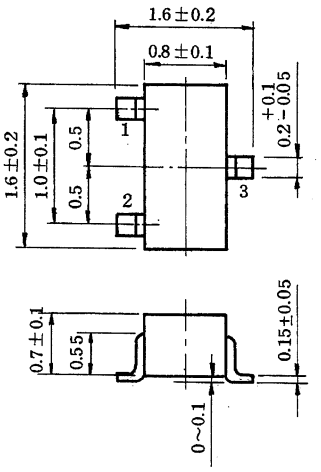
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

RN1107, RN1108, RN1109

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- With built-in bias resistors.
- Simplified circuit design
- Reduced number of parts and simplified manufacturing process
- Complementary to RN2107 to 2109

Unit: mm



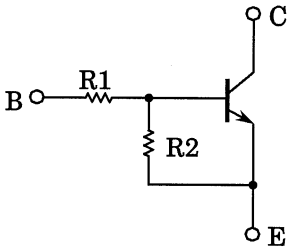
1. BASE
2. EMITTER
3. COLLECTOR

SSM

JEDEC	—
JEITA	—
TOSHIBA	2-2H1A

Weight: 2.4mg (typ.)

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1107	10	47
RN1108	22	47
RN1109	47	22

Absolute Maximum Ratings (Ta = 25°C)

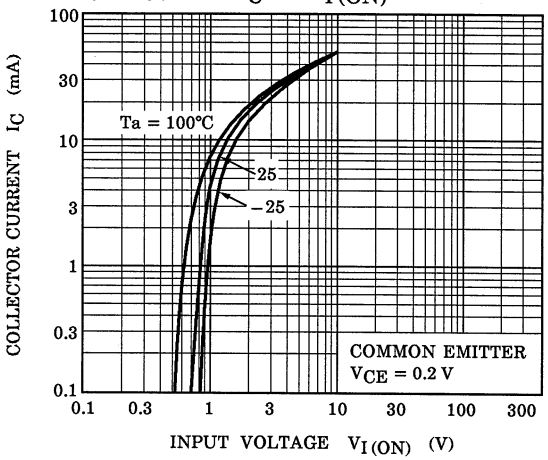
Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1107 to 1109	V_{CBO}	50	V
Collector-emitter voltage	RN1107 to 1109	V_{CEO}	50	V
Emitter-base voltage	RN1107	V_{EBO}	6	V
	RN1108		7	
	RN1109		15	
Collector current	RN1107 to 1109	I_C	100	mA
Collector power dissipation	RN1107 to 1109	P_C	100	mW
Junction temperature	RN1107 to 1109	T_j	150	°C
Storage temperature range	RN1107 to 1109	T_{stg}	−55 to 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).

