

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL TYPE (PCT PROCESS)

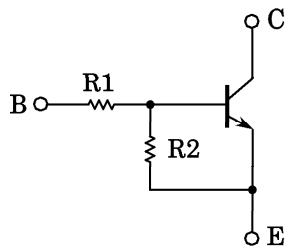
# RN1961, RN1962, RN1963, RN1964, RN1965, RN1966

SWITCHING, INVERTER CIRCUIT, INTERFACE CIRCUIT  
AND DRIVER CIRCUIT APPLICATIONS.

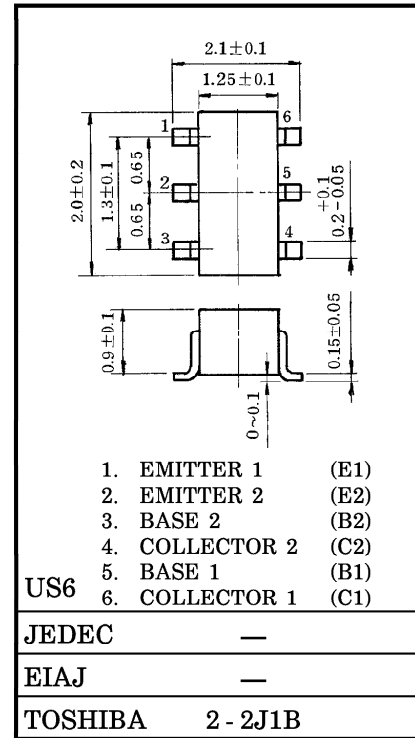
Unit in mm

- 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

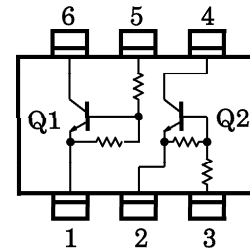


TYPE No.	R1 (kΩ)	R2 (kΩ)
RN1961	4.7	4.7
RN1962	10	10
RN1963	22	22
RN1964	47	47
RN1965	2.2	47
RN1966	4.7	47



Weight : 6.8mg

### EQUIVALENT CIRCUIT (TOP VIEW)



### MAXIMUM RATINGS (Ta = 25°C) (Q1, Q2 COMMON)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Base Voltage	RN1961~1966	VCBO	50	V
Collector-Emitter Voltage		VCEO	50	V
Emitter-Base Voltage	RN1961~1964	VEBO	10	V
	RN1965~1966		5	
Collector Current	RN1961~1966	IC	100	mA
Collector Power Dissipation		PC*	200	mW
Junction Temperature		Tj	150	°C
Storage Temperature Range		Tstg	-55~150	°C

\* : Total Rating

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● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

