



## Digital transistors (built-in resistors)

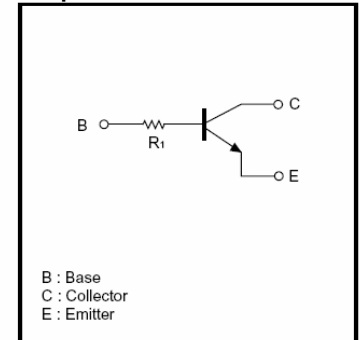
### DTC144TE/ DTC144TUA/ DTC144TCA/DTC144TKA/DTC144TSA

DIGITAL TRANSISTOR (NPN)

#### 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 device design easy.

#### ●Equivalent circuit



#### PIN CONNECTIONS AND MARKING

<p>DTC144TE</p> <p>(1) Base (2) Emitter (3) Collector</p> <p>SOT-523      Abbreviated symbol: 06</p>	<p>DTC144TUA</p> <p>(1) Base (2) Emitter (3) Collector</p> <p>SOT-323      Abbreviated symbol: 06</p>
<p>DTC144TKA</p> <p>(1) Base (2) Emitter (3) Collector</p> <p>SOT-23-3L      Abbreviated symbol: 06</p>	<p>DTC144TCA</p> <p>(1) Base (2) Emitter (3) Collector</p> <p>SOT-23      Abbreviated symbol: 06</p>
<p>DTC144TSA</p> <p>(1) Emitter (2) Collector (3) Base</p> <p>TO-92S</p>	

**MAXIMUM RATINGS\***  $T_A=25^{\circ}\text{C}$  unless otherwise noted

Symbol	Parameter	LIMITS(DTC144T□)					Units
		E	UA	KA	CA	SA	
$V_{CB0}$	Collector-Base Voltage	50					V
$V_{CE0}$	Collector-Emitter Voltage	50					V
$V_{EB0}$	Emitter-Base Voltage	5					V
$I_C$	Collector Current -Continuous	100					mA
$P_C$	Collector Dissipation	150		200		300	mW
$T_j$	Junction temperature	150					$^{\circ}\text{C}$
$T_J, T_{stg}$	Junction and Storage Temperature	-55~+150					$^{\circ}\text{C}$

**ELECTRICAL CHARACTERISTICS ( $T_{amb}=25^{\circ}\text{C}$  unless otherwise specified)**

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=50\mu\text{A}, I_E=0$	50			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=1\text{mA}, I_B=0$	50			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=50\mu\text{A}, I_C=0$	5			V
Collector cut-off current	$I_{CBO}$	$V_{CB}=50\text{V}, I_E=0$			0.5	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB}=4\text{V}, I_C=0$			0.5	$\mu\text{A}$
DC current gain	$h_{FE}$	$V_{CE}=5\text{V}, I_C=1\text{mA}$	100	300	600	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=5\text{mA}, I_B=0.5\text{mA}$			0.3	V
Transition frequency	$f_T$	$V_{CE}=10\text{V}, I_E=-5\text{mA}, f=100\text{MHz}$		250		MHz
Input resistor	R1		32.9	47	61.1	$k\Omega$

**Typical Characteristics**

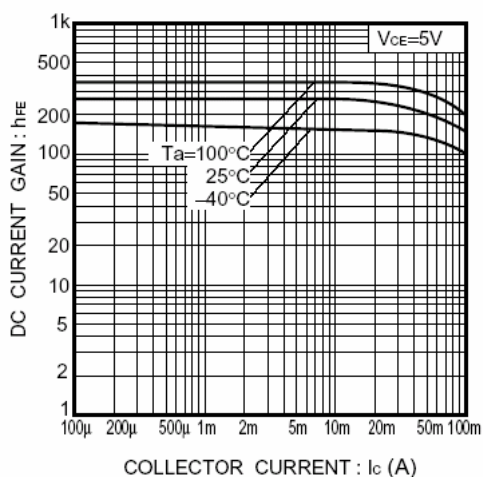


Fig.1 DC current gain vs. collector current

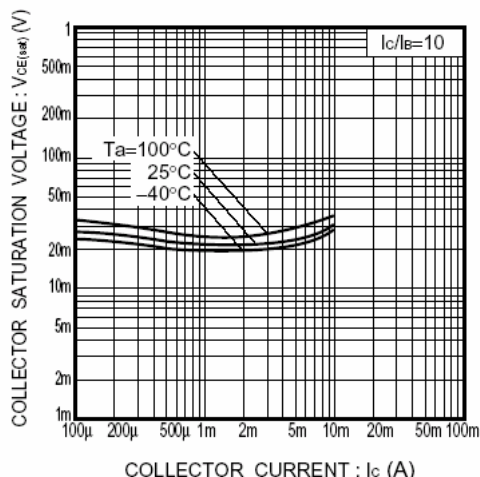


Fig.2 Collector-emitter saturation voltage vs. collector current