

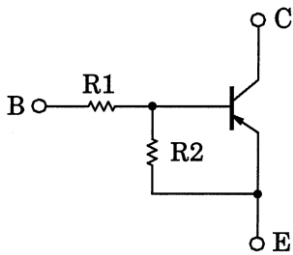
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

RN2961, RN2962, RN2963 RN2964, RN2965, RN2966

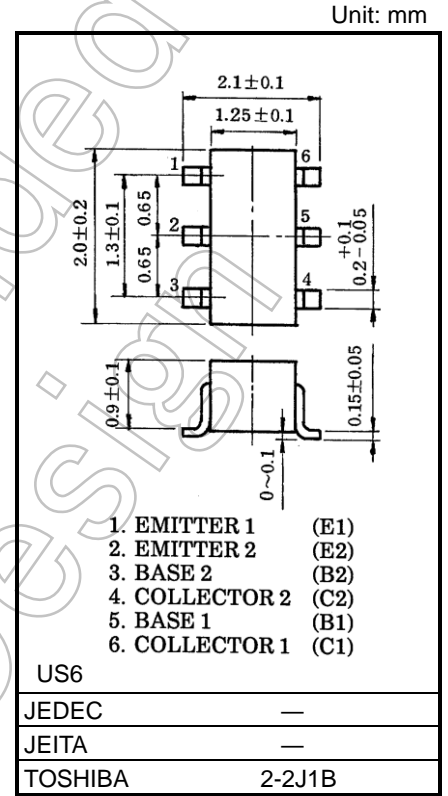
Switching, Inverter Circuit, Interface Circuit and Driver Circuit

- Including two devices in US6 (ultra super mini type with 6 leads)
- With built-in bias resistors.
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process and miniaturize equipment.
- Various resistance values are available to suit various circuit designs.
- Complementary to RN1961 to RN1966

Equivalent Circuit and Bias Resistor Values



Part No.	R1 (kΩ)	R2 (kΩ)
RN2961	4.7	4.7
RN2962	10	10
RN2963	22	22
RN2964	47	47
RN2965	2.2	47
RN2966	4.7	47



US6

JEDEC —

JEITA —

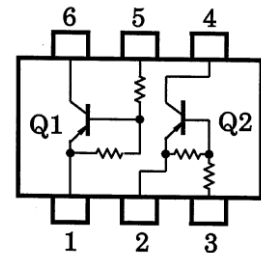
TOSHIBA 2-2J1B

Weight: 6.8mg (typ.)

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

Characteristic	Symbol	Rating	Unit
Collector-base voltage	VCBO	-50	V
Collector-emitter voltage	VCEO	-50	V
Emitter-base voltage	VEBO	-10	V
		-5	
Collector current	IC	-100	mA
Collector power dissipation	PC *	200	mW
Junction temperature	Tj	150	°C
Storage temperature range	Tstg	-55 to 150	°C

Equivalent Circuit (Top View)



Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

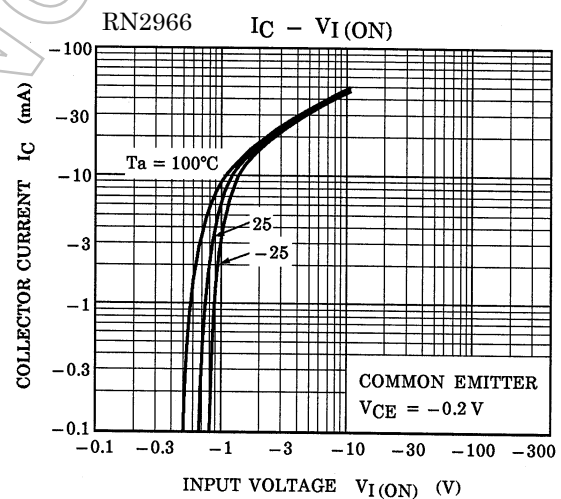
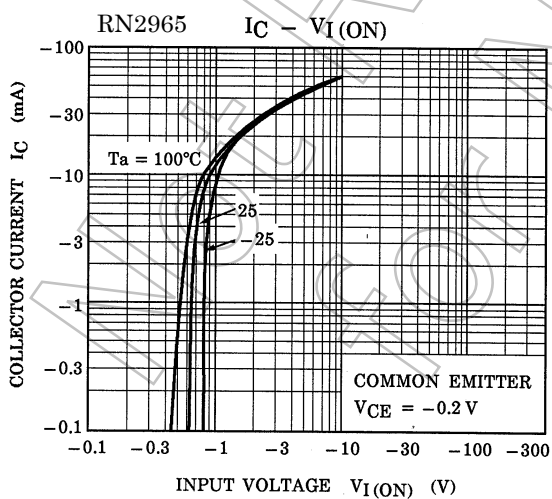
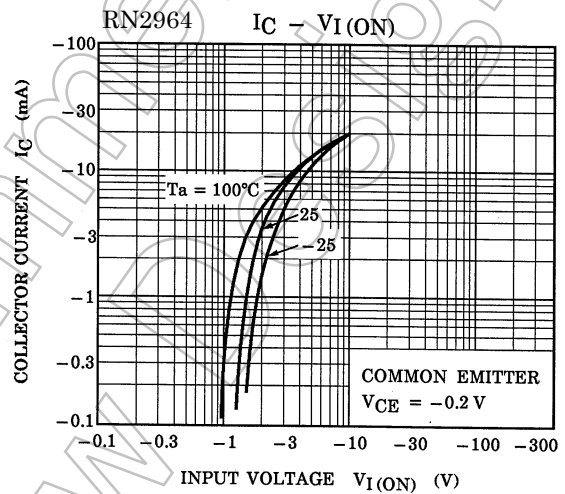
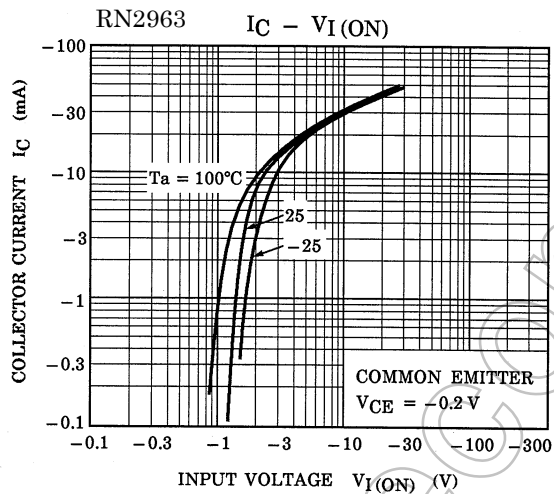
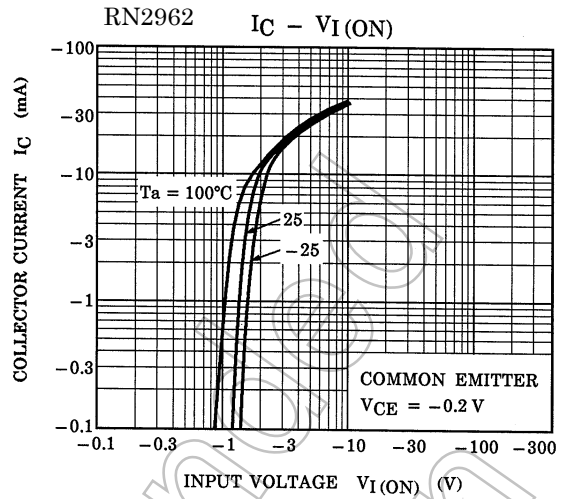
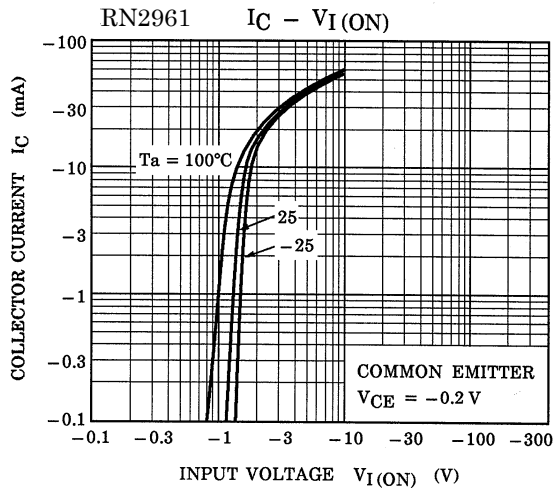
*: Total rating