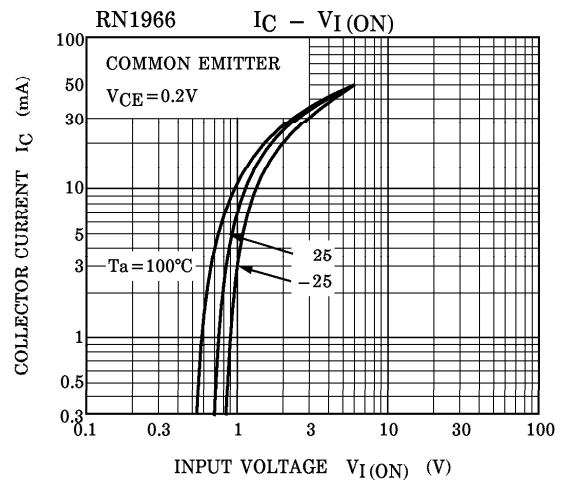
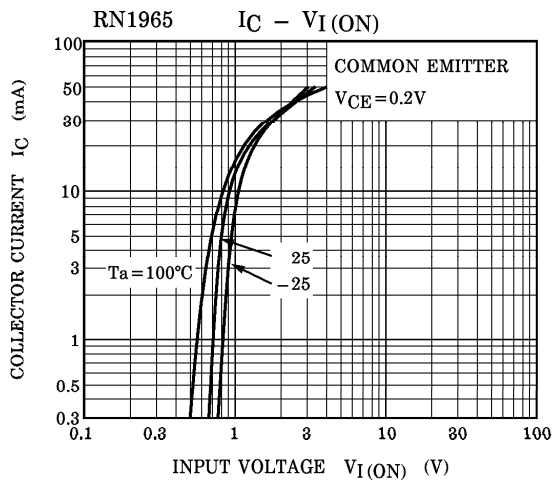
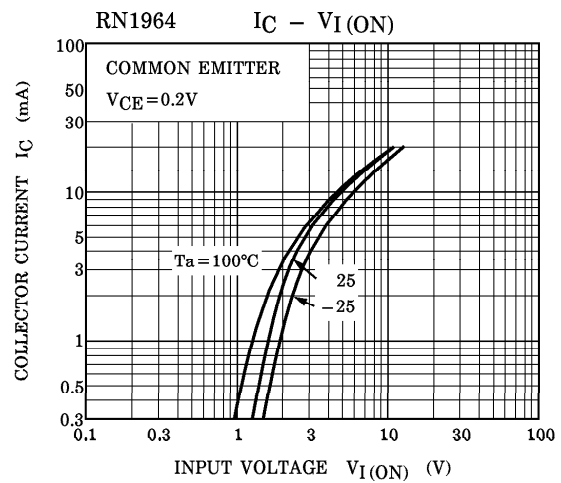
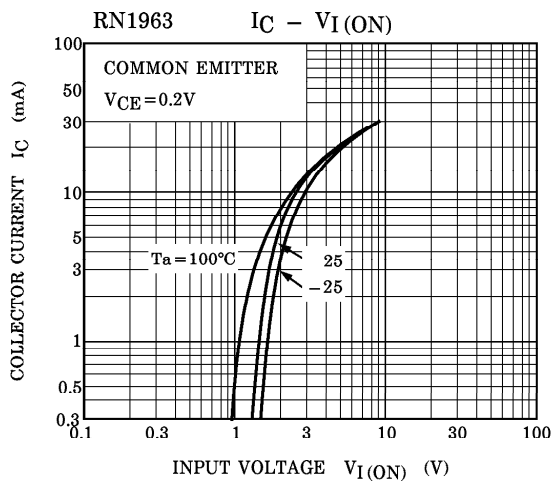
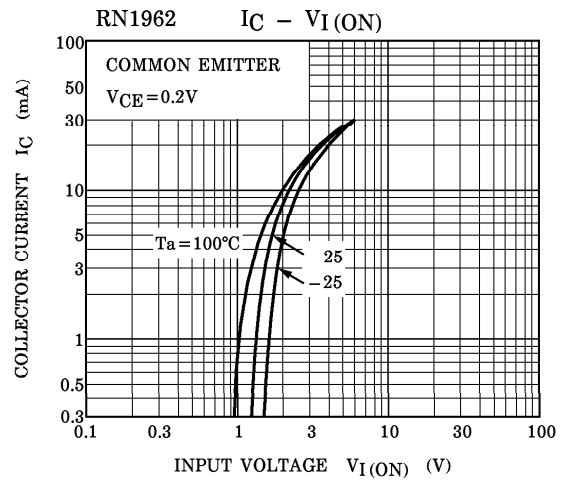
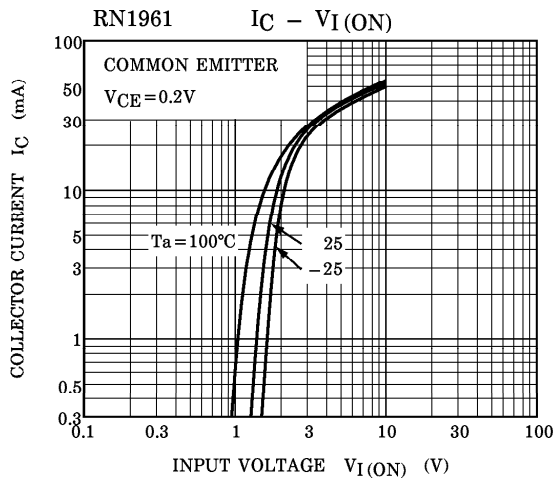
ELECTRICAL CHARACTERISTICS (Ta = 25°C) (Q1, Q2 COMMON)

