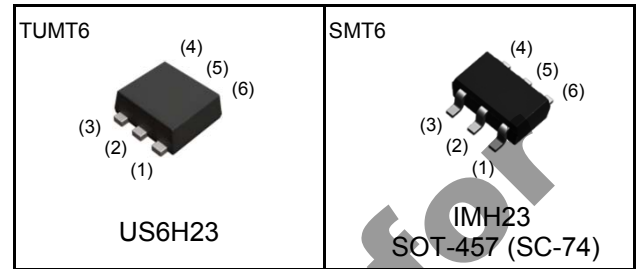


| Parameter | Tr1 and Tr2   |
|-----------|---------------|
| $V_{CEO}$ | 20V           |
| $V_{EBO}$ | 12V           |
| $I_C$     | 600mA         |
| $R_1$     | 4.7k $\Omega$ |

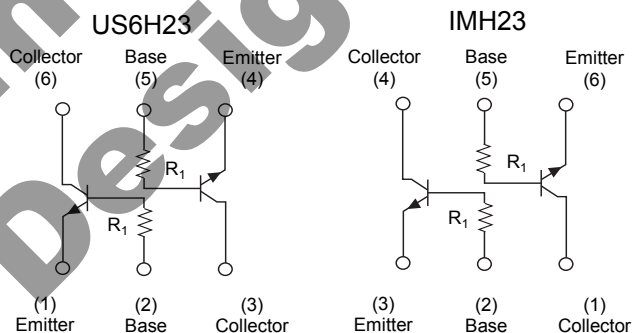
## ●Outline



## ●Features

- 1) Built-In Biasing Resistors
- 2) Two DTC643T chips in one package.
- 3) 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.
- 4) These transistors can be used at high current levels,  $I_C = 600\text{mA}$ .
- 5) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).
- 6) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of completely eliminating parasitic effects.
- 7) Lead Free/RoHS Compliant.

## ●Inner circuit



## ●Application

Muting circuit

## ●Packaging specifications

| Part No. | Package | Package size (mm) | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit (pcs) | Marking |
|----------|---------|-------------------|-------------|----------------|-----------------|---------------------------|---------|
| US6H23   | TUMT6   | 2021              | TN          | 180            | 8               | 3,000                     | H23     |
| IMH23    | SMT6    | 2928              | T110        | 180            | 8               | 3,000                     | H23     |

● **Absolute maximum ratings** (Ta = 25°C)

<For Tr1 and Tr2 in common>

| Parameter                    |        | Symbol        | Values                   | Unit |
|------------------------------|--------|---------------|--------------------------|------|
| Collector-base voltage       |        | $V_{CBO}$     | 20                       | V    |
| Collector-emitter voltage    |        | $V_{CEO}$     | 20                       | V    |
| Emitter-base voltage         |        | $V_{EBO}$     | 12                       | V    |
| Collector current            |        | $I_C$         | 600                      | mA   |
|                              |        | $I_{CP}^{*1}$ | 1                        | A    |
| Power dissipation            | US6H23 | $P_D^{*2}$    | 1(TOTAL) <sup>*3</sup>   | W    |
|                              | IMH23  | $P_D^{*4}$    | 300(TOTAL) <sup>*5</sup> | mW   |
| Junction temperature         |        | $T_j$         | 150                      | °C   |
| Range of storage temperature |        | $T_{stg}$     | -55 to +150              | °C   |

● **Electrical characteristics** (Ta = 25°C)

<For Tr1 and Tr2 in common>

| Parameter                            | Symbol        | Conditions                                  | Min. | Typ. | Max. | Unit       |
|--------------------------------------|---------------|---------------------------------------------|------|------|------|------------|
| Collector-base breakdown voltage     | $BV_{CBO}$    | $I_C = 50\mu A$                             | 20   | -    | -    | V          |
| Collector-emitter breakdown voltage  | $BV_{CEO}$    | $I_C = 1mA$                                 | 20   | -    | -    | V          |
| Emitter-base breakdown voltage       | $BV_{EBO}$    | $I_E = 50\mu A$                             | 12   | -    | -    | V          |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB} = 20V$                              | -    | -    | 0.5  | $\mu A$    |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB} = 12V$                              | -    | -    | 0.5  | $\mu A$    |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C / I_B = 50mA / 2.5mA$                  | -    | 40   | 150  | mV         |
| DC current gain                      | $h_{FE}$      | $V_{CE} = 5V, I_C = 50mA$                   | 820  | -    | 2700 | -          |
| Input resistance                     | $R_1$         | -                                           | 3.29 | 4.7  | 6.11 | k $\Omega$ |
| Transition frequency                 | $f_T^{*6}$    | $V_{CE} = 10V, I_E = -50mA$<br>$f = 100MHz$ | -    | 150  | -    | MHz        |
| Output ON Resistance                 | $R_{on}$      | $V_I = 5V$<br>$R_L = 1k\Omega, f = 1kHz$    | -    | 0.55 | -    | $\Omega$   |

