

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

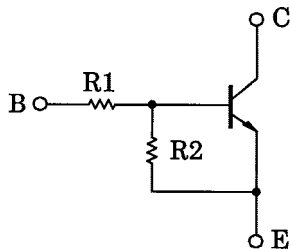
## RN1301,RN1302,RN1303 RN1304,RN1305,RN1306

Switching, Inverter Circuit, Interface Circuit  
And Driver Circuit Applications

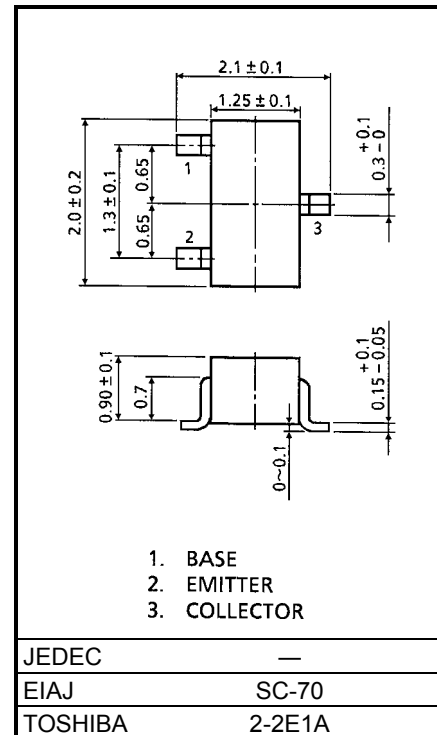
Unit: mm

- With built-in bias resistors.
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2301~RN2306

### Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1301	4.7	4.7
RN1302	10	10
RN1303	22	22
RN1304	47	47
RN1305	2.2	47
RN1306	4.7	47



