

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL TYPE (PCT PROCESS)

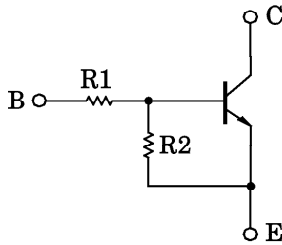
# RN1607, RN1608, RN1609

SWITCHING, INVERTER CIRCUIT, INTERFACE CIRCUIT AND DRIVER CIRCUIT APPLICATIONS.

Unit in mm

- Including Two Devices in SM6 (Super Mini Type with 6 leads)
- With Built-in Bias Resistors
- Simplify Circuit Design
- Reduce a Quantity of Parts and Manufacturing Process
- Complementary to RN2607~RN2609

EQUIVALENT CIRCUIT AND BIAS RESISTOR VALUES



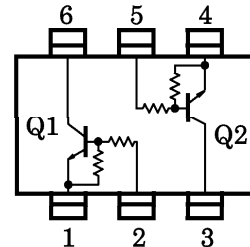
| TYPE NO. | R1 (kΩ) | R2 (kΩ) |
|----------|---------|---------|
| RN1607   | 10      | 47      |
| RN1608   | 22      | 47      |
| RN1609   | 47      | 22      |

|                     |  |
|---------------------|--|
| 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 | 2-3N1A |

Weight : 0.015g

EQUIVALENT CIRCUIT (TOP VIEW)



MAXIMUM RATINGS (Ta = 25°C) (Q1, Q2 COMMON)

| CHARACTERISTIC              |             | SYMBOL           | RATING  | UNIT |
|-----------------------------|-------------|------------------|---------|------|
| Collector-Base Voltage      | RN1607~1609 | V <sub>CB0</sub> | 50      | V    |
| Collector-Emitter Voltage   |             | V <sub>CE0</sub> | 50      | V    |
| Emitter-Base Voltage        | RN1607      | V <sub>EBO</sub> | 6       | V    |
|                             | RN1608      |                  | 7       |      |
|                             | RN1609      |                  | 15      |      |
| Collector Current           | RN1607~1609 | I <sub>C</sub>   | 100     | mA   |
| Collector Power Dissipation |             | P <sub>C</sub> * | 300     | mW   |
| Junction Temperature        |             | T <sub>j</sub>   | 150     | °C   |
| Storage Temperature Range   |             | T <sub>stg</sub> | -55~150 | °C   |

