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

DTD543XE / DTD543XM

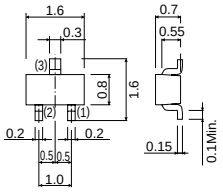
●Applications
Inverter, Interface, Driver

●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)

DTD543XE



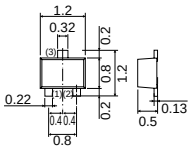
EMT3
JEITA No. (SC-75A)
JEDEC No. <SOT-416>

(1) GND
(2) IN
(3) OUT

Each lead has same dimensions

Addreviated symbol : X43

DTD543XM



VMT3

(1) IN
(2) GND
(3) OUT

Each lead has same dimensions

Addreviated symbol : X43

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits		Unit
		DTD543XE	DTD543XM	
Supply voltage	V_{CC}	12		V
Input voltage	V_{IN}	−7 to +12		V
Collector current *1	$I_{C\ (max)}$	500		mA
Power dissipation	P_D	150		mW
Junction temperature *2	Tj	150		℃
Storage temperature	Tstg	−55 to +150		℃

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

●Packaging specifications

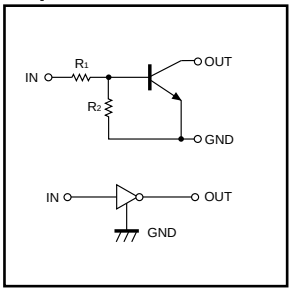
	Package	EMT3	VMT3
	Packaging type	Taping	Taping
	Code	TL	T2L
Part No.	Basic ordering unit (pieces)	3000	8000
DTD543XE		○	–
DTD543XM		–	○

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	–	–	0.3	V	V_{CC}= 5V, I_O= 100μA
	$V_{I(on)}$	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	kΩ	–
Resistance ratio	R_2/R_1	1.7	2.1	2.6	–	–

* Characteristics of built-in transistor.

●Equivalent circuit



R_1=4.7kΩ / R_2=10kΩ

●**Electrical characteristic curves**

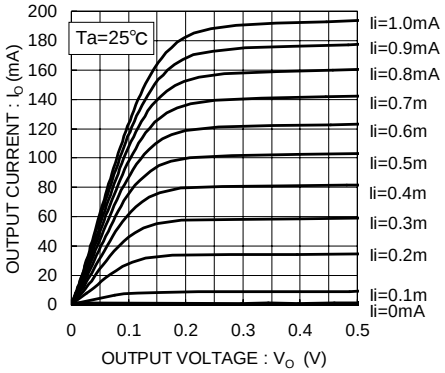


Fig.1 Output Current vs. Output Voltage

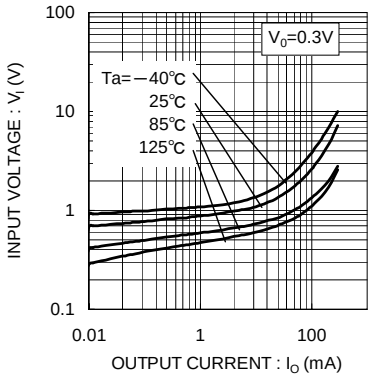


Fig.2 Input Voltage vs. Output Current

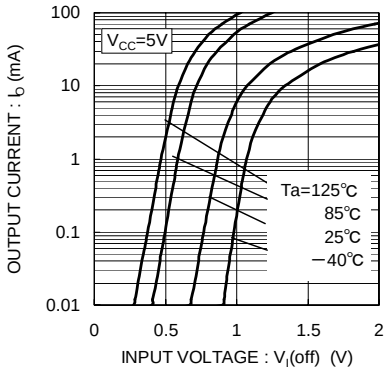


Fig.3 Output Current vs. Input Voltage

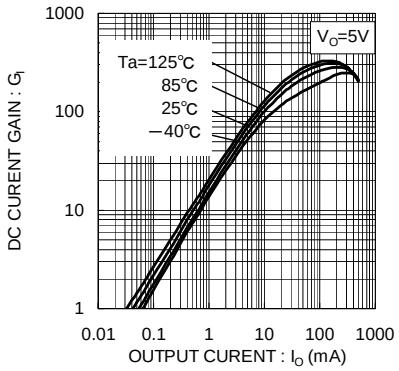


Fig.4 DC Current Gain vs. Output Current

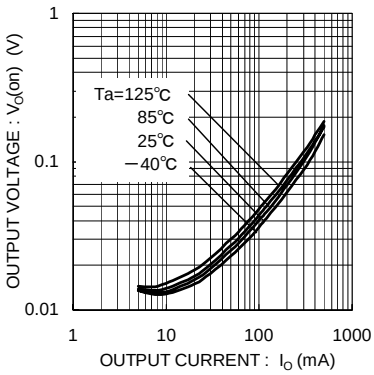


Fig.5 Output Voltage vs. Output Current

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