

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

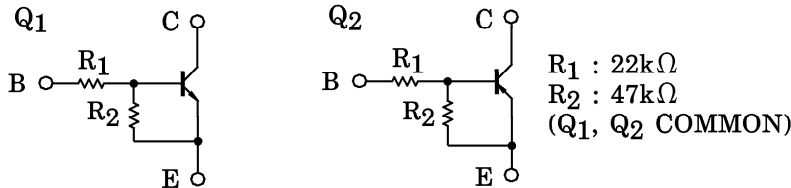
RN4988

SWITCHING, INVERTER CIRCUIT, INTERFACE CIRCUIT
AND DRIVER CIRCUIT APPLICATIONS

Unit in mm

- 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

EQUIVALENT CIRCUIT AND BIAS RESISTOR VALUES



Q1 MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---------------------------|------------------|--------|------|
| Collector-Base Voltage | V _{CBO} | 50 | V |
| Collector-Emitter Voltage | V _{CEO} | 50 | V |
| Emitter-Base Voltage | V _{EB0} | 7 | V |
| Collector Current | I _C | 100 | mA |

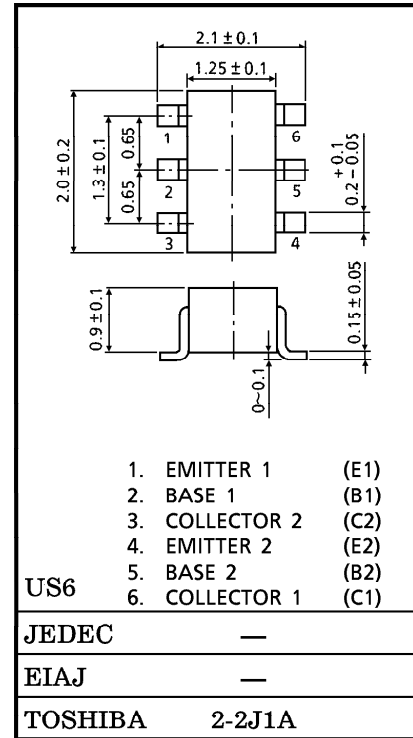
Q2 MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---------------------------|------------------|--------|------|
| Collector-Base Voltage | V _{CBO} | -50 | V |
| Collector-Emitter Voltage | V _{CEO} | -50 | V |
| Emitter-Base Voltage | V _{EB0} | -7 | V |
| Collector Current | I _C | -100 | mA |

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

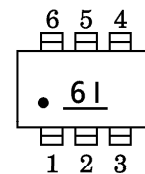
| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|-----------------------------|------------------|---------|------|
| Collector Power Dissipation | P _C ※ | 200 | mW |
| Junction Temperature | T _j | 150 | °C |
| Storage Temperature Range | T _{stg} | -55~150 | °C |

※ : Total Rating

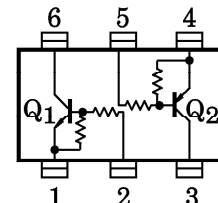


Weight : 6.8mg

MARKING



EQUIVALENT CIRCUIT (TOP VIEW)



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Q1 ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|---------------|-----------------------------------|-------|------|-------|------|
| Collector Cut-off Current | I_{CBO} | $V_{CB} = 50V, I_E = 0$ | — | — | 100 | nA |
| | I_{CEO} | $V_{CE} = 50V, I_B = 0$ | — | — | 500 | |
| Emitter Cut-off Current | I_{EBO} | $V_{EB} = 7V, I_C = 0$ | 0.078 | — | 0.145 | mA |
| DC Current Gain | h_{FE} | $V_{CE} = 5V, I_C = 10mA$ | 80 | — | — | |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 5mA, I_B = 0.25mA$ | — | 0.1 | 0.3 | V |
| Input Voltage (ON) | $V_{I(ON)}$ | $V_{CE} = 0.2V, I_C = 5mA$ | 1.0 | — | 2.6 | V |
| Input Voltage (OFF) | $V_{I(OFF)}$ | $V_{CE} = 5V, I_C = 0.1mA$ | 0.6 | — | 1.16 | V |
| Transition Frequency | f_T | $V_{CE} = 10V, I_C = 5mA$ | — | 250 | — | MHz |
| Collector Output Capacitance | C_{ob} | $V_{CB} = 10V, I_E = 0, f = 1MHz$ | — | 3 | 6 | pF |