Start of commercial production
1998-02

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

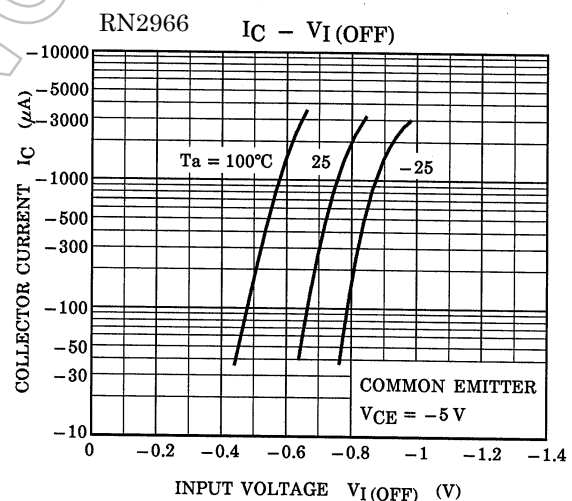
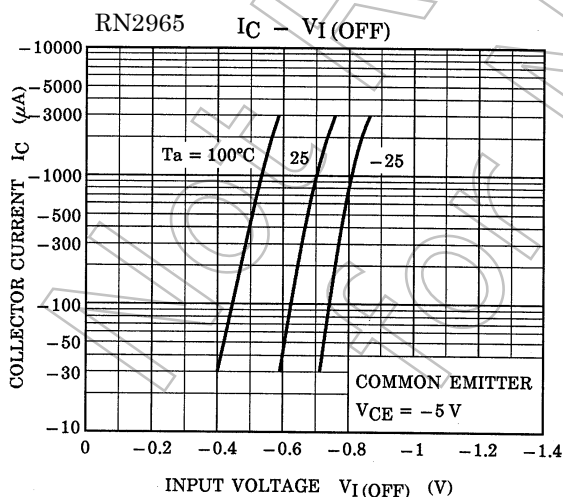
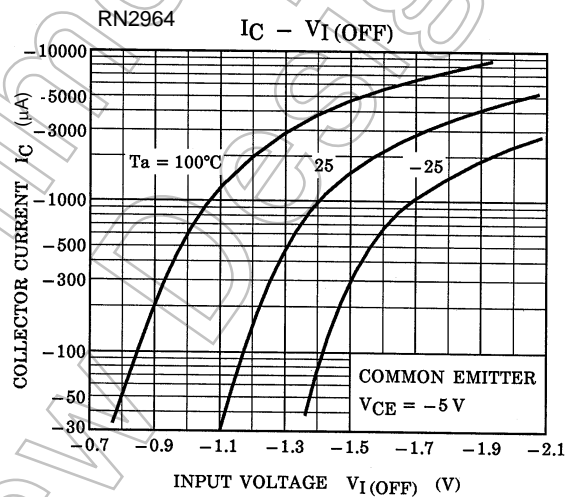
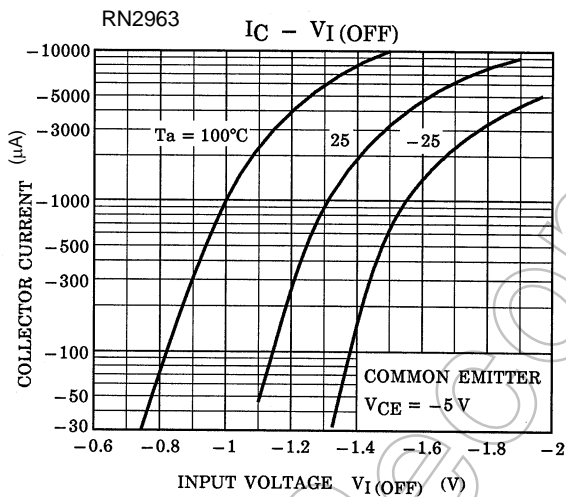
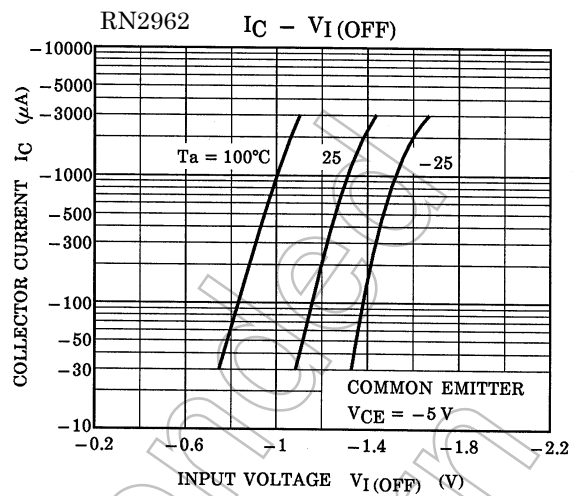
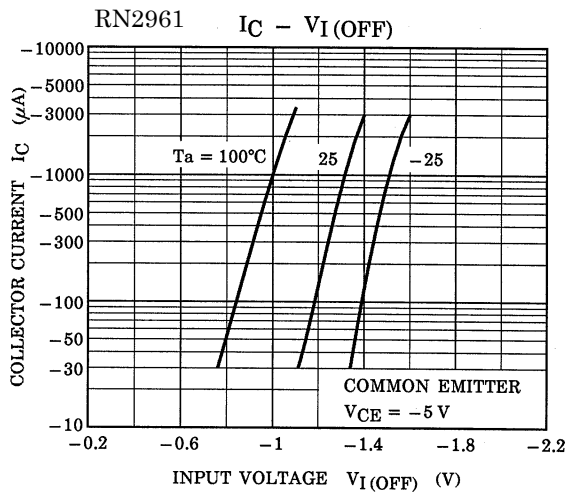
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2961 to 2966	ICBO	V _{CB} = -50 V, I _E = 0 mA	—	—	-100	nA
		ICEO	V _{CE} = -50 V, I _B = 0 mA	—	—	-500	
Emitter cut-off current	RN2961	I _{EBO}	V _{EB} = -10 V, I _C = 0 mA	-0.82	—	-1.52	mA
	RN2962			-0.38	—	-0.71	
	RN2963			-0.17	—	-0.33	
	RN2964		-0.082	—	-0.15		
	RN2965		V _{EB} = -5 V, I _C = 0 mA	-0.078	—	-0.145	
	RN2966			-0.074	—	-0.138	
DC current gain	RN2961	h _{FE}	V _{CE} = -5 V, I _C = -10 mA	30	—	—	—
	RN2962			50	—	—	
	RN2963			70	—	—	
	RN2964			80	—	—	
	RN2965			80	—	—	
	RN2966			80	—	—	
