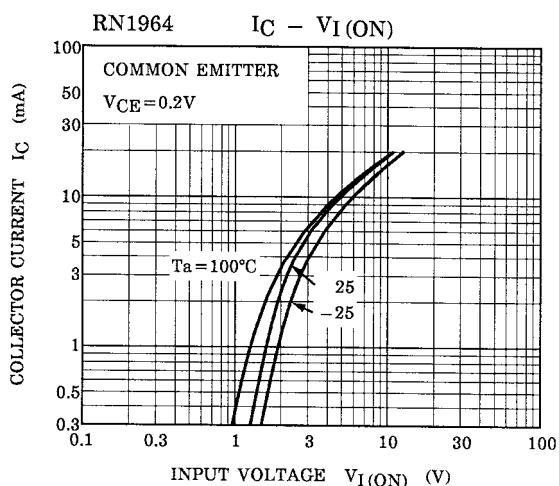
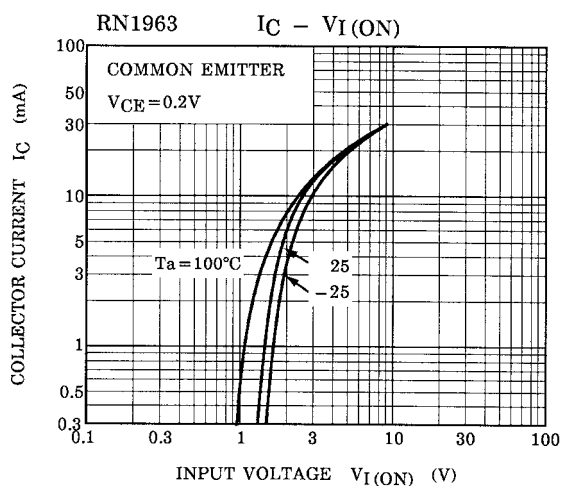
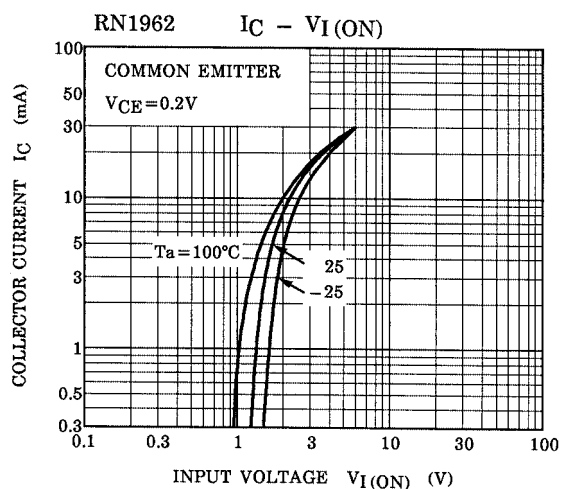
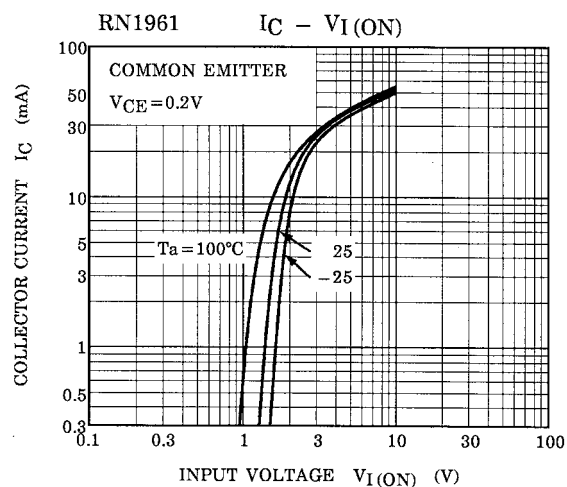
*: Total rating