CHARACTERISTIC		SYMBOL	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	
Transition 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	RN1961~1964	R1/R2	—	0.9	1.0	1.1	
	RN1965			0.0421	0.0468	0.0515	
	RN1966			0.09	0.1	0.11	

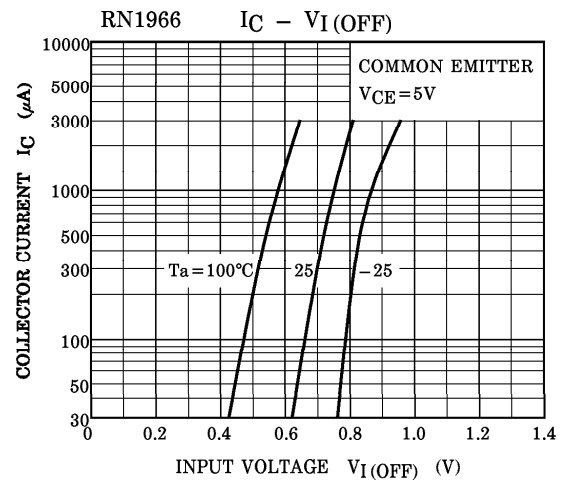
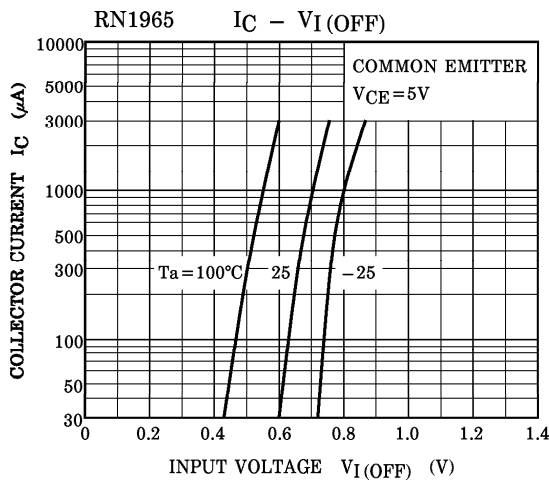
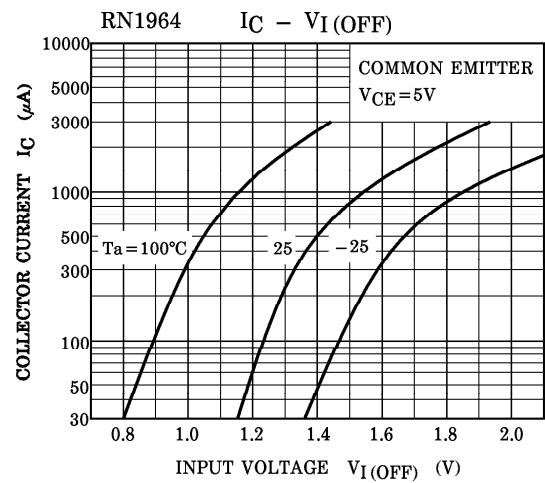
