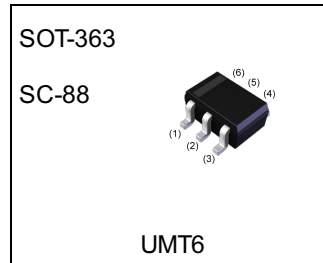


| Parameter | DTr1 and DTr2 |
|-----------|---------------|
| $V_{CEO}$ | 20V           |
| $I_C$     | 400mA         |
| $R_1$     | 2.2k $\Omega$ |

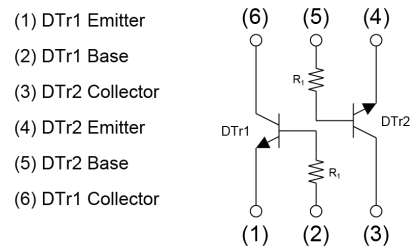
### ●Outline



### ●Features

- 1) Built-In Biasing Resistor,  $R_1 = 2.2k\Omega$
- 2) Two DTC923TUB chips in one package.
- 3) High Breakdown Voltage of Emitter to Base  $BV_{EBO}$  is Min. 40V at  $I_E=50\mu A$
- 4) Low Output ON Resistance.  $R_{ON}$  is Typ. 0.6 $\Omega$  at  $V_I=5V$
- 5) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner circuit).

### ●Inner circuit



### ●Application

MUTING

### ●Packaging specifications

| Part No. | Package        | Package size | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit.(pcs) | Marking |
|----------|----------------|--------------|-------------|----------------|-----------------|---------------------------|---------|
| UMH33N   | SOT-363 (UMT6) | 2021         | TR          | 180            | 8               | 3000                      | H33     |

### ●Notice

This product might cause chip aging and breakdown under the large electrified environment. Please consider to design ESD protection circuit.

● **Absolute maximum ratings** ( $T_a = 25^\circ\text{C}$ )

<For DTr1 and DTr2 in common>

| Parameter                    | Symbol                | Values      | Unit             |
|------------------------------|-----------------------|-------------|------------------|
| Collector-base voltage       | $V_{\text{CBO}}$      | 40          | V                |
| Collector-emitter voltage    | $V_{\text{CEO}}$      | 20          | V                |
| Emitter-base voltage         | $V_{\text{EBO}}$      | 40          | V                |
| Collector current            | $I_{\text{C}}$        | 400         | mA               |
| Power dissipation            | $P_{\text{D}}^{*1*2}$ | 150         | mW/Total         |
| Junction temperature         | $T_{\text{j}}$        | 150         | $^\circ\text{C}$ |
| Range of storage temperature | $T_{\text{stg}}$      | -55 to +150 | $^\circ\text{C}$ |

● **Electrical characteristics** ( $T_a = 25^\circ\text{C}$ )