Collector-emitter saturation voltage	RN2961 to 2966	V _{CE (sat)}	I _C = -5 mA, I _B = -0.25 mA	—	-0.1	-0.3	V
Input voltage (ON)	RN2961	V _{I (ON)}	V _{CE} = -0.2 V, I _C = -5 mA	-1.1	—	-2.0	V
	RN2962			-1.2	—	-2.4	
	RN2963			-1.3	—	-3.0	
	RN2964			-1.5	—	-5.0	
	RN2965			-0.6	—	-1.1	
	RN2966			-0.7	—	-1.3	
Input voltage (OFF)	RN2961 to 2964	V _{I (OFF)}	V _{CE} = -5 V, I _C = -0.1 mA	-1.0	—	-1.5	V
	RN2965, 2966			-0.5	—	-0.8	
Transition frequency	RN2961 to 2966	f _T	V _{CE} = -10 V, I _C = -5 mA	—	200	—	MHz
Collector output capacitance	RN2961 to 2966	C _{ob}	V _{CB} = -10 V, I _E = 0 mA f = 1 MHz	—	3	6	pF
Input resistor	RN2961	R ₁	—	3.29	4.7	6.11	kΩ
	RN2962			7	10	13	
	RN2963			15.4	22	28.6	
	RN2964			32.9	47	61.1	
	RN2965			1.54	2.2	2.86	
	RN2966			3.29	4.7	6.11	
Resistor ratio	RN2961 to 2964	R _{1/R2}	—	0.9	1.0	1.1	—
	RN2965			0.0421	0.0468	0.0515	
	RN2966			0.09	0.1	0.11	

