

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

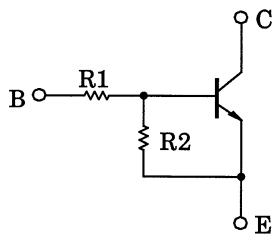
RN1307, RN1308, RN1309

Switching, Inverter Circuit, Interface Circuit
And Driver Circuit Applications

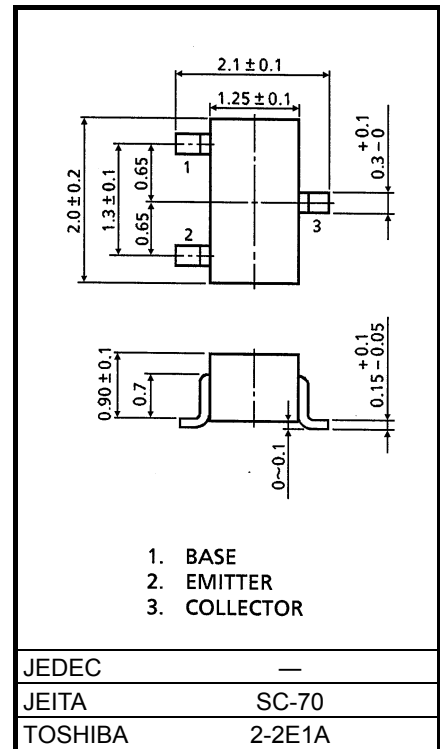
Unit: mm

- With built-in bias resistors.
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2307~RN2309

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN2207	10	47
RN2208	22	47
RN2209	47	22



Absolute Maximum Ratings (Ta = 25°C)

Weight: 0.006g (typ.)

