

## Transistors

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

## DTB543XE / DTB543XM

### ●Applications

Inverter, Interface, Driver

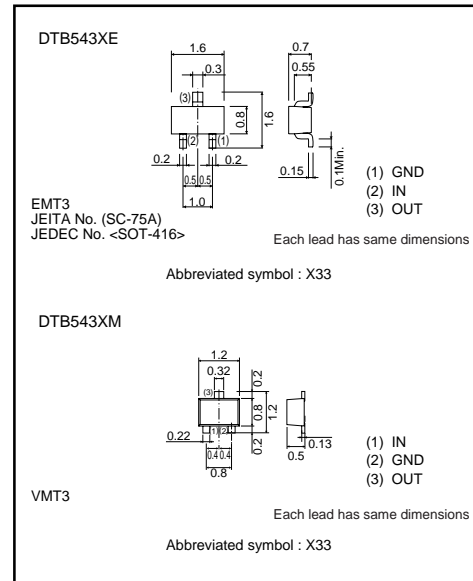
### ●Feature

- 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
		DTB543XE	DTB543XM	
Supply voltage	$V_{CC}$	-12		V
Input voltage	$V_{IN}$	-12 to +7		V
Collector current <sup>*1</sup>	$I_C$ (max)	-500		mA
Power dissipation <sup>*2</sup>	$P_D$	150		mW
Junction temperature	$T_J$	150		$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150		$^\circ\text{C}$

<sup>\*1</sup> Characteristics of built-in transistor.

<sup>\*2</sup> Each terminal mounted on a recommended land.

### ●Packaging specifications

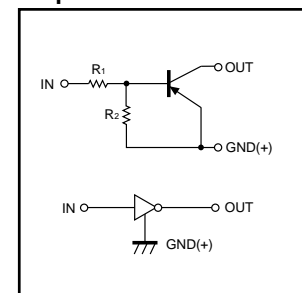
Part No.	Package	EMT3	VMT3
	Package type	Taping	Taping
	Code	TL	T2L
	Basic ordering unit (pieces)	3000	8000
DTB543XE		○	—
DTB543XM		—	○

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	—	—	-0.3	V	$V_{CC}=-5V, I_o=-100\mu\text{A}$
	$V_{I(on)}$	-2.5	—	—		$V_o=-0.3V, I_o=-20\text{mA}$
Output voltage	$V_{O(on)}$	—	-70	-300	mV	$I_o/I_i=-100\text{mA} / -5\text{mA}$
Input current	$I_i$	—	—	-1.4	mA	$V_i=-5V$
Output current	$I_o(off)$	—	—	-500	nA	$V_{CC}=-12V, V_i=0V$
DC current gain	$G_i$	140	—	—	—	$V_o=-2V, I_o=-100\text{mA}$
Transition frequency <sup>*</sup>	$f_T$	—	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	—	—

<sup>\*</sup> Characteristics of built-in transistor.

### ●Equivalent circuit



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

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