

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

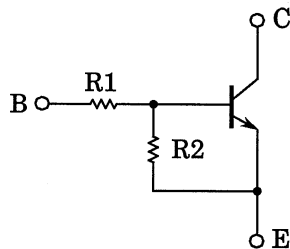
RN1501, RN1502, RN1503 RN1504, RN1505, RN1506

Unit: mm

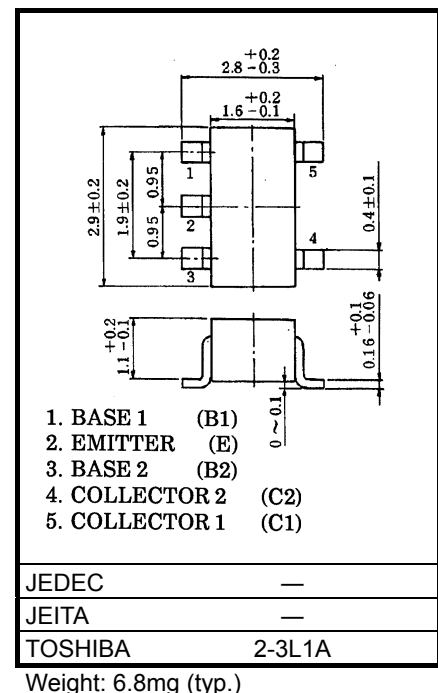
Switching, Inverter Circuit, Interface Circuit
and Driver Circuit Applications

- Including two devices in SMV (super mini type with 5 leads)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2501~RN2506

Equivalent Circuit and Bias Resister Values



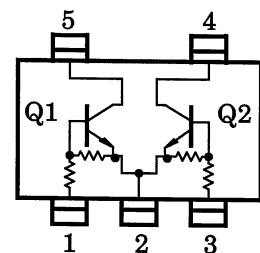
Type No.	R1 (kΩ)	R2 (kΩ)
RN1501	4.7	4.7
RN1502	10	10
RN1503	22	22
RN1504	47	47
RN1505	2.2	47
RN1506	4.7	47



Equivalent Circuit (Top View)

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

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	10	V
		5	V
Collector current	I_C	100	mA
Collector power dissipation	P_C *	300	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	-55~150	°C



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.

