

Transistors

-500mA / -12V Low $V_{CE(sat)}$ Digital transistors (with built-in resistors)

DTB543ZE / DTB543ZM

●Applications

Inverter, Interface, Driver

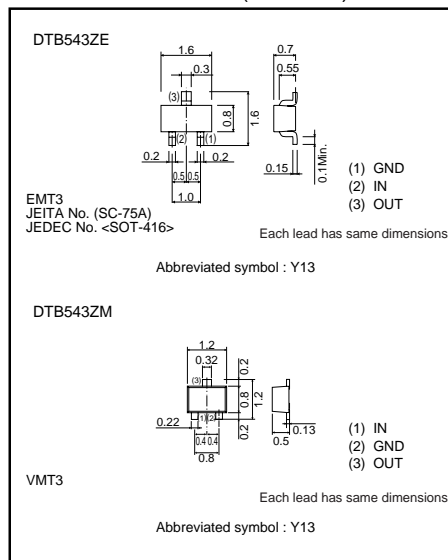
●Feature

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

●Structure

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

●External dimensions (Unit : mm)



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

| Parameter | Symbol | Limits | | Unit |
|----------------------|-------------|-------------|----------|------------------|
| | | DTB543ZE | DTB543ZM | |
| Supply voltage | V_{CC} | -12 | | V |
| Input voltage | V_{IN} | -12 to +5 | | V |
| Collector current *1 | $I_C (max)$ | -500 | | mA |
| Power dissipation *2 | P_D | 150 | | mW |
| Junction temperature | T_J | 150 | | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | -55 to +150 | | $^\circ\text{C}$ |

*1 Characteristics of built-in transistor.

*2 Each terminal mounted on a recommended land.

●Packaging specifications

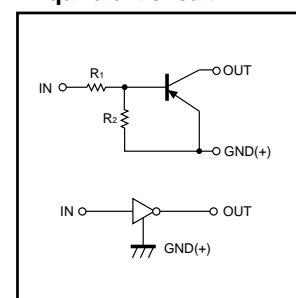
| Part No. | Package | EMT3 | VMT3 |
|----------|------------------------------|--------|--------|
| | Packaging type | Taping | Taping |
| | Code | TL | T2L |
| | Basic ordering unit (pieces) | 3000 | 8000 |
| DTB543ZE | | ○ | — |
| DTB543ZM | | — | ○ |

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|------------------------|--------------|------|------|------|------------|--|
| Input voltage | $V_{I(off)}$ | — | — | -0.3 | V | $V_{CC} = -5V, I_o = -100\mu A$ |
| | $V_{I(on)}$ | -2.5 | — | — | | $V_o = -0.3V, I_o = -20mA$ |
| Output voltage | $V_{O(on)}$ | — | -60 | -300 | mV | $I_o/I_i = -100mA / -5mA$ |
| Input current | I_i | — | — | -1.4 | mA | $V_i = -5V$ |
| Output current | $I_{O(off)}$ | — | — | -0.5 | μA | $V_{CC} = -12V, V_i = 0V$ |
| DC current gain | G_i | 140 | — | — | — | $V_o = -2V, I_o = -100mA$ |
| Transition frequency * | f_T | — | 260 | — | MHz | $V_{CE} = -10V, I_E = 5mA, f = 100MHz$ |
| Input resistance | R_1 | 3.29 | 4.7 | 6.11 | k Ω | — |
| Resistance ratio | R_2/R_1 | 8.0 | 10 | 12 | — | — |

* Characteristics of built-in transistor.

●Equivalent circuit

 $R_1 = 4.7k\Omega / R_2 = 47k\Omega$

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