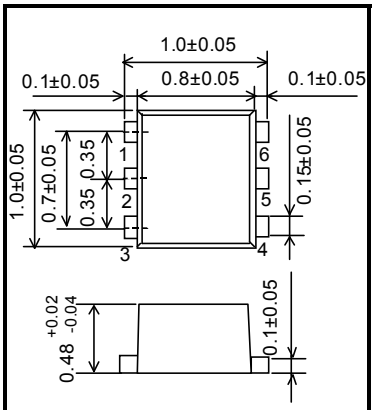
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

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



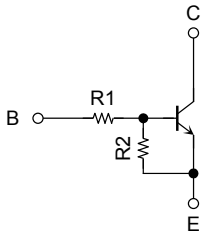
1.EMIITTER1 (E1)
2.EMITTER2 (E2)
3.BASE2 (B2)
4.COLLECTOR2 (C2)
5.BASE1 (B1)
6.COLLECTOR1 (C1)

fS6

JEDEC	—
JEITA	—
TOSHIBA	2-1F1C

Weight: 0.001 g (typ.)

Equivalent Circuit and Bias Resistor Values

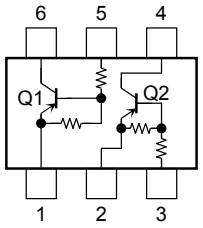


Type No.	R1 (kΩ)	R2 (kΩ)
RN2967FS	10	47
RN2968FS	22	47
RN2969FS	47	22

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)



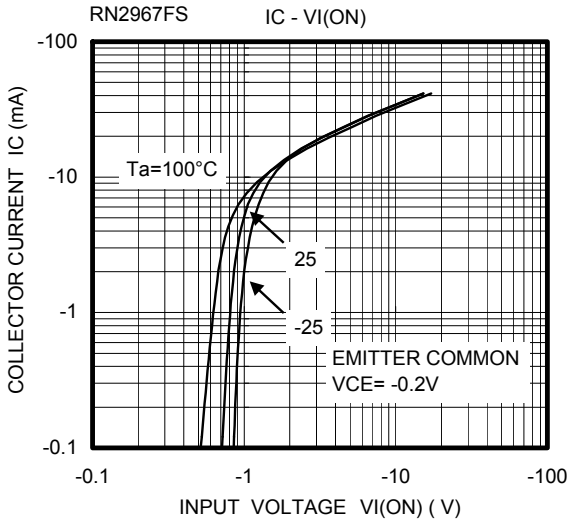
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

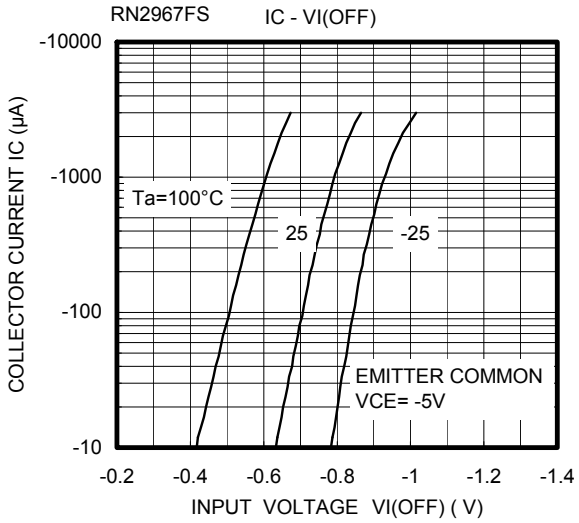
Note 1: Total rating

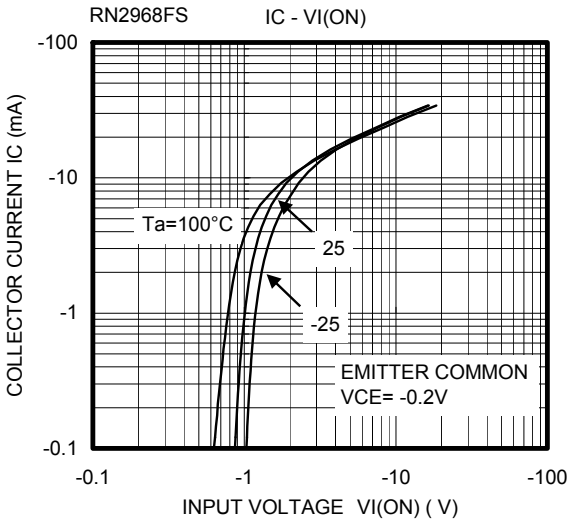
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