<For DTr1 and DTr2 in common>

| Parameter                            | Symbol               | Conditions   | Values |      |      | Unit       |
|--------------------------------------|----------------------|--|--------|------|------|------------|
|                                      |                      |  | Min.   | Typ. | Max. |            |
| Collector-base breakdown voltage     | $BV_{\text{CBO}}$    | $I_{\text{C}} = 50\mu\text{A}$   | 40     | -    | -    | V          |
| Collector-emitter breakdown voltage  | $BV_{\text{CEO}}$    | $I_{\text{C}} = 1\text{mA}$  | 20     | -    | -    | V          |
| Emitter-base breakdown voltage       | $BV_{\text{EBO}}$    | $I_{\text{E}} = 50\mu\text{A}$   | 40     | -    | -    | V          |
| Collector cut-off current            | $I_{\text{CBO}}$     | $V_{\text{CB}} = 40\text{V}$   | -      | -    | 500  | nA         |
| Emitter cut-off current              | $I_{\text{EBO}}$     | $V_{\text{EB}} = 40\text{V}$   | -      | -    | 500  | nA         |
| Collector-emitter saturation voltage | $V_{\text{CE(sat)}}$ | $I_{\text{C}} = 30\text{mA}, I_{\text{B}} = 3\text{mA}$  | -      | 30   | 100  | mV         |
| DC current gain                      | $h_{\text{FE}}$      | $V_{\text{CE}} = 5\text{V}, I_{\text{C}} = 10\text{mA}$  | 820    | -    | 2700 | -          |
| Transition frequency                 | $f_{\text{T}}^{*3}$  | $V_{\text{CE}} = 6\text{V}, I_{\text{E}} = -4\text{mA},$<br>$f = 10\text{MHz}$                         | -      | 35   | -    | MHz        |
| Input resistance                     | $R_{\text{i}}$       | -  | 1.54   | 2.2  | 2.86 | k $\Omega$ |
| Output on resistance                 | $R_{\text{on}}$      | $V_{\text{i}} = 5\text{V},$<br>$R_{\text{L}} = 1\text{k}\Omega, f = 1\text{kHz}$<br>(See test circuit) | -      | 0.6  | -    | $\Omega$   |

\*1 Each terminal mounted on a reference land.

\*2 120mW per element must not be exceeded.

\*3 Characteristics of built-in transistor

● Electrical characteristic curves ( $T_a = 25^\circ\text{C}$ )

