# DTC113ZUA

NPN 100mA 50V Digital Transistor (Bias Resistor Built-in Transistor)

## ●Features

1) Built-In Biasing Resistors,
   $R_1$ = 1kΩ, $R_2$ = 10kΩ
2) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner circuit) .
3) Only the on/off conditions need to be set for operation, making the circuit design easy.

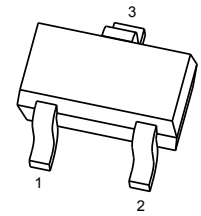
## ●Application

INVERTER, INTERFACE, DRIVER

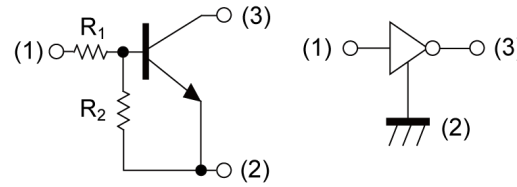
| Parameter | Value |
|---|---|
| