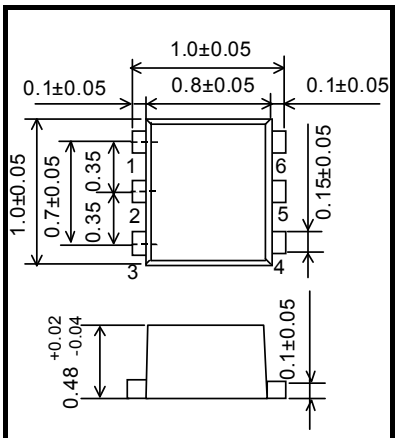
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

RN2967FS,RN2968FS,RN2969FS

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- Two devices are incorporated into a fine pitch Small Mold (6 pin) package.
- 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 RN1967FS~RN1969FS

Unit: mm



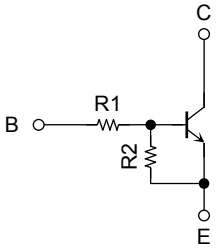
1.EMIITTER1	(E1)
2.EMITTER2	(E2)
3.BASE2	(B2)
4.COLLECTOR2	(C2)
5.BASE1	(B1)
6.COLLECTOR1	(C1)

fS6

JEDEC	—
JEITA	—
TOSHIBA	2-1F1C

Weight: 0.001 g (typ.)

Equivalent Circuit and Bias Resistor Values

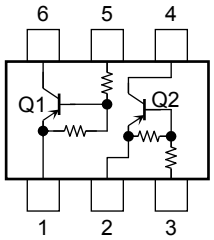


Type No.	R1 (kΩ)	R2 (kΩ)
RN2967FS	10	47
RN2968FS	22	47
RN2969FS	47	22

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

Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN2967FS~ RN2969FS	V_{CBO}	−20	V
Collector-emitter voltage		V_{CEO}	−20	V
Emitter-base voltage	RN2967FS	V_{EBO}	−6	V
	RN2968FS		−7	
	RN2969FS		−15	
Collector current	RN2967FS~ RN2969FS	I_C	−50	mA
Collector power dissipation		P_C (Note 1)	50	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55~150	°C

Equivalent Circuit (top view)



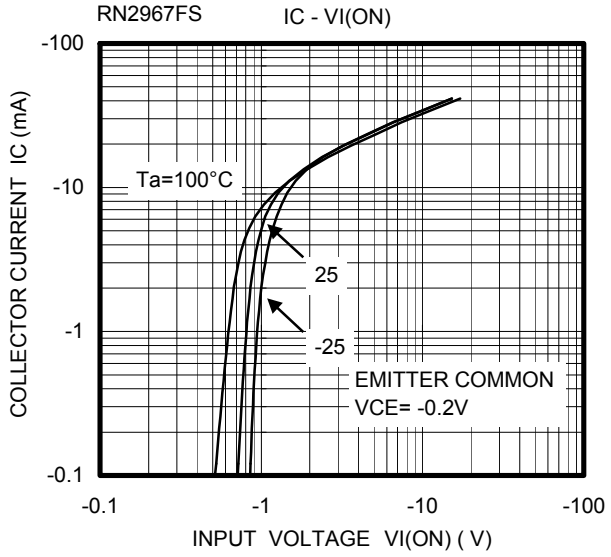
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

