

## Transistors

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

## DTB513ZE / DTB513ZM

### ●Applications

Inverter, Interface, Driver

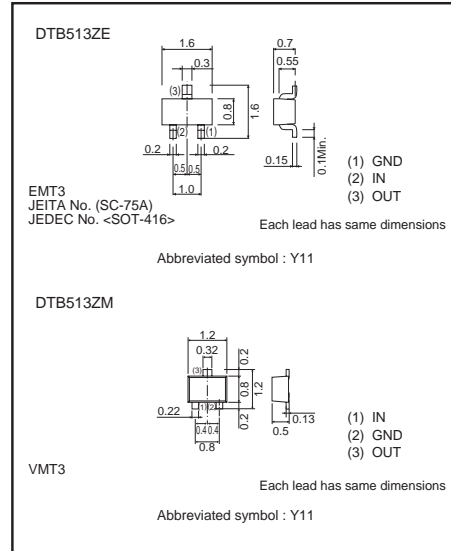
### ●Feature

- 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 positive 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

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

### ●Dimensions (Unit : mm)



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

Parameter	Symbol	Limits		Unit
		DTB513ZE	DTB513ZM	
Supply voltage	$V_{CC}$	-12		V
Input voltage	$V_{IN}$	-10 to +5		V
Collector current *1	$I_C$ (max)	-500		mA
Power dissipation *2	$P_D$	150		mW
Junction temperature	$T_J$	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

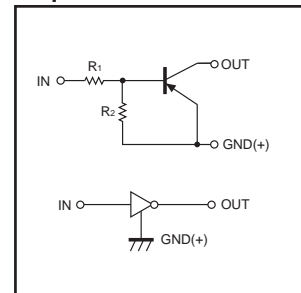
Part No.	Package	EMT3	VMT3
	Packaging type	Taping	Taping
	Code	TL	T2L
	Basic ordering unit (pieces)	3000	8000
	DTB513ZE	○	-
DTB513ZM	-	○	

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	-	-	-0.3	V	$V_{CC}=-5V, I_o=-100\mu\text{A}$
	$V_{I(on)}$	-2.5	-	-		$V_o=-0.3V, I_o=-20\text{mA}$
Output voltage	$V_{O(on)}$	-	-60	-300	mV	$I_o/I_i=-100\text{mA} / -5\text{mA}$
Input current	$I_i$	-	-	-6.4	mA	$V_i=-5V$
Output current	$I_{O(off)}$	-	-	-0.5	$\mu\text{A}$	$V_{CC}=-12V, V_i=0V$
DC current gain	$G_i$	140	-	-	-	$V_o=-2V, I_o=-100\text{mA}$
Transition frequency *	$f_T$	-	260	-	MHz	$V_{CE}=-10V, I_e=5\text{mA}, f=100\text{MHz}$
Input resistance	$R_1$	0.7	1.0	1.3	k $\Omega$	-
Resistance ratio	$R_2/R_1$	8.0	10	12	-	-

\* Characteristics of built-in transistor.

### ●Equivalent circuit



$R_1=1.0\text{k}\Omega / R_2=10\text{k}\Omega$

Transistors

●Electrical characteristic curves

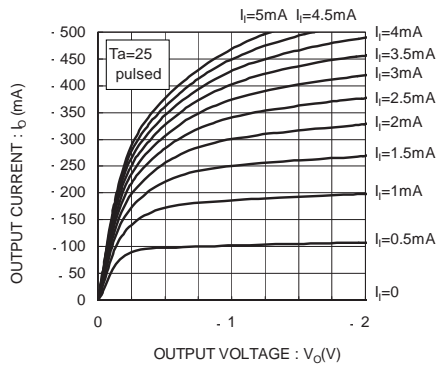


Fig.1 Output Current vs. Output Voltage

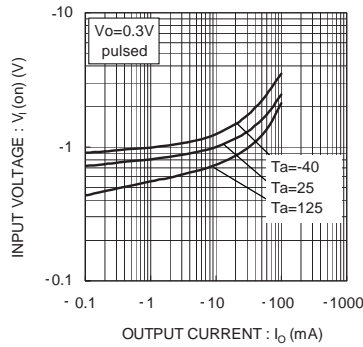


Fig.2 Input Voltage vs. Output Current

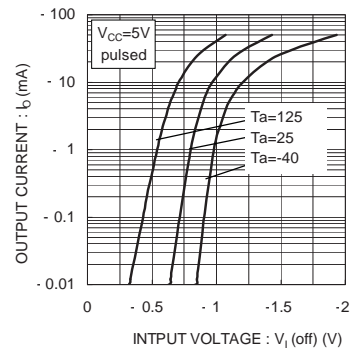


Fig.3 Output Current vs. Input Voltage

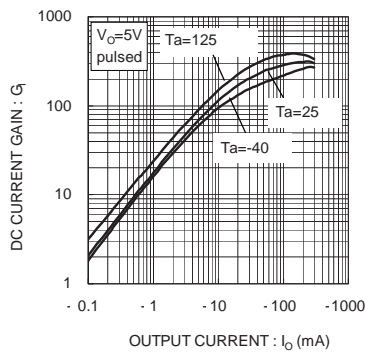


Fig.4 DC Current Gain vs. Output Current

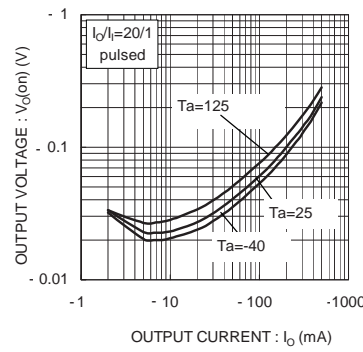


Fig.5 Output Voltage vs. Output Current

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