

Transistors

Low $V_{CE(sat)}$ Digital transistors (with built-in resistors)

DTD543EE / DTD543EM

●Applications

Inverter, Interface, Driver

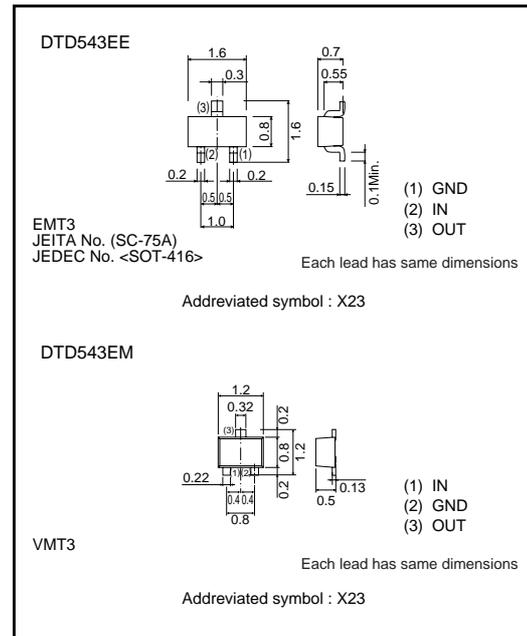
●Structure

NPN digital transistor (Built-in resistor type)

●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 device design easy.

●External dimensions (Unit : mm)



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

Parameter	Symbol	Limits		Unit
		DTD543EE	DTD543EM	
Supply voltage	V_{CC}	12		V
Input voltage	V_{IN}	-10 to +12		V
Collector current *1	$I_C(max)$	500		mA
Power dissipation *2	PD	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

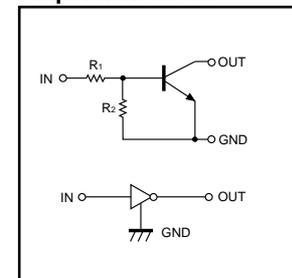
Part No.	Package	EMT3	VMT3
		Package type	Taping
	Code	TL	T2L
	Basic ordering unit (pieces)	3000	8000
DTD543EE		○	—
DTD543EM		—	○

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	—	—	0.5	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	$V_{O(on)}$	—	60	300	mV	$I_O/I_I=100\text{mA} / 5\text{mA}$
Input current	I_I	—	—	1.4	mA	$V_I=5V$
Output current	$I_{O(off)}$	—	—	0.5	μA	$V_{CC}=12V, V_I=0V$
DC current gain	G_I	115	—	—	—	$V_O=2V, I_O=100\text{mA}$
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 Ω	—
Resistance ratio	R_2/R_1	0.8	1.0	1.2	—	—

* Characteristics of built-in transistor.

●Equivalent circuit



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

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