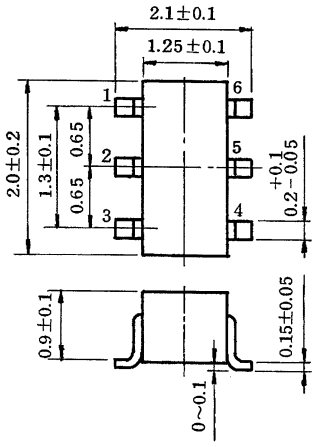
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

RN2970,RN2971

Switching, Inverter Circuit, Interface Circuit
And Driver Circuit Applications

- Including two devices in US6 (ultra super mini type with 6 leads)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN1970~RN1971

Unit: mm

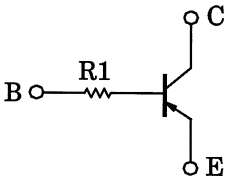


1. EMITTER 1 (E1)
2. EMITTER 2 (E2)
3. BASE 2 (B2)
4. COLLECTOR 2 (C2)
5. BASE 1 (B1)
6. COLLECTOR 1 (C1)

JEDEC	—
EIAJ	—
TOSHIBA	2-2J1B

Weight: 6.8mg

Equivalent Circuit

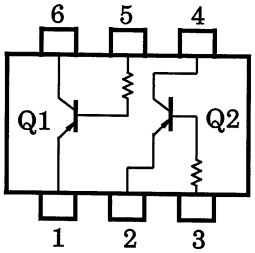


Maximum Ratings (Ta = 25°C) (Q1, Q2 Common)

Characterisstic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	−50	V
Collector-emitter voltage	V_{CEO}	−50	V
Emitter-base voltage	V_{EBO}	−5	V
Collector current	I_C	−100	mA
Collector power dissipation	P_C*	200	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55~150	°C

*: Total rating

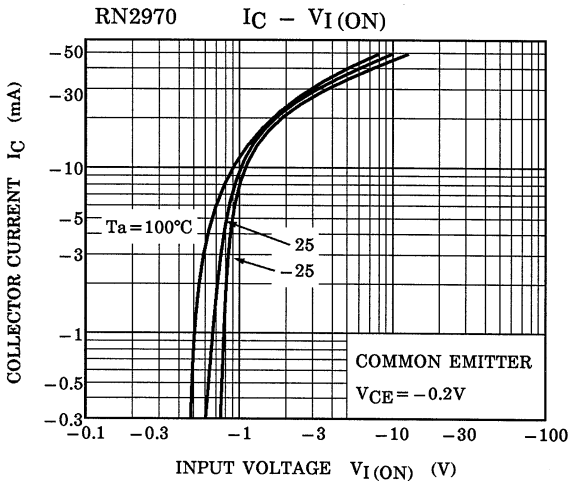
Equivalent Circuit (Top View)

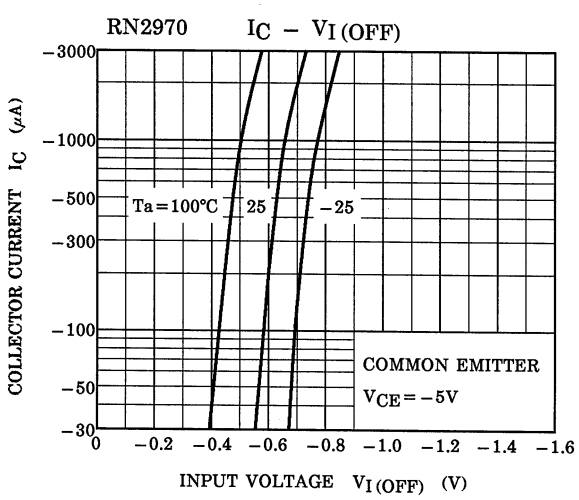


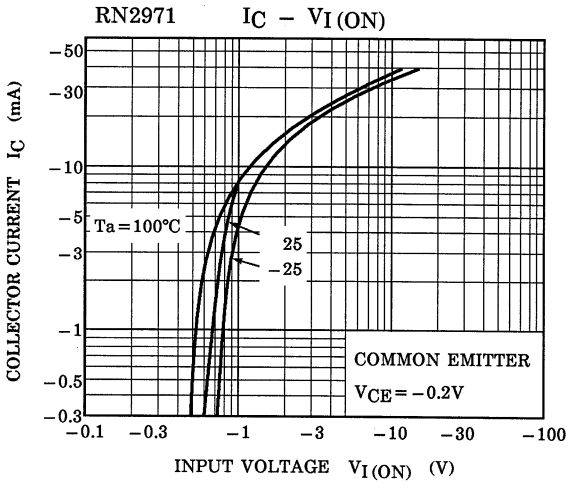
Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)

