

Low VCE (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.

●Packaging specifications

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

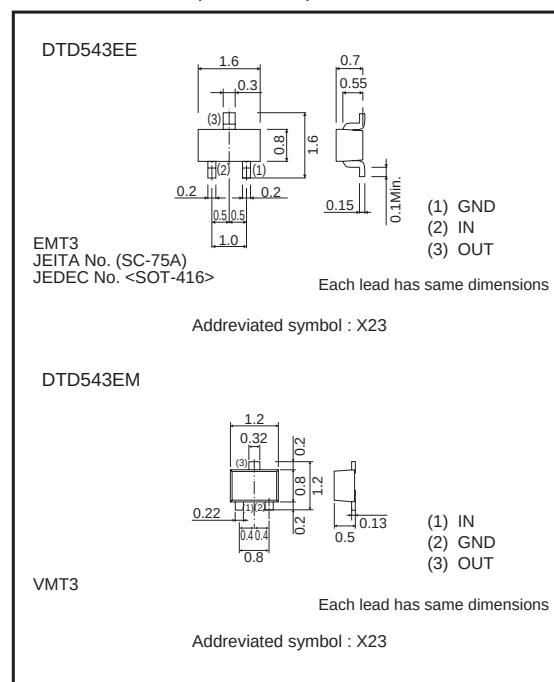
●Absolute maximum ratings (Ta=25°C)

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		°C
Storage temperature	T_{stg}	-55 to +150		°C

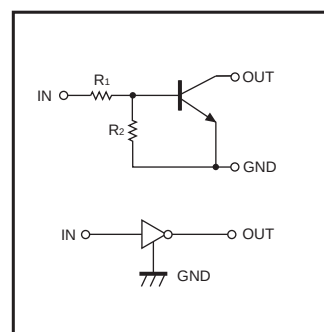
*1 Characteristics of built-in transistor.

*2 Each terminal mounted on a recommended land.

●Dimensions (Unit : mm)



●Inner circuit



$R_1=4.7k\Omega$ / $R_2=4.7k\Omega$

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	—	—	0.5	V	$V_{CC}=5V, I_o=100\mu A$
	$V_{I(on)}$	2.5	—	—		$V_o=0.3V, I_o=20mA$
Output voltage	$V_{O(on)}$	—	60	300	mV	$I_o/I_i=100mA / 5mA$
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	—	—	—	$V_o=2V, I_o=100mA$
Transition frequency *	f_r	—	260	—	MHz	$V_{CE}=10V, I_E=-5mA, f=100MHz$
Input resistance	R_i	3.29	4.7	6.11	$k\Omega$	—
Resistance ratio	R_2/R_1	0.8	1.0	1.2	—	—

* Characteristics of built-in transistor.

●Electrical characteristics curves

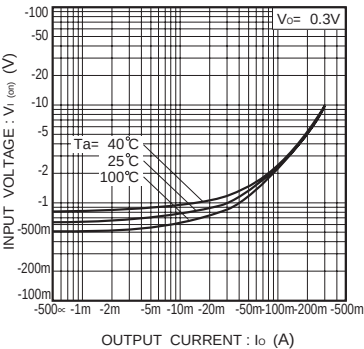


Fig.1 Input voltage vs. output current (ON characteristics)

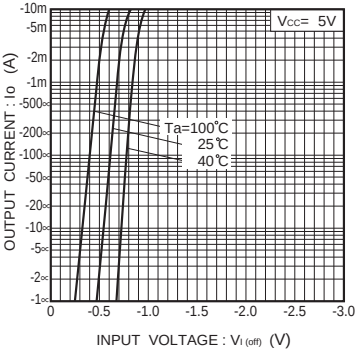


Fig.2 Output current vs. input voltage (OFF characteristics)

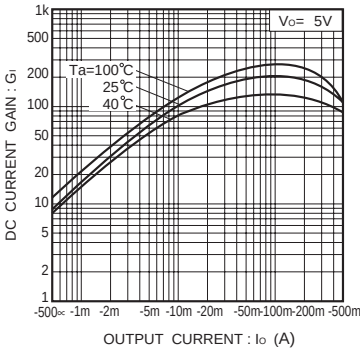


Fig.3 DC current gain vs. output current

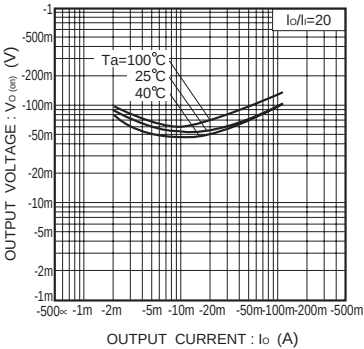


Fig.4 Output voltage vs. output current

Notes

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