

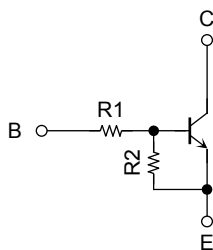
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

RN1107FS, RN1108FS, RN1109FS

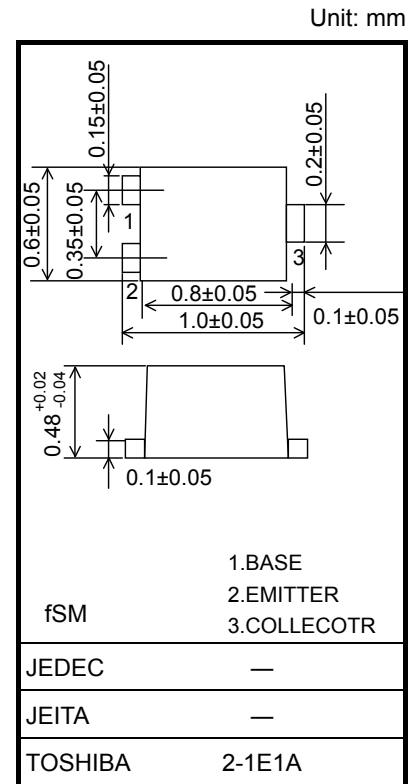
Switching, Inverter Circuit, Interface Circuit and
Driver Circuit Applications

- 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.
- Complementary to RN2107FS~RN2109FS

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1107FS	10	47
RN1108FS	22	47
RN1109FS	47	22



Weight: 0.0006 g (typ.)