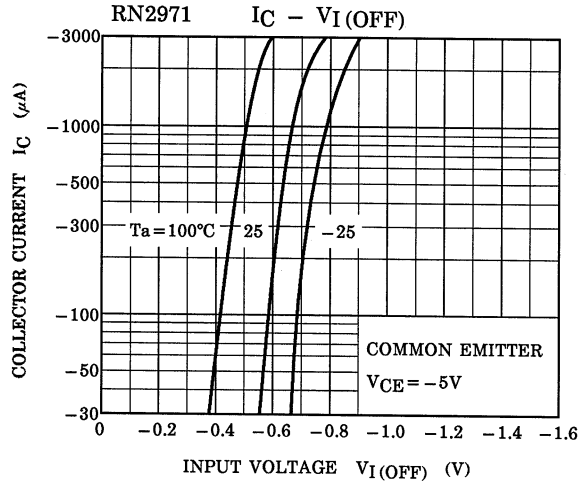
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	—	V_{CB} = −50V, I_E = 0	—	—	−100	nA
Emitter cut-off current		I_{EBO}	—	V_{EB} = −5V, I_C = 0	—	—	−100	nA
DC current gain		h_{FE}	—	V_{CE} = −5V, I_C = −1mA	120	—	400	—
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	—	I_C = −5mA, I_B = −0.25mA	—	−0.1	−0.3	V
Translation frequency		f_T	—	V_{CE} = −10V, I_C = −5mA	—	200	—	MHz
Collector output capacitance		C_{ob}	—	V_{CB} = −10V, I_E = 0, f = 1MHz	—	3	6	pF
Input resistor	RN2970	R1	—	—	3.29	4.7	6.11	kΩ
	RN2971				7	10	13	

(Q1, Q2 Common)

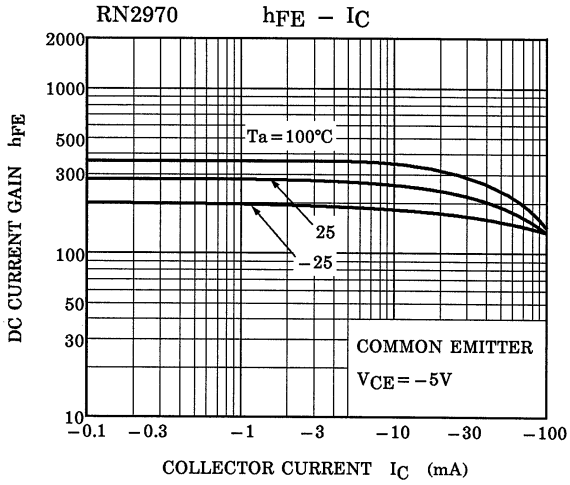

RN2970 I_C – $V_{I(ON)}$
COLLECTOR CURRENT I_C (mA)
−50
−30
−10
−5
−3
−1
−0.5
−0.3
Ta = 100°C
25
−25
COMMON EMITTER
V_{CE} = −0.2V
−0.1 −0.3 −1 −3 −10 −30 −100
INPUT VOLTAGE $V_{I(ON)}$ (V)

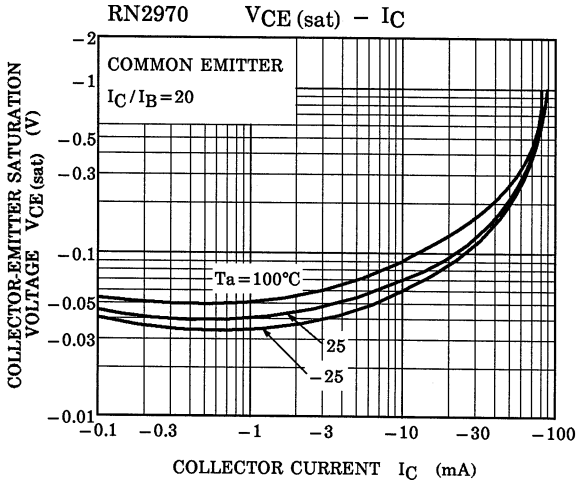

RN2970 I_C – $V_{I(OFF)}$
COLLECTOR CURRENT I_C (μA)
−3000
−1000
−500
−300
−100
−50
−30
Ta = 100°C
25
−25
COMMON EMITTER
V_{CE} = −5V
0 −0.2 −0.4 −0.6 −0.8 −1.0 −1.2 −1.4 −1.6
INPUT VOLTAGE $V_{I(OFF)}$ (V)

