

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

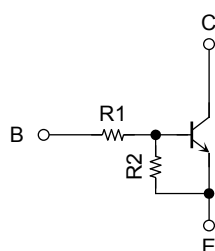
RN1107FT, RN1108FT, RN1109FT

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

Unit: mm

- High-density mount is possible because of devices housed in very thin TSM packages.
- Incorporating a bias resistor into a transistor reduces parts count. Reducing the parts count enable the manufacture of ever more compact equipment and save assembly cost.
- Wide range of resistor values are available to use in various circuit designs.
- Complementary to RN2107FT to RN2109FT

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1107FT	10	47
RN1108FT	22	47
RN1109FT	47	22

1. BASE	
2. EMITTER	
3. COLLECTOR	
TSM	
JEDEC	—
JEITA	—
TOSHIBA	2-1B1A

Weight:2.2 mg (typ.)

Absolute Maximum Ratings (Ta = 25°C)

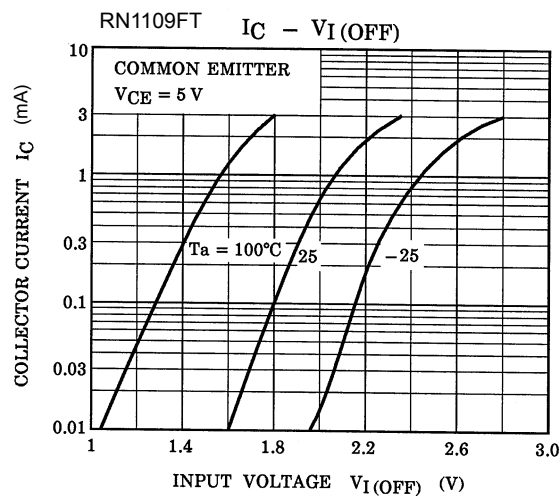
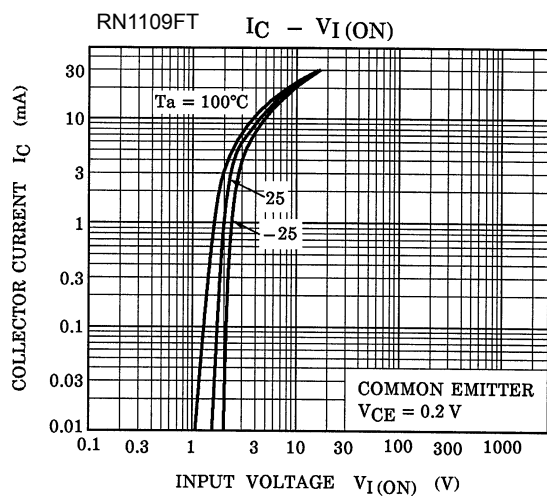
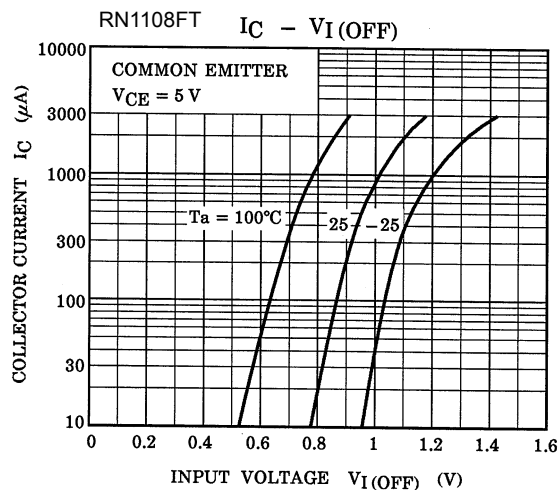
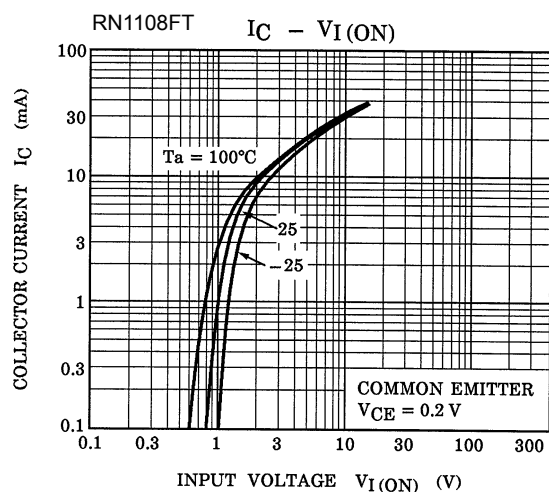
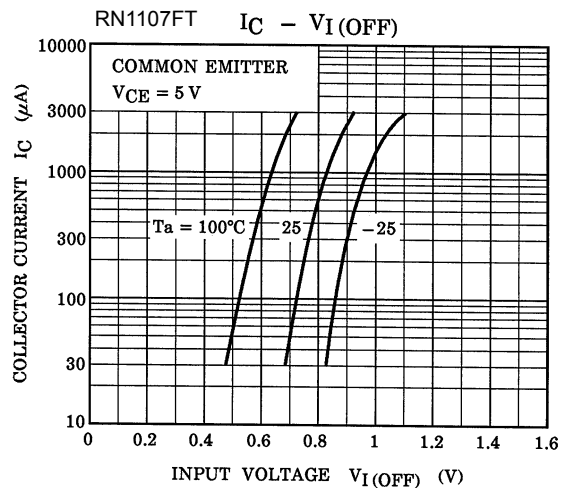
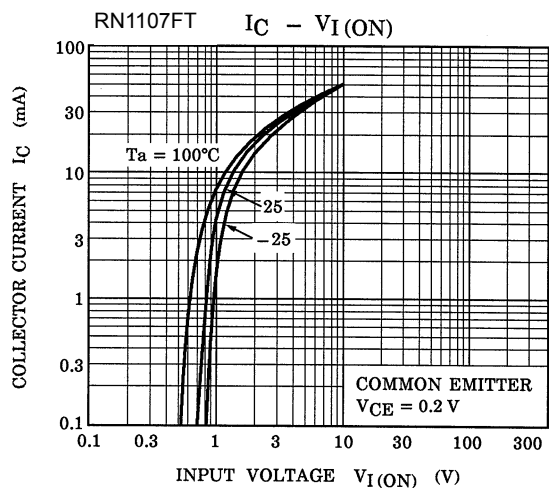
Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN1107FT to 1109FT	V _{CB0}	50	V
Collector-emitter voltage		V _{CE0}	50	V
Emitter-base voltage	RN1107FT	V _{EB0}	6	V
	RN1108FT		7	
	RN1109FT		15	
Collector current	RN1107FT to 1109FT	I _C	100	mA
Collector power dissipation		P _C	100	mW
Junction temperature		T _J	150	°C
Storage temperature range		T _{stg}	−55 to 150	°C

