

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

## DTC144EUB

### ●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.

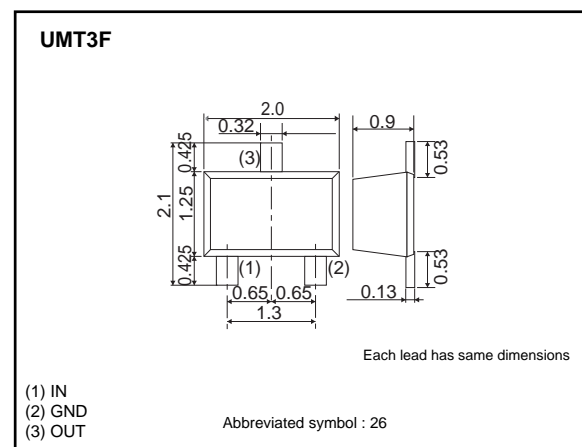
### ●Structure

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

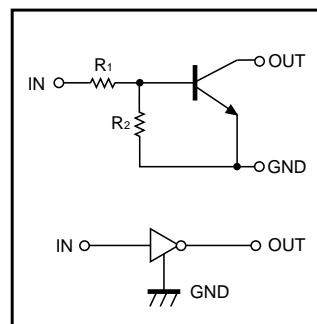
### ●Packaging specifications

Part No.	Package	UMT3F
	Packaging type	Taping
	Code	TL
	Basic ordering unit (pieces)	3000
DTC144EUB		○

### ●Dimensions (Unit : mm)



### ●Equivalent circuit



$$R_1 = R_2 = 47k\Omega$$

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

Parameter	Symbol	Limits	Unit
Supply voltage	$V_{CC}$	50	V
Input voltage	$V_{IN}$	-10 to +40	V
Collector current	$I_{C(max)}^{*1}$	100	mA
Output current	$I_O$	30	mA
Power dissipation	$P_D^{*2}$	200	mW
Junction temperature	$T_J$	150	$^\circ\text{C}$
Range of storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

\*1 Characteristics of built-in transistor

\*2 Each terminal mounted on a recommended land

**●Electrical characteristics (Ta=25°C)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	—	—	0.5	V	$V_{CC}=5V, I_o=100\mu A$
	$V_{I(on)}$	3.0	—	—		$V_o=0.3V, I_o=2mA$
Output voltage	$V_{O(on)}$	—	100	300	mV	$I_o=10mA, I_i=0.5mA$
Input current	$I_i$	—	—	180	$\mu A$	$V_i=5V$
Output current	$I_{O(off)}$	—	—	500	nA	$V_{CC}=50V, V_i=0V$
DC current gain	$G_i$	68	—	—	—	$V_o=5V, I_o=5mA$
Transition frequency	$f_T$ *	—	250	—	MHz	$V_{CE}=10V, I_E=-5mA, f=100MHz$
Input resistance	$R_i$	32.9	47	61.1	$k\Omega$	—
Resistance ratio	$R_2/R_1$	0.8	1.0	1.2	—	—

\* Characteristics of built-in transistor

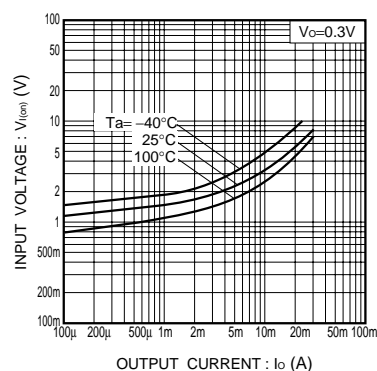
**●Electrical characteristic curves**


Fig.1 Input voltage vs. output current (ON characteristics)

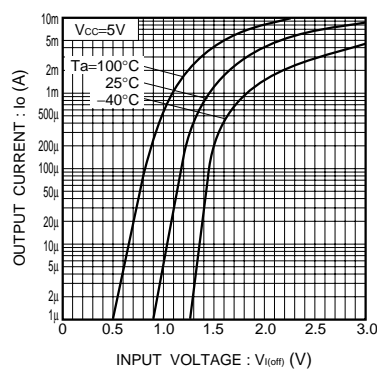


Fig.2 Output current vs. input voltage (OFF characteristics)

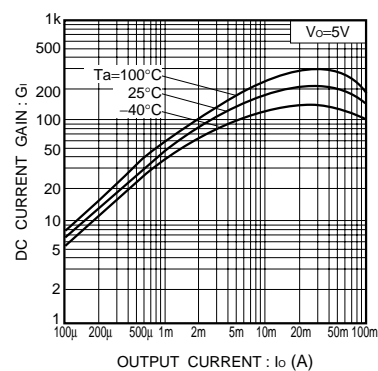


Fig.3 DC current gain vs. output current

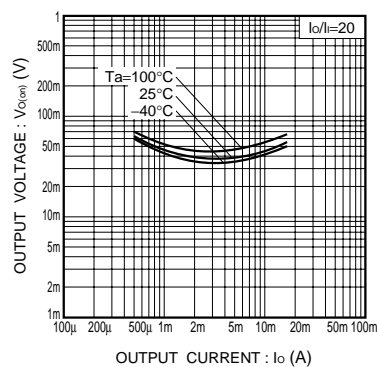


Fig.4 Output voltage vs. output current

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