

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

DTD543XE / DTD543XM

●Applications

Inverter, Interface, Driver

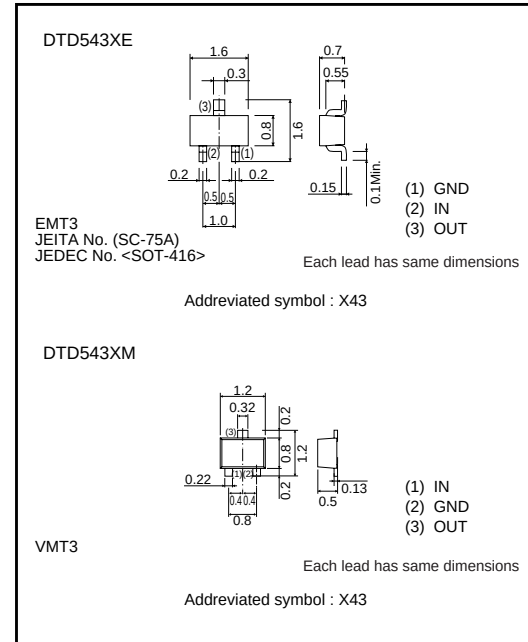
●Feature

- 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 planar silicon transistor
(Resistor built-in type)

●Dimensions (Unit : mm)



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

Parameter	Symbol	Limits		Unit
		DTD543XE	DTD543XM	
Supply voltage	V_{CC}	12		V
Input voltage	V_{IN}	-7 to +12		V
Collector current *1	$I_C(\text{max})$	500		mA
Power dissipation	P_D	150		mW
Junction temperature *2	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

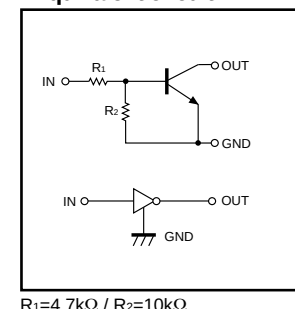
Part No.	Package	EMT3	VMT3
	Packaging type	Taping	Taping
	Code	TL	T2L
	Basic ordering unit (pieces)	3000	8000
DTD543XE		○	—
DTD543XM		—	○

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	—	—	0.3	V	$V_{CC}=5V, I_o=100\mu A$
	$V_{I(on)}$	2.5	—	—		$V_o=0.3V, I_o=2mA$
Output voltage	$V_{O(on)}$	—	60	300	mV	$I_o/I_i=100mA / 5mA$
Input current	I_i	—	—	1.4	mA	$V_i=5V$
Output current	$I_{O(off)}$	—	—	500	μA	$V_{CC}=12V, V_i=0V$
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	3.29	4.7	6.11	k Ω	—
Resistance ratio	R_2/R_1	1.7	2.1	2.6	—	—

* Characteristics of built-in transistor.

●Equivalent circuit



Transistors

●Electrical characteristic curves

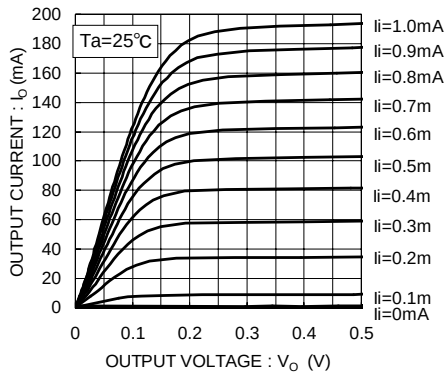


Fig.1 Output Current vs. Output Voltage

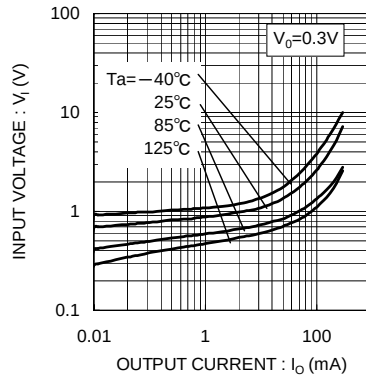


Fig.2 Input Voltage vs. Output Current

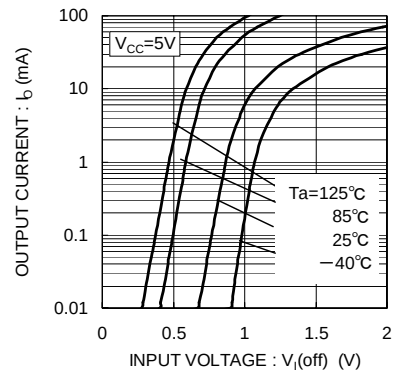


Fig.3 Output Current vs. Input Voltage

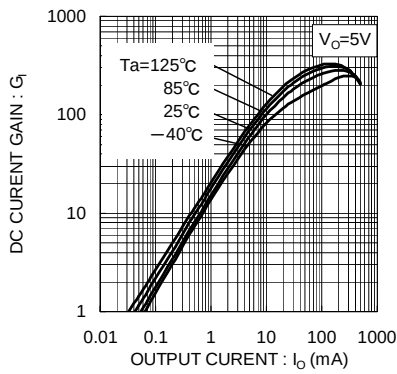


Fig.4 DC Current Gain vs. Output Current

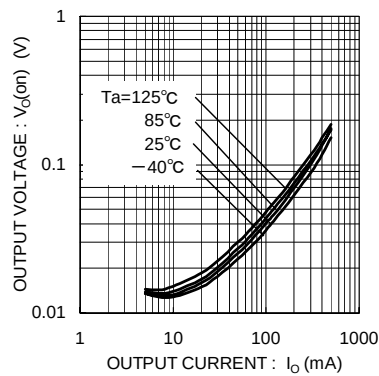


Fig.5 Output Voltage vs. Output Current

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