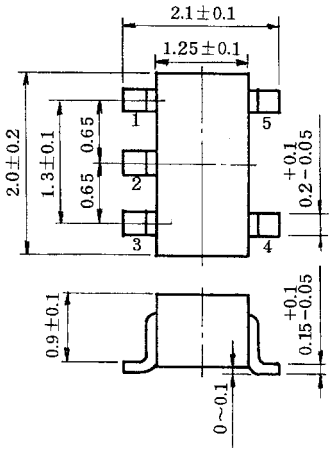
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

# RN2707,RN2708,RN2709

Switching, Inverter Circuit, Interface Circuit
And Driver Circuit Applications

- Including two devices in USV (ultra super mini type with 5 leads)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN1707~RN1709

Unit: mm

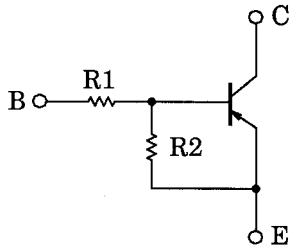



1. BASE 1 (B1)
2. EMITTER (E)
3. BASE 2 (B2)
4. COLLECTOR 2 (C2)
5. COLLECTOR 1 (C1)

| | |
|---|---|
| JEDEC | — |
| EIAJ | — |
| TOSHIBA | 2-2L1A |

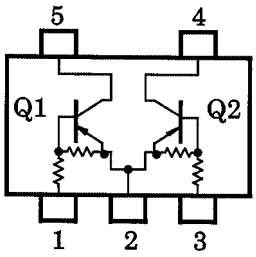
Weight: 6.2mg

## Equivalent Circuit and Bias Resistor Values




| Type No. | R1 (kΩ) | R2 (kΩ) |
|---|---|---|
| RN2707 | 10 | 47 |
| RN2708 | 22 | 47 |
| RN2709 | 47 | 22 |

## Equivalent Circuit (Top View)




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

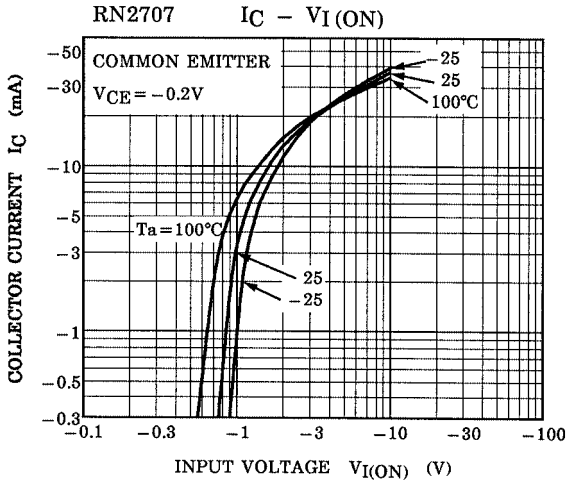
| Characteristic | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Collector-base voltage | RN2707~2709 | $V_{CBO}$ | −50 | V |
| Collector-emitter voltage | | $V_{CEO}$ | −50 | V |
| Emitter-base voltage | RN2707 | $V_{EBO}$ | −6 | V |
| | RN2708 | | −7 | |
| | RN2709 | | −15 | |
| Collector current | RN2707~2709 | $I_C$ | −100 | mA |
| Collector power dissipation | | $P_C$* | 200 | mW |
| Junction temperature | | $T_j$ | 150 | °C |
| Storage temperature range | | $T_{stg}$ | −55~150 | °C |