\*1  $P_W = 10ms$ , Single pulse

\*2 Mounted on a ceramic board

\*3 700mW per element mounted on ceramic board.

\*4 Each terminal mounted on a reference footprint

\*5 200mW per element must not be exceeded.

\*6 Characteristics of built-in transistor

●Electrical characteristic curves(Ta = 25°C)

Fig.1 Grounded emitter propagation characteristics

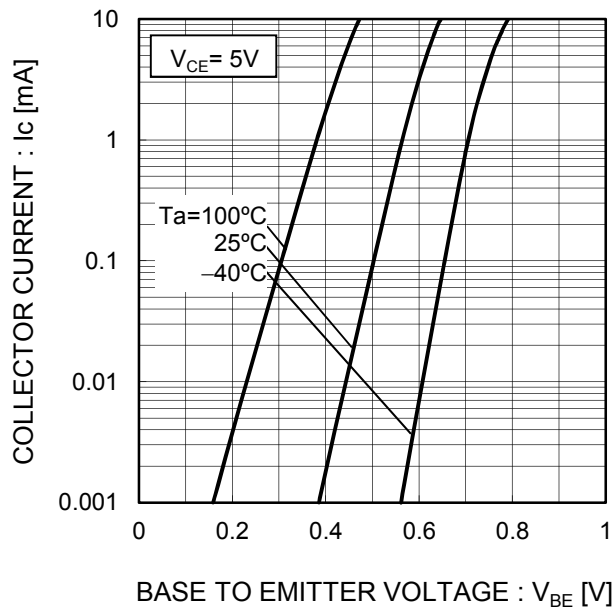


Fig.2 Grounded emitter output characteristics

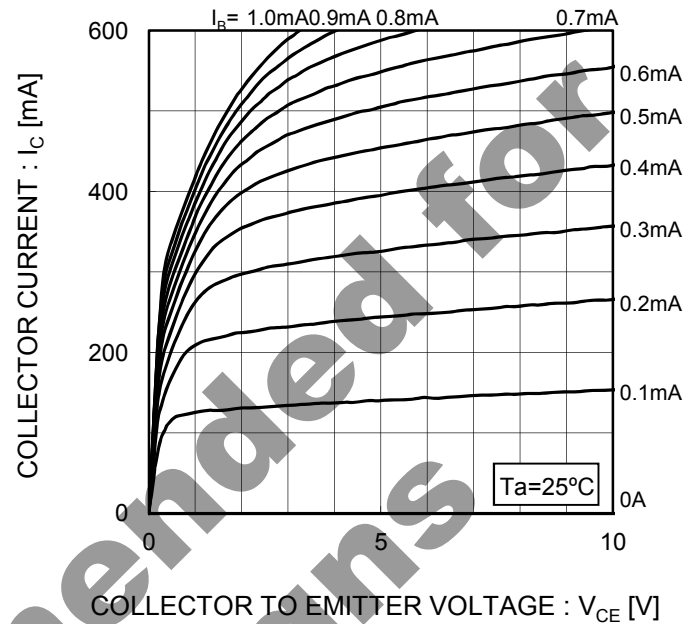


Fig.3 DC Current gain vs. Collector Current

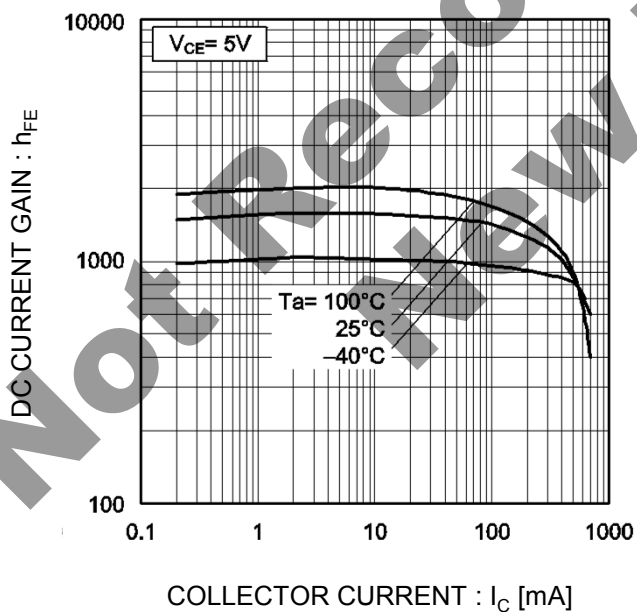
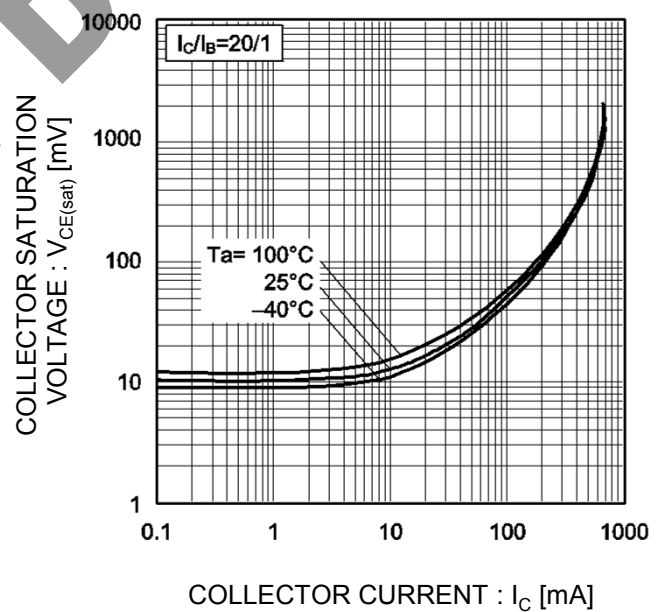


Fig.4 Collector-emitter saturation voltage vs. Collector Current



●Electrical characteristic curves(Ta = 25°C)