\* Total Rating

961001EAA2

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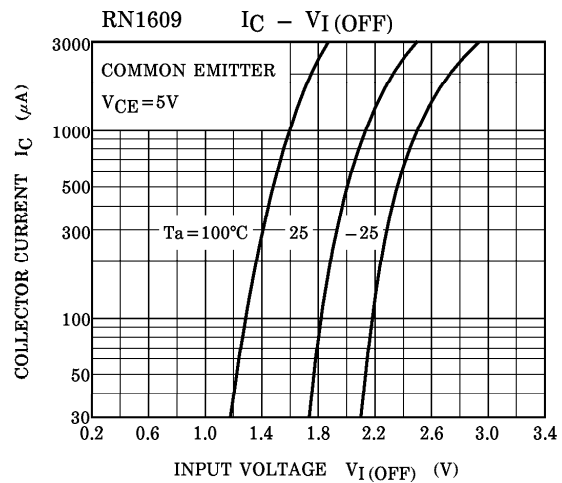
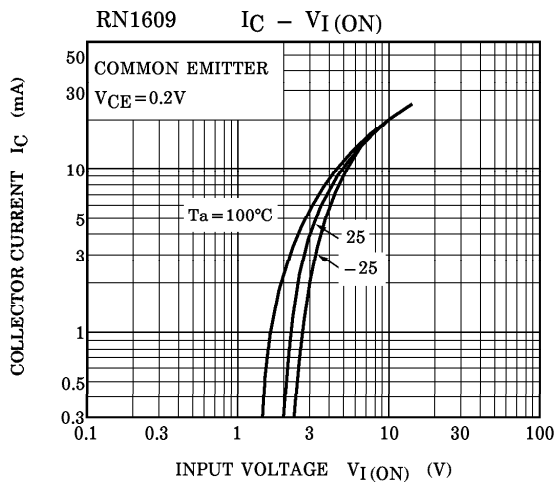
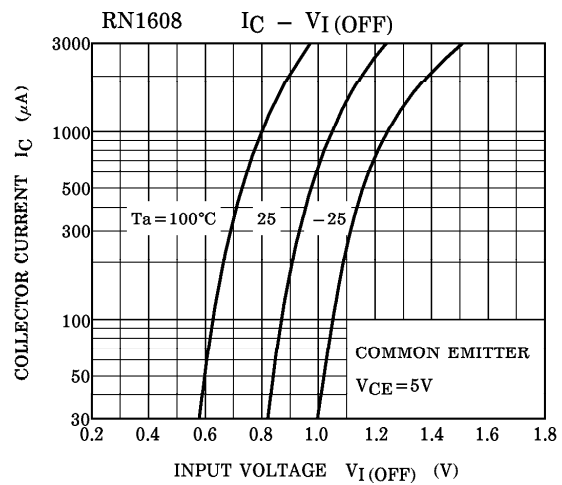
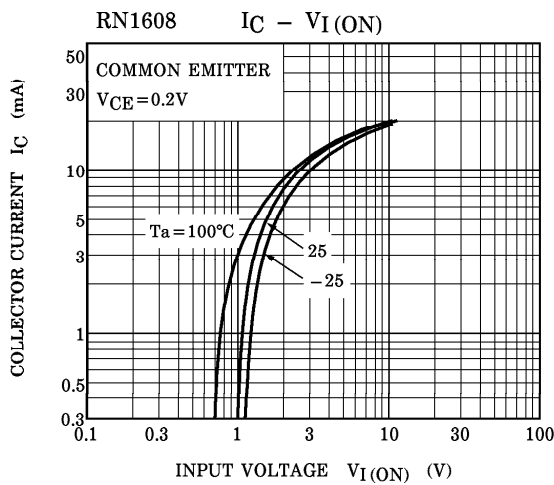
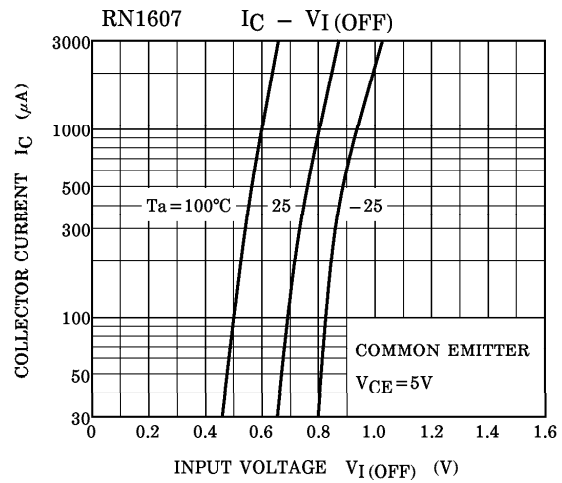
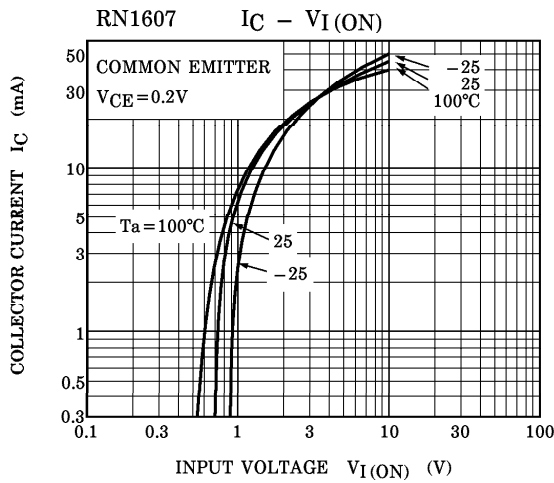
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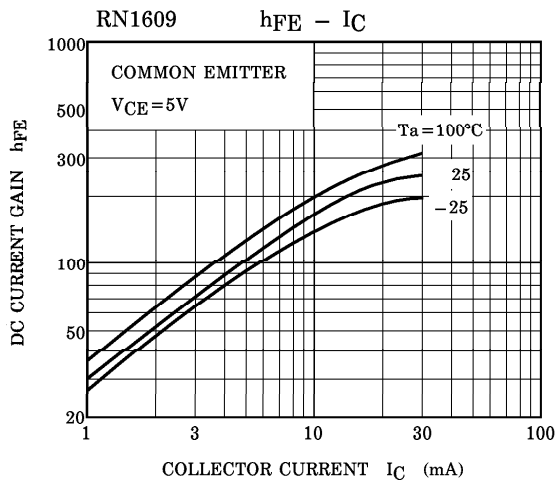
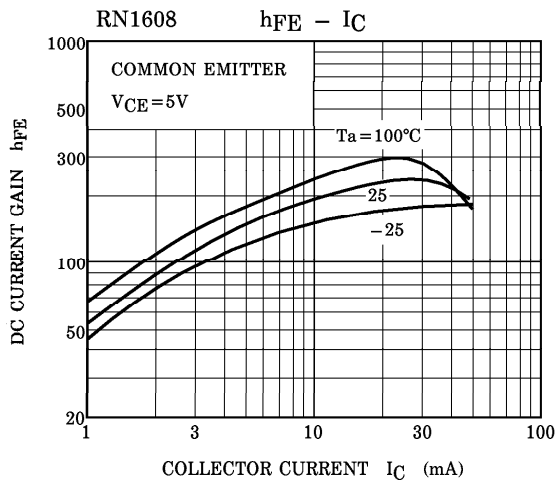
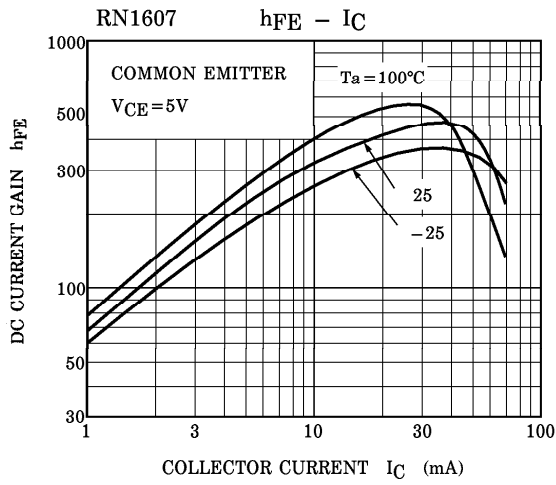
## ELECTRICAL CHARACTERISTICS (Ta = 25°C) (Q1, Q2 COMMON)