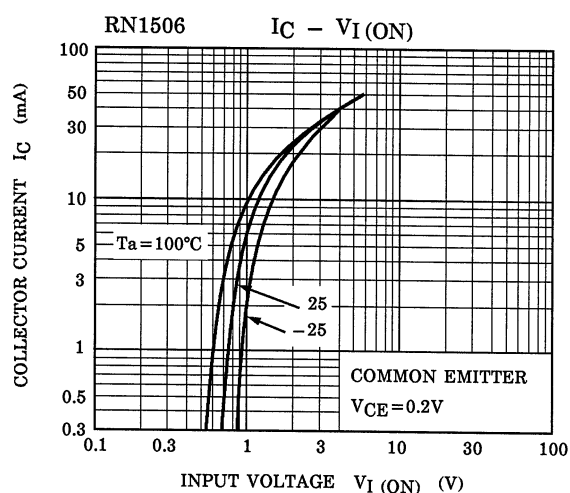
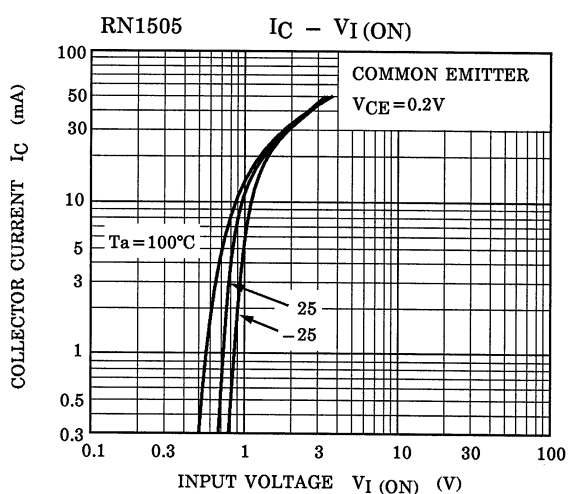
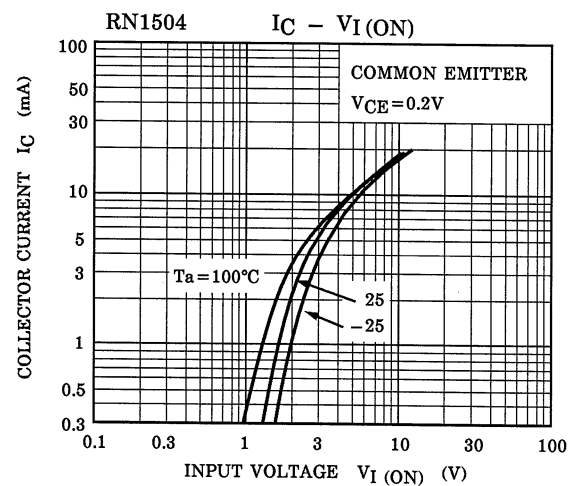
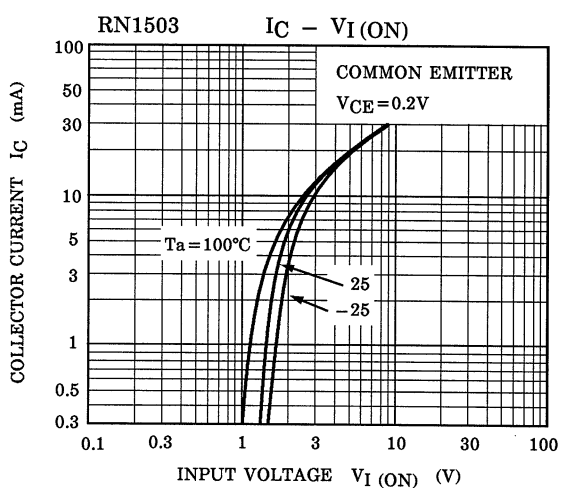
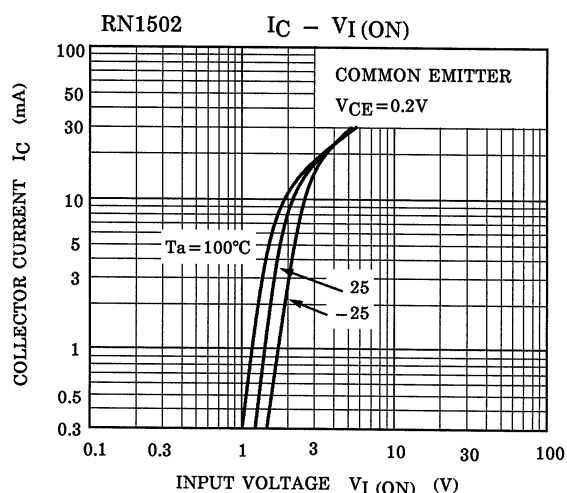
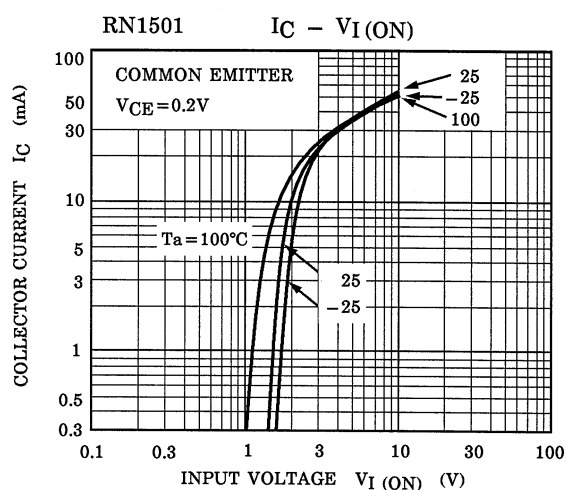
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