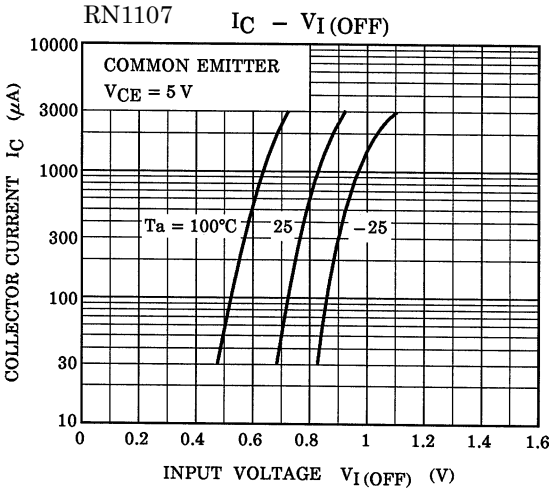
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut off current	RN1107 to 1109	I_{CBO}	—	V_{CB} = 50 V, I_E = 0	—	—	100	nA
		I_{CEO}	—	V_{CE} = 50 V, I_B = 0	—	—	500	nA
Emitter cut-off current	RN1107	I_{EBO}	—	V_{EB} = 6 V, I_C = 0	0.081	—	0.15	mA
	RN1108		—	V_{EB} = 7 V, I_C = 0	0.078	—	0.145	
	RN1109		—	V_{EB} = 15 V, I_C = 0	0.167	—	0.311	
DC current gain	RN1107	h_{FE}	—	V_{CE} = 5 V, I_C = 10 mA	80	—	—	—
	RN1108		—		80	—	—	
	RN1109		—		70	—	—	
Collector-emitter saturation voltage	RN1107 to 1109	$V_{CE\ (sat)}$	—	I_C = 5 mA, I_B = 0.25 mA	—	0.1	0.3	V
Input voltage (ON)	RN1107	$V_{I\ (ON)}$	—	V_{CE} = 0.2 V, I_C = 5 mA	0.7	—	1.8	V
	RN1108		—		1.0	—	2.6	
	RN1109		—		2.2	—	5.8	
Input voltage (OFF)	RN1107	$V_{I\ (OFF)}$	—	V_{CE} = 5 V, I_C = 0.1 mA	0.5	—	1.0	V
	RN1108		—		0.6	—	1.16	
	RN1109		—		1.5	—	2.6	
Transition frequency	RN1107 to 1109	f_T	—	V_{CE} =10 V, I_C = 5 mA	—	250	—	MHz
Collector output capacitance	RN1107 to 1109	C_{ob}	—	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	3	6	pF
Input Resistor	RN1107	R1	—	—	7	10	13	kΩ
	RN1108		—		15.4	22	28.6	
	RN1109		—		32.9	47	61.1	
Resistor Ratio	RN1107	R1/R2	—	—	0.191	0.213	0.232	—
	RN1108		—		0.421	0.468	0.515	
	RN1109		—		1.92	2.14	2.35	

