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

# DTC124TM / DTC124TE / DTC124TUA / DTC124TKA / DTC124TSA

### Applications

Inverter, Interface, Driver

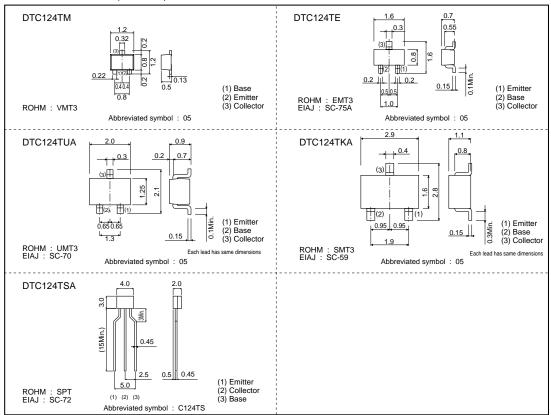
### Features

- 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)

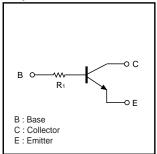
### ●External dimensions (Unit: mm)



### Packaging specifications

|           | 1                            |        |        |        |        |        |
|-----------|------------------------------|--------|--------|--------|--------|--------|
|           | Package                      | VMT3   | EMT3   | UMT3   | SMT3   | SST3   |
|           | Packaging type               | Taping | Taping | Taping | Taping | Taping |
|           | Code                         | T2L    | TL     | T106   | T146   | TP     |
| Part No.  | Basic ordering unit (pieces) | 8000   | 3000   | 3000   | 3000   | 5000   |
| DTC124TM  |                              | 0      |        |        | -      | -      |
| DTC124TE  |                              | -      | 0      | -      | -      | -      |
| DTC124TUA |                              | -      | -      | 0      | -      | -      |
| DTC124TKA |                              | -      | _      | _      | 0      | -      |
| DTC124TSA |                              | -      | _      | -      | -      | 0      |

### ●Equivalent circuit



R<sub>1</sub>=22kΩ

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

| Parameter                   | Symbol |                   | Unit                |           |        |  |  |
|-----------------------------|--------|-------------------|---------------------|-----------|--------|--|--|
|                             |        | DTC124TM DTC124TE | DTC124TUA DTC124TKA | DTC124TSA | J. III |  |  |
| Collector-base voltage      | Vсво   |                   | V                   |           |        |  |  |
| Collector-emitter voltage   | Vceo   |                   | V                   |           |        |  |  |
| Emitter-base voltage        | Vево   |                   | V                   |           |        |  |  |
| Collector current           | lc     |                   | mA                  |           |        |  |  |
| Collector power dissipation | Pc     | 150               | 200                 | 300       | mW     |  |  |
| Junction temperature        | Tj     |                   | °C                  |           |        |  |  |
| Storage temperature         | Tstg   | −55 to +150       |                     |           | °C     |  |  |

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

| Parameter                            | Symbol         | Min. | Тур. | Max. | Unit | Conditions                   |
|--------------------------------------|----------------|------|------|------|------|------------------------------|
| Collector-base breakdown voltage     | ВУсво          | 50   | -    | -    | V    | Ic=50μA                      |
| Collector-emitter breakdown voltage  | BVceo          | 50   | _    | -    | V    | Ic=1mA                       |
| Emitter-base breakdown voltage       | ВУЕВО          | 5    | _    | _    | V    | Iε=50μA                      |
| Collector cutoff current             | Ісво           | -    | _    | 0.5  | μА   | Vcb=50V                      |
| Emitter cutoff current               | ІЕВО           | -    | _    | 0.5  | μА   | V <sub>EB</sub> =4V          |
| Collector-emitter saturation voltage | VCE(sat)       | -    | _    | 0.3  | V    | Ic/I <sub>B</sub> =5mA/0.5mA |
| DC current transfer ratio            | hfe            | 100  | 250  | 600  | -    | VcE=5V, Ic=1mA               |
| Input resistance                     | R <sub>1</sub> | 15.4 | 22   | 28.6 | kΩ   | -                            |
| Transition frequency                 | <b>f</b> ⊤ *   | -    | 250  | _    | MHz  | Vc=10V, I=-5mA, f=100MHz     |

<sup>\*</sup> Characteristics of built-in transistor

### •Electrical characteristic curves

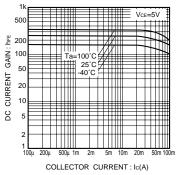


Fig.1 DC current gain vs. collector current

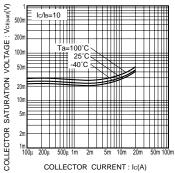


Fig.2 Collector-emitter saturation voltage vs. collector current

Rev.A

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Appendix-1