

# Digital transistors (built-in resistor)

## DTC314TU / DTC314TK / DTC314TS

### ●Features

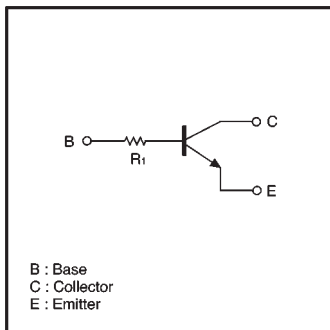
In addition to the features of regular digital transistors,

- 1) Low saturation voltage, typically  $V_{CE(sat)} = 40\text{mV}$  at  $I_C/I_B = 50\text{mA}/2.5\text{mA}$ , makes these transistors ideal for muting circuits.
- 2) These transistors can be used at high current levels,  $I_C = 600\text{mA}$ .

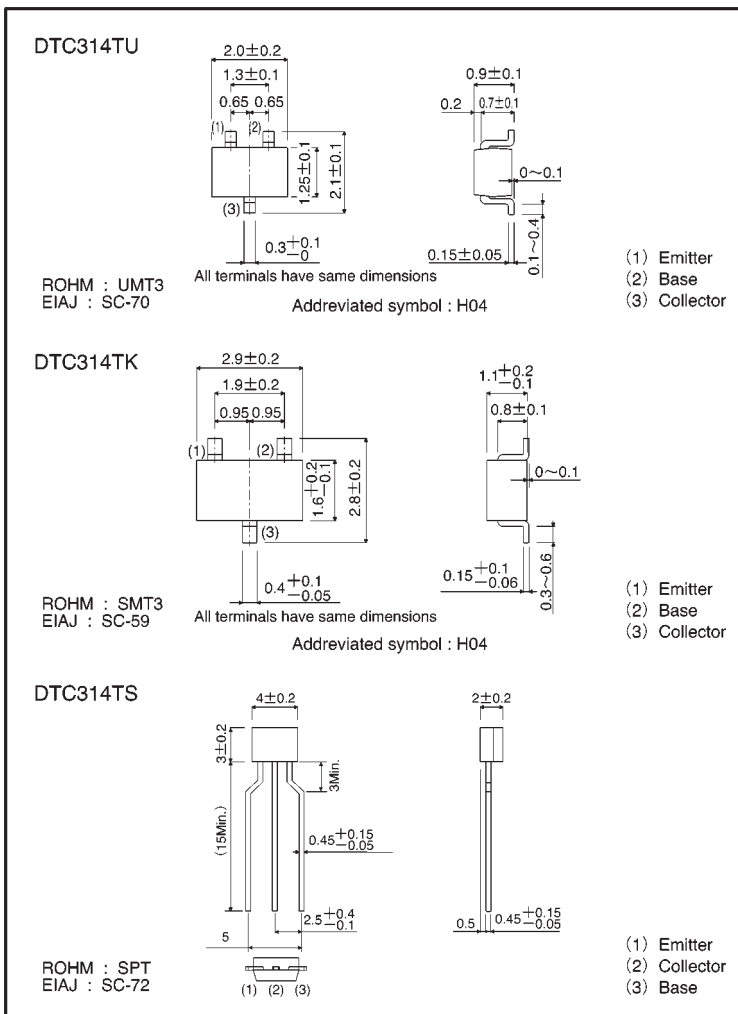
### ●Structure

NPN digital transistor  
(Built-in resistor type)

### ●Equivalent circuit



### ●External dimensions (Units: mm)



● Absolute maximum ratings (Ta = 25°C)

| Parameter                   | Symbol           | Limits(DTC314T□) |     |   | Unit |
|-----------------------------|------------------|------------------|-----|---|------|
|                             |                  | U                | K   | S |      |
| Collector-base voltage      | V <sub>CB0</sub> | 30               |     |   | V    |
| Collector-emitter voltage   | V <sub>CE0</sub> | 15               |     |   | V    |
| Emitter-base voltage        | V <sub>EB0</sub> | 5                |     |   | V    |
| Collector current           | I <sub>c</sub>   | 600              |     |   | mA   |
| Collector power dissipation | P <sub>c</sub>   | 200              | 300 |   | mW   |
| Junction temperature        | T <sub>J</sub>   | 150              |     |   | °C   |
| Storage temperature         | T <sub>stg</sub> | -55~+150         |     |   | °C   |