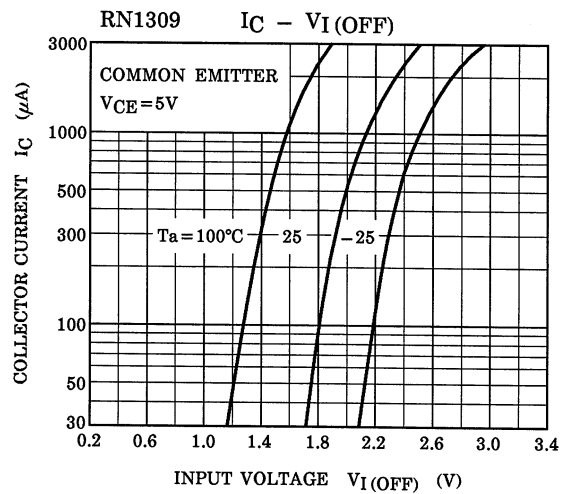
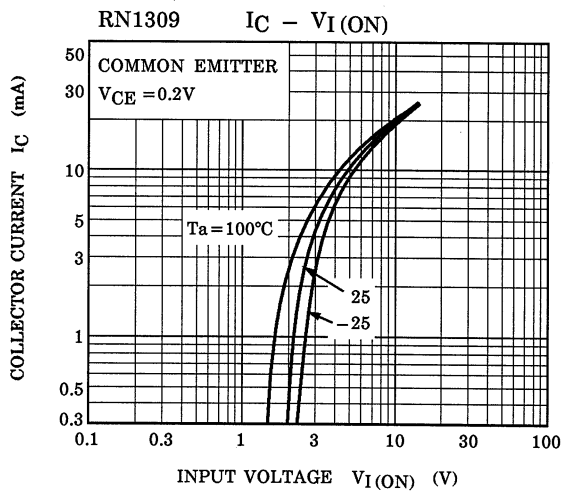
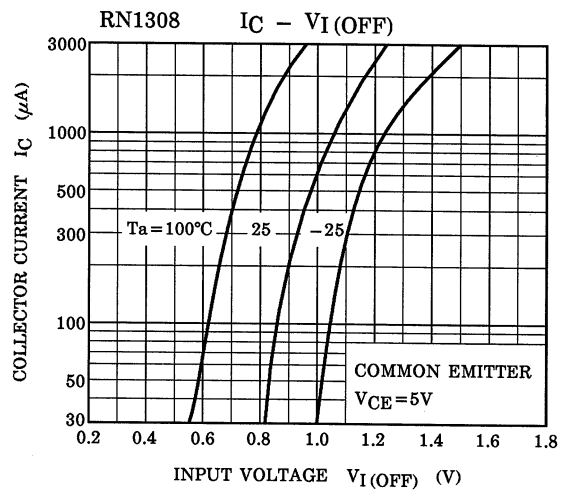
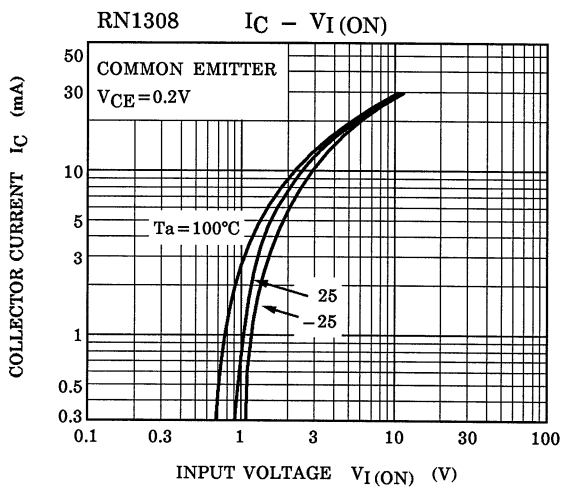
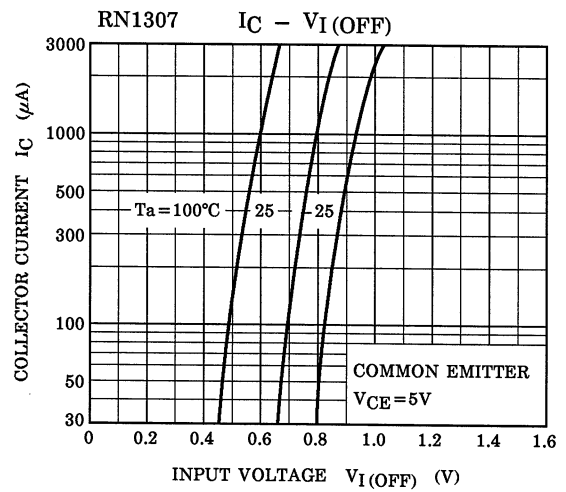
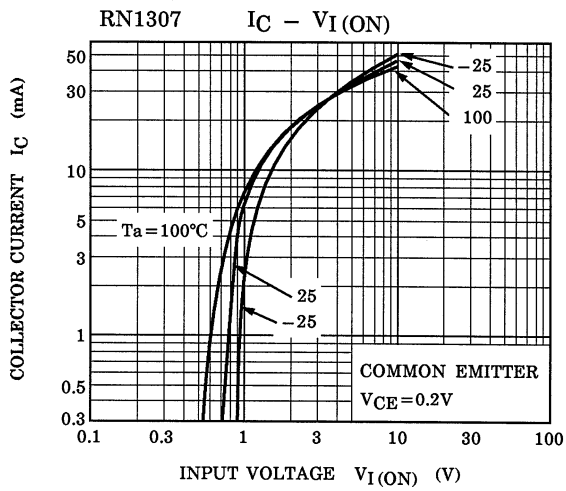
Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	6	V
		7	
		15	
Collector current	I_c	100	mA
Collector power dissipation	P_c	100	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	-55~150	°C