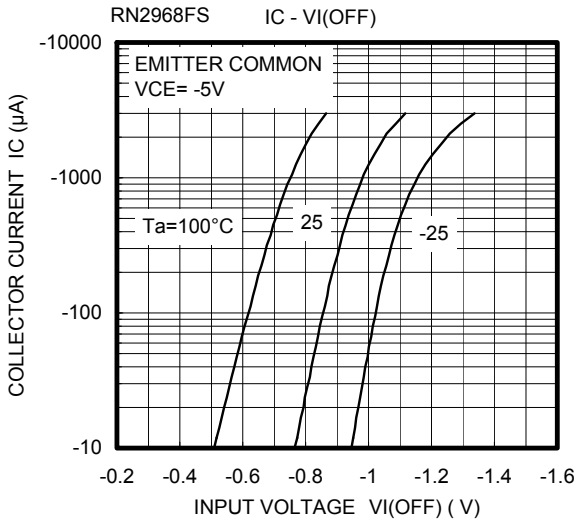
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2967FS~2969FS	I_{CBO}	V_{CB} = −20 V, I_E = 0	—	—	−100	nA
		I_{CEO}	V_{CE} = −20 V, I_B = 0	—	—	−500	
Emitter cut-off current	RN2967FS	I_{EBO}	V_{EB} = −6 V, I_C = 0	−0.088	—	−0.131	mA
	RN2968FS		V_{EB} = −7 V, I_C = 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	

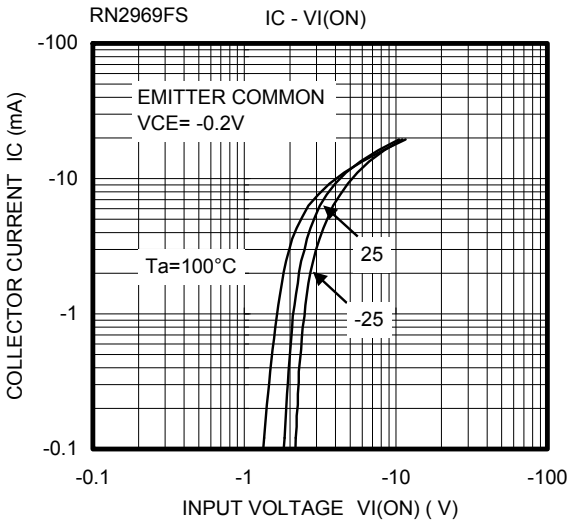
(Q1,Q2 common)