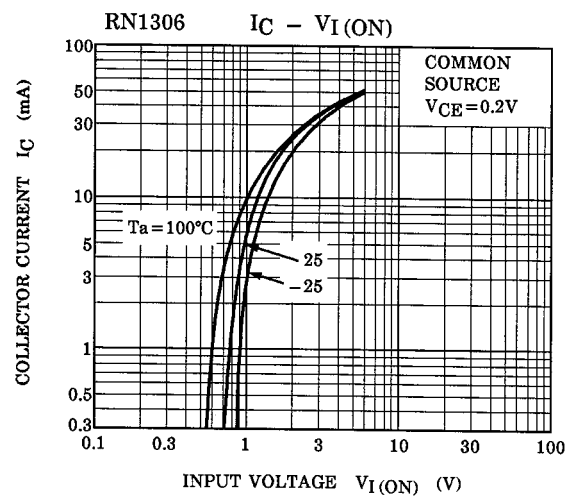
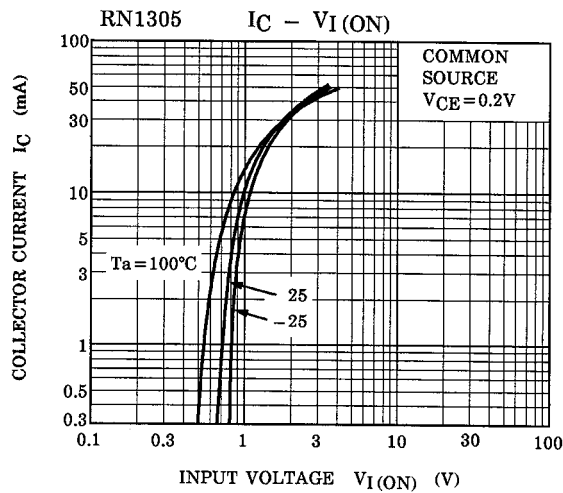
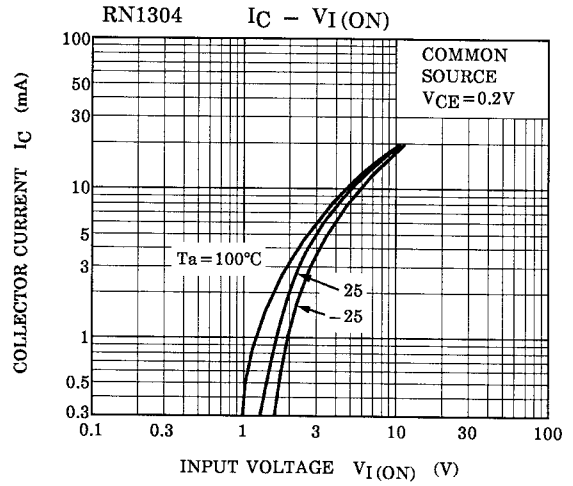
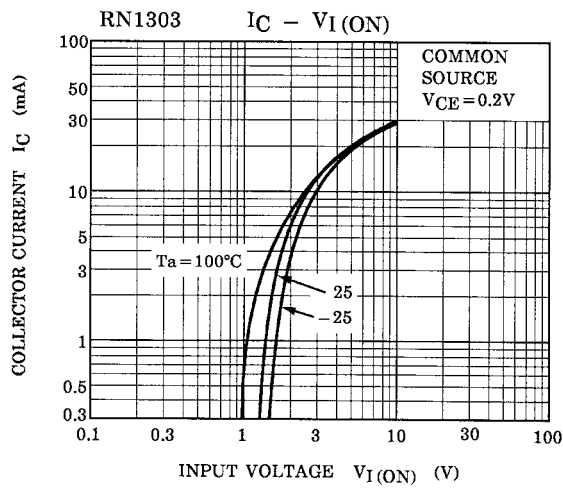
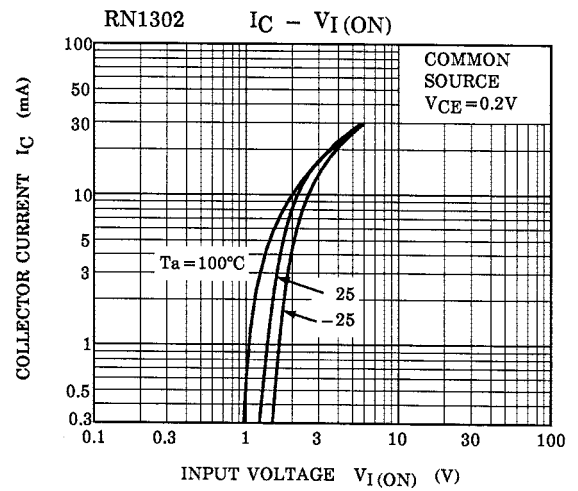
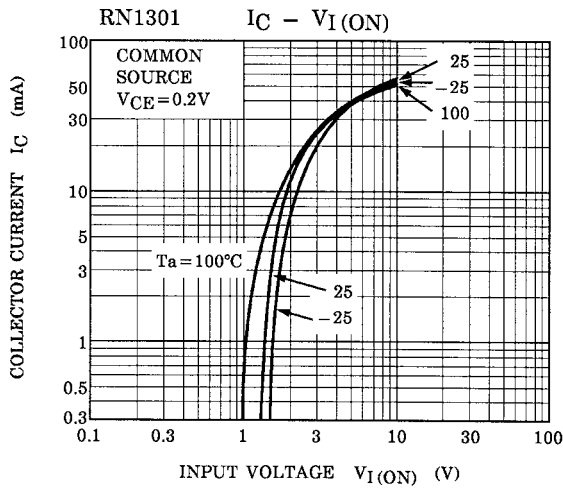
Weight: 0.006g

