



THE DATASHEET OF DTC144TSATP



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

DTC144TM / DTC144TE / DTC144TUA / DTC144TKA / DTC144TSA

●Applications

Inverter, Interface, Driver

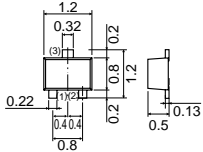
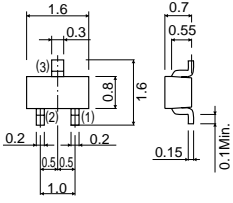
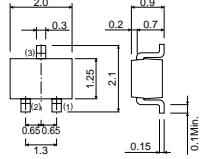
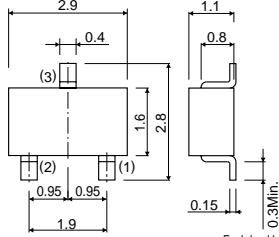
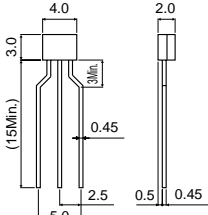
●Features

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

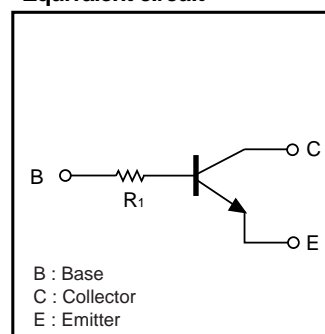
DTC144TM / DTC144TE / DTC144TUA DTC144TKA / DTC144TSA

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 ($T_a=25^\circ\text{C}$)

| Parameter | Symbol | Limits | | | | | Unit |
|-----------------------------|-----------|-------------|----------|-----------|-----------|-----------|------------------|
| | | DTC144TM | DTC144TE | DTC144TUA | DTC144TKA | DTC144TSA | |
| Collector-base voltage | V_{CB0} | 50 | | | | | V |
| Collector-emitter voltage | V_{CE0} | 50 | | | | | V |
| Emitter-base voltage | V_{EB0} | 5 | | | | | |
| Collector current | I_C | 100 | | | | | mA |
| Collector power dissipation | P_C | 150 | | 200 | | 300 | mW |
| Junction temperature | T_j | 150 | | | | | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | -55 to +150 | | | | | $^\circ\text{C}$ |

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|--------------------------------------|---------------|------|------|------|---------------|---|
| Collector-base breakdown voltage | BV_{CB0} | 50 | - | - | V | $I_C=50\mu\text{A}$ |
| Collector-emitter breakdown voltage | BV_{CE0} | 50 | - | - | V | $I_C=1\text{mA}$ |
| Emitter-base breakdown voltage | BV_{EB0} | 5 | - | - | V | $I_E=50\mu\text{A}$ |
| Collector cutoff current | I_{CB0} | - | - | 0.5 | μA | $V_{CB}=50\text{V}$ |
| Emitter cutoff current | I_{EB0} | - | - | 0.5 | μA | $V_{EB}=4\text{V}$ |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | - | - | 0.3 | V | $I_C/I_B=5\text{mA}/0.5\text{mA}$ |
| DC current transfer ratio | h_{FE} | 100 | 250 | 600 | - | $V_{CE}=5\text{V}, I_C=1\text{mA}$ |
| Input resistance | R_1 | 32.9 | 47 | 61.1 | $k\Omega$ | - |
| Transition frequency | f_T * | - | 250 | - | MHz | $V_{CE}=10\text{V}, I_E=-5\text{mA}, f=100\text{MHz}$ |

* Characteristics of built-in transistor

DTC144TM / DTC144TE / DTC144TUA
DTC144TKA / DTC144TSA

Transistors

●Electrical characteristic curves

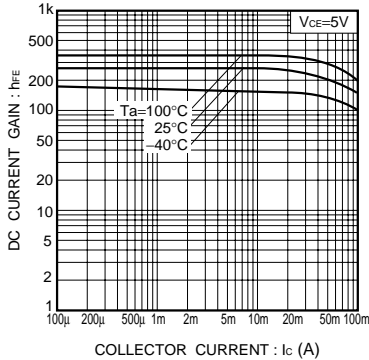


Fig.1 DC current gain vs. collector current

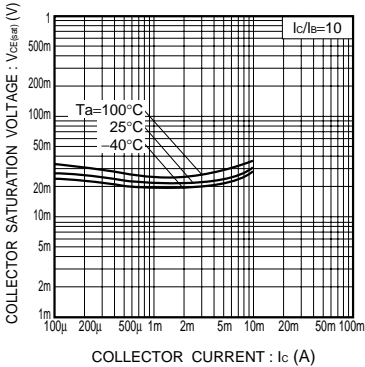


Fig.2 Collector-emitter saturation voltage vs. collector current

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