Fig.5 Output ON resistance  
vs. input voltage

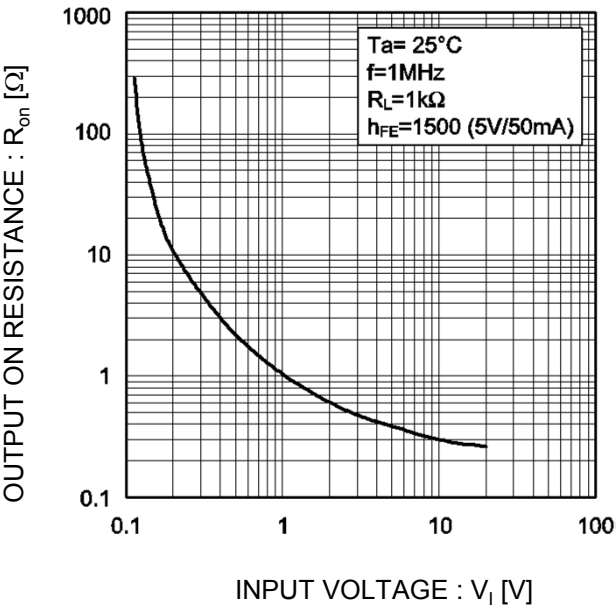
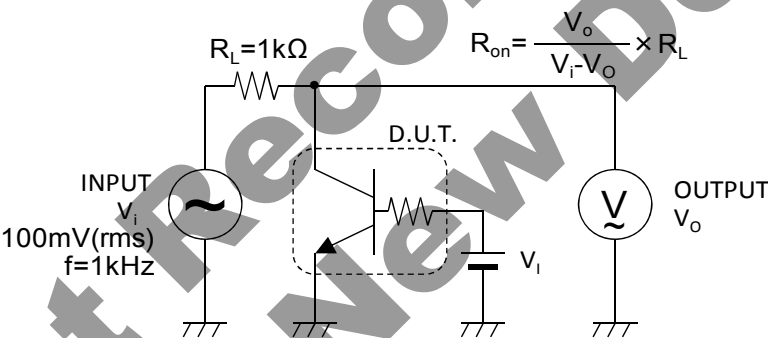
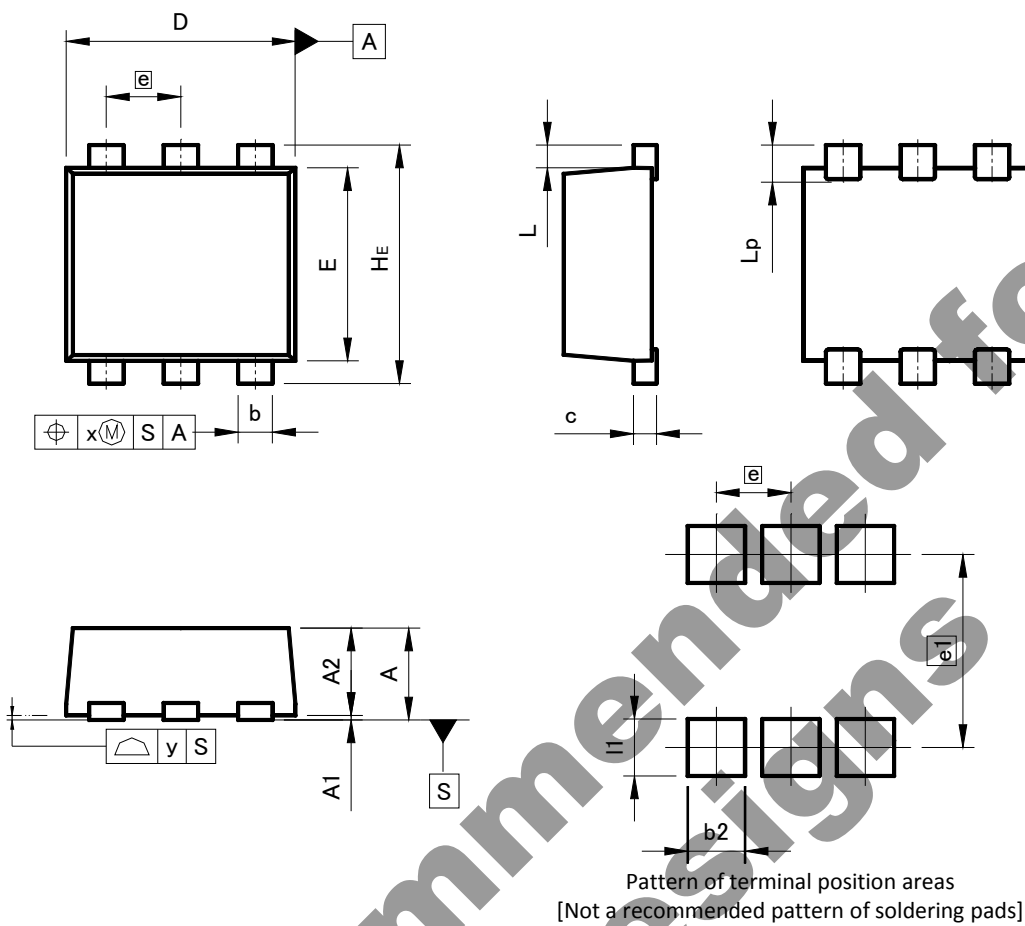


Fig.6 Ron measurement circuit.



●Dimensions (Unit : mm)