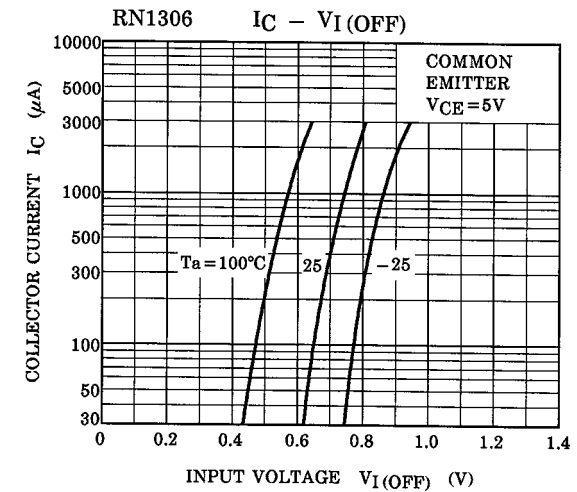
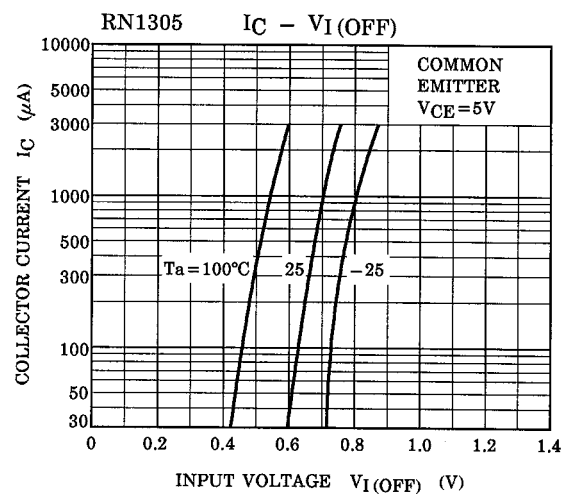
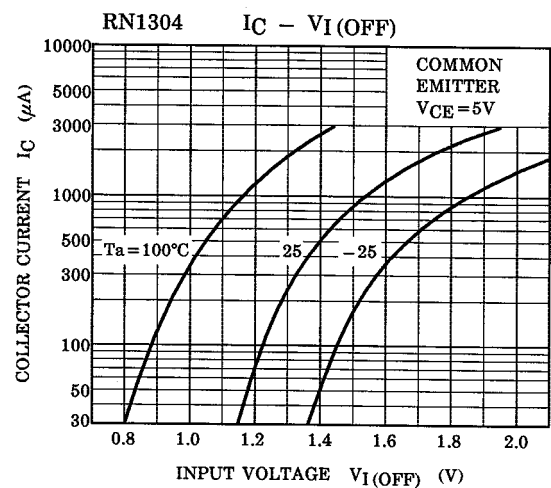
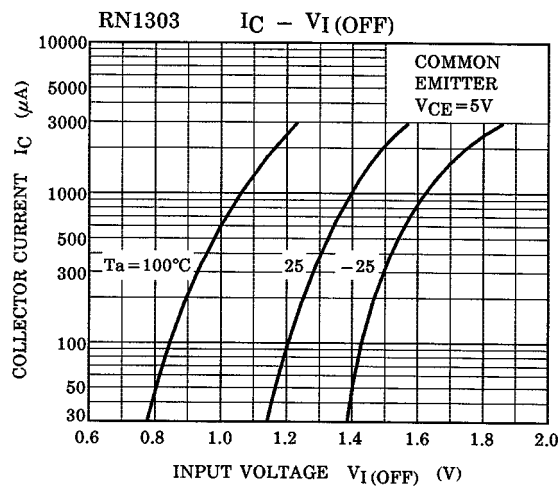
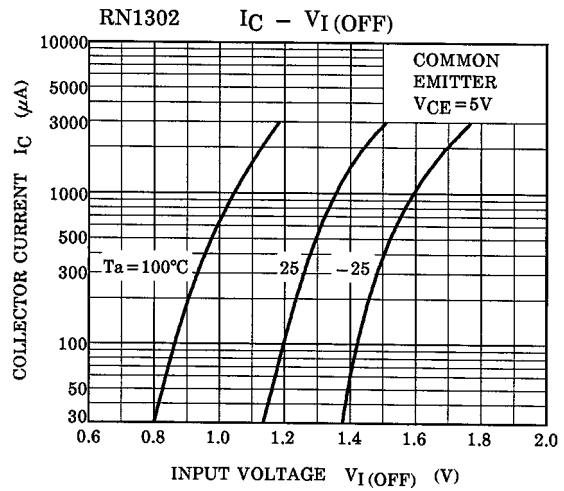
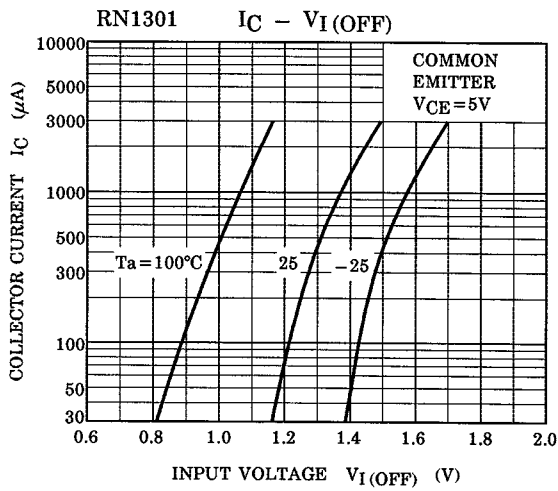
### Maximum Ratings (Ta = 25°C)