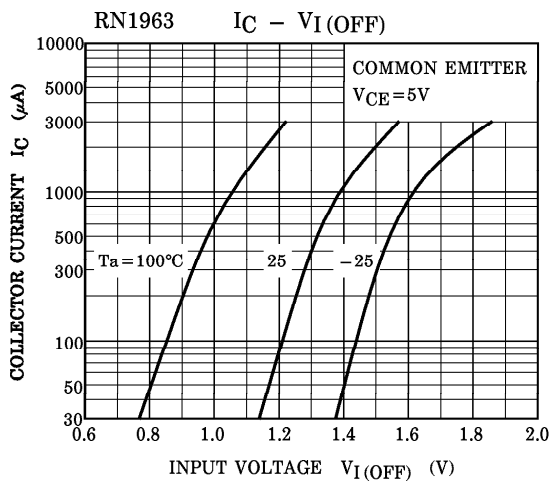
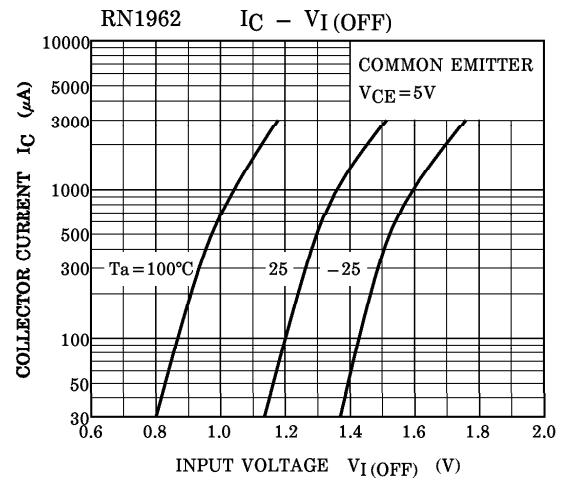
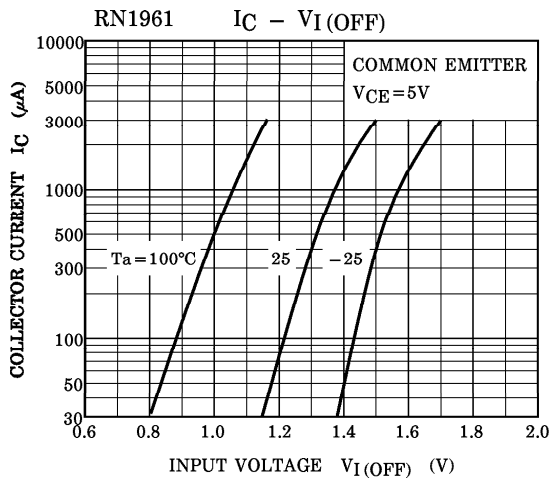
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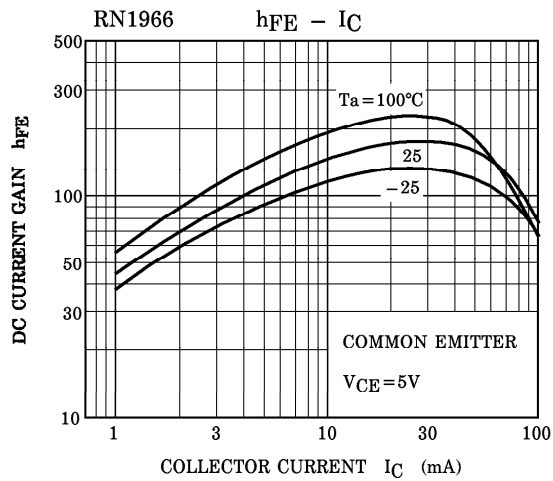
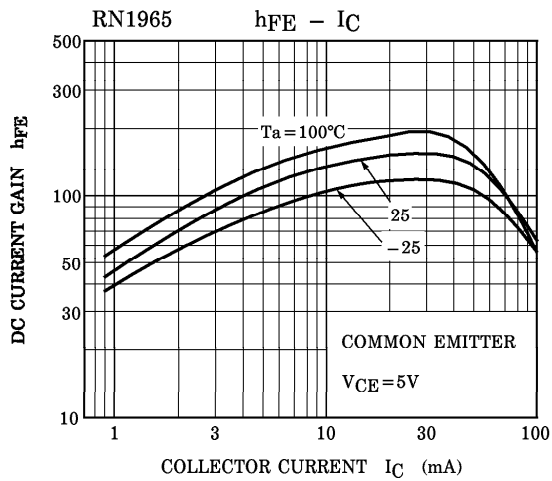
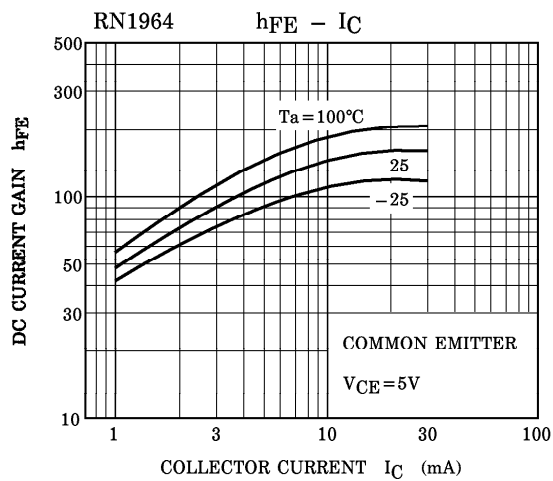
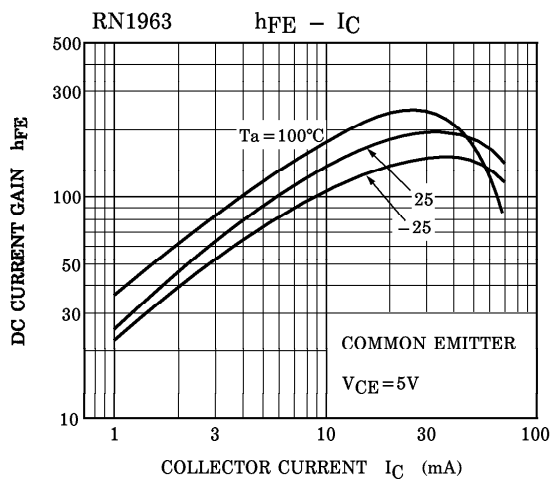
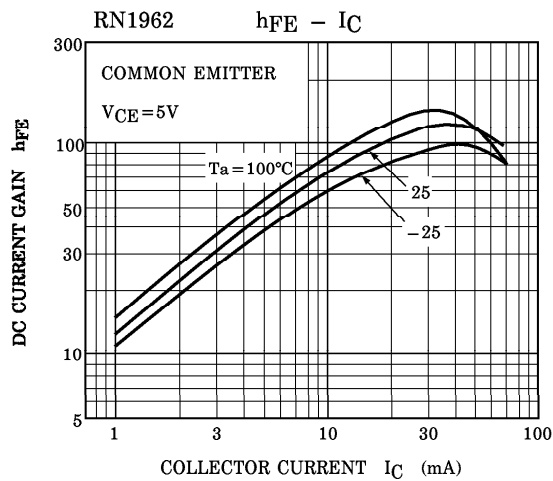