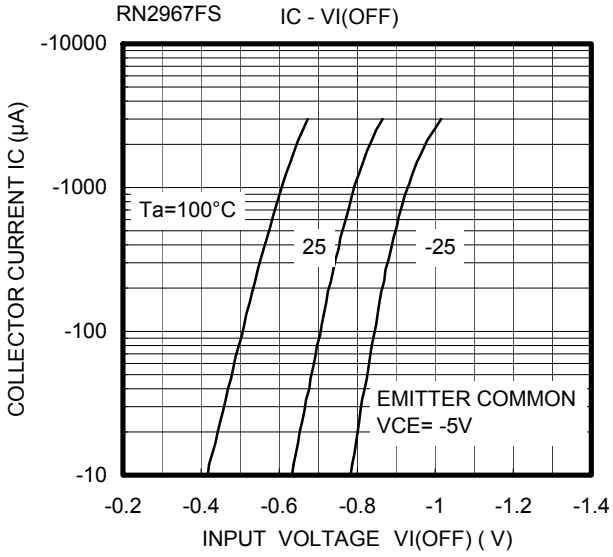
Note 1: Total rating

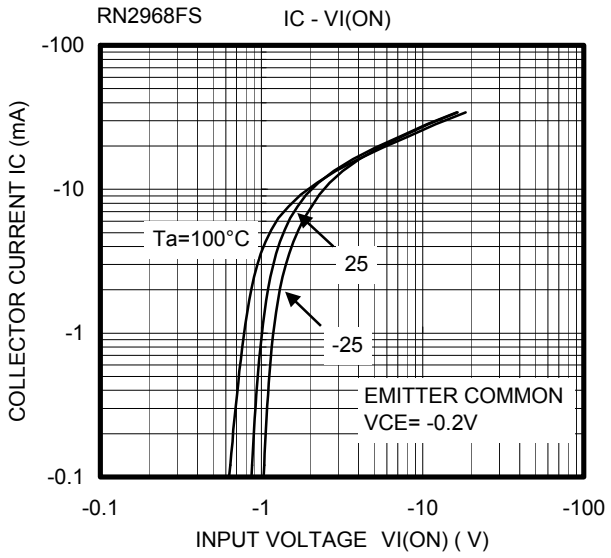
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

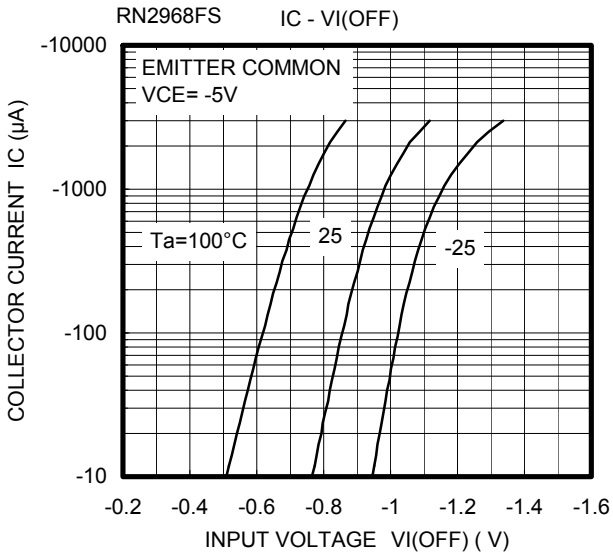
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2967FS~2969FS	I_{CBO}	V_{CB} = –20 V, I_E = 0	—	—	–100	nA
		I_{CEO}	V_{CE} = –20 V, I_B = 0	—	—	–500	
Emitter cut-off current	RN2967FS	I_{EBO}	V_{EB} = –6 V, I_C = 0	–0.088	—	–0.131	mA
	RN2968FS		V_{EB} = –7 V, I_C = 0	–0.085	—	–0.126	
	RN2969FS		V_{EB} = –15 V, I_C = 0	–0.182	—	–0.271	
DC current gain	RN2967FS	h_{FE}	V_{CE} = –5 V, I_C = –10 mA	120	—	—	
	RN2968FS			120	—	—	
	RN2969FS			100	—	—	
Collector-emitter saturation voltage	RN2967FS~2969FS	$V_{CE\ (sat)}$	I_C = –5 mA, I_B = –0.25 mA	—	—	–0.15	V
Input voltage (ON)	RN2967FS	$V_{I\ (ON)}$	V_{CE} = –0.2 V, I_C = –5mA	–0.7	—	–1.5	V
	RN2968FS			–0.8	—	–2.2	
	RN2969FS			–1.6	—	–5.0	
Input voltage (OFF)	RN2967FS	$V_{I\ (OFF)}$	V_{CE} = –5 V, I_C = –0.1mA,	–0.5	—	–1.0	V
	RN2968FS			–0.6	—	–1.1	
	RN2969FS			–1.3	—	–2.6	
Collector output capacitance	RN2967FS~2969FS	C_{ob}	V_{CB} = –10 V, I_E = 0, f = 1 MHz	—	1.2	—	pF
Input resistor	RN2967FS	R1	—	8	10	12	kΩ
	RN2968FS			17.6	22	26.4	
	RN2969FS			37.6	47	56.4	
Resistor ratio	RN2967FS	R1/R2	—	0.17	0.213	0.255	
	RN2968FS			0.374	0.468	0.562	
	RN2969FS			1.71	2.14	2.56	