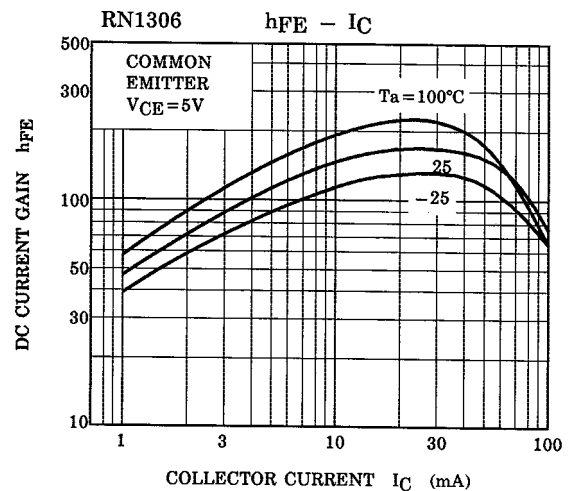
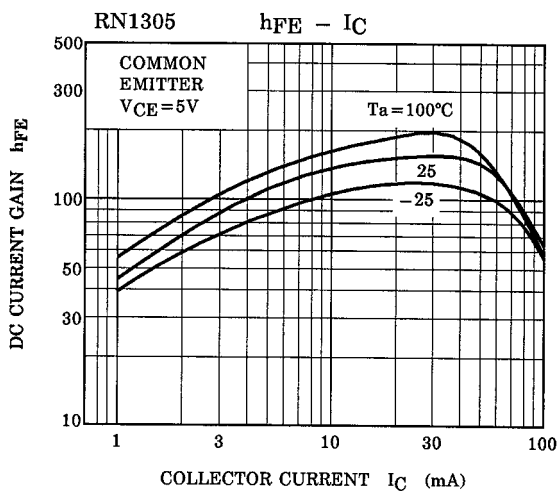
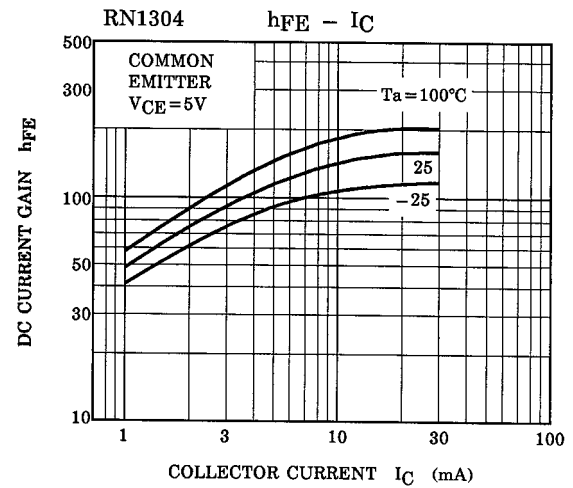
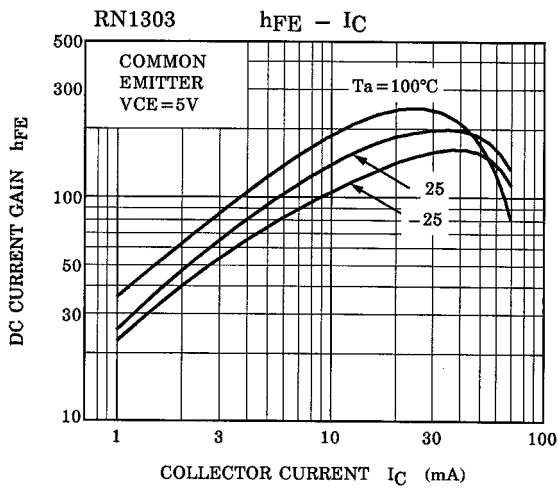
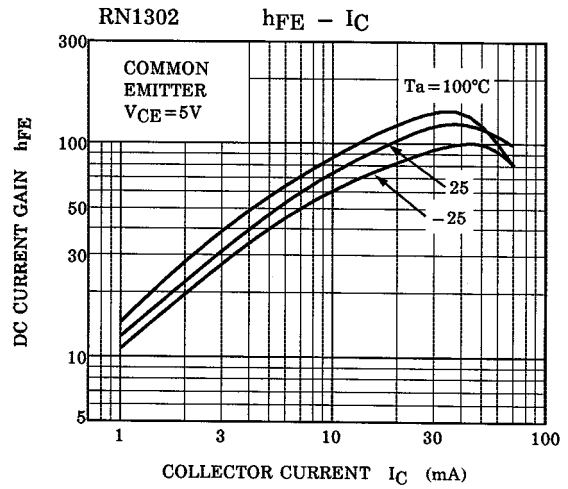
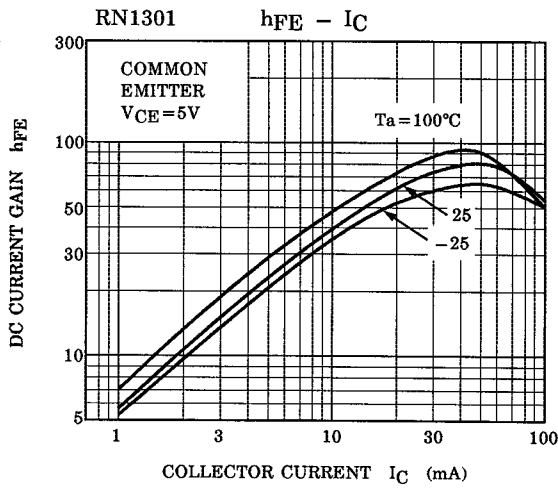
Characteristic	Symbol	Rating	Unit	
Collector-base voltage	RN1301~1306	$V_{CB0}$	50	V
Collector-emitter voltage		$V_{CE0}$	50	V
Emitter-base voltage	RN1301~1304	$V_{EB0}$	10	V
	RN1305, 1306		5	
Collector current	RN1301~1306	$I_c$	100	mA
Collector power dissipation		$P_c$	100	mW
Junction temperature		$T_j$	150	°C
Storage temperature range		$T_{stg}$	-55~150	°C