TUMT6



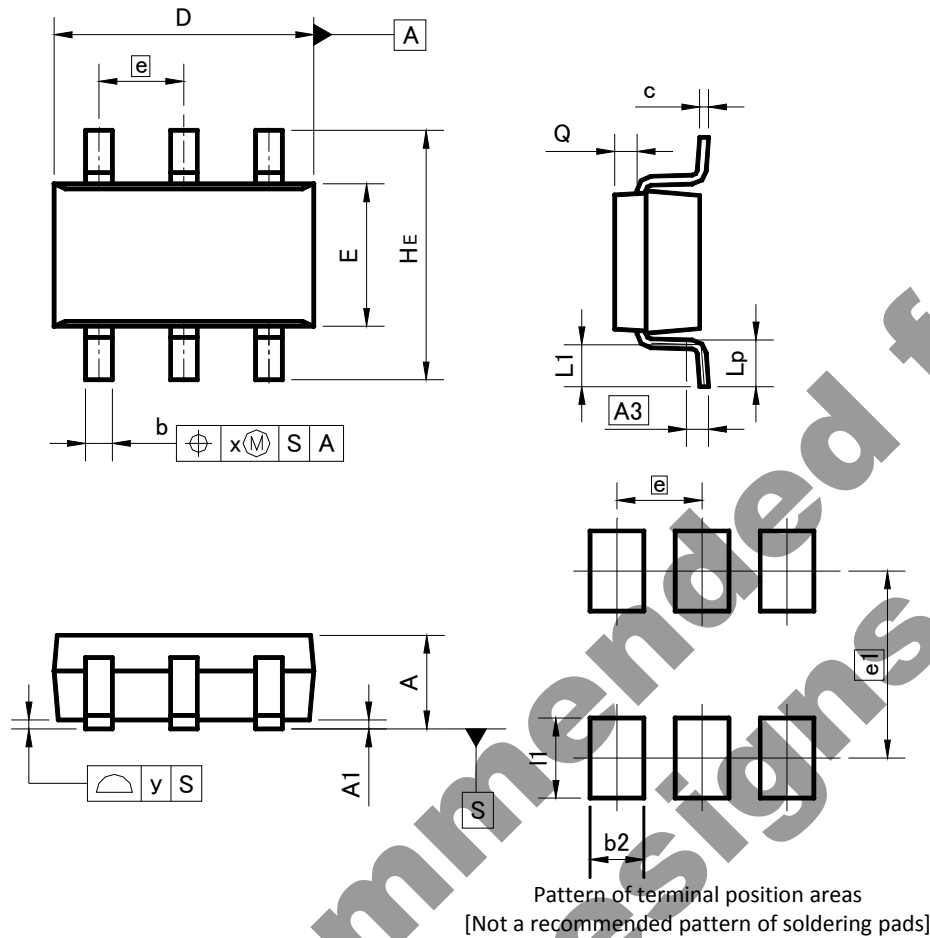
| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | —          | 0.85 | —      | 0.033 |
| A1  | 0.00       | 0.10 | 0.000  | 0.004 |
| A2  | 0.72       | 0.82 | 0.028  | 0.032 |
| b   | 0.25       | 0.40 | 0.010  | 0.016 |
| c   | 0.12       | 0.22 | 0.005  | 0.009 |
| D   | 1.90       | 2.10 | 0.075  | 0.083 |
| E   | 1.60       | 1.80 | 0.063  | 0.071 |
| e   | 0.65       |      | 0.026  |       |
| HE  | 2.00       | 2.20 | 0.079  | 0.087 |
| L   | 0.20       |      | 0.008  |       |
| Lp  | —          | 0.40 | —      | 0.016 |
| x   | —          | 0.10 | —      | 0.004 |
| y   | —          | 0.10 | —      | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | —          | 0.50 | —      | 0.020 |
| e1  | 1.70       |      | 0.067  |       |
| l1  | —          | 0.50 | —      | 0.020 |

Dimension in mm / inches

## ●Dimensions (Unit : mm)

SMT6



| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 1.00       | 1.30 | 0.039  | 0.051 |
| A1  | 0.00       | 0.10 | 0.000  | 0.004 |
| A3  | 0.25       |      | 0.010  |       |
| b   | 0.25       | 0.40 | 0.010  | 0.016 |
| c   | 0.09       | 0.25 | 0.004  | 0.010 |
| D   | 2.80       | 3.00 | 0.110  | 0.118 |
| E   | 1.50       | 1.80 | 0.059  | 0.071 |
| e   | 0.95       |      | 0.037  |       |
| HE  | 2.60       | 3.00 | 0.102  | 0.118 |
| L1  | 0.30       | 0.60 | 0.012  | 0.024 |
| Lp  | 0.40       | 0.70 | 0.016  | 0.028 |
| Q   | 0.20       | 0.30 | 0.008  | 0.012 |
| x   | —          | 0.20 | —      | 0.008 |
| y   | —          | 0.10 | —      | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | —          | 0.60 | —      | 0.024 |
| e1  | 2.10       |      | 0.083  |       |
| l1  | —          | 0.90 | —      | 0.035 |

Dimension in mm / inches

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