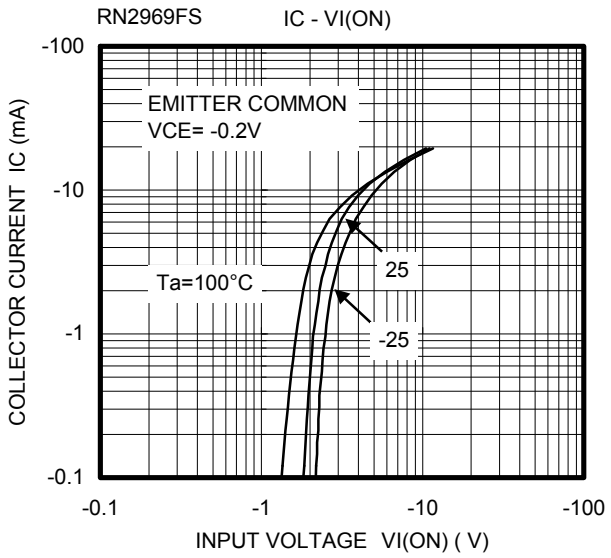
(Q1,Q2 common)

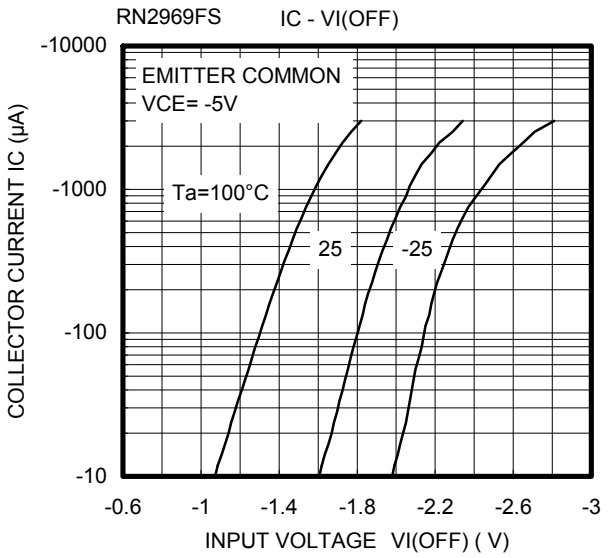






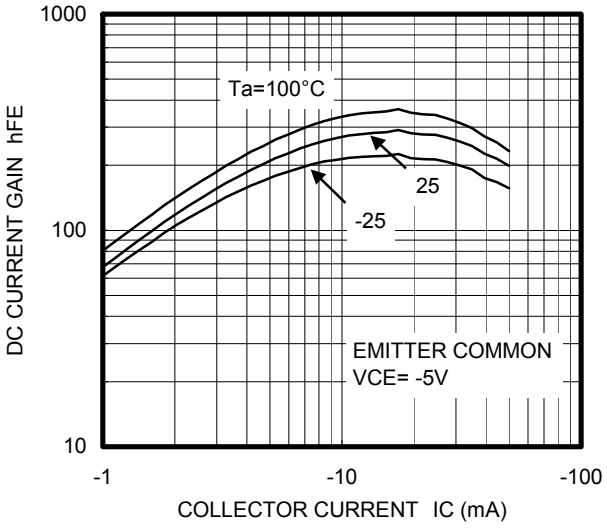




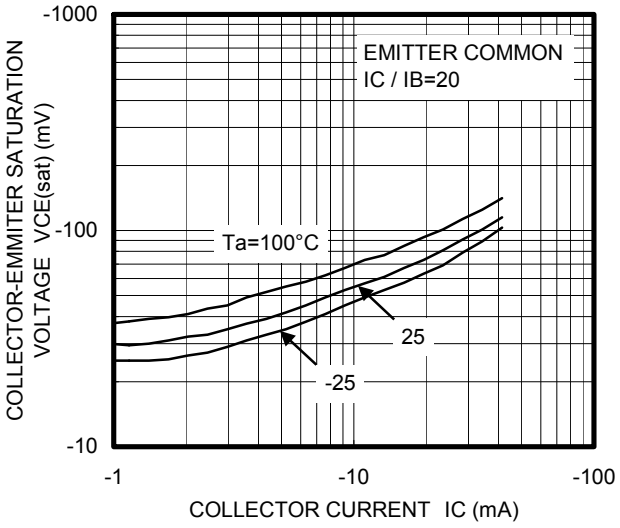


(Q1,Q2 common)

