

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

## DTD513ZE / DTD513ZM

### ●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)

### ●Packaging specifications

Part No.	Package	EMT3	VMT3
	Packaging type	Taping	Taping
	Code	TL	T2L
	Basic ordering unit (pieces)	3000	8000
DTD513ZE		○	—
DTD513ZM		—	○

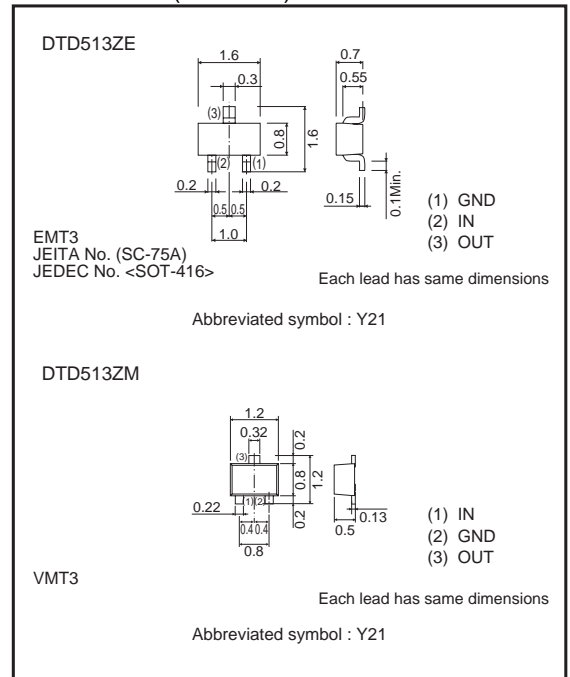
### ●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits		Unit
		DTD513ZE	DTD513ZM	
Supply voltage	$V_{CC}$	12		V
Input voltage	$V_{IN}$	-5 to +10		V
Collector current *1	$I_{C(max)}$	500		mA
Power dissipation *2	$P_D$	150		mW
Junction temperature	$T_j$	150		°C
Storage temperature	$T_{stg}$	-55 to +150		°C

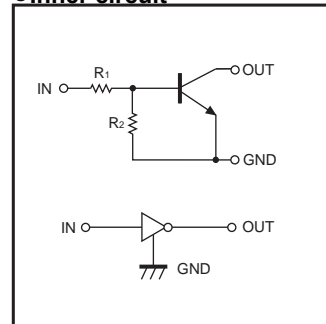
\*1 Characteristics of built-in transistor.

\*2 Each terminal mounted on a recommended land.

### ●Dimensions (Unit : mm)



### ●Inner circuit



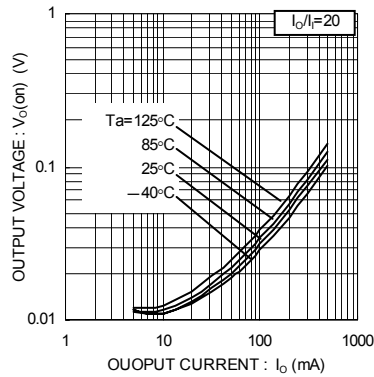
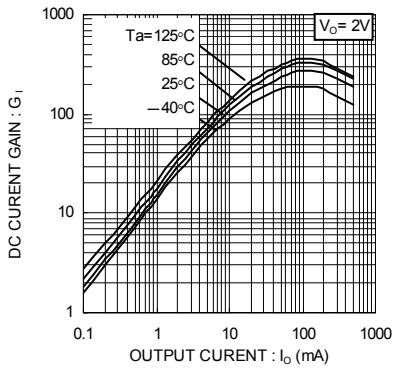
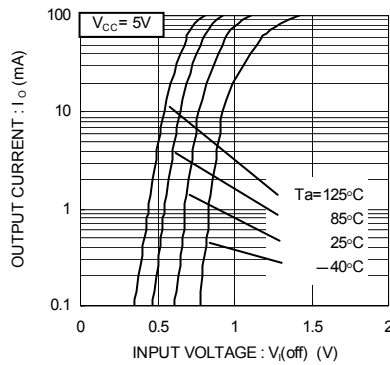
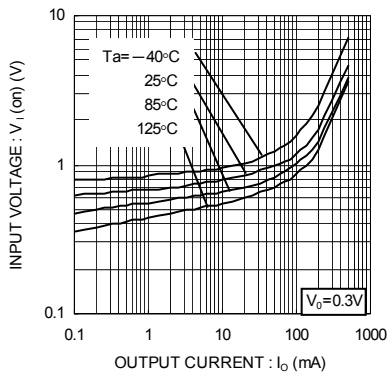
$R_1=1.0k\Omega$  /  $R_2=10k\Omega$

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	-	-	0.3	V	$V_{CC}=5V, I_o=100\mu A$
	$V_{I(on)}$	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	$I_i$	-	-	6.4	mA	$V_i=5V$
Output current	$I_{o(off)}$	-	-	0.5	$\mu A$	$V_{CC}=12V, V_i=0V$
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	$R_i$	0.7	1.0	1.3	$k\Omega$	-
Resistance ratio	$R_2/R_1$	8.0	10	12	-	-

\* Characteristics of built-in transistor.

●Electrical characteristics (Ta=25°C)



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