

Transistors

# 200mA / 30V Low $V_{CE(sat)}$ Digital transistors (with built-in resistors)

## DTD743XE / DTD743XM

●Applications

Inverter, Interface, Driver

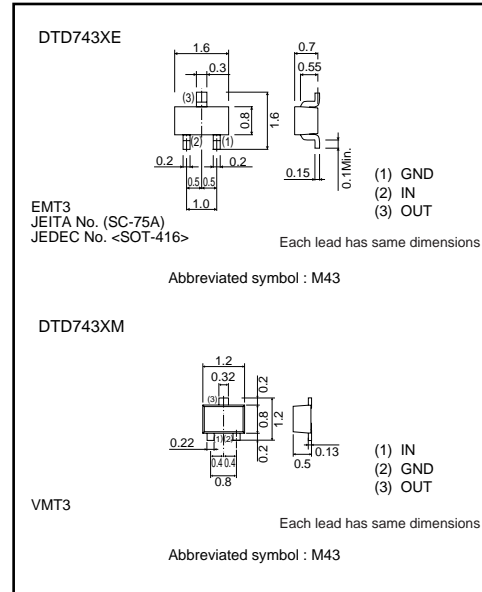
●Feature

- 1)  $V_{CE(sat)}$  is lower than the 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 negative 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

NPN 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             |
|----------------------|-------------|-------------|----------|------------------|
|                      |             | DTD743XE    | DTD743XM |                  |
| Supply voltage       | $V_{CC}$    | 30          |          | V                |
| Input voltage        | $V_{IN}$    | -7 to +20   |          | V                |
| Collector current    | $I_C$ (max) | 200         |          | mA               |
| Power dissipation    | $P_D$       | 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

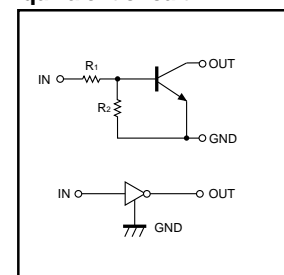
| Part No. | Package                      | EMT3   | VMT3   |
|----------|------------------------------|--------|--------|
|          | Packaging type               | Taping | Taping |
|          | Code                         | TL     | T2L    |
|          | Basic ordering unit (pieces) | 3000   | 8000   |
| DTD743XE |                              | ○      | -      |
| DTD743XM |                              | -      | ○      |

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

| Parameter              | Symbol       | Min. | Typ. | Max. | Unit       | Conditions   |
|------------------------|--------------|------|------|------|------------|--|
|                        |              |      |      |      |            |  |
| Input voltage          | $V_{I(off)}$ | -    | -    | 0.3  | V          | $V_{CC}=5V, I_{O}=100\mu\text{A}$<br>$V_O=0.3V, I_{O}=20\text{mA}$ |
|                        | $V_{I(on)}$  | 2.5  | -    | -    |            |  |
| Output voltage         | $V_{O(on)}$  | -    | 70   | 300  | mV         | $I_{O}/I_I=50\text{mA} / 2.5\text{mA}$                             |
| Input current          | $I_I$        | -    | -    | 1.4  | mA         | $V_I=5V$   |
| Output current         | $I_{O(off)}$ | -    | -    | 500  | nA         | $V_{CC}=30V, V_I=0V$   |
| DC current gain        | $G_I$        | 140  | -    | -    | -          | $V_O=2V, I_{O}=100\text{mA}$                                       |
| Transition frequency * | $f_T$        | -    | 260  | -    | MHz        | $V_{CE}=10V, I_E=-5\text{mA}, f=100\text{MHz}$                     |
| Input resistance       | $R_1$        | 3.29 | 4.7  | 6.11 | k $\Omega$ | -  |
| Resistance ratio       | $R_2/R_1$    | 1.7  | 2.1  | 2.6  | -          | -  |

\* Characteristics of built-in transistor.

●Equivalent circuit



$R_1=4.7\text{k}\Omega / R_2=10\text{k}\Omega$

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