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

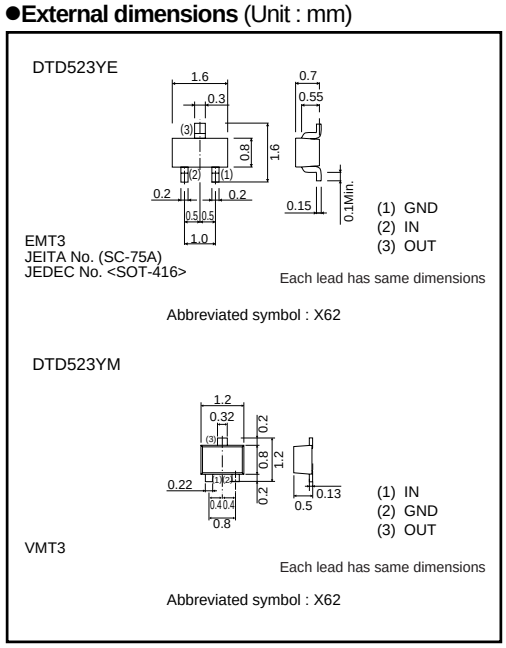
## DTD523YE / DTD523YM

### ●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 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 plannar silicon transistor
(Resistor built-in type)

### ●External dimensions (Unit : mm)




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

| Parameter | Symbol | Limits | | Unit |
|---|---|---|---|---|
| | | DTD523YE | DTD523YM | |
| Supply voltage | $V_{CC}$ | 12 | | V |
| Input voltage | $V_{IN}$ | −5 to +12 | | V |
| Collector current *1 | $I_{C\ (max)}$ | 500 | | mA |
| Power dissipation *2 | $P_D$ | 150 | | mW |
| Junction temperature | Tj | 150 | | ℃ |
| Storage temperature | Tstg | −55 to +150 | | ℃ |

*1 Characteristics of built-in transistor.
*2 Each terminal mounted on a recommended land.

### ●Packaging specifications

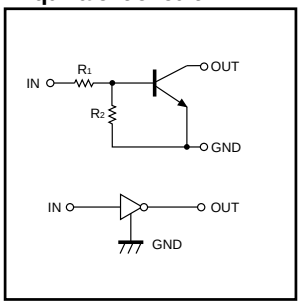
| | Package | EMT3 | VMT3 |
|---|---|---|---|
| | Packaging type | Taping | Taping |
| | Code | TL | T2L |
| Part No. | Basic ordering unit (pieces) | 3000 | 8000 |
| DTD523YE | | ○ | − |
| DTD523YM | | − | ○ |

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Input voltage | $V_{I(off)}$ | − | − | 0.3 | V | $V_{CC}$=5V, $I_O$=100μA |
| | $V_{I(on)}$ | 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 | $I_I$ | − | − | 3.0 | mA | $V_I$= 5V |
| Output current | $I_{O(off)}$ | − | − | 500 | nA | $V_{CC}$=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 | $R_1$ | 1.54 | 2.2 | 2.86 | kΩ | − |
| Resistance ratio | $R_2/R_1$ | 3.6 | 4.5 | 5.5 | − | − |

* Characteristics of built-in transistor.

### ●Equivalent circuit




$R_1$=2.2kΩ / $R_2$=10kΩ

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