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

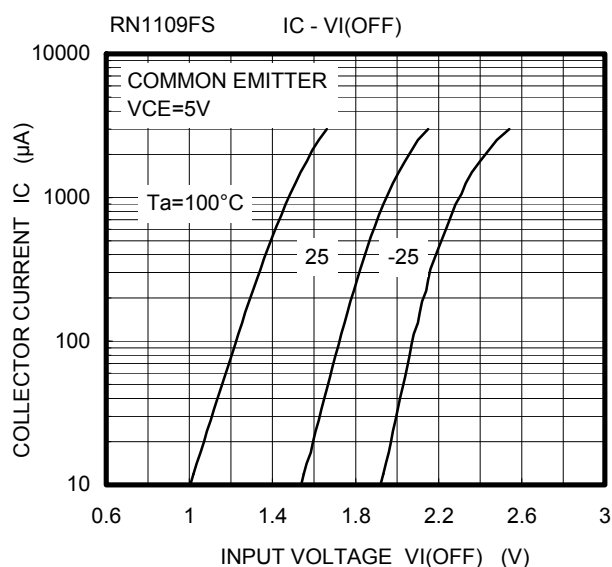
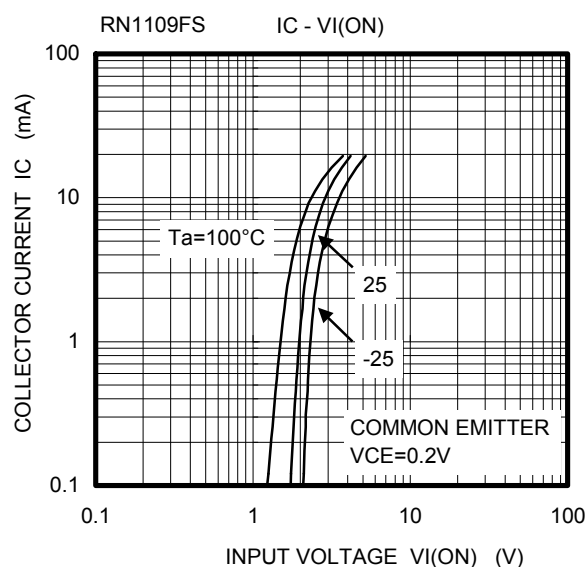
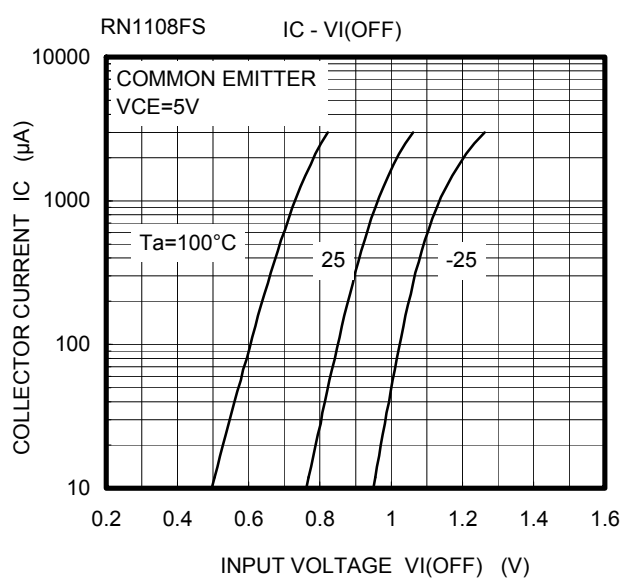
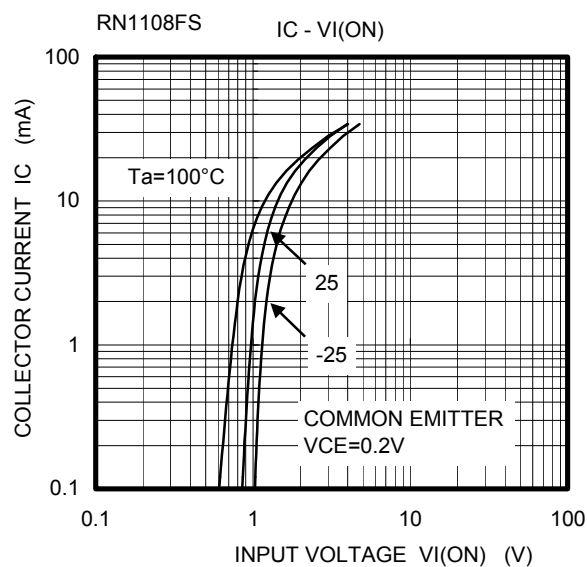
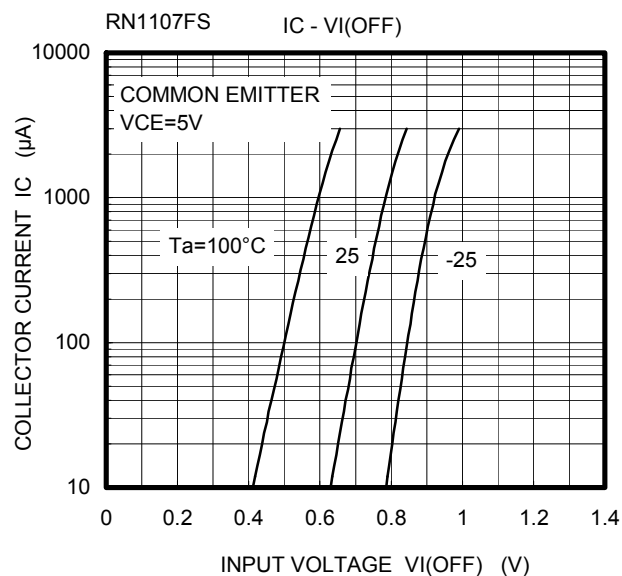
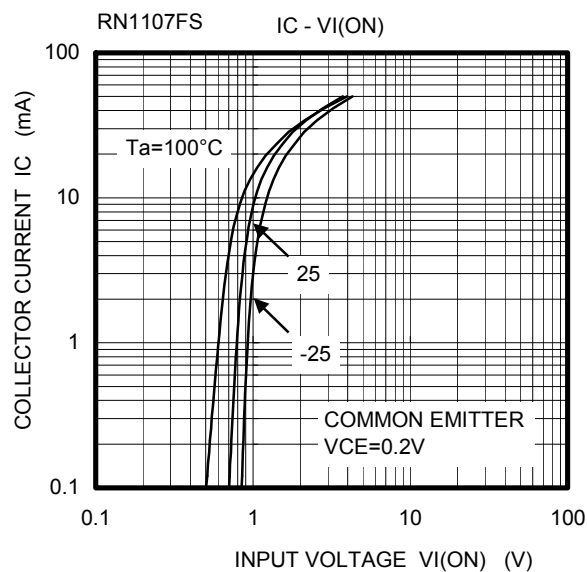
Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CB0}	20	V
Collector-emitter voltage	V_{CEO}	20	V
Emitter-base voltage	V_{EBO}	6	V
		7	
		15	
Collector current	I_C	50	mA
Collector power dissipation	P_C	50	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	-55~150	°C