Q2 ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|---------------|------------------------------------|--------|------|--------|------|
| Collector Cut-off Current | I_{CBO} | $V_{CB} = -50V, I_E = 0$ | — | — | -100 | nA |
| | I_{CEO} | $V_{CE} = -50V, I_B = 0$ | — | — | -500 | |
| Emitter Cut-off Current | I_{EBO} | $V_{EB} = -7V, I_C = 0$ | -0.078 | — | -0.145 | mA |
| DC Current Gain | h_{FE} | $V_{CE} = -5V, I_C = -10mA$ | 80 | — | — | |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = -5mA, I_B = -0.25mA$ | — | -0.1 | -0.3 | V |
| Input Voltage (ON) | $V_{I(ON)}$ | $V_{CE} = -0.2V, I_C = -5mA$ | -1.0 | — | -2.6 | V |
| Input Voltage (OFF) | $V_{I(OFF)}$ | $V_{CE} = -5V, I_C = -0.1mA$ | -0.6 | — | -1.16 | V |
| Transition 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 |

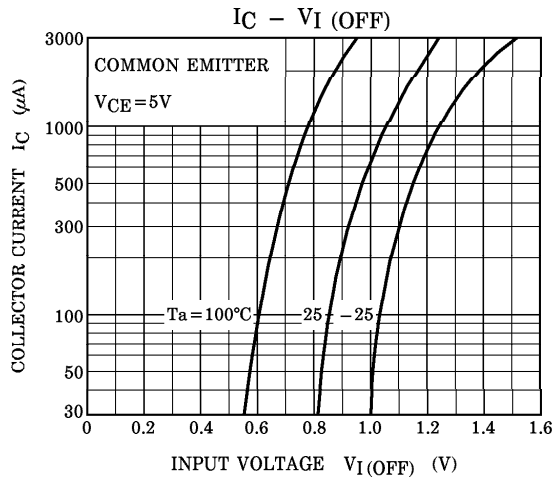
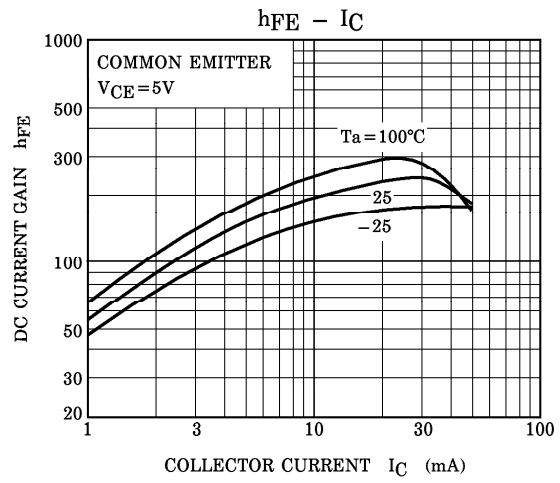
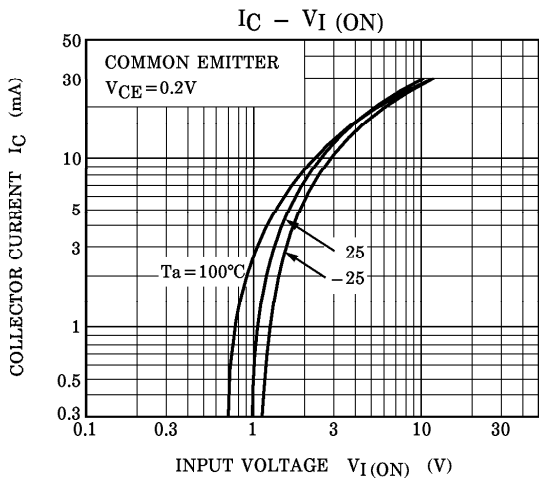
Q1, Q2 COMMON ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------|---------|----------------|-------|-------|-------|------|
| Input Resistor | R1 | — | 15.4 | 22 | 28.6 | kΩ |
| Resistor Ratio | R1 / R2 | — | 0.421 | 0.468 | 0.515 | |

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Q1



Q₂