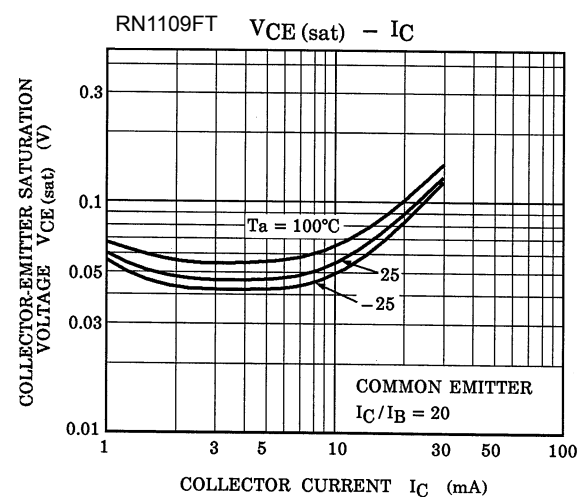
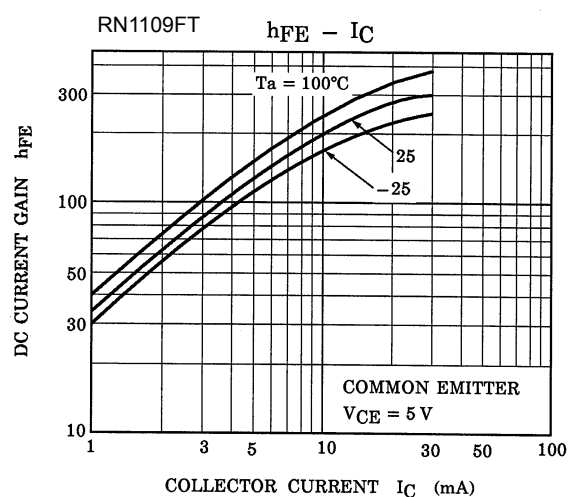
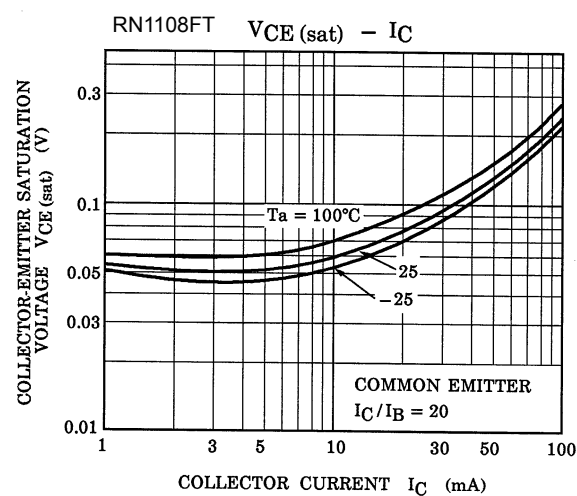
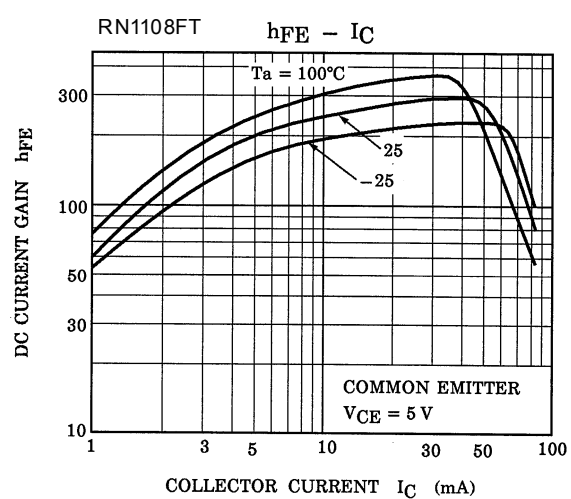
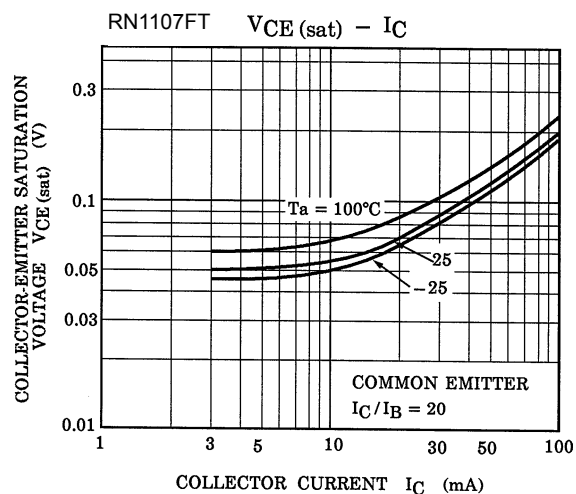
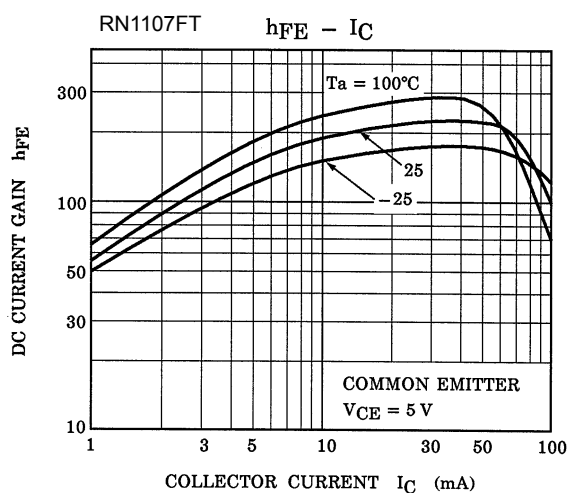
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