● Electrical characteristics (Ta = 25°C)

| Parameter                            | Symbol               | Min. | Typ. | Max. | Unit | Conditions  |
|--------------------------------------|----------------------|------|------|------|------|---|
| Collector-base breakdown voltage     | BV <sub>CB0</sub>    | 30   | —    | —    | V    | I <sub>c</sub> =50 μA                                   |
| Collector-emitter breakdown voltage  | BV <sub>CE0</sub>    | 15   | —    | —    | V    | I <sub>c</sub> =1mA                                     |
| Emitter-base breakdown voltage       | BV <sub>EB0</sub>    | 5    | —    | —    | V    | I <sub>E</sub> =50 μA                                   |
| Collector cutoff current             | I <sub>CB0</sub>     | —    | —    | 0.5  | μA   | V <sub>CB</sub> =20V                                    |
| Emitter cutoff current               | I <sub>EB0</sub>     | —    | —    | 0.5  | μA   | V <sub>EB</sub> =4V                                     |
| Collector-emitter saturation voltage | V <sub>CE(sat)</sub> | —    | 40   | 80   | mV   | I <sub>c</sub> /I <sub>B</sub> =50mA/2.5mA              |
| DC current transfer ratio            | h <sub>FE</sub>      | 100  | 250  | 600  | —    | V <sub>CE</sub> =5V, I <sub>c</sub> =50mA               |
| Input resistance                     | R <sub>i</sub>       | 7    | 10   | 13   | kΩ   | —   |
| Transition frequency                 | f <sub>T</sub>       | —    | 200  | —    | MHz  | V <sub>CE</sub> =10V, I <sub>E</sub> =-50mA, f=100MHz * |
| Output "ON" resistance               | R <sub>on</sub>      | —    | 1.5  | —    | Ω    | V <sub>i</sub> =7V, R <sub>L</sub> =1kΩ, f=1kHz         |

\* Transition frequency of the device

● Packaging specifications

| Part No. | Package                      | UMT3   | SMT3   | SPT    |
|----------|------------------------------|--------|--------|--------|
|          | Packaging type               | Taping | Taping | Taping |
|          | Code                         | T106   | T146   | TP     |
|          | Basic ordering unit (pieces) | 3000   | 3000   | 5000   |
| DTC314TU |                              | ○      | —      | —      |
| DTC314TK |                              | —      | ○      | —      |
| DTC314TS |                              | —      | —      | ○      |

● R<sub>on</sub> measurement circuit

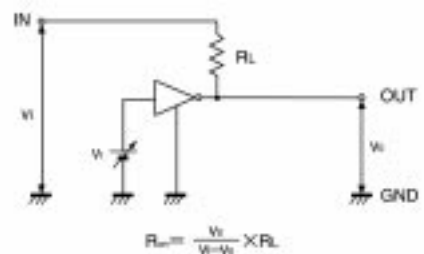


Fig.1 Output "ON" resistance (R<sub>on</sub>) measurement circuit

● Electrical characteristic curves

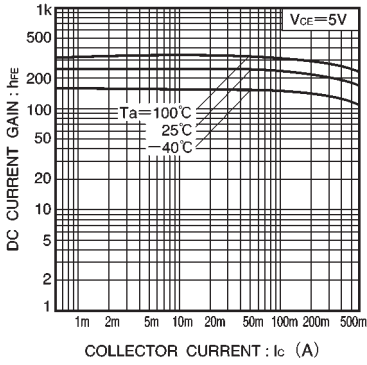


Fig.2 DC current gain vs. collector current

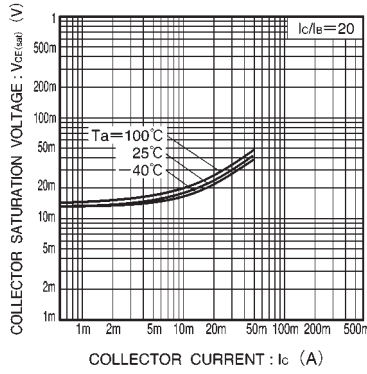


Fig.3 Collector-emitter saturation voltage vs. collector current

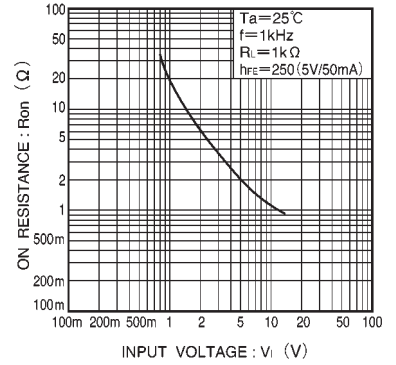


Fig.4 "ON" resistance vs. input voltage