* Total rating

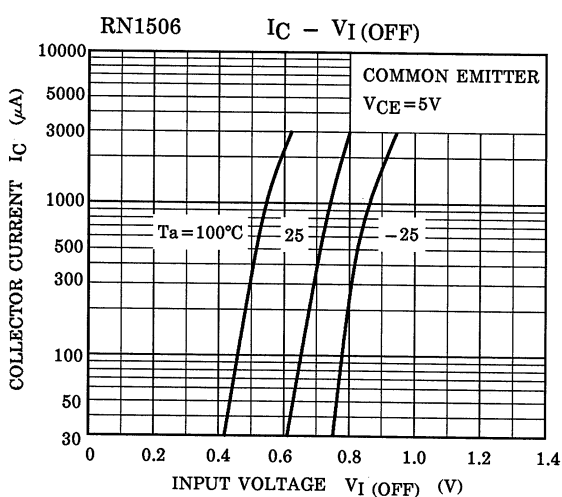
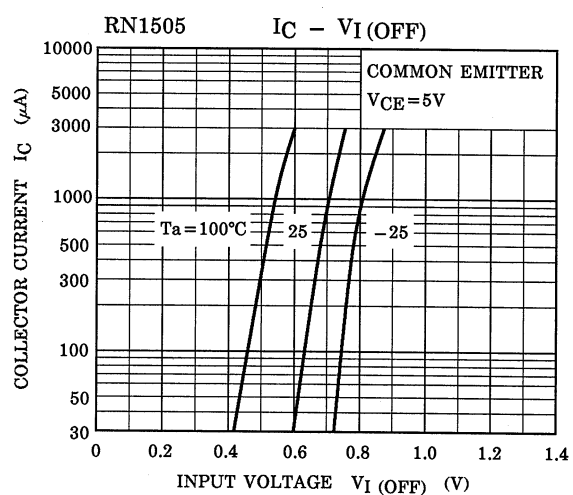
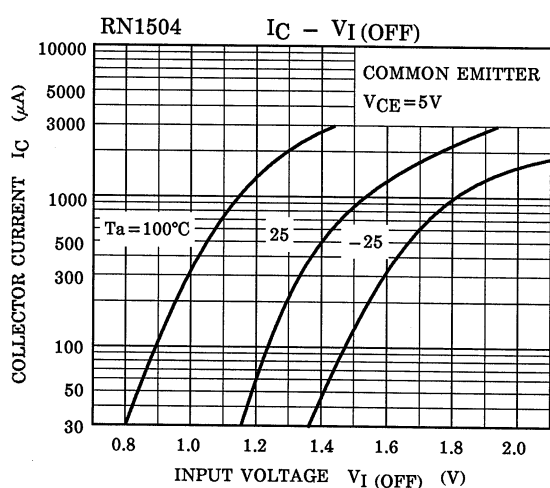
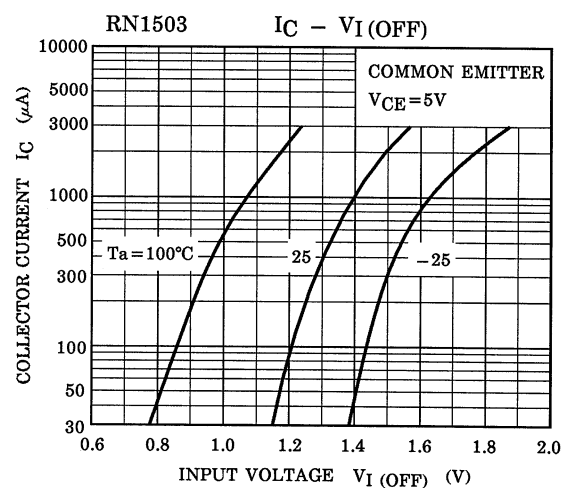
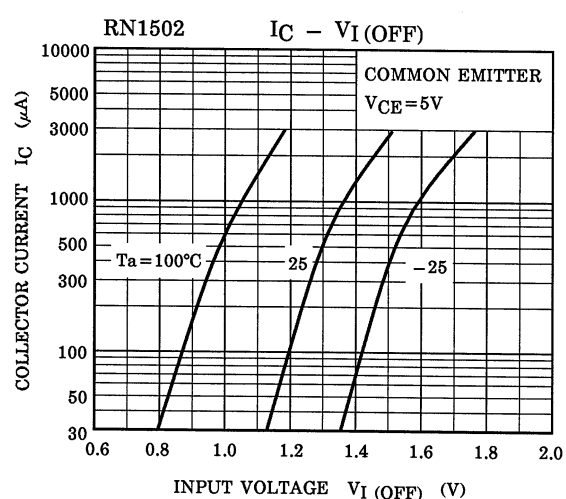
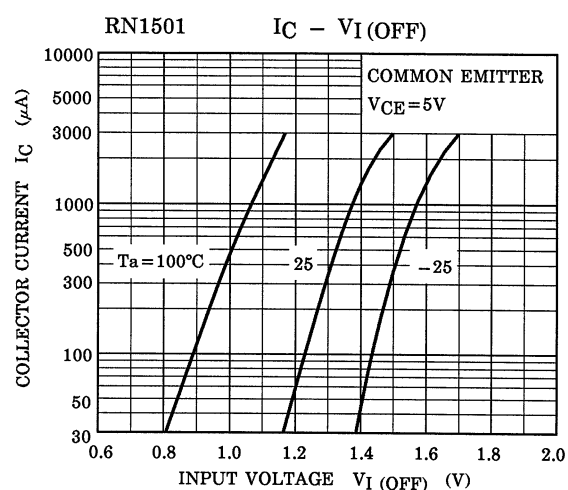
Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1501~1506	I_{CBO}	—	$V_{CB} = 50V, I_E = 0$	—	—	100	nA
		I_{CEO}		$V_{CE} = 50V, I_B = 0$	—	—	500	
Emitter cut-off current	RN1501	I_{EBO}	—	$V_{EB} = 10V, I_C = 0$	0.82	—	1.52	mA
	RN1502				0.38	—	0.71	
	RN1503				0.17	—	0.33	
	RN1504				0.082	—	0.15	
	RN1505			$V_{EB} = 5V, I_C = 0$	0.078	—	0.145	
	RN1506				0.074	—	0.138	
DC current gain	RN1501	h_{FE}	—	$V_{CE} = 5V, I_C = 10mA$	30	—	—	
	RN1502				50	—	—	
	RN1503				70	—	—	
	RN1504				80	—	—	
	RN1505				80	—	—	
	RN1506				80	—	—	
