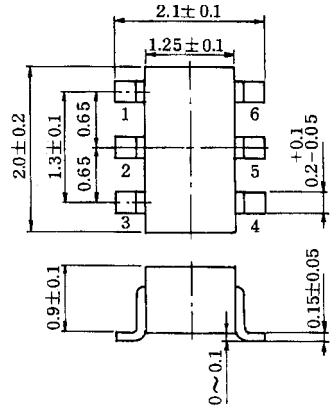
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

# RN1907,RN1908,RN1909

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 RN2907~RN2909

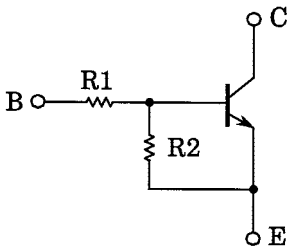
Unit: mm




| | |
|---|---|
| 1. EMITTER 1 | (E1) |
| 2. BASE 1 | (B1) |
| 3. COLLECTOR 2 | (C2) |
| 4. EMITTER 2 | (E2) |
| 5. BASE 2 | (B2) |
| 6. COLLECTOR 1 | (C1) |
| JEDEC | — |
| EIAJ | — |
| TOSHIBA | 2-2J1A |

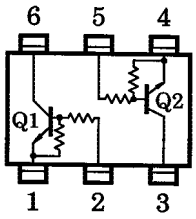
Weight: 6.8mg

## Equivalent Circuit and Bias Resistor Values




| Type No. | R1 (kΩ) | R2 (kΩ) |
|---|---|---|
| RN1907 | 10 | 47 |
| RN1908 | 22 | 47 |
| RN1909 | 47 | 22 |

## Equivalent Circuit (Top View)




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

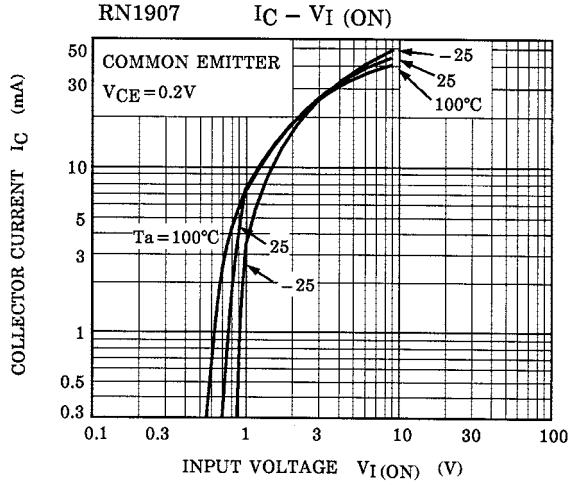
| Characteristic | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Collector-base voltage | RN1907~1909 | $V_{CBO}$ | 50 | V |
| Collector-emitter voltage | | $V_{CEO}$ | 50 | V |
| Emitter-base voltage | RN1907 | $V_{EBO}$ | 6 | V |
| | RN1908 | | 7 | |
| | RN1909 | | 15 | |
| Collector current | RN1907~1909 | $I_C$ | 100 | mA |
| Collector power dissipation | | $P_C$* | 200 | mW |
| Junction temperature | | $T_j$ | 150 | °C |
| Storage temperature range | | $T_{stg}$ | −55~150 | °C |

