

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

DTB723YE / DTB723YM

## ●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)

## ●Packaging specifications

| Part No. | Package                      | EMT3   | VMT3   |
|----------|------------------------------|--------|--------|
|          | Packaging type               | Taping | Taping |
|          | Code                         | TL     | T2L    |
|          | Basic ordering unit (pieces) | 3000   | 8000   |
| DTB723YE |                              | ○      | —      |
| DTB723YM |                              | —      | ○      |

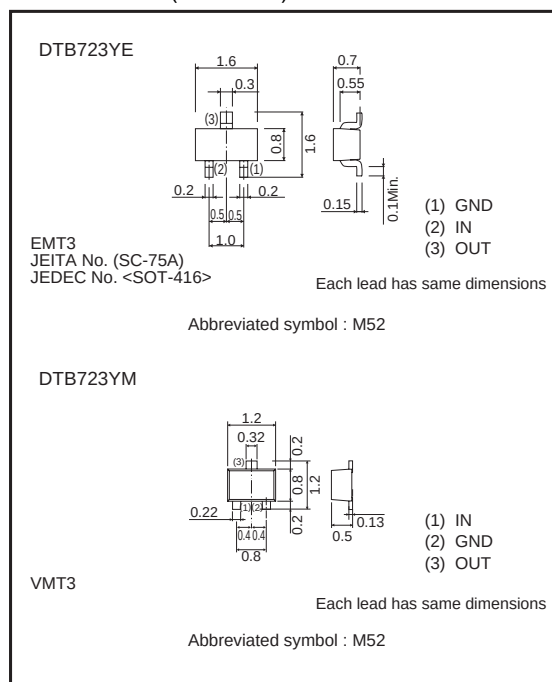
## ●Absolute maximum ratings ( $T_a=25^{\circ}\text{C}$ )

| Parameter            | Symbol      | Limits      |          | Unit               |
|----------------------|-------------|-------------|----------|--------------------|
|                      |             | DTB723YE    | DTB723YM |                    |
| Supply voltage       | $V_{CC}$    | -30         |          | V                  |
| Input voltage        | $V_{IN}$    | -15 to +5   |          | V                  |
| Collector current *1 | $I_C$ (max) | -200        |          | mA                 |
| Power dissipation *2 | $P_D$       | 150         |          | mW                 |
| Junction temperature | $T_j$       | 150         |          | $^{\circ}\text{C}$ |
| Storage temperature  | $T_{stg}$   | -55 to +150 |          | $^{\circ}\text{C}$ |

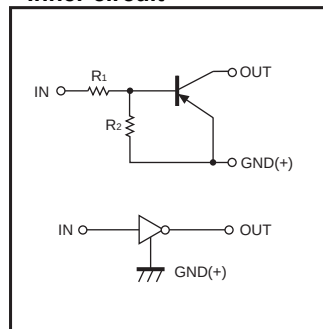
\*1 Characteristics of built-in transistor.

\*2 Each terminal mounted on a recommended land.

## ●Dimensions (Unit : mm)



## ●Inner circuit



$R_1=2.2\text{k}\Omega$  /  $R_2=10\text{k}\Omega$

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

| Parameter              | Symbol       | Min. | Typ. | Max. | Unit       | Conditions                             |
|------------------------|--------------|------|------|------|------------|----------------------------------------|
| Input voltage          | $V_{I(off)}$ | —    | —    | -0.3 | V          | $V_{CC} = -5V, I_o = -100\mu A$        |
|                        | $V_{I(on)}$  | -2.5 | —    | —    |            | $V_o = -0.3V, I_o = -20mA$             |
| Output voltage         | $V_{O(on)}$  | —    | -70  | -300 | mV         | $I_o/I_i = -50mA / -2.5mA$             |
| Input current          | $I_i$        | —    | —    | -3.0 | mA         | $V_i = -5V$                            |
| Output current         | $I_{O(off)}$ | —    | —    | -500 | nA         | $V_{CC} = -30V, V_i = 0V$              |
| DC current gain        | $G_i$        | 140  | —    | —    | —          | $V_o = -2V, I_o = -100mA$              |
| Transition frequency * | $f_T$        | —    | 260  | —    | MHz        | $V_{CE} = -10V, I_E = 5mA, f = 100MHz$ |
| Input resistance       | $R_i$        | 1.54 | 2.2  | 2.86 | k $\Omega$ | —                                      |
| Resistance ratio       | $R_2/R_1$    | 3.6  | 4.5  | 5.5  | —          | —                                      |

\* Characteristics of built-in transistor.

## ●Electrical characteristic curves

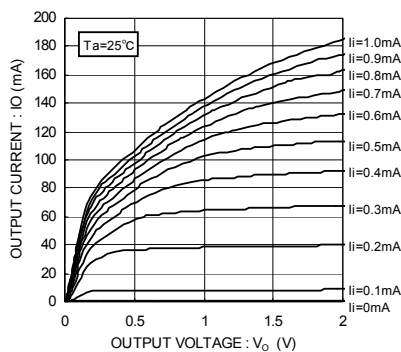


Fig.1 Output Current vs. Output Voltage

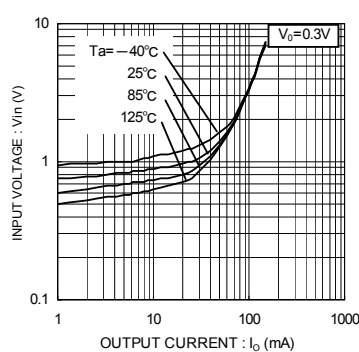


Fig.2 Input Voltage vs. Output Current

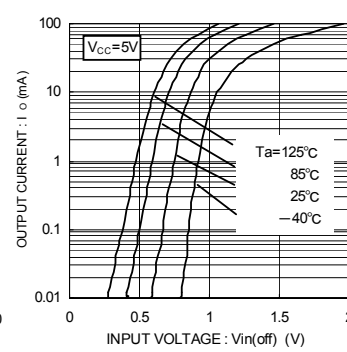


Fig.3 Output Current vs. Input Voltage

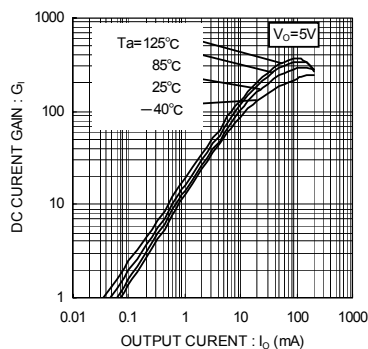


Fig.4 DC Current Gain vs. Output Current

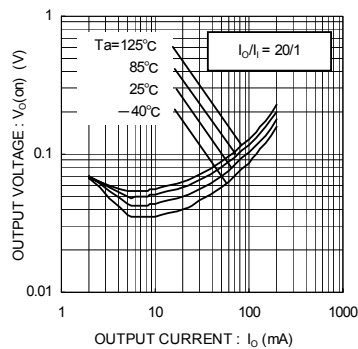


Fig.5 Output Voltage vs. Output Current

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