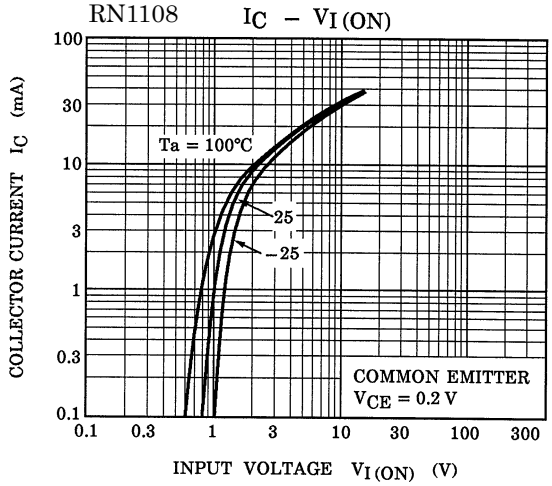
RN1107 I_C – $V_{I(ON)}$



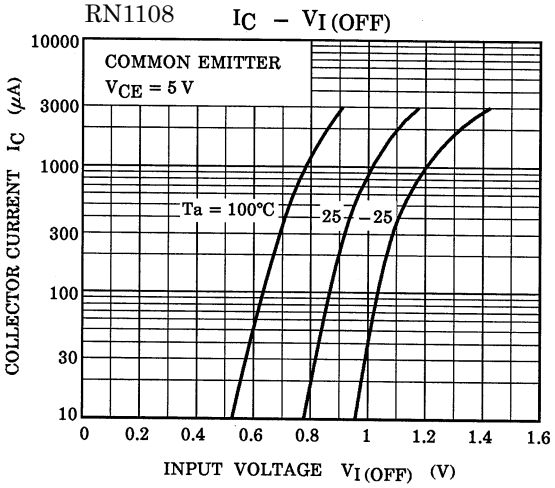
RN1107 I_C – $V_{I(OFF)}$



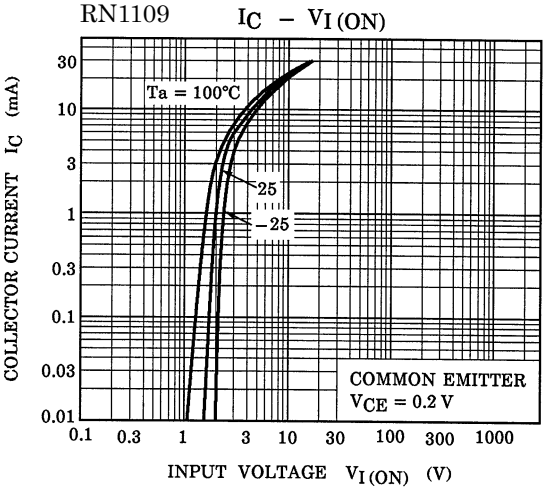
RN1108 I_C – $V_{I(ON)}$



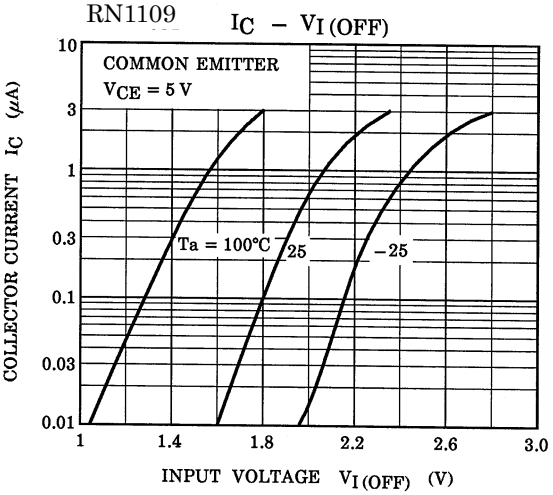
RN1108 I_C – $V_{I(OFF)}$



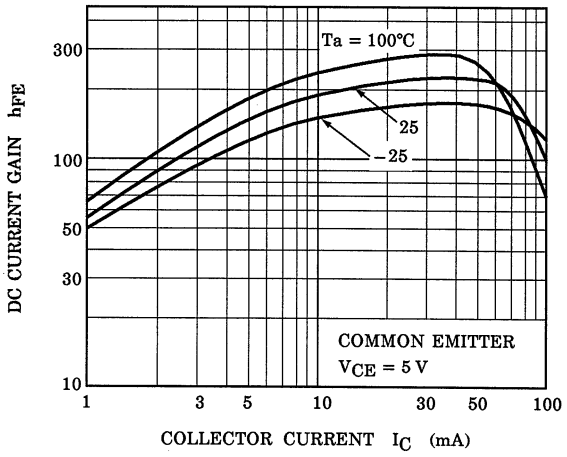
RN1109 I_C – $V_{I(ON)}$



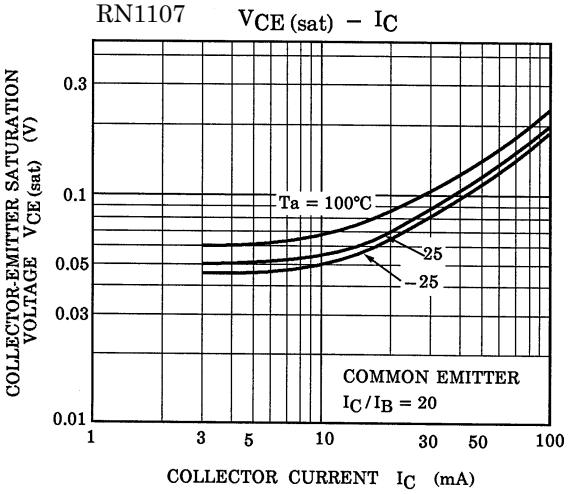
RN1109 I_C – $V_{I(OFF)}$



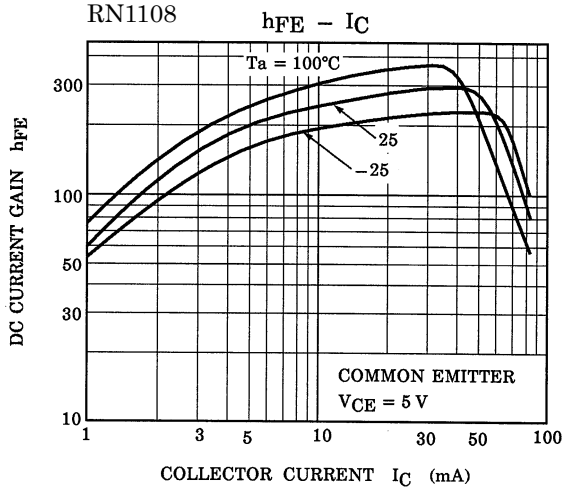
RN1107 h_{FE} – I_C