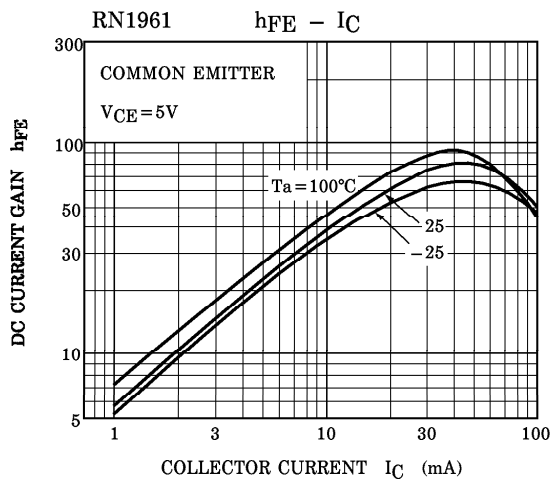
(Q1, Q2 COMMON)

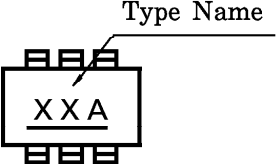
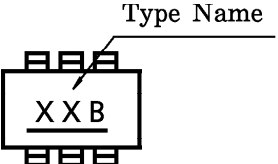
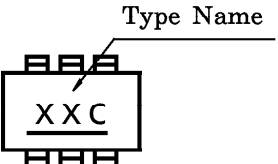
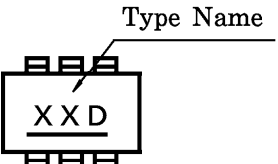
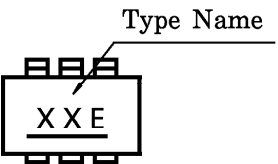


(Q1, Q2 COMMON)



(Q1, Q2 COMMON)



TYPE NAME	MARKING
RN1961	
RN1962	
RN1963	
RN1964	
RN1965	
RN1966	