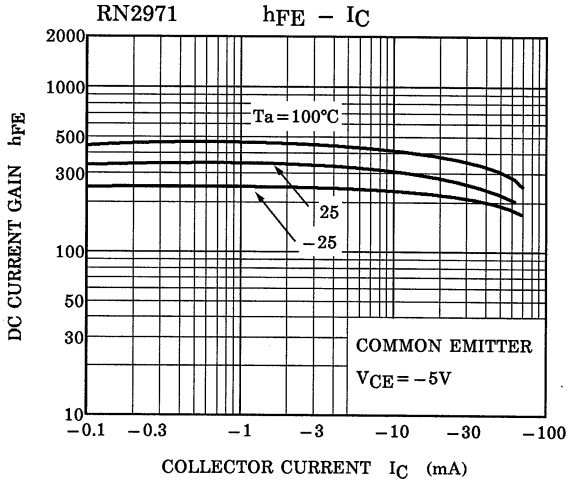

RN2971 I_C – $V_{I(ON)}$
COLLECTOR CURRENT I_C (mA)
−50
−30
−10
−5
−3
−1
−0.5
−0.3
Ta = 100°C
25
−25
COMMON EMITTER
V_{CE} = −0.2V
−0.1 −0.3 −1 −3 −10 −30 −100
INPUT VOLTAGE $V_{I(ON)}$ (V)

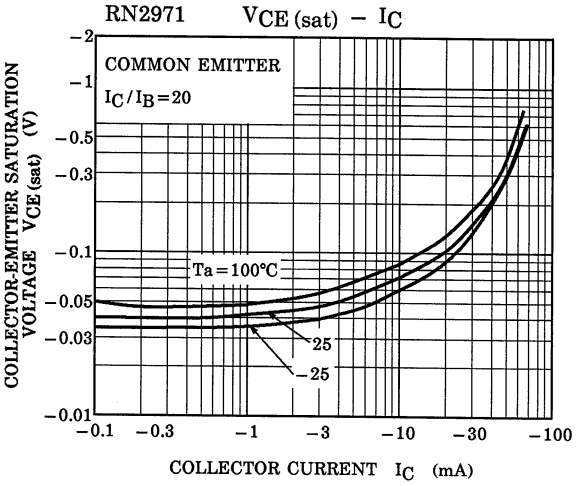

RN2971 I_C – $V_{I(OFF)}$
COLLECTOR CURRENT I_C (μA)
−3000
−1000
−500
−300
−100
−50
−30
Ta = 100°C
25
−25
COMMON EMITTER
V_{CE} = −5V
0 −0.2 −0.4 −0.6 −0.8 −1.0 −1.2 −1.4 −1.6
INPUT VOLTAGE $V_{I(OFF)}$ (V)

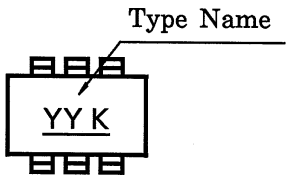
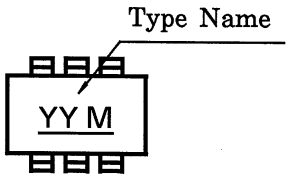
(Q1, Q2 Common)


RN2970 hFE – IC
DC CURRENT GAIN hFE
2000
1000
500
300
100
50
30
10
Ta = 100°C
25
−25
COMMON EMITTER
VCE = −5V
−0.1 −0.3 −1 −3 −10 −30 −100
COLLECTOR CURRENT IC (mA)


RN2970 VCE (sat) – IC
COLLECTOR-EMITTER SATURATION VOLTAGE VCE (sat) (V)
−2
−1
−0.5
−0.3
−0.1
−0.05
−0.03
−0.01
COMMON EMITTER
IC / IB = 20
Ta = 100°C
25
−25
−0.1 −0.3 −1 −3 −10 −30 −100
COLLECTOR CURRENT IC (mA)


RN2971 hFE – IC
DC CURRENT GAIN hFE
2000
1000
500
300
100
50
30
10
Ta = 100°C
25
−25
COMMON EMITTER
VCE = −5V
−0.1 −0.3 −1 −3 −10 −30 −100
COLLECTOR CURRENT IC (mA)


RN2971 VCE (sat) – IC
COLLECTOR-EMITTER SATURATION VOLTAGE VCE (sat) (V)
−2
−1
−0.5
−0.3
−0.1
−0.05
−0.03
−0.01
COMMON EMITTER
IC / IB = 20
Ta = 100°C
25
−25
−0.1 −0.3 −1 −3 −10 −30 −100
COLLECTOR CURRENT IC (mA)

Type Name	Marking
RN2970	
RN2971	

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