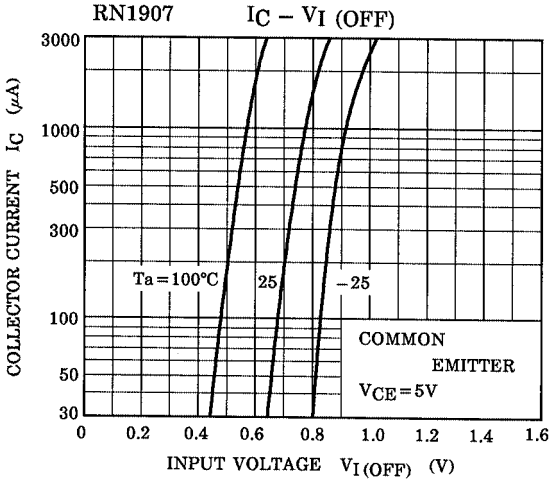
*: Total rating

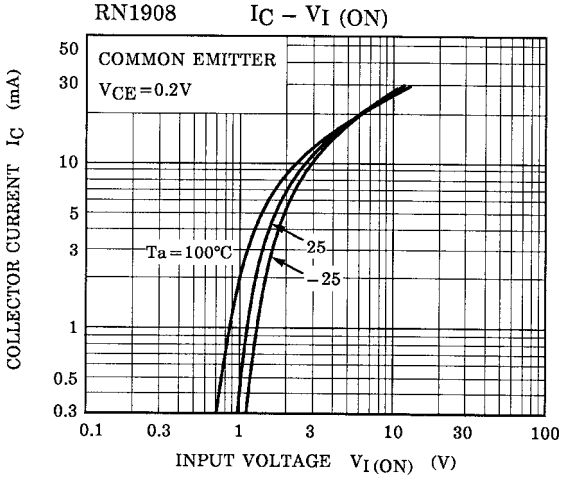
## Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)

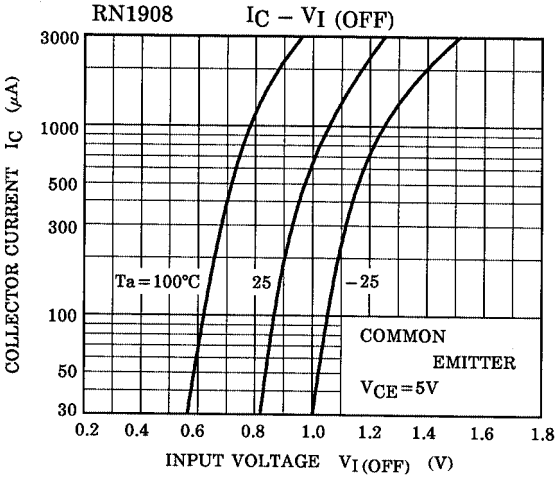
| Characteristic | | Symbol | Test Circuit | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|
| Collector cut-off current | RN1907~1909 | $I_{CBO}$ | — | $V_{CB}$ = 50V, $I_E$ = 0 | — | — | 100 | nA |
| | | $I_{CEO}$ | — | $V_{CE}$ = 50V, $I_B$ = 0 | — | — | 500 | nA |
| Emitter cut-off current | RN1907 | $I_{EBO}$ | — | $V_{EB}$ = 6V, $I_C$ = 0 | 0.081 | — | 0.15 | mA |
| | RN1908 | | — | $V_{EB}$ = 7V, $I_C$ = 0 | 0.078 | — | 0.145 | |
| | RN1909 | | — | $V_{EB}$ = 15V, $I_C$ = 0 | 0.167 | — | 0.311 | |
| DC current gain | RN1907 | $h_{FE}$ | — | $V_{CE}$ = 5V, $I_C$ = 10mA | 80 | — | — | — |
| | RN1908 | | — | | 80 | — | — | |
| | RN1909 | | — | | 70 | — | — | |
| Collector-emitter saturation voltage | RN1907~1909 | $V_{CE\ (sat)}$ | — | $I_C$ = 5mA, $I_B$ = 0.25mA | — | 0.1 | 0.3 | V |
| Input voltage (ON) | RN1907 | $V_{I\ (ON)}$ | — | $V_{CE}$ = 0.2V, $I_C$ = 5mA | 0.7 | — | 1.8 | V |
| | RN1908 | | — | | 1.0 | — | 2.6 | |
| | RN1909 | | — | | 2.2 | — | 5.8 | |
| Input voltage (OFF) | RN1907 | $V_{I\ (OFF)}$ | — | $V_{CE}$ = 5V, $I_C$ = 0.1mA | 0.5 | — | 1.0 | V |
| | RN1908 | | — | | 0.6 | — | 1.16 | |
| | RN1909 | | — | | 1.5 | — | 2.6 | |
| Translation frequency | RN1907~1909 | $f_T$ | — | $V_{CE}$ = 10V, $I_C$ = 5mA | — | 250 | — | MHz |
| Collector output capacitance | RN1907~1909 | $C_{ob}$ | — | $V_{CB}$ = 10V, $I_E$ = 0, f = 1MHz | — | 3 | 6 | pF |
| Input resistor | RN1907 | R1 | — | — | 7 | 10 | 13 | kΩ |
| | RN1908 | | — | | 15.4 | 22 | 28.6 | |
| | RN1909 | | — | | 32.9 | 47 | 61.1 | |
| Resistor ratio | RN1907 | R1/R2 | — | — | 0.191 | 0.213 | 0.232 | — |
| | RN1908 | | — | | 0.421 | 0.468 | 0.515 | |
| | RN1909 | | — | | 1.92 | 2.14 | 2.35 | |