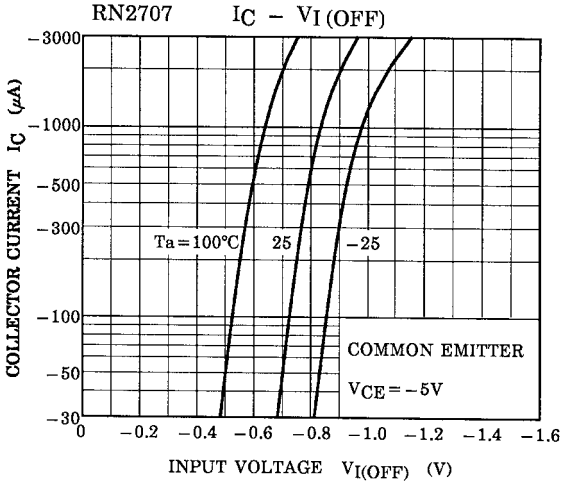
* : Total rating

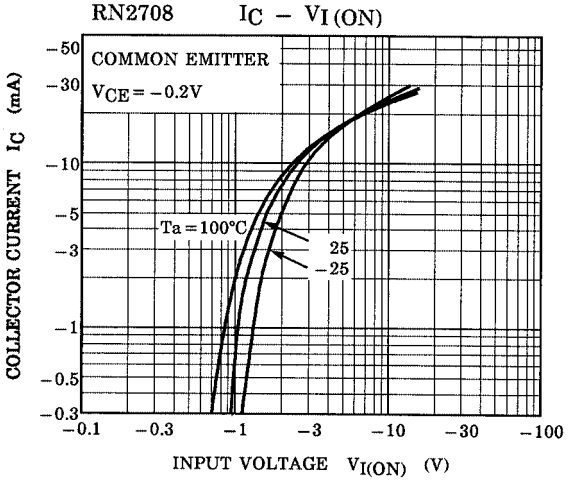
## Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)

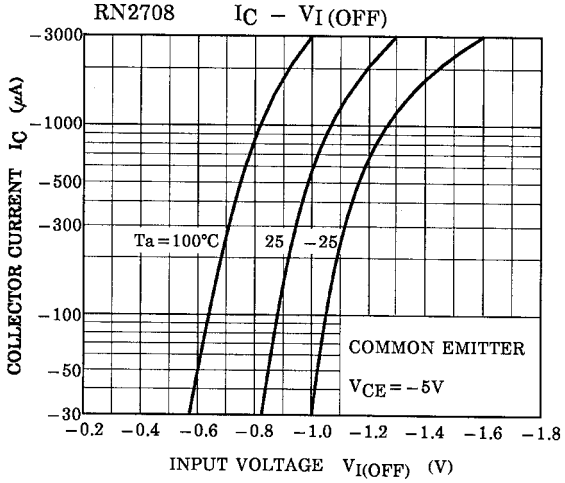
| Characteristic | | Symbol | Test Circuit | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|
| Collector cut-off current | RN2707~2709 | $I_{CBO}$ | — | $V_{CB}$ = −50V, $I_E$ = 0 | — | — | −100 | nA |
| | | $I_{CEO}$ | — | $V_{CE}$ = −50V, $I_B$ = 0 | — | — | −500 | nA |
| Emitter cut-off current | RN2707 | $I_{EBO}$ | — | $V_{EB}$ = −6V, $I_C$ = 0 | −0.081 | — | −0.15 | mA |
| | RN2708 | | — | $V_{EB}$ = −7V, $I_C$ = 0 | −0.078 | — | −0.145 | |
| | RN2709 | | — | $V_{EB}$ = −15V, $I_C$ = 0 | −0.167 | — | −0.311 | |
| DC current gain | RN2707 | $h_{FE}$ | — | $V_{CE}$ = −5V, $I_C$ = −10mA | 80 | — | — | — |
| | RN2708 | | — | | 80 | — | — | |
| | RN2709 | | — | | 70 | — | — | |
| Collector-emitter saturation voltage | RN2707~2709 | $V_{CE\ (sat)}$ | — | $I_C$ = −5mA, $I_B$ = −0.25mA | — | −0.1 | −0.3 | V |
| Input voltage (ON) | RN2707 | $V_{I\ (ON)}$ | — | $V_{CE}$ = −0.2V, $I_C$ = −5mA | −0.7 | — | −1.8 | V |
| | RN2708 | | — | | −1.0 | — | −2.6 | |
| | RN2709 | | — | | −2.2 | — | −5.8 | |
| Input voltage (OFF) | RN2707 | $V_{I\ (OFF)}$ | — | $V_{CE}$ = −5V, $I_C$ = −0.1mA | −0.5 | — | −1.0 | V |
| | RN2708 | | — | | −0.6 | — | −1.16 | |
| | RN2709 | | — | | −1.5 | — | −2.6 | |
| Translation frequency | RN2707~2709 | $f_T$ | — | $V_{CE}$ = −10V, $I_C$ = −5mA | — | 200 | — | MHz |
| Collector output capacitance | RN2707~2709 | $C_{ob}$ | — | $V_{CB}$ = −10V, $I_E$ = 0, f = 1MHz | — | 3 | 6 | pF |
| Input resistor | RN2707 | R1 | — | — | 7 | 10 | 13 | kΩ |
| | RN2708 | | — | | 15.4 | 22 | 28.6 | |
| | RN2709 | | — | | 32.9 | 47 | 61.1 | |
| Resistor ratio | RN2707 | R1/R2 | — | — | 0.191 | 0.213 | 0.232 | — |
| | RN2708 | | — | | 0.421 | 0.468 | 0.515 | |
| | RN2709 | | — | | 1.92 | 2.14 | 2.35 | |

