

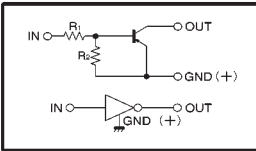
# Digital transistors (built-in resistors)

## DTB133HK / DTB133HS

### ●Features

- 1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors.
- 2) The bias resistors consist of thin-film resistors with complete isolation to allow positive biasing of the input, and parasitic effects are almost completely eliminated.
- 3) Only the on / off conditions need to be set for operation, making device design easy.
- 4) Higher mounting densities can be achieved.

### ●Circuit schematic



### ●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	—	—		$V_o = -0.3V, I_o = -20mA$
Output voltage	$V_{O(on)}$	—	-0.1	-0.3	V	$I_o = -50mA, I_i = -2.5mA$
Input current	$I_i$	—	—	-2.4	mA	$V_i = -5V$
Output current	$I_{O(off)}$	—	—	-0.5	$\mu A$	$V_{CC} = -50V, V_i = 0V$
DC current gain	$G_i$	56	—	—	—	$I_o = -50mA, V_o = -5V$
Input resistance	$R_i$	2.31	3.3	4.29	k $\Omega$	—
Resistance ratio	$R_2/R_1$	2.4	3	3.7	—	—
Transition frequency	$f_T$	—	200	—	MHz	$V_{CE} = -10V, I_E = 5mA, f = 100MHz$ *

\* Transition frequency of the device.

(94S-611-B133H)

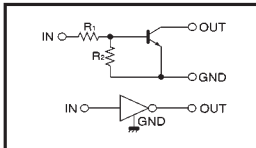
# Digital transistors (built-in resistors)

## DTD133HK / DTD133HS

### ●Features

- 1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors.
- 2) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input, and parasitic effects are almost completely eliminated.
- 3) Only the on / off conditions need to be set for operation, making device design easy.
- 4) Higher mounting densities can be achieved.

### ●Circuit schematic



### ●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	—	—		$V_o = 0.3V, I_o = 20mA$
Output voltage	$V_{O(on)}$	—	0.1	0.3	V	$I_o = 50mA, I_i = 2.5mA$
Input current	$I_i$	—	—	2.4	mA	$V_i = 5V$
Output current	$I_{O(off)}$	—	—	0.5	$\mu A$	$V_{CC} = 50V, V_i = 0V$
DC current gain	$G_i$	56	—	—	—	$I_o = 50mA, V_o = 5V$
Input resistance	$R_i$	2.31	3.3	4.29	k $\Omega$	—
Resistance ratio	$R_2/R_1$	2.4	3	3.7	—	—
Transition frequency	$f_T$	—	200	—	MHz	$V_{CE} = 10V, I_E = -5mA, f = 100MHz$ *

\* Transition frequency of the device.

(94S-733-D133H)

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

Parameter	Symbol	Limits	Unit
Supply voltage	$V_{CC}$	-50	V
Input voltage	$V_i$	-20 ~ +6	V
Output current	$I_o$	-500	mA
Power dissipation	DTB133HK	200	mW
	DTB133HS	300	
Junction temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-55 ~ +150	°C

### ●Package, marking, and packaging specifications

Part No.	DTB133HK	DTB133HS
Package	SMT3	SMT3
Marking	G98	—
Packaging code	T146	TP
Basic ordering unit (pieces)	3000	5000

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

Parameter	Symbol	Limits	Unit
Supply voltage	$V_{CC}$	50	V
Input voltage	$V_i$	-6 ~ +20	V
Output current	$I_o$	500	mA
Power dissipation	DTD133HK	200	mW
	DTD133HS	300	
Junction temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-55 ~ +150	°C

### ●Package, marking, and packaging specifications

Part No.	DTD133HK	DTD133HS
Package	SMT3	SMT3
Marking	G08	—
Packaging code	T146	TP
Basic ordering unit (pieces)	3000	5000