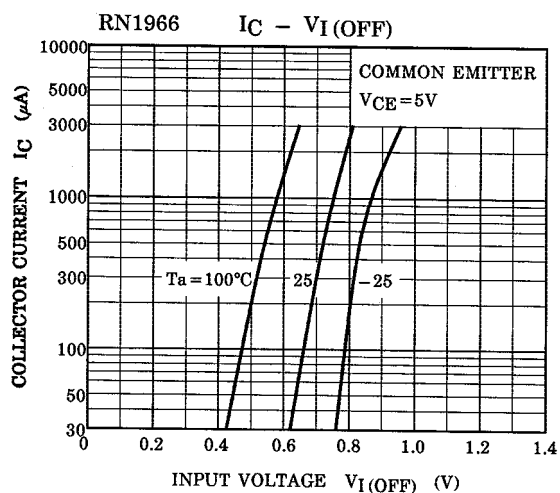
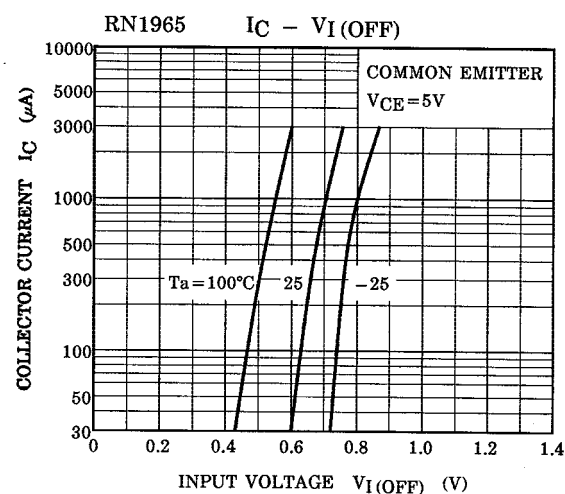
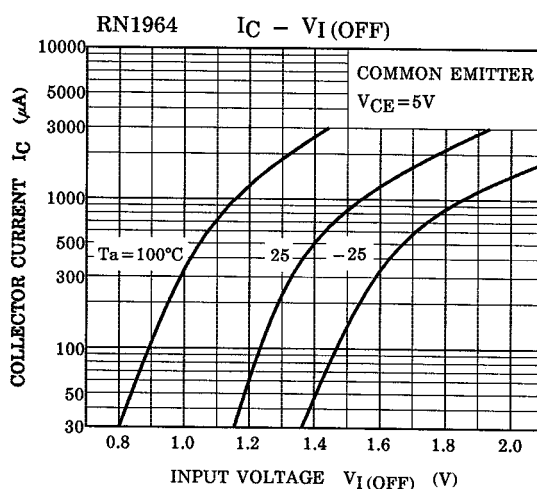
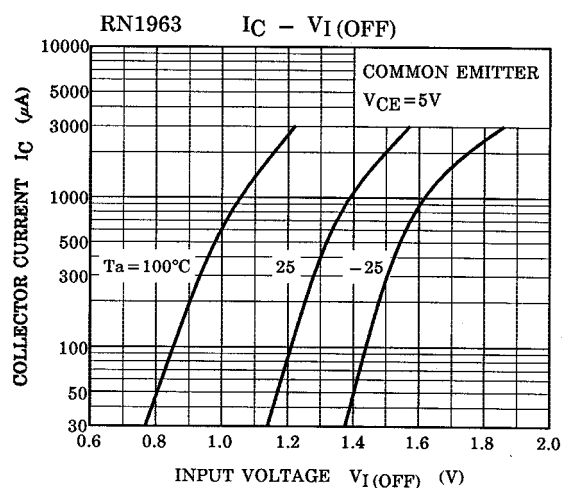
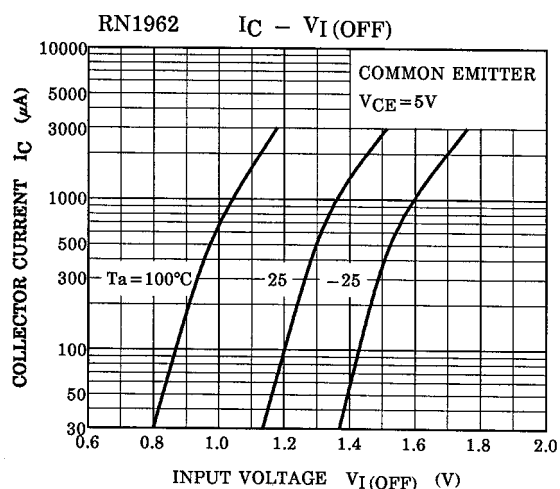
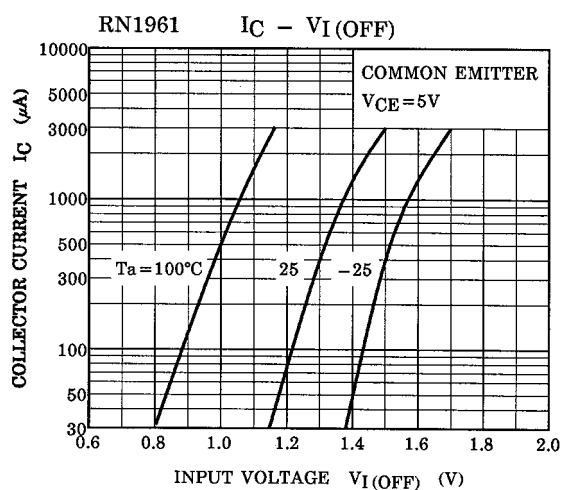
Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)

