

# 100mA / 50V Digital transistors (with built-in resistor)

## DTC144TM / DTC144TE / DTC144TUA / DTC144TKA / DTC144TSA

### ●Applications

Inverter, Interface, Driver

### ●Features

- 1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).
- 2) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of almost completely eliminating parasitic effects.
- 3) Only the on/off conditions need to be set for operation, making the device design easy.

### ●Structure

NPN epitaxial planar silicon transistor (Resistor built-in type)

### ●External dimensions (Unit : mm)

|   |   |
|---|---|
| <p>DTC144TM</p> <p>ROHM : VMT3<br/>Abbreviated symbol : 06</p> <p>(1) Base<br/>(2) Emitter<br/>(3) Collector</p>  | <p>DTC144TE</p> <p>ROHM : EMT3<br/>Abbreviated symbol : 06</p> <p>(1) Emitter<br/>(2) Base<br/>(3) Collector</p>  |
| <p>DTC144TUA</p> <p>ROHM : UMT3<br/>EIAJ : SC-70<br/>Abbreviated symbol : 06</p> <p>(1) Emitter<br/>(2) Base<br/>(3) Collector</p> <p>Each lead has same dimensions</p> | <p>DTC144TKA</p> <p>ROHM : SMT3<br/>EIAJ : SC-59<br/>Abbreviated symbol : 06</p> <p>(1) Emitter<br/>(2) Base<br/>(3) Collector</p> <p>Each lead has same dimensions</p> |
| <p>DTC144TSA</p> <p>ROHM : SPT<br/>EIAJ : SC-72<br/>Abbreviated symbol : C144TS</p> <p>(1) Emitter<br/>(2) Collector<br/>(3) Base</p>                                   |   |

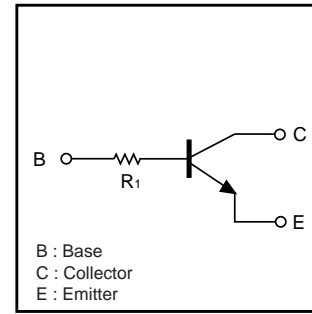
# DTC144TM / DTC144TE / DTC144TUA DTC144TKA / DTC144TSA

## Transistors

### ●Packaging specifications

| Part No.  | Package                      | VMT3   | EMT3   | UMT3   | SMT3   | SPT    |
|-----------|------------------------------|--------|--------|--------|--------|--------|
|           | Packaging type               | Taping | Taping | Taping | Taping | Taping |
|           | Code                         | T2L    | TL     | T106   | T146   | TP     |
|           | Basic ordering unit (pieces) | 8000   | 3000   | 3000   | 3000   | 5000   |
| DTC144TM  |                              | ○      | -      | -      | -      | -      |
| DTC144TE  |                              | -      | ○      | -      | -      | -      |
| DTC144TUA |                              | -      | -      | ○      | -      | -      |
| DTC144TKA |                              | -      | -      | -      | ○      | -      |
| DTC144TSA |                              | -      | -      | -      | -      | ○      |

### ●Equivalent circuit



$R_1=47k\Omega$

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

| Parameter                   | Symbol    | Limits      |          |           |           |           | Unit |
|-----------------------------|-----------|-------------|----------|-----------|-----------|-----------|------|
|                             |           | DTC144TM    | DTC144TE | DTC144TUA | DTC144TKA | DTC144TSA |      |
| Collector-base voltage      | $V_{CBO}$ | 50          |          |           |           |           | V    |
| Collector-emitter voltage   | $V_{CEO}$ | 50          |          |           |           |           | V    |
| Emitter-base voltage        | $V_{EBO}$ | 5           |          |           |           |           | V    |
| Collector current           | $I_C$     | 100         |          |           |           |           | mA   |
| Collector power dissipation | $P_C$     | 150         | 200      |           | 300       | mW        |      |
| Junction temperature        | $T_j$     | 150         |          |           |           |           | °C   |
| Storage temperature         | $T_{stg}$ | -55 to +150 |          |           |           |           | °C   |

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

| Parameter                            | Symbol        | Min. | Typ. | Max. | Unit      | Conditions                       |
|--------------------------------------|---------------|------|------|------|-----------|----------------------------------|
| Collector-base breakdown voltage     | $BV_{CBO}$    | 50   | -    | -    | V         | $I_C=50\mu A$                    |
| Collector-emitter breakdown voltage  | $BV_{CEO}$    | 50   | -    | -    | V         | $I_C=1mA$                        |
| Emitter-base breakdown voltage       | $BV_{EBO}$    | 5    | -    | -    | V         | $I_E=50\mu A$                    |
| Collector cutoff current             | $I_{CBO}$     | -    | -    | 0.5  | $\mu A$   | $V_{CB}=50V$                     |
| Emitter cutoff current               | $I_{EBO}$     | -    | -    | 0.5  | $\mu A$   | $V_{EB}=4V$                      |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | -    | -    | 0.3  | V         | $I_C/I_B=5mA/0.5mA$              |
| DC current transfer ratio            | $h_{FE}$      | 100  | 250  | 600  | -         | $V_{CE}=5V, I_C=1mA$             |
| Input resistance                     | $R_1$         | 32.9 | 47   | 61.1 | $k\Omega$ | -                                |
| Transition frequency                 | $f_T$ *       | -    | 250  | -    | MHz       | $V_{CE}=10V, I_E=-5mA, f=100MHz$ |

\* Characteristics of built-in transistor

Transistors

● Electrical characteristic curves

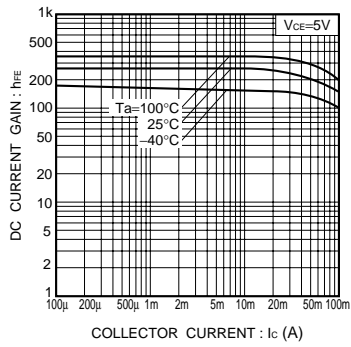


Fig.1 DC current gain vs. collector current

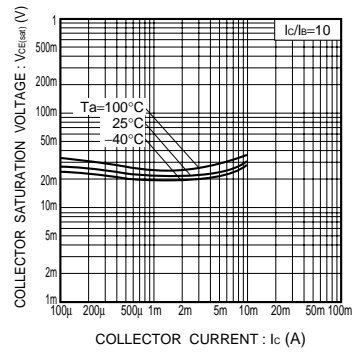


Fig.2 Collector-emitter saturation voltage vs. collector current

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