Characteristics Curves (Q1, Q2 Common)



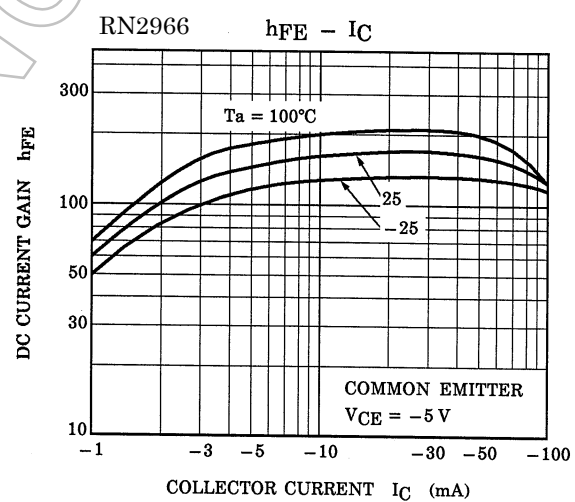
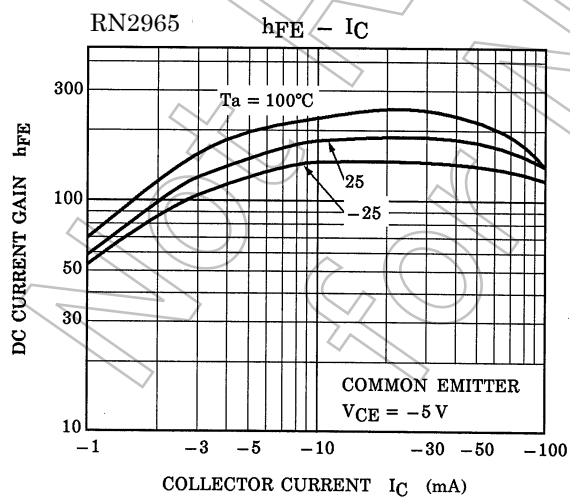
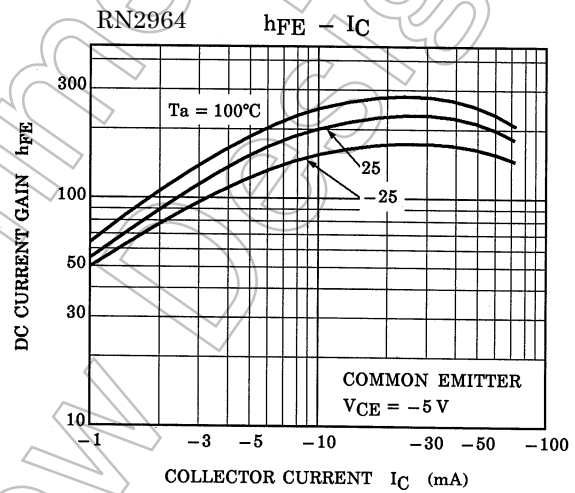
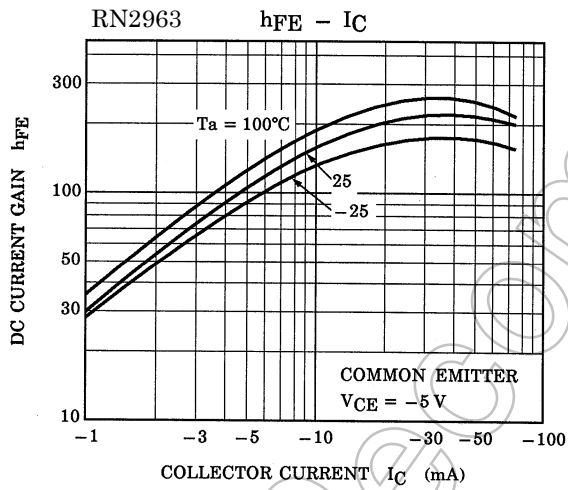
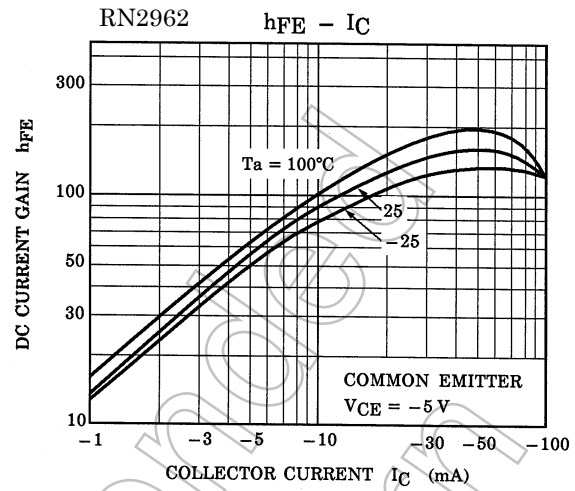
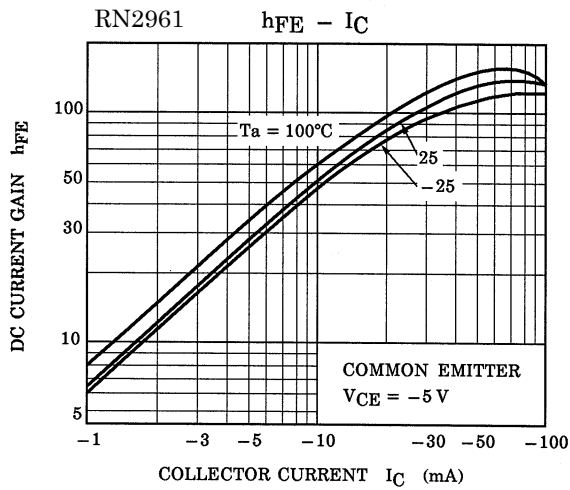
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Characteristics Curves (Q1, Q2 Common)