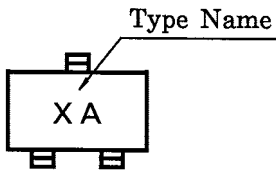
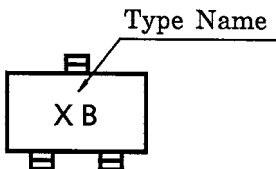
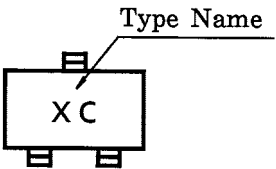
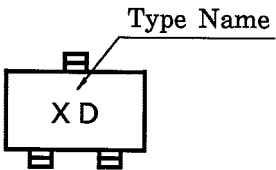
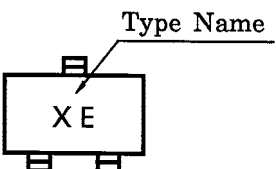
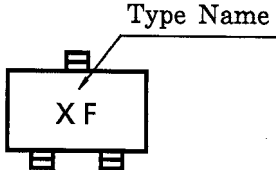
## Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1301~1306	$I_{CBO}$	—	$V_{CB} = 50V, I_E = 0$	—	—	100	nA
		$I_{CEO}$	—	$V_{CE} = 50V, I_B = 0$	—	—	500	
Emitter cut-off current	RN1301	$I_{EBO}$	—	$V_{EB} = 10V, I_C = 0$	0.82	—	1.52	mA
	RN1302		—		0.38	—	0.71	
	RN1303		—		0.17	—	0.33	
	RN1304		—	0.082	—	0.15		
	RN1305		—	$V_{EB} = 5V, I_C = 0$	0.078	—	0.145	
	RN1306		—		0.074	—	0.138	
DC current gain	RN1301	$h_{FE}$	—	$V_{CE} = 5V, I_C = 10mA$	30	—	—	—
	RN1302		—		50	—	—	
	RN1303		—		70	—	—	
	RN1304		—		80	—	—	
	RN1305		—		80	—	—	
	RN1306		—		80	—	—	
Collector-emitter saturation voltage	RN1301~1306	$V_{CE(sat)}$	—	$I_C = 5mA, I_B = 0.25mA$	—	0.1	0.3	V
Input voltage (ON)	RN1301	$V_{I(ON)}$	—	$V_{CE} = 0.2V, I_C = 5mA$	1.1	—	2.0	V
	RN1302		—		1.2	—	2.4	
	RN1303		—		1.3	—	3.0	
	RN1304		—		1.5	—	5.0	
	RN1305		—		0.6	—	1.1	
	RN1306		—		0.7	—	1.3	
Input voltage (OFF)	RN1301~1304	$V_{I(OFF)}$	—	$V_{CE} = 5V, I_C = 0.1mA$	1.0	—	1.5	V
	RN1305, 1306		—		0.5	—	0.8	
Translation frequency	RN1301~1306	$f_T$	—	$V_{CE} = 10V, I_C = 5mA$	—	250	—	MHz
Collector output capacitance	RN1301~1306	$C_{ob}$	—	$V_{CB} = 10V, I_E = 0, f = 1MHz$	—	3	6	pF
Input resistor	RN1301	R1	—	—	3.29	4.7	6.11	kΩ
	RN1302		—		7	10	13	
	RN1303		—		15.4	22	28.6	
	RN1304		—		32.9	47	61.1	
	RN1305		—		1.54	2.2	2.86	
	RN1306		—		3.29	4.7	6.11	
Resistor ratio	RN1301~1305	R1/R2	—	—	0.9	1.0	1.1	—
	RN1305		—		0.0421	0.0468	0.0515	
	RN1306		—		0.09	0.1	0.11	







Type Name	Marking
RN1301	
RN1302	
RN1303	
RN1304	
RN1305	
RN1306	

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000707EAA

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