RN1107 $V_{CE\,(sat)}$ – I_C



RN1108 h_{FE} – I_C



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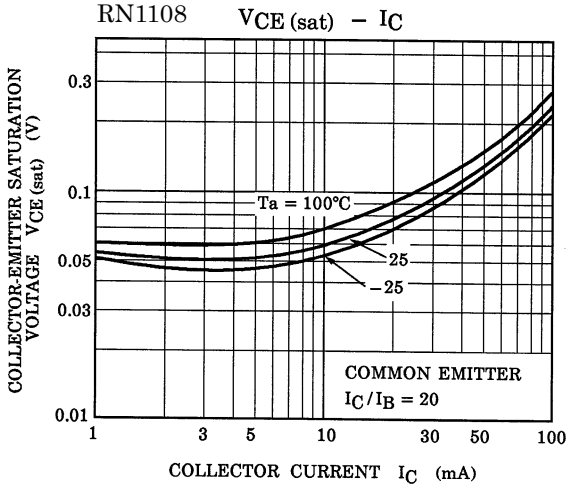
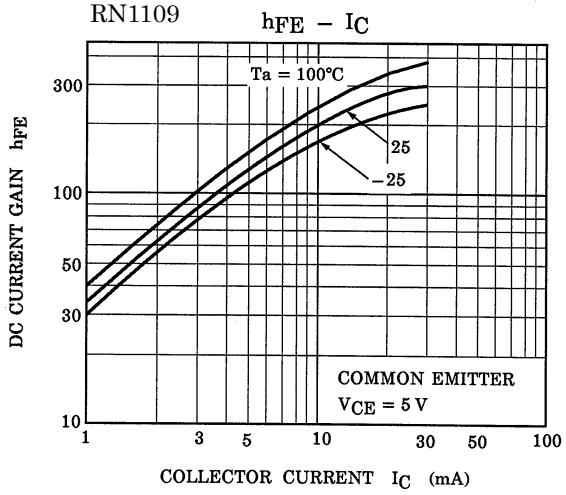
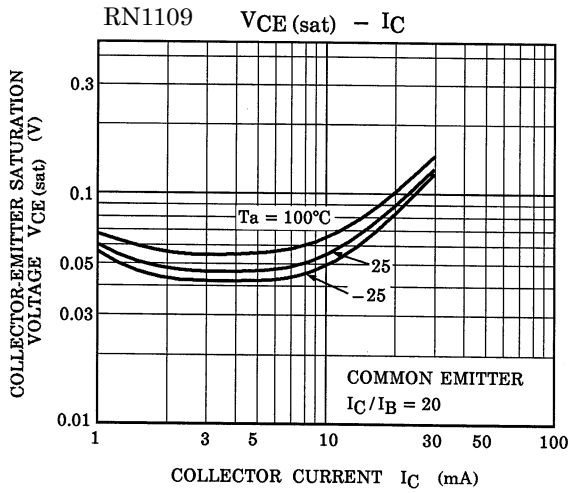
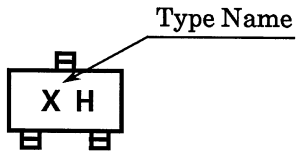
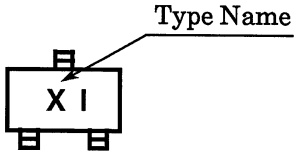
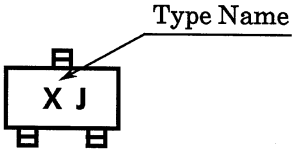


RN1109 h_{FE} – I_C



RN1109 $V_{CE\,(sat)}$ – I_C



Type Name	Marking
RN1107	
RN1108	
RN1109	

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