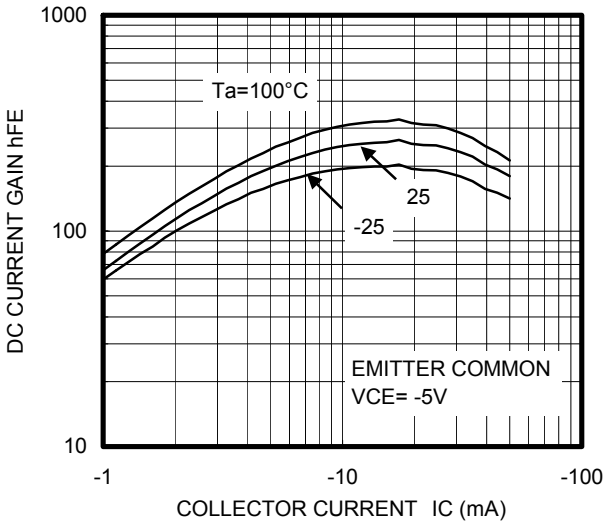
RN2967FS hFE - IC



RN2967FS VCE(sat) - IC



RN2968FS hFE - IC



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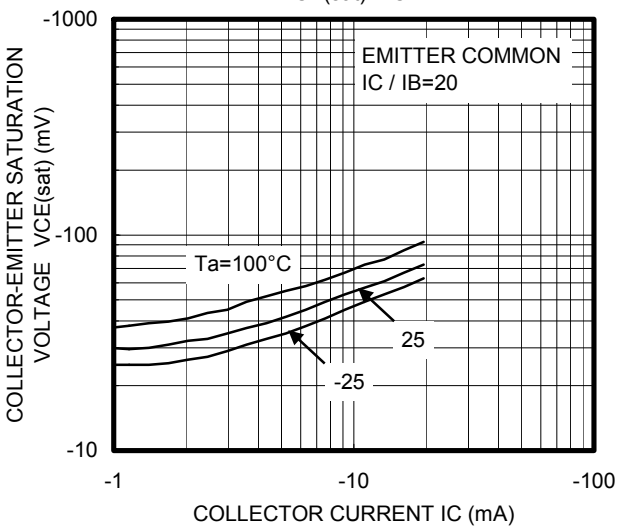
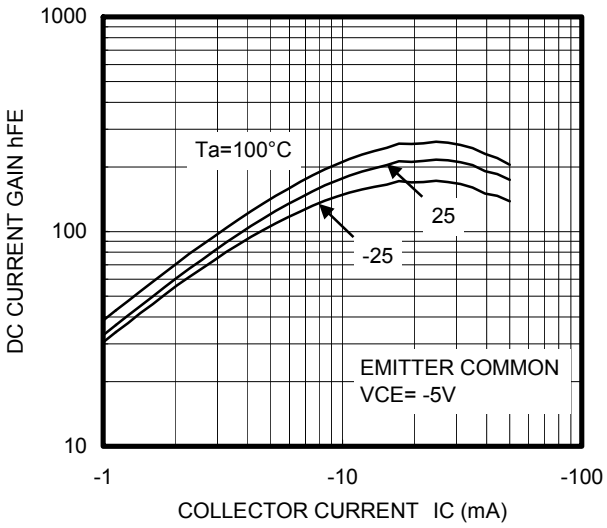
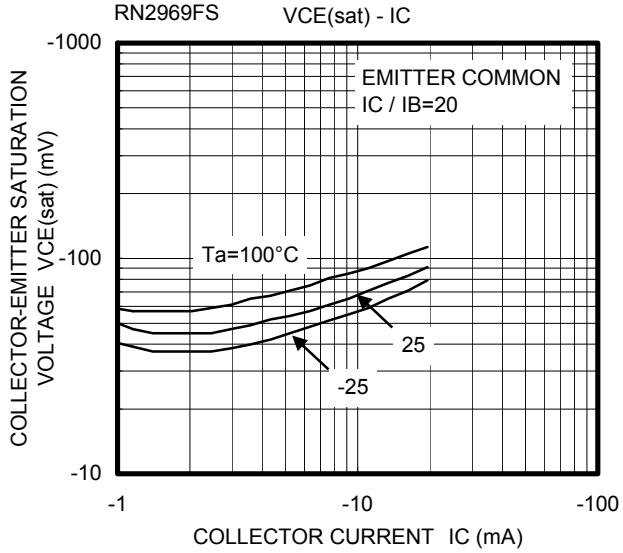
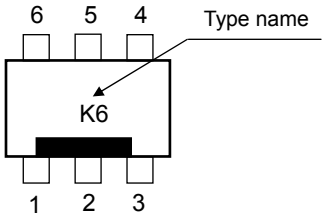
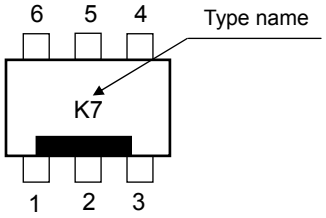
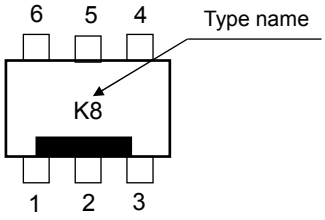


RN2969FS hFE - IC



RN2969FS VCE(sat) - IC



Type Name	Marking
RN2967FS	
RN2968FS	
RN2969FS	

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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