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	

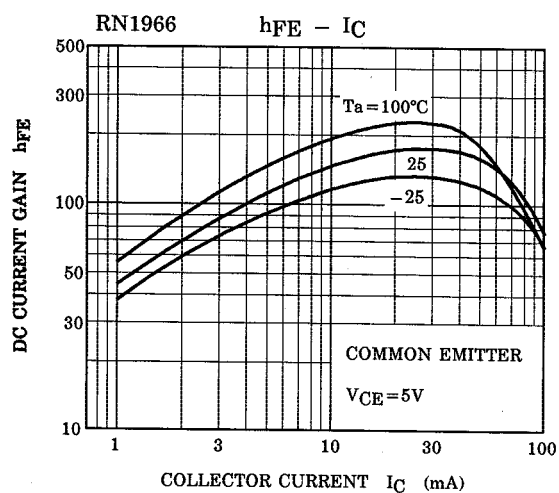
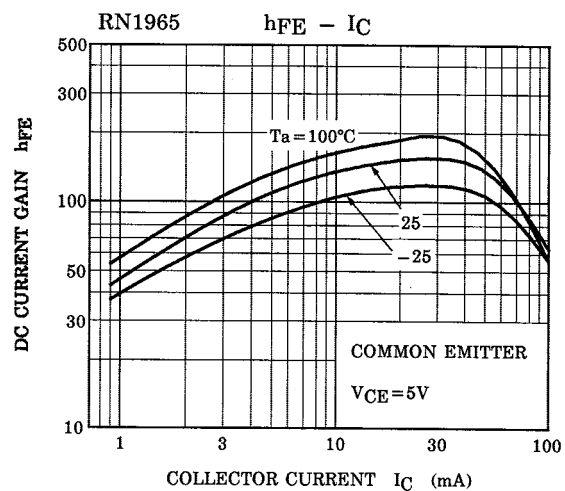
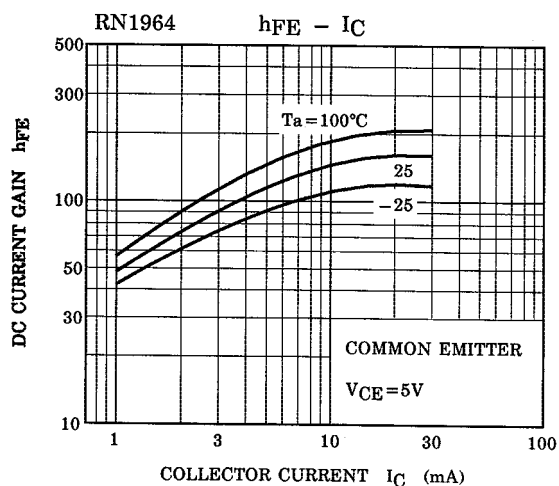
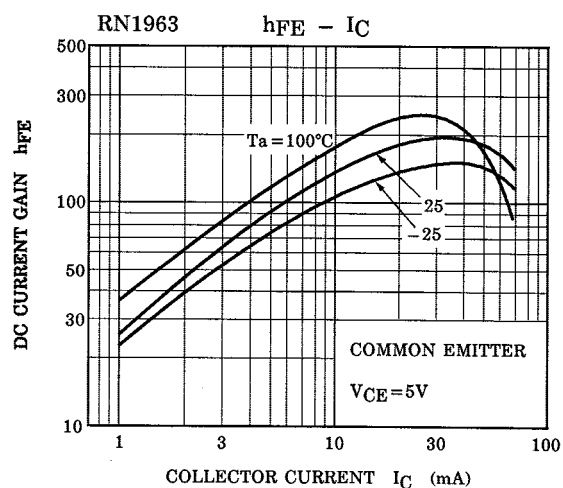
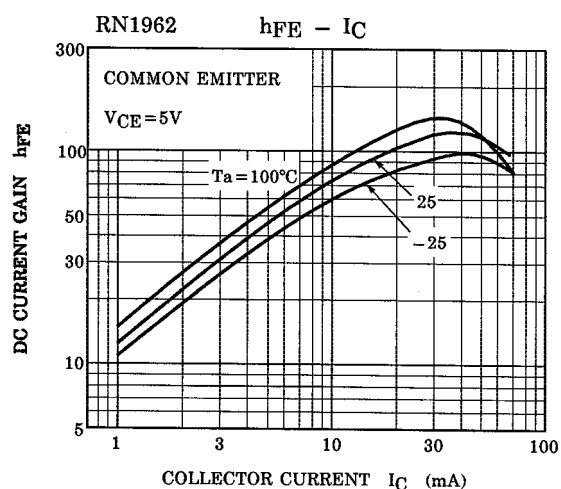
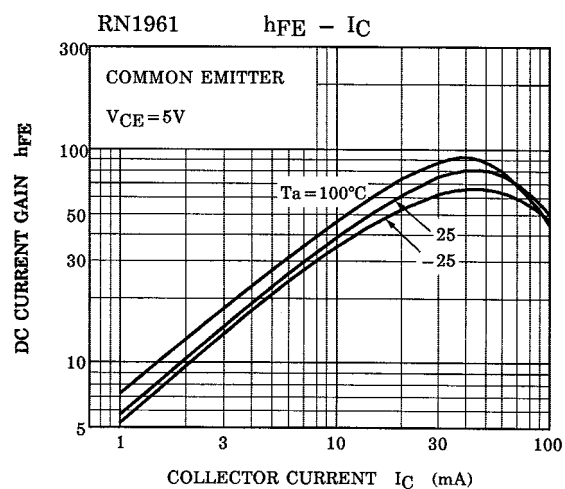
(Q1, Q2 Common)

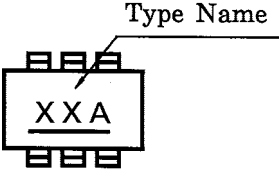
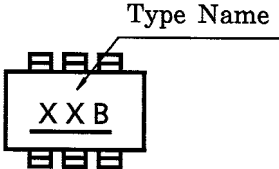
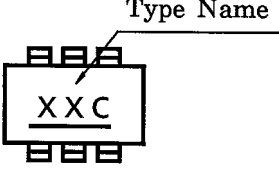
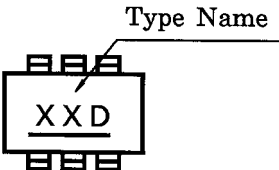
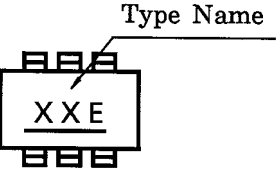
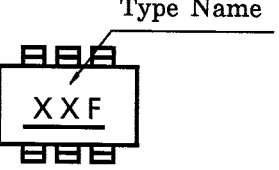


(Q1, Q2 Common)



(Q1, Q2 Common)



Type Name	Marking
RN1961	
RN1962	
RN1963	
RN1964	
RN1965	
RN1966	

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