Collector-emitter saturation voltage	RN1501~1506	$V_{CE(sat)}$	—	$I_C = 5mA, I_B = 0.25mA$	—	0.1	0.3	V
Input voltage (ON)	RN1501	$V_I(ON)$	—	$V_{CE} = 0.2V, I_C = 5mA$	1.1	—	2.0	V
	RN1502				1.2	—	2.4	
	RN1503				1.3	—	3.0	
	RN1504				1.5	—	5.0	
	RN1505				0.6	—	1.1	
	RN1506				0.7	—	1.3	
Input voltage (OFF)	RN1501~1504	$V_I(OFF)$	—	$V_{CE} = 5V, I_C = 0.1mA$	1.0	—	1.5	V
	RN1505, 1506				0.5	—	0.8	
Transition frequency	RN1501~1506	f_T	—	$V_{CE} = 10V, I_C = 5mA$	—	250	—	MHz
Collector Output capacitance	RN1501~1506	C_{ob}	—	$V_{CB} = 10V, I_E = 0, f = 1MHz$	—	3	6	pF
Input resistor	RN1501	R1	—		3.29	4.7	6.11	kΩ
	RN1502				7	10	13	
	RN1503				15.4	22	28.6	
	RN1504				32.9	47	61.1	
	RN1505				1.54	2.2	2.86	
	RN1506				3.29	4.7	6.11	
Resistor ratio	RN1501~1504	R1/R2	—		0.9	1.0	1.1	
	RN1505				0.0421	0.0468	0.0515	
	RN1506				0.09	0.1	0.11	