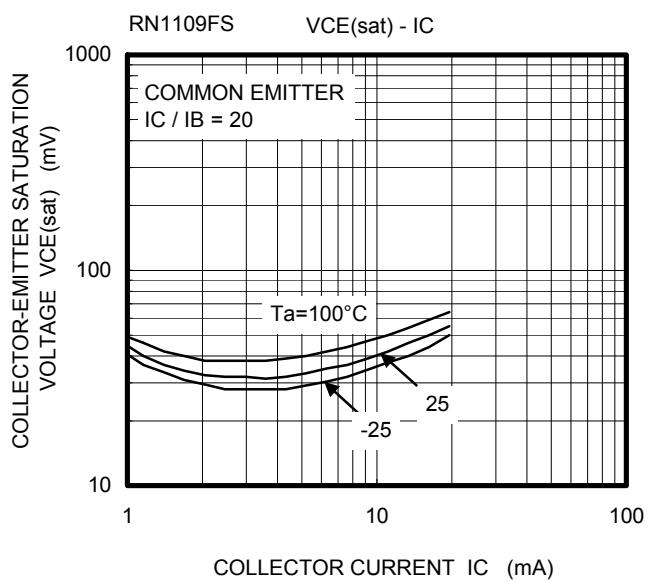
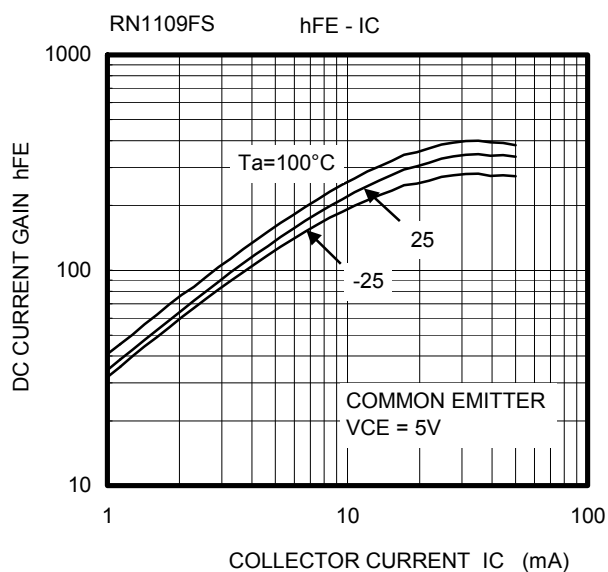
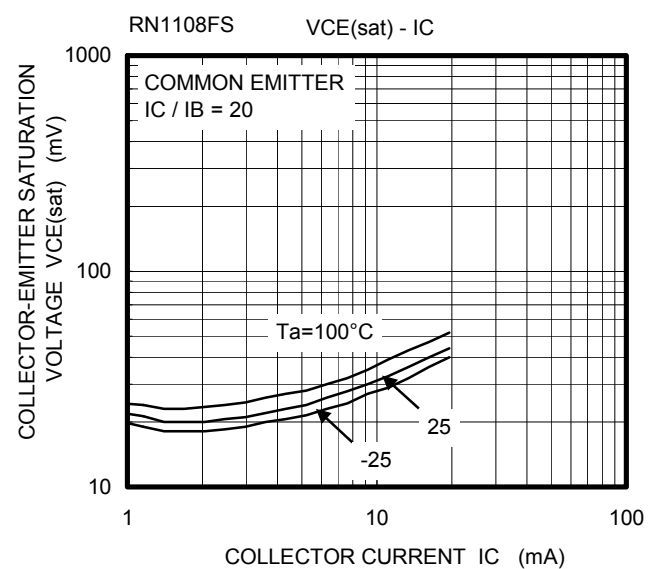
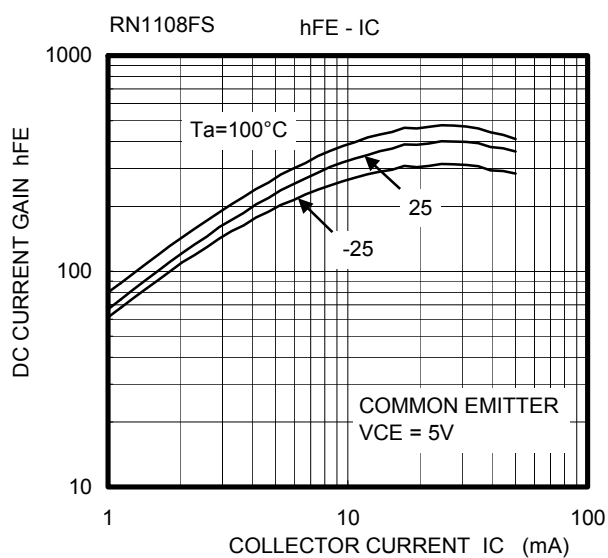
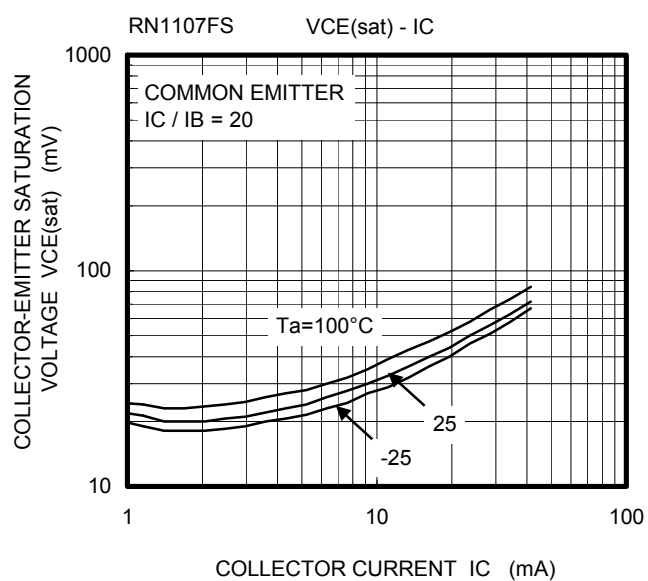
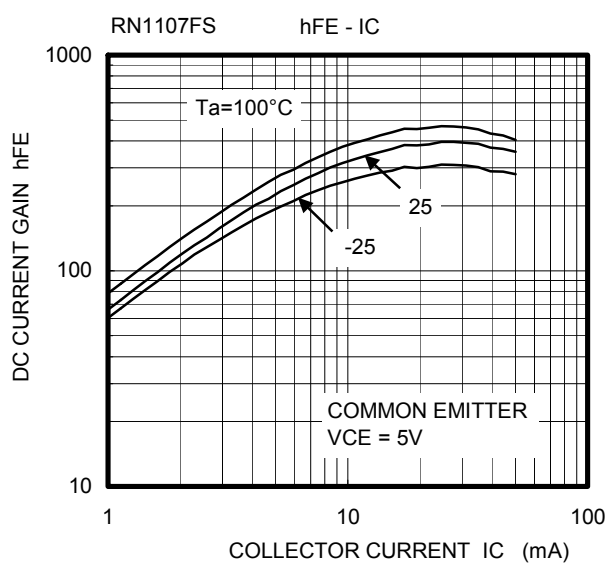
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