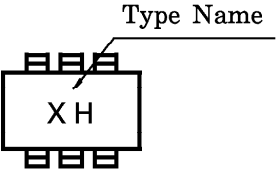
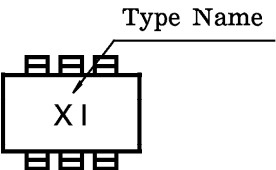
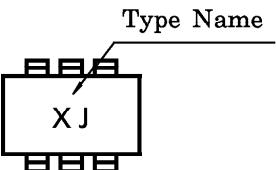
| CHARACTERISTIC                       |             | SYMBOL                | TEST CONDITION                                    | MIN.  | TYP.  | MAX.  | UNIT |
|--------------------------------------|-------------|-----------------------|---|-------|-------|-------|------|
| Collector Cut-off Current            | RN1607~1609 | ICBO                  | V <sub>CB</sub> =50V, I <sub>E</sub> =0           | —     | —     | 100   | nA   |
|                                      |             | ICEO                  | V <sub>CE</sub> =50V, I <sub>B</sub> =0           | —     | —     | 500   | nA   |
| Emitter Cut-off Current              | RN1607      | IEBO                  | V <sub>EB</sub> =6V, I <sub>C</sub> =0            | 0.081 | —     | 0.15  | mA   |
|                                      | RN1608      |                       | V <sub>EB</sub> =7V, I <sub>C</sub> =0            | 0.078 | —     | 0.145 |      |
|                                      | RN1609      |                       | V <sub>EB</sub> =15V, I <sub>C</sub> =0           | 0.167 | —     | 0.311 |      |
| DC Current Gain                      | RN1607      | h <sub>FE</sub>       | V <sub>CE</sub> =5V, I <sub>C</sub> =10mA         | 80    | —     | —     |      |
|                                      | RN1608      |                       |   | 80    | —     | —     |      |
|                                      | RN1609      |                       |   | 70    | —     | —     |      |
| Collector-Emitter Saturation Voltage | RN1607~1609 | V <sub>CE (sat)</sub> | I <sub>C</sub> =5mA, I <sub>B</sub> =0.25mA       | —     | 0.1   | 0.3   | V    |
| Input Voltage (ON)                   | RN1607      | V <sub>I (ON)</sub>   | V <sub>CE</sub> =0.2V, I <sub>C</sub> =5mA        | 0.7   | —     | 1.8   | V    |
|                                      | RN1608      |                       |   | 1.0   | —     | 2.6   |      |
|                                      | RN1609      |                       |   | 2.2   | —     | 5.8   |      |
| Input Voltage (OFF)                  | RN1607      | V <sub>I (OFF)</sub>  | V <sub>CE</sub> =5V, I <sub>C</sub> =0.1mA        | 0.5   | —     | 1.0   | V    |
|                                      | RN1608      |                       |   | 0.6   | —     | 1.16  |      |
|                                      | RN1609      |                       |   | 1.5   | —     | 2.6   |      |
| Transition Frequency                 | RN1607~1609 | f <sub>T</sub>        | V <sub>CE</sub> =10V, I <sub>C</sub> =5mA         | —     | 250   | —     | MHz  |
| Collector Output Capacitance         | RN1607~1609 | C <sub>ob</sub>       | V <sub>CB</sub> =10V, I <sub>E</sub> =0<br>f=1MHz | —     | 3     | 6     | pF   |
| Input Resistor                       | RN1607      | R1                    |   | 7     | 10    | 13    | kΩ   |
|                                      | RN1608      |                       |   | 15.4  | 22    | 28.6  |      |
|                                      | RN1609      |                       |   | 32.9  | 47    | 61.1  |      |
| Resistor Ratio                       | RN1607      | R1 / R2               |   | 0.191 | 0.213 | 0.232 |      |
|                                      | RN1608      |                       |   | 0.421 | 0.468 | 0.515 |      |
|                                      | RN1609      |                       |   | 1.92  | 2.14  | 2.35  |      |

(Q1, Q2 COMMON)



(Q1, Q2 COMMON)



| TYPE NAME | MARKING  |
|-----------|--|
| RN1607    |   |
| RN1608    |   |
| RN1609    |  |