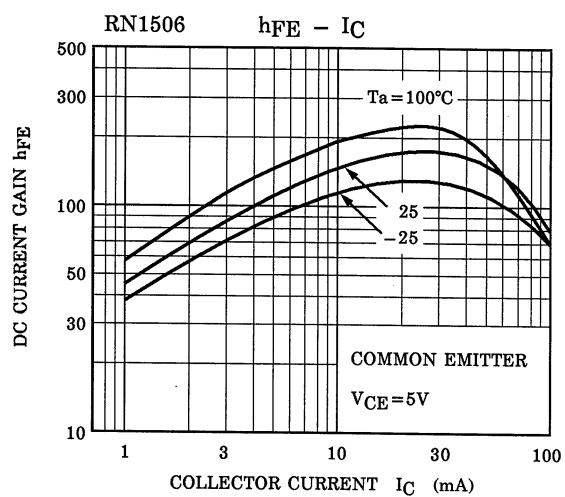
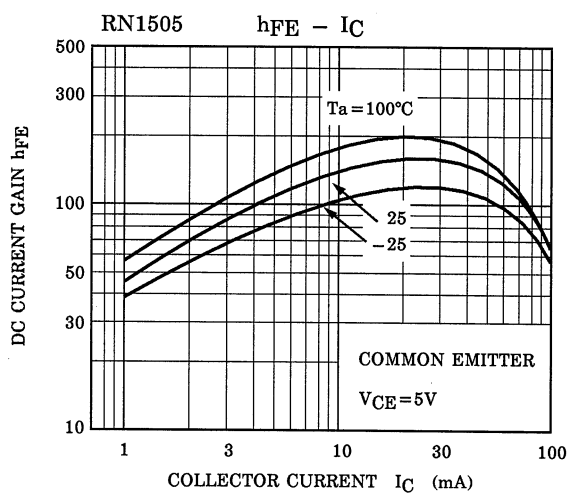
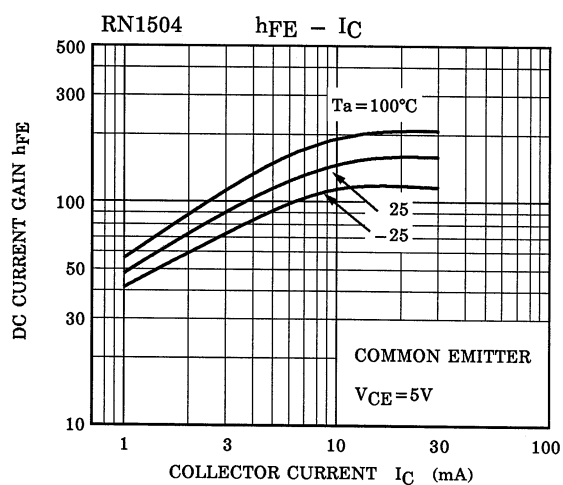
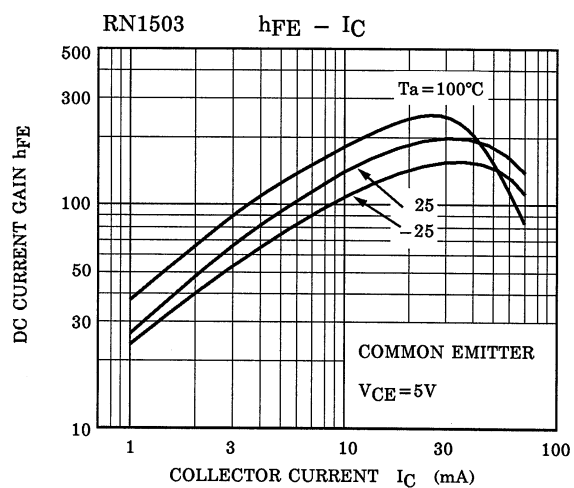
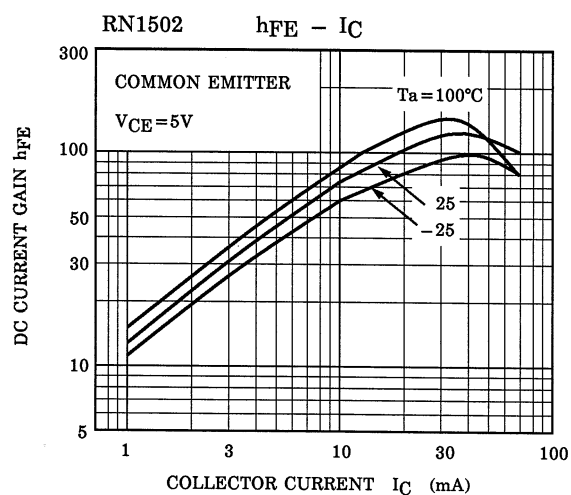
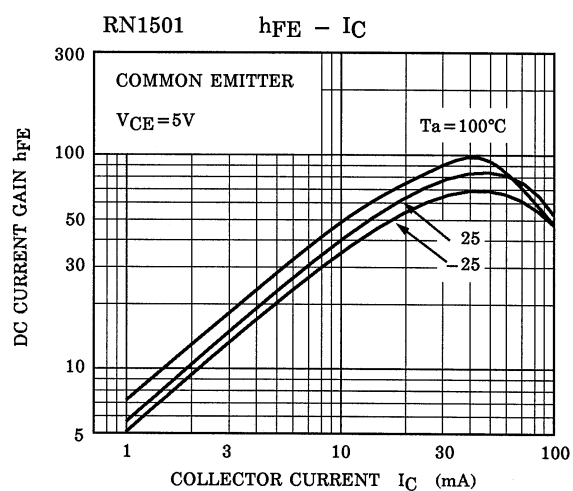
(Q1, Q2 COMMON)