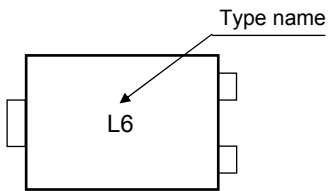
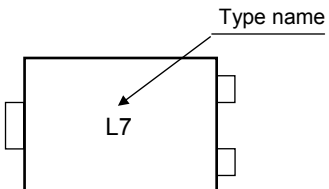
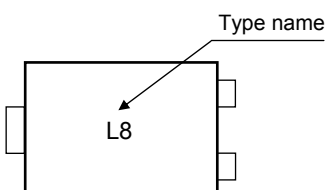
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1107FS~1109FS	I_{CBO}	$V_{CB} = 20 \text{ V}, I_E = 0$	—	—	100	nA
		I_{CEO}	$V_{CE} = 20 \text{ V}, I_B = 0$	—	—	500	
Emitter cut-off current	RN1107FS	I_{EBO}	$V_{EB} = 6 \text{ V}, I_C = 0$	0.088	—	0.131	mA
	RN1108FS		$V_{EB} = 7 \text{ V}, I_C = 0$	0.085	—	0.126	
	RN1109FS		$V_{EB} = 15 \text{ V}, I_C = 0$	0.182	—	0.271	
DC current gain	RN1107FS	h_{FE}	$V_{CE} = 5 \text{ V}, I_C = 10 \text{ mA}$	120	—	—	
	RN1108FS			120	—	—	
	RN1109FS			100	—	—	
Collector-emitter saturation voltage	RN1107FS~1109FS	$V_{CE(sat)}$	$I_C = 5 \text{ mA}, I_B = 0.25 \text{ mA}$	—	—	0.15	V
Input voltage (ON)	RN1107FS	$V_I(ON)$	$V_{CE} = 0.2 \text{ V}, I_C = 5 \text{ mA}$	0.7	—	1.5	V
	RN1108FS			0.8	—	2.2	
	RN1109FS			1.6	—	5.0	
Input voltage (OFF)	RN1107FS	$V_I(OFF)$	$V_{CE} = 5 \text{ V}, I_C = 0.1 \text{ mA}$	0.5	—	1.0	V
	RN1108FS			0.6	—	1.1	
	RN1109FS			1.3	—	2.6	
Collector output capacitance	RN1107FS~1109FS	C_{ob}	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	—	1.2	—	pF
Input resistor	RN1107FS	R1	—	8	10	12	kΩ
	RN1108FS			17.6	22	26.4	
	RN1109FS			37.6	47	56.4	
Resistor ratio	RN1107FS	R1/R2	—	0.17	0.213	0.255	
	RN1108FS			0.374	0.468	0.562	
	RN1109FS			1.71	2.14	2.56	





Type Name	Marking
RN1107FS	
RN1108FS	
RN1109FS	

Handling Precaution

When handling individual devices (which are not yet mounted on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static materials.

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