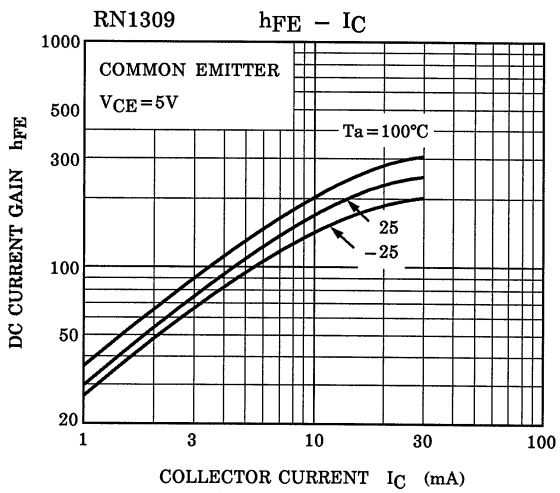
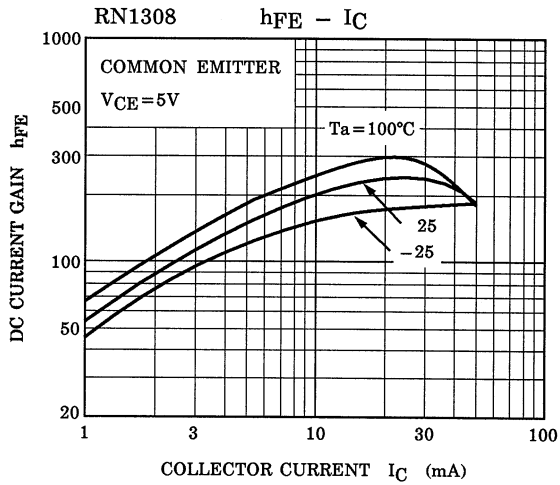
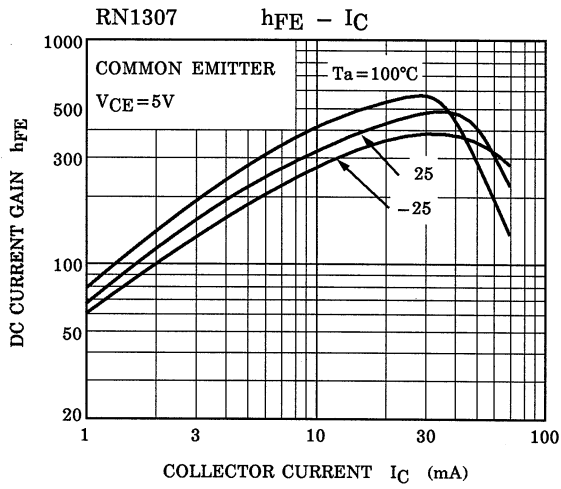
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

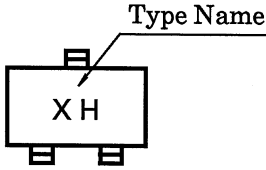
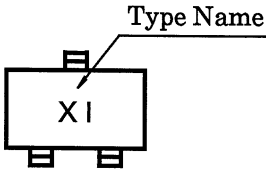
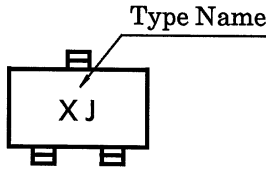
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit					
Collector cut-off current		I_{CBO}	—	$V_{CB} = 50V, I_E = 0$	—	—	100	nA					
		I_{CEO}	—	$V_{CE} = 50V, I_B = 0$	—	—	500						
Emitter cut-off current		RN1307	I _{EBO}	—	$V_{EB} = 6V, I_C = 0$	0.081	—	0.15					
		RN1308							—	$V_{EB} = 7V, I_C = 0$	0.078	—	0.145
		RN1309											
DC current gain		RN1307	h _{FE}	—	$V_{CE} = 5V, I_C = 10mA$	80	—	—					
		RN1308							—	80	—	—	
		RN1309							—	70	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	—	$I_C = 5mA, I_B = 0.25mA$	—	0.1	0.3	V					
Input voltage (ON)		RN1307	$V_{I(ON)}$	—	$V_{CE} = 0.2V, I_C = 5mA$	0.7	—	1.8					
		RN1308							—	1.0	—	2.6	
		RN1309							—	2.2	—	5.8	
Input voltage (OFF)		RN1307	$V_{I(OFF)}$	—	$V_{CE} = 5V, I_C = 0.1mA$	0.5	—	1.0					
		RN1308							—	0.6	—	1.16	
		RN1309							—	1.5	—	2.6	
Translation frequency		f_T	—	$V_{CE} = 10V, I_C = 5mA$	—	250	—	MHz					
Collector output capacitance		C_{ob}	—	$V_{CB} = 10V, I_E = 0, f = 1MHz$	—	3	6	pF					
Input resistor		RN1307	R1	—	—	7	10	13					
		RN1308							—	15.4	22	28.6	
		RN1309							—	32.9	47	61.1	
Resistor ratio		RN1307	R1/R2	—	—	0.191	0.213	0.232					
		RN1308							—	0.421	0.468	0.515	
		RN1309							—	1.92	2.14	2.35	





Type Name	Marking
RN1307	
RN1308	
Rn1309	

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