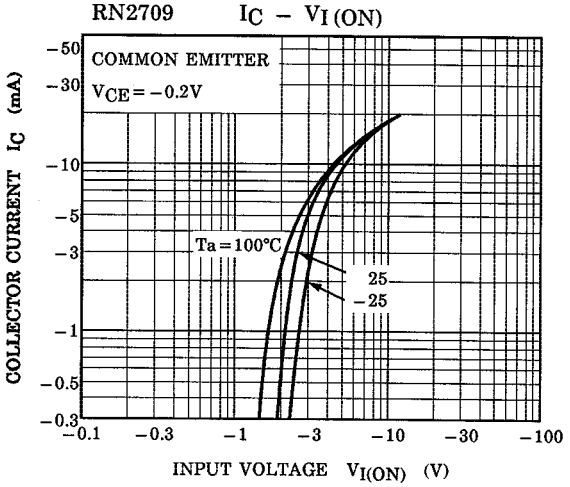
**(Q1, Q2 Common)**

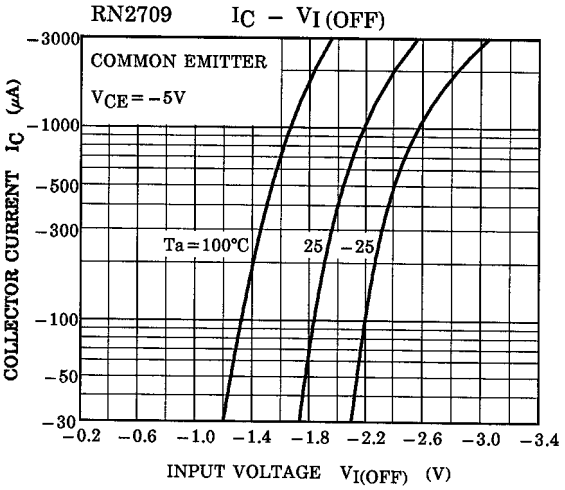

RN2707 IC – VI (ON)
COMMON EMITTER
VCE = −0.2V
Ta = 100°C
25
−25
25
100°C
COLLECTOR CURRENT IC (mA)
INPUT VOLTAGE VI(ON) (V)


RN2707 IC – VI (OFF)
Ta = 100°C
25
−25
COMMON EMITTER
VCE = −5V
COLLECTOR CURRENT IC (μA)
INPUT VOLTAGE VI(OFF) (V)


RN2708 IC – VI (ON)
COMMON EMITTER
VCE = −0.2V
Ta = 100°C
25
−25
COLLECTOR CURRENT IC (mA)
INPUT VOLTAGE VI(ON) (V)


RN2708 IC – VI (OFF)
Ta = 100°C
25
−25
COMMON EMITTER
VCE = −5V
COLLECTOR CURRENT IC (μA)
INPUT VOLTAGE VI(OFF) (V)


RN2709 IC – VI (ON)
COMMON EMITTER
VCE = −0.2V
Ta = 100°C
25
−25
COLLECTOR CURRENT IC (mA)
INPUT VOLTAGE VI(ON) (V)


RN2709 IC – VI (OFF)
COMMON EMITTER
VCE = −5V
Ta = 100°C
25
−25
COLLECTOR CURRENT IC (μA)
INPUT VOLTAGE VI(OFF) (V)