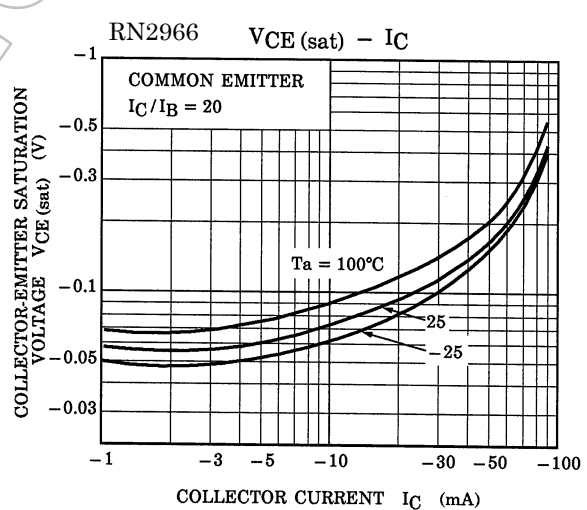
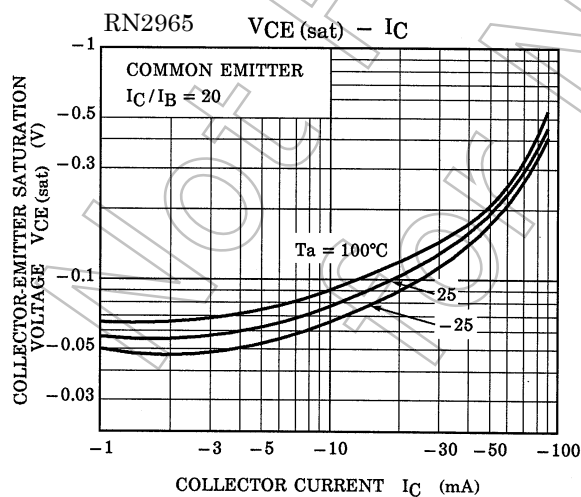
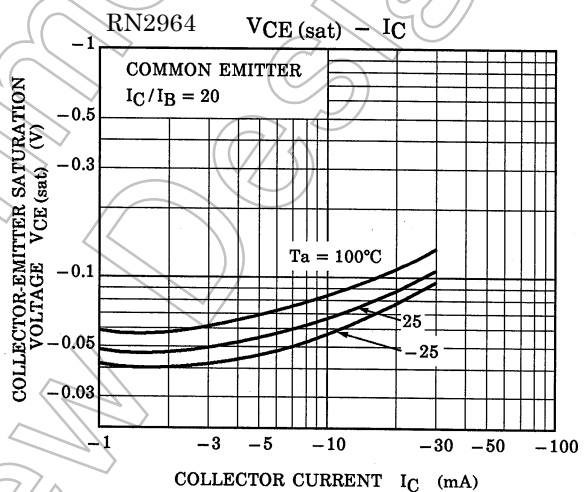
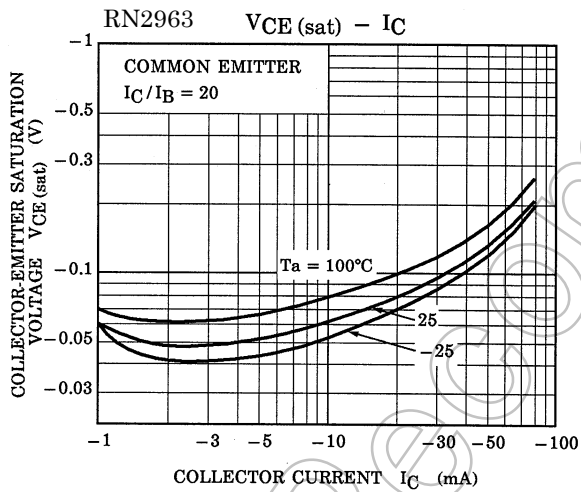
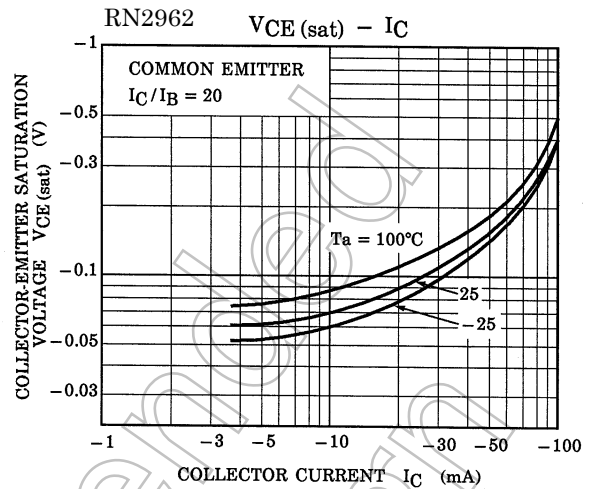
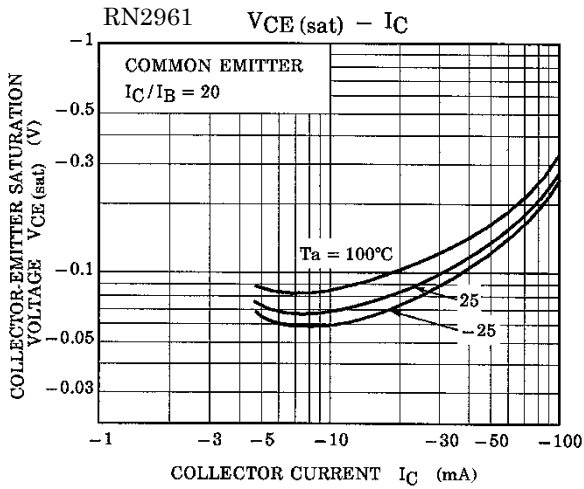
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Characteristics Curves (Q1, Q2 Common)




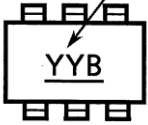
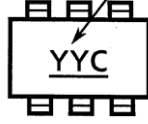
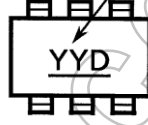

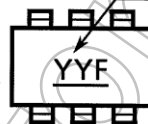
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Characteristics Curves (Q1, Q2 Common)



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Marking

Part No.	Marking
RN2961	<p>Part No.(abbreviation code)</p> 
RN2962	<p>Part No.(abbreviation code)</p> 
RN2963	<p>Part No.(abbreviation code)</p> 
RN2964	<p>Part No.(abbreviation code)</p> 
RN2965	<p>Part No.(abbreviation code)</p> 
RN2966	<p>Part No.(abbreviation code)</p> 

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