



THE DATASHEET OF DTC143ESATP



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

DTC143EM / DTC143EE / DTC143EUA / DTC143EKA / DTC143ESA

●Applications

Inverter, Interface, Driver

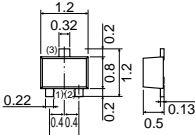
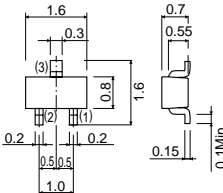
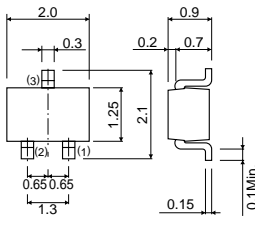
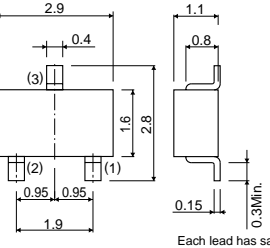
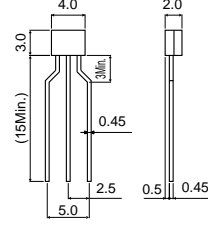
●Features

- 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>DTC143EM</p>  <p>ROHM : VMT3</p> <p>Abbreviated symbol : 23</p> <p>(1) IN (2) GND (3) OUT</p> | <p>DTC143EE</p>  <p>ROHM : EMT3</p> <p>Abbreviated symbol : 23</p> <p>(1) GND (2) IN (3) OUT</p> |
| <p>DTC143EUA</p>  <p>ROHM : UMT3 EIAJ : SC-70</p> <p>Abbreviated symbol : 23</p> <p>(1) GND (2) IN (3) OUT</p> | <p>DTC143EKA</p>  <p>ROHM : SMT3 EIAJ : SC-59</p> <p>Abbreviated symbol : 23</p> <p>Each lead has same dimensions</p> <p>(1) GND (2) IN (3) OUT</p> |
| <p>DTC143ESA</p>  <p>ROHM : SPT EIAJ : SC-72</p> <p>Abbreviated symbol : C143ES</p> <p>(1) GND (2) OUT (3) IN</p> | |

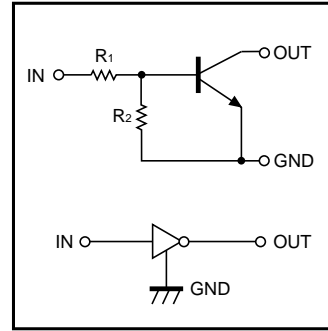
DTC143EM / DTC143EE / DTC143EUA DTC143EKA / DTC143ESA

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 |
| DTC143EM | | ○ | - | - | - | - |
| DTC143EE | | - | ○ | - | - | - |
| DTC143EUA | | - | - | ○ | - | - |
| DTC143EKA | | - | - | - | ○ | - |
| DTC143ESA | | - | - | - | - | ○ |

●Equivalent circuit



$R_1=R_2=4.7k\Omega$

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

| Parameter | Symbol | Limits | | | | | Unit |
|----------------------|--------------|-------------|----------|-----------|-----------|-----------|------------------|
| | | DTC143EM | DTC143EE | DTC143EUA | DTC143EKA | DTC143ESA | |
| Supply voltage | V_{CC} | 50 | | | | | V |
| Input voltage | V_{IN} | -10 to +30 | | | | | V |
| Output current | I_o | 100 | | | | | mA |
| | $I_{C(Max)}$ | 100 | | | | | |
| Power dissipation | P_D | 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 |
|----------------------|--------------|------|------|------|-----------|----------------------------------|
| Input voltage | $V_{I(off)}$ | - | - | 0.5 | V | $V_{CC}=5V, I_o=100\mu A$ |
| | $V_{I(on)}$ | 3 | - | - | | $V_o=0.3V, I_o=20mA$ |
| Output voltage | $V_{O(on)}$ | - | 0.1 | 0.3 | V | $I_o/I_i=10mA/0.5mA$ |
| Input current | I_i | - | - | 1.8 | mA | $V_i=5V$ |
| Output current | $I_{O(off)}$ | - | - | 0.5 | μA | $V_{CC}=50V, V_i=0V$ |
| DC current gain | G_i | 30 | - | - | - | $V_o=5V, I_o=10mA$ |
| Input resistance | R_i | 3.29 | 4.7 | 6.11 | $k\Omega$ | - |
| Resistance ratio | R_2/R_1 | 0.8 | 1 | 1.2 | - | - |
| Transition frequency | f_T * | - | 250 | - | MHz | $V_{CE}=10V, I_E=-5mA, f=100MHz$ |

* Characteristics of built-in transistor

DTC143EM / DTC143EE / DTC143EUA
DTC143EKA / DTC143ESA

Transistors

●Electrical characteristic curves

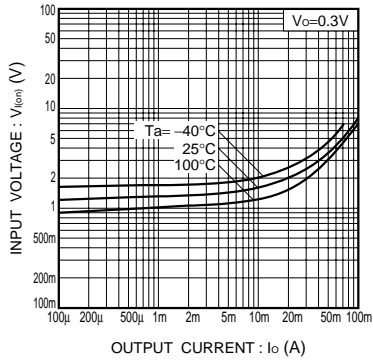


Fig.1 Input voltage vs. output current (ON characteristics)

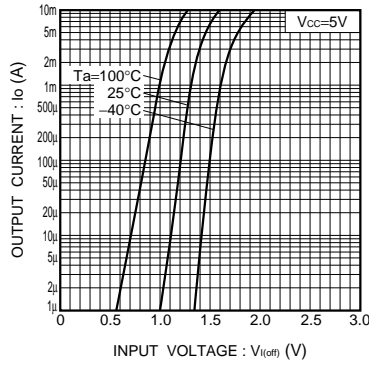


Fig.2 Output current vs. input voltage (OFF characteristics)

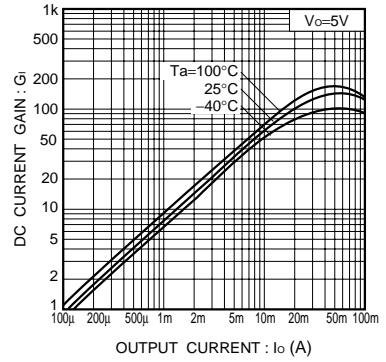


Fig.3 DC current gain vs. output current

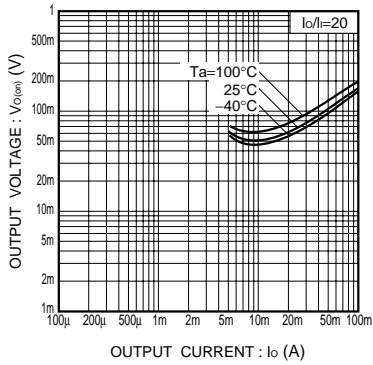


Fig.4 Output voltage vs. output current

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