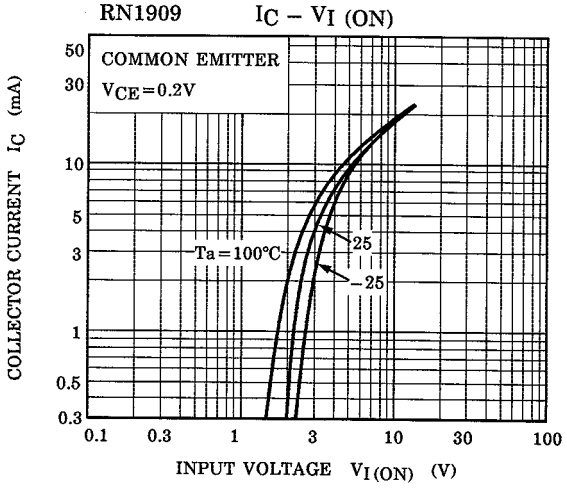
**(Q1, Q2 Common)**

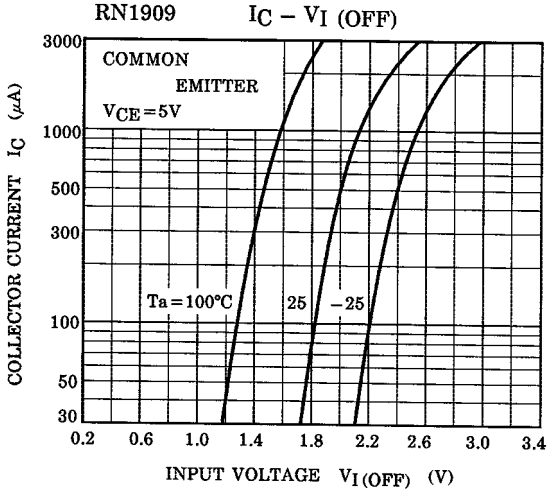

RN1907 $I_C - V_I$ (ON)
COMMON EMITTER
$V_{CE}$ = 0.2V
Ta = 100°C
25
−25
COLLECTOR CURRENT $I_C$ (mA)
INPUT VOLTAGE $V_{I(ON)}$ (V)


RN1907 $I_C - V_I$ (OFF)
Ta = 100°C
25
−25
COMMON EMITTER
$V_{CE}$ = 5V
COLLECTOR CURRENT $I_C$ (μA)
INPUT VOLTAGE $V_{I(OFF)}$ (V)


RN1908 $I_C - V_I$ (ON)
COMMON EMITTER
$V_{CE}$ = 0.2V
Ta = 100°C
25
−25
COLLECTOR CURRENT $I_C$ (mA)
INPUT VOLTAGE $V_{I(ON)}$ (V)


RN1908 $I_C - V_I$ (OFF)
Ta = 100°C
25
−25
COMMON EMITTER
$V_{CE}$ = 5V
COLLECTOR CURRENT $I_C$ (μA)
INPUT VOLTAGE $V_{I(OFF)}$ (V)


RN1909 $I_C - V_I$ (ON)
COMMON EMITTER
$V_{CE}$ = 0.2V
Ta = 100°C
25
−25
COLLECTOR CURRENT $I_C$ (mA)
INPUT VOLTAGE $V_{I(ON)}$ (V)


RN1909 $I_C - V_I$ (OFF)
COMMON EMITTER
$V_{CE}$ = 5V
Ta = 100°C
25
−25
COLLECTOR CURRENT $I_C$ (μA)
INPUT VOLTAGE $V_{I(OFF)}$ (V)