# 500mA / 12V Low VcE (sat) Digital transistors (with built-in resistors)

# DTD543XE / DTD543XM

# Applications

Inverter, Interface, Driver

#### ● Feature

- 1) VcE (sat) is lower than conventional products.
- 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

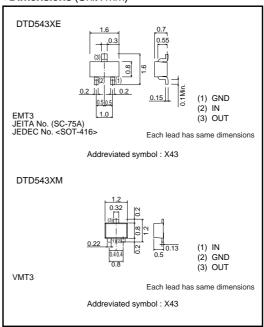
NPN epitaxial planar silicon transistor (Resistor built-in type)

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

Parameter	Symbol	Limits	Unit
raidilletei	Symbol	DTD543XE DTD543XM	
Supply voltage	Vcc	12	V
Input voltage	Vin	−7 to +12	V
Collector current *1	Ic (max)	500	mA
Power dissipation	Po	150	mW
Junction temperature *2	Tj	150	ಭ
Storage temperature	Tstg	-55 to +150	ర

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

# ●Dimensions (Unit:mm)



## Packaging specifications

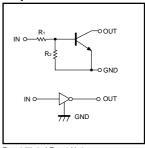
		Package	EMT3	VMT3
		Packaging type	Taping	Taping
		Code	TL	T2L
	Part No.	Basic ordering unit (pieces)	3000	8000
	DTD543XE		0	-
DTD543XM		-	0	

# ●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Input voltage	V <sub>I(off)</sub>	-	-	0.3	٧	Vcc=5V, Io=100μA
	V <sub>I(on)</sub>	2.5	-	-		Vo=0.3V, Io=2mA
Output voltage	Vo(on)	-	60	300	mV	Io/I:= 100mA / 5mA
Input current	li	-	-	1.4	mA	Vi= 5V
Output current	IO(off)	-	_	500	μΑ	Vcc=12V, Vi=0V
DC current gain	Gı	140	-	-	-	Vo=2V, Io=100mA
Transition frequency *	f⊤	-	260	-	MHz	Vc==10V, I==-5mA, f=100MHz
Input resistance	R <sub>1</sub>	3.29	4.7	6.11	kΩ	-
Resistance ratio	R <sub>2</sub> /R <sub>1</sub>	1.7	2.1	2.6	_	_

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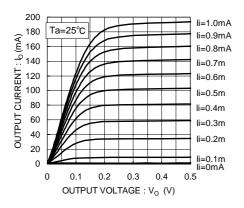
# ●Equivalent circuit

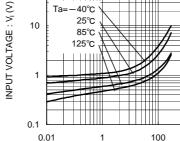


R<sub>1</sub>=4.7kΩ / R<sub>2</sub>=10kΩ

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

#### •Electrical characteristic curves





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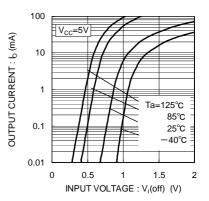


Fig.1 Output Current vs. Output Voltage

Fig.2 Input Voltage vs. Output Current

OUTPUT CURRENT :  $I_O$  (mA)

V<sub>0</sub>=0.3V

Fig.3 Output Current vs. Input Voltage

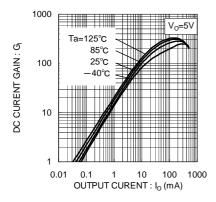


Fig.4 DC Current Gain vs. Output Current

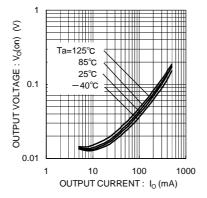


Fig.5 Output Voltage vs. Output Current

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