<For DTr1 and DTr2 in common>

Fig.1 Grounded emitter propagation characteristics

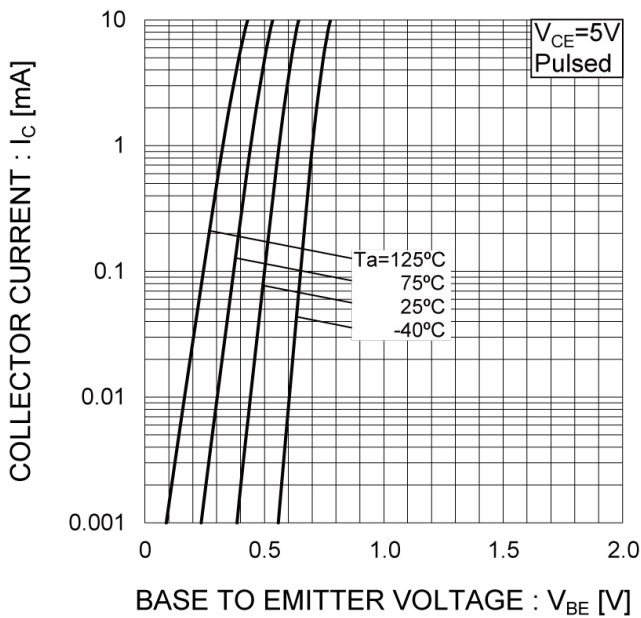


Fig.2 Grounded emitter output characteristics

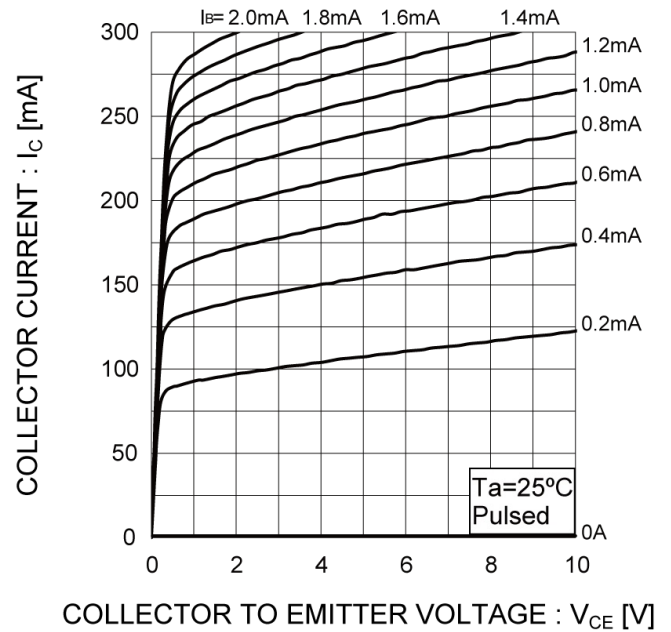


Fig.3 DC Current gain vs. Collector Current

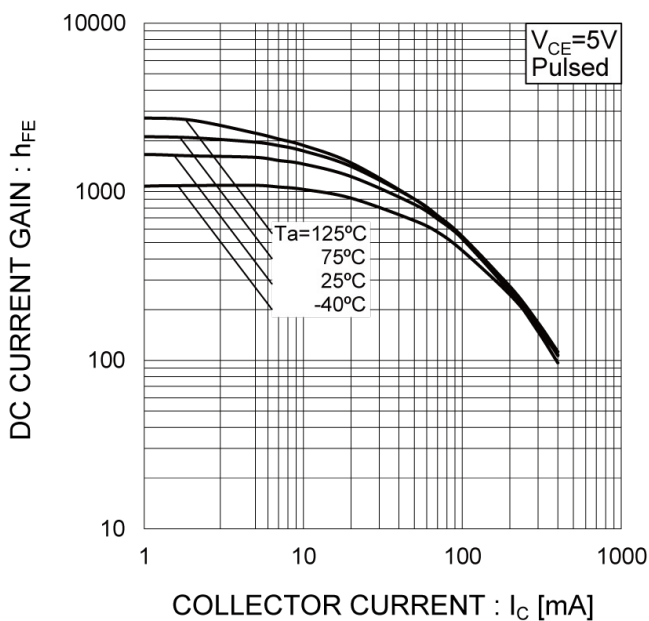
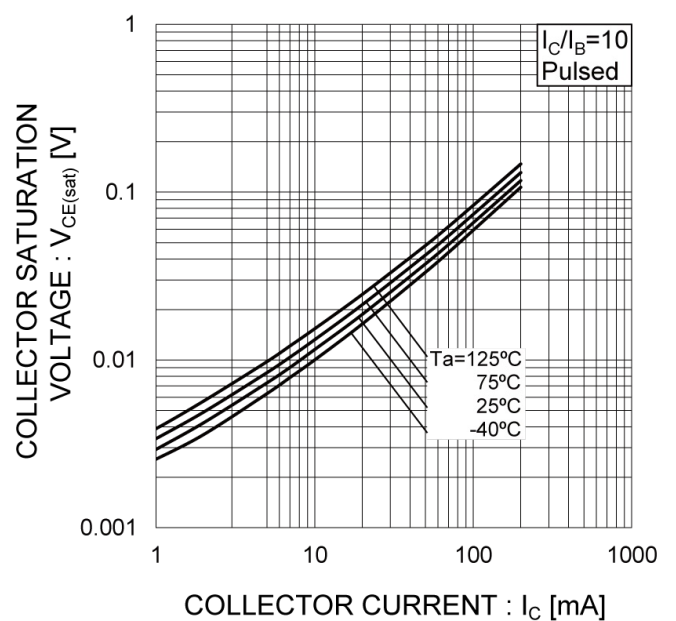


