

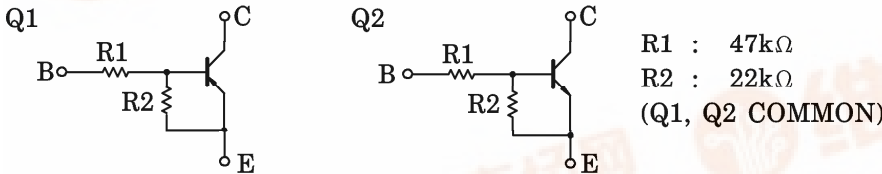
TOSHIBA TRANSISTOR  
SILICON PNP EPITAXIAL TYPE (PCT PROCESS) SILICON NPN EPITAXIAL TYPE (PCT PROCESS)

# RN4609

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

- 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

EQUIVALENT CIRCUIT AND BIAS RESISTOR VALUES



Q1 MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC            | SYMBOL           | RATING | UNIT |
|---------------------------|------------------|--------|------|
| Collector-Base Voltage    | V <sub>CB0</sub> | -50    | V    |
| Collector-Emitter Voltage | V <sub>CEO</sub> | -50    | V    |
| Emitter-Base Voltage      | V <sub>EBO</sub> | -15    | V    |
| Collector Current         | I <sub>C</sub>   | -100   | mA   |

Q2 MAXIMUM RATINGS (Ta = 25°C)

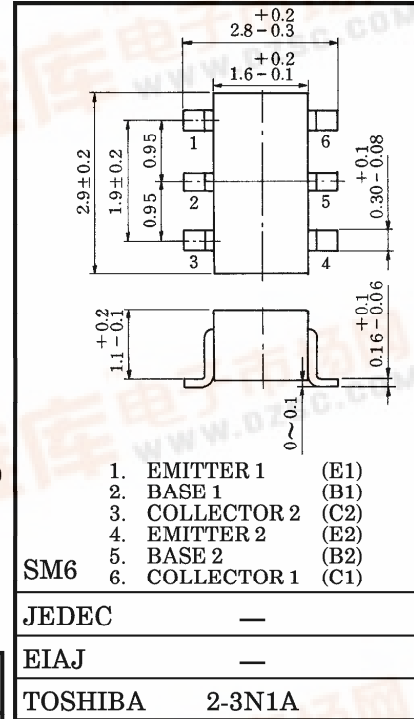
| CHARACTERISTIC            | SYMBOL           | RATING | UNIT |
|---------------------------|------------------|--------|------|
| Collector-Base Voltage    | V <sub>CB0</sub> | 50     | V    |
| Collector-Emitter Voltage | V <sub>CEO</sub> | 50     | V    |
| Emitter-Base Voltage      | V <sub>EBO</sub> | 15     | V    |
| Collector Current         | I <sub>C</sub>   | 100    | mA   |

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

| CHARACTERISTIC              | SYMBOL           | RATING  | UNIT |
|-----------------------------|------------------|---------|------|
| 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   |

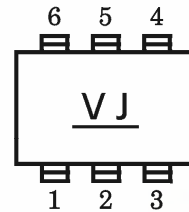
\* : Total Rating

Unit in mm

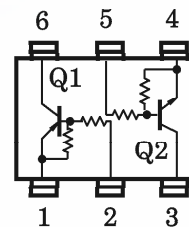


Weight : 0.015g

MARKING



EQUIVALENT CIRCUIT (TOP VIEW)



**Q1 ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

| CHARACTERISTIC                       | SYMBOL               | TEST CONDITION                                       | MIN.   | TYP. | MAX.   | UNIT |
|--------------------------------------|----------------------|--|--------|------|--------|------|
| Collector Cut-off Current            | 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   |      |
| Emitter Cut-off Current              | IEBO                 | V <sub>EB</sub> = -15V, I <sub>C</sub> = 0           | -0.167 | —    | -0.311 | mA   |
| DC Current Gain                      | h <sub>FE</sub>      | V <sub>CE</sub> = -5V, I <sub>C</sub> = -10mA        | 70     | —    | —      |      |
| Collector-Emitter Saturation Voltage | V <sub>CE(sat)</sub> | I <sub>C</sub> = -5mA, I <sub>B</sub> = -0.25mA      | —      | -0.1 | -0.3   | V    |
| Input Voltage (ON)                   | V <sub>I(ON)</sub>   | V <sub>CE</sub> = -0.2V, I <sub>C</sub> = -5mA       | -2.2   | —    | -5.8   | V    |
| Input Voltage (OFF)                  | V <sub>I(OFF)</sub>  | V <sub>CE</sub> = -5V, I <sub>C</sub> = -0.1mA       | -1.5   | —    | -2.6   | V    |
| Transition Frequency                 | f <sub>T</sub>       | V <sub>CE</sub> = -10V, I <sub>C</sub> = -5mA        | —      | 200  | —      | MHz  |
| Collector Output Capacitance         | C <sub>ob</sub>      | V <sub>CB</sub> = -10V, I <sub>E</sub> = 0, f = 1MHz | —      | 3    | 6      | pF   |

**Q2 ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

| CHARACTERISTIC                       | SYMBOL               | TEST CONDITION                                      | MIN.  | TYP. | MAX.  | UNIT |
|--------------------------------------|----------------------|---|-------|------|-------|------|
| Collector Cut-off Current            | 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   |      |
| Emitter Cut-off Current              | IEBO                 | V <sub>EB</sub> = 15V, I <sub>C</sub> = 0           | 0.167 | —    | 0.311 | mA   |
| DC Current Gain                      | h <sub>FE</sub>      | V <sub>CE</sub> = 5V, I <sub>C</sub> = 10mA         | 70    | —    | —     |      |
| Collector-Emitter Saturation Voltage | V <sub>CE(sat)</sub> | I <sub>C</sub> = 5mA, I <sub>B</sub> = 0.25mA       | —     | 0.1  | 0.3   | V    |
| Input Voltage (ON)                   | V <sub>I(ON)</sub>   | V <sub>CE</sub> = 0.2V, I <sub>C</sub> = 5mA        | 2.2   | —    | 5.8   | V    |
| Input Voltage (OFF)                  | V <sub>I(OFF)</sub>  | V <sub>CE</sub> = 5V, I <sub>C</sub> = 0.1mA        | 1.5   | —    | 2.6   | V    |
| Transition Frequency                 | f <sub>T</sub>       | V <sub>CE</sub> = 10V, I <sub>C</sub> = 5mA         | —     | 250  | —     | MHz  |
| Collector Output Capacitance         | C <sub>ob</sub>      | V <sub>CB</sub> = 10V, I <sub>E</sub> = 0, f = 1MHz | —     | 3    | 6     | pF   |

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

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------|--------|----------------|------|------|------|------|
| Input Resistor | R1     | —              | 32.9 | 47   | 61.1 | kΩ   |
| Resistor Ratio | R1/R2  | —              | 1.92 | 2.14 | 2.35 |      |