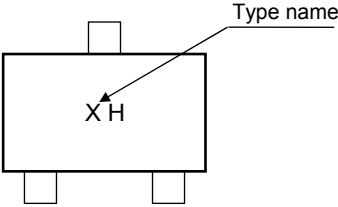
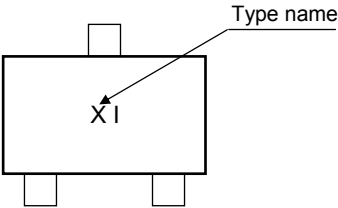
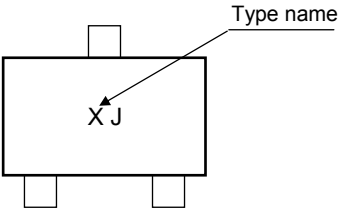
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1107FT to 1109FT	I_{CBO}	$V_{CB} = 50 \text{ V}, I_E = 0$	—	—	100	nA
		I_{CEO}	$V_{CE} = 50 \text{ V}, I_B = 0$	—	—	500	
Emitter cut-off current	RN1107FT	I_{EBO}	$V_{EB} = 6 \text{ V}, I_C = 0$	0.081	—	0.15	mA
	RN1108FT		$V_{EB} = 7 \text{ V}, I_C = 0$	0.078	—	0.145	
	RN1109FT		$V_{EB} = 15 \text{ V}, I_C = 0$	0.167	—	0.311	
DC current gain	RN1107FT	h_{FE}	$V_{CE} = 5 \text{ V}, I_C = 10 \text{ mA}$	80	—	—	
	RN1108FT			80	—	—	
	RN1109FT			70	—	—	
Collector-emitter saturation voltage	RN1107FT to 1109FT	$V_{CE(sat)}$	$I_C = 5 \text{ mA}, I_B = 0.25 \text{ mA}$	—	0.1	0.3	V
Input voltage (ON)	RN1107FT	$V_I(ON)$	$V_{CE} = 0.2 \text{ V}, I_C = 5 \text{ mA}$	0.7	—	1.8	V
	RN1108FT			1.0	—	2.6	
	RN1109FT			2.2	—	5.8	
Input voltage (OFF)	RN1107FT	$V_I(OFF)$	$V_{CE} = 5 \text{ V}, I_C = 0.1 \text{ mA}$	0.5	—	1.0	V
	RN1108FT			0.6	—	1.16	
	RN1109FT			1.5	—	2.6	
Transition frequency	RN1107FT to 1109FT	f_T	$V_{CE} = 10 \text{ V}, I_C = 5 \text{ mA}$	—	250	—	MHz
Collector output capacitance	RN1107FT to 1109FT	C_{ob}	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	—	3	6	pF
Input resistor	RN1107FT	R1	—	7	10	13	kΩ
	RN1108FT			15.4	22	28.6	
	RN1109FT			32.9	47	61.1	
Resistor ratio	RN1107FT	R1/R2	—	0.191	0.213	0.232	
	RN1108FT			0.421	0.468	0.515	
	RN1109FT			1.92	2.14	2.35	





Type Name	Marking
RN1107FT	 The diagram shows a rectangular component with a top pin and two bottom pins. The marking 'XH' is centered on the component. An arrow points from the text 'Type name' to the 'H' in 'XH'.
RN1108FT	 The diagram shows a rectangular component with a top pin and two bottom pins. The marking 'XI' is centered on the component. An arrow points from the text 'Type name' to the 'I' in 'XI'.
RN1109FT	 The diagram shows a rectangular component with a top pin and two bottom pins. The marking 'XJ' is centered on the component. An arrow points from the text 'Type name' to the 'J' in 'XJ'.

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