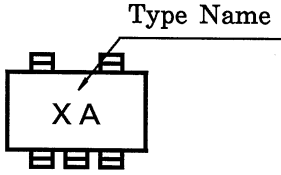
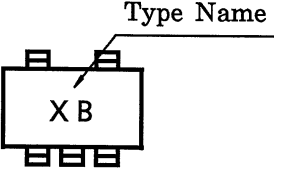
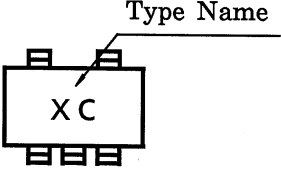
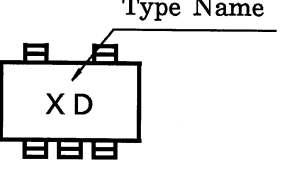
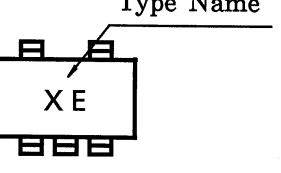
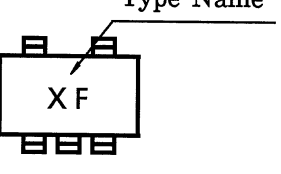


(Q1, Q2 COMMON)



(Q1, Q2 COMMON)



Type Name	Marking
RN1501	
RN1502	
RN1503	
RN1504	
RN1505	
RN1506	

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