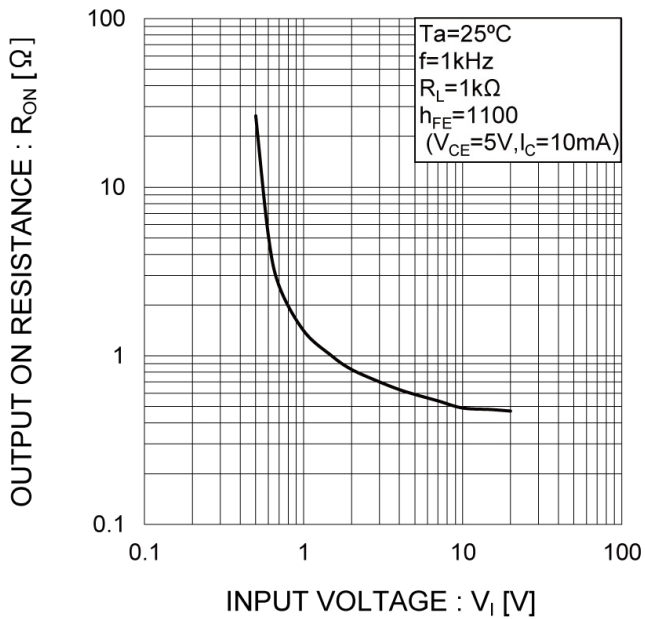
Fig.4 Collector-emitter saturation voltage vs. Collector Current



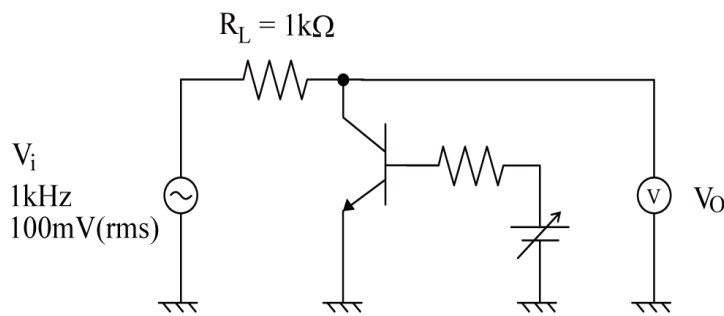
● Electrical characteristic curves (T<sub>a</sub> = 25°C)

<For DTr1 and DTr2 in common>

Fig.5 Output ON resistance vs. input voltage



R<sub>on</sub> MEASUREMENT CIRCUIT



$$R_{on} = \frac{V_O}{V_i - V_O} \times R_L$$

●Dimensions



| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 0.80       | 1.00 | 0.031  | 0.039 |
| A1  | 0.00       | 0.10 | 0.000  | 0.004 |
| A3  | 0.25       |      | 0.010  |       |
| b   | 0.15       | 0.30 | 0.006  | 0.012 |
| c   | 0.10       | 0.20 | 0.004  | 0.008 |
| D   | 1.90       | 2.10 | 0.075  | 0.083 |
| E   | 1.15       | 1.35 | 0.045  | 0.053 |
| e   | 0.65       |      | 0.026  |       |
| HE  | 2.00       | 2.20 | 0.079  | 0.087 |
| L1  | 0.10       | 0.40 | 0.004  | 0.016 |
| Lp  | 0.25       | 0.55 | 0.010  | 0.022 |
| Q   | 0.10       | 0.30 | 0.004  | 0.012 |
| x   | -          | 0.10 | -      | 0.004 |
| y   | -          | 0.10 | -      | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | -          | 0.40 | -      | 0.016 |
| e1  | 1.55       |      | 0.061  |       |
| I1  | -          | 0.65 | -      | 0.026 |

Dimension in mm/inches

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|-----------|-----------|------------|-----------|
| CLASS III | CLASS III | CLASS II b | CLASS III |
| CLASS IV  |           | CLASS III  |           |

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  - Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
  - Sealing or coating our Products with resin or other coating materials
  - Use of our Products without cleaning residue of flux (even if you use no-clean type fluxes, cleaning residue of flux is recommended); or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
  - Use of the Products in places subject to dew condensation
- The Products are not subject to radiation-proof design.
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- In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse. is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
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- Confirm that operation temperature is within the specified range described in the product specification.
- ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

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This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature / humidity control).

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  - [b] the temperature or humidity exceeds those recommended by ROHM
  - [c] the Products are exposed to direct sunshine or condensation
  - [d] the Products are exposed to high Electrostatic
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4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

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