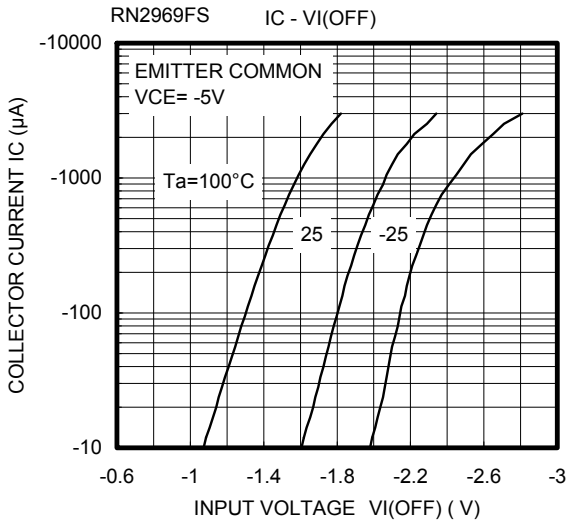




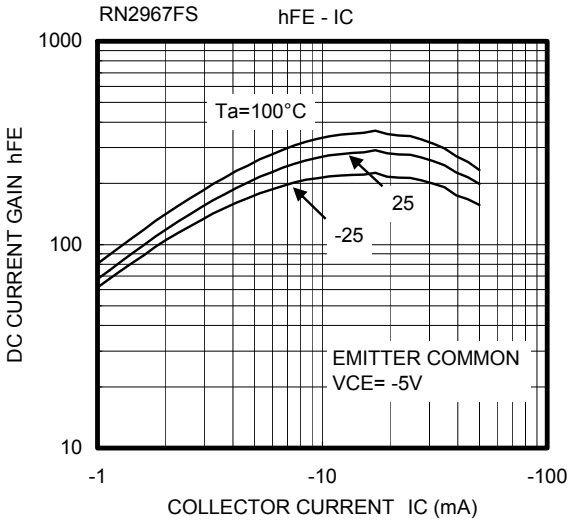


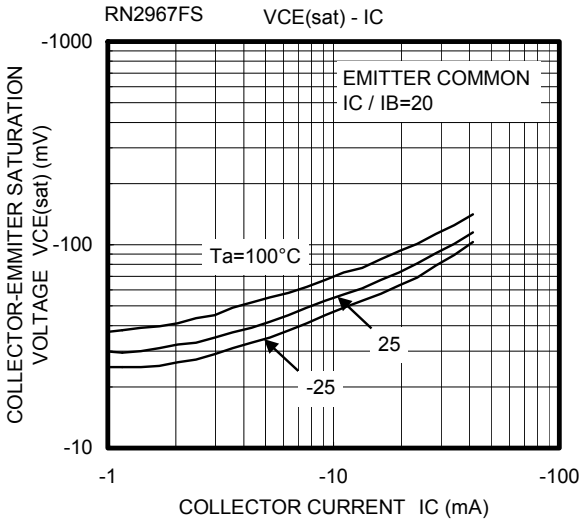


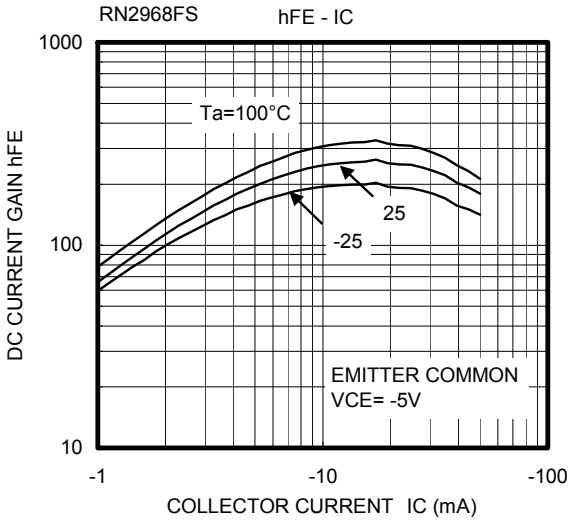


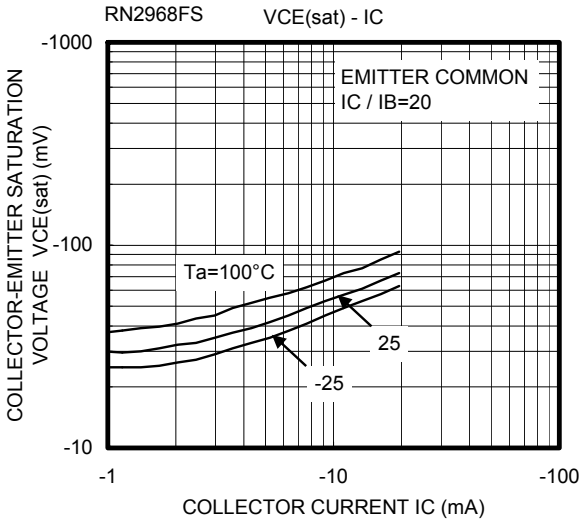


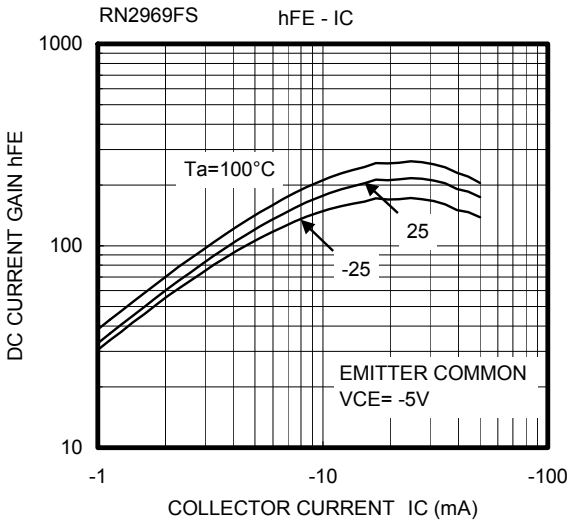
(Q1,Q2 common)

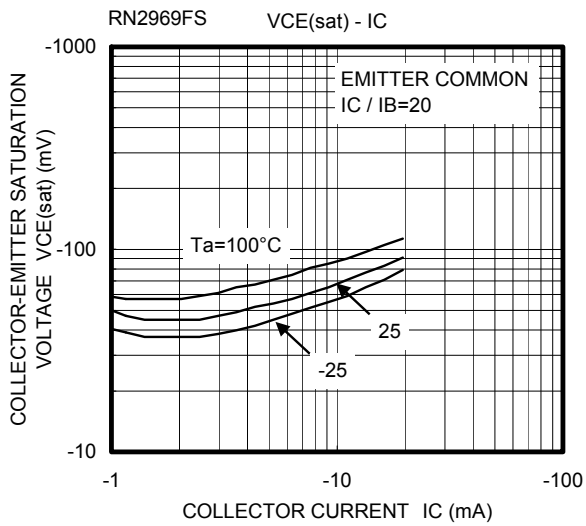


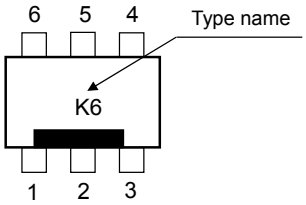
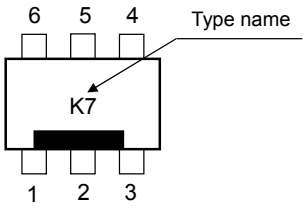
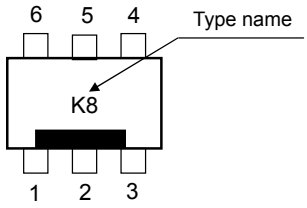










Type Name	Marking
RN2967FS	
RN2968FS	
RN2969FS	

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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