

# 100mA / 50V Digital transistors (with built-in resistor)

## DTC144TM / DTC144TE / DTC144TUA / DTC144TKA / DTC144TSA

### ●Applications

Inverter, Interface, Driver

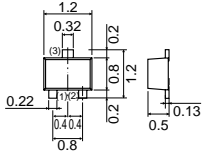
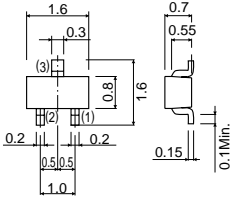
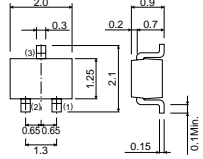
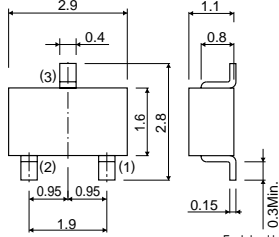
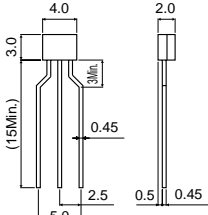
### ●Features

- 1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).
- 2) 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.
- 3) 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)

### ●External dimensions (Unit : mm)

<p>DTC144TM</p>  <p>ROHM : VMT3 Abbreviated symbol : 06</p> <p>(1) Base (2) Emitter (3) Collector</p>	<p>DTC144TE</p>  <p>ROHM : EMT3 Abbreviated symbol : 06</p> <p>(1) Emitter (2) Base (3) Collector</p>
<p>DTC144TUA</p>  <p>ROHM : UMT3 EIAJ : SC-70 Abbreviated symbol : 06</p> <p>(1) Emitter (2) Base (3) Collector</p> <p>Each lead has same dimensions</p>	<p>DTC144TKA</p>  <p>ROHM : SMT3 EIAJ : SC-59 Abbreviated symbol : 06</p> <p>(1) Emitter (2) Base (3) Collector</p> <p>Each lead has same dimensions</p>
<p>DTC144TSA</p>  <p>ROHM : SPT EIAJ : SC-72 Abbreviated symbol : C144TS</p> <p>(1) Emitter (2) Collector (3) Base</p>	

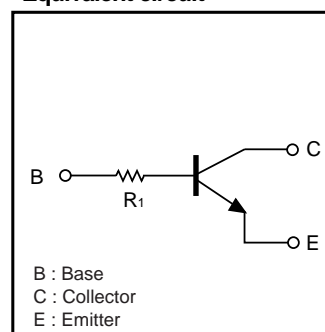
# DTC144TM / DTC144TE / DTC144TUA DTC144TKA / DTC144TSA

## Transistors

### ●Packaging specifications

Part No.	Package	VMT3	EMT3	UMT3	SMT3	SPT
	Packaging type	Taping	Taping	Taping	Taping	Taping
	Code	T2L	TL	T106	T146	TP
	Basic ordering unit (pieces)	8000	3000	3000	3000	5000
DTC144TM		○	—	—	—	—
DTC144TE		—	○	—	—	—
DTC144TUA		—	—	○	—	—
DTC144TKA		—	—	—	○	—
DTC144TSA		—	—	—	—	○

### ●Equivalent circuit



B : Base  
C : Collector  
E : Emitter

$R_1=47k\Omega$

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

Parameter	Symbol	Limits					Unit
		DTC144TM	DTC144TE	DTC144TUA	DTC144TKA	DTC144TSA	
Collector-base voltage	$V_{CB0}$	50					V
Collector-emitter voltage	$V_{CE0}$	50					V
Emitter-base voltage	$V_{EB0}$	5					
Collector current	$I_C$	100					mA
Collector power dissipation	$P_C$	150		200		300	mW
Junction temperature	$T_j$	150					$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150					$^\circ\text{C}$

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CB0}$	50	—	—	V	$I_C=50\mu\text{A}$
Collector-emitter breakdown voltage	$BV_{CE0}$	50	—	—	V	$I_C=1\text{mA}$
Emitter-base breakdown voltage	$BV_{EB0}$	5	—	—	V	$I_E=50\mu\text{A}$
Collector cutoff current	$I_{CB0}$	—	—	0.5	$\mu\text{A}$	$V_{CB}=50\text{V}$
Emitter cutoff current	$I_{EB0}$	—	—	0.5	$\mu\text{A}$	$V_{EB}=4\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	0.3	V	$I_C/I_B=5\text{mA}/0.5\text{mA}$
DC current transfer ratio	$h_{FE}$	100	250	600	—	$V_{CE}=5\text{V}$ , $I_C=1\text{mA}$
Input resistance	$R_1$	32.9	47	61.1	$k\Omega$	—
Transition frequency	$f_T$ *	—	250	—	MHz	$V_{CE}=10\text{V}$ , $I_E=-5\text{mA}$ , $f=100\text{MHz}$

\* Characteristics of built-in transistor

Transistors

●Electrical characteristic curves

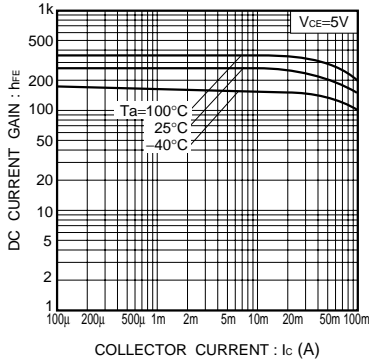


Fig.1 DC current gain vs. collector current

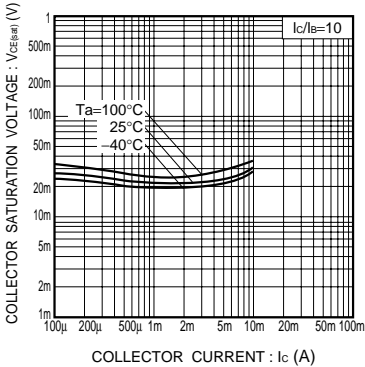


Fig.2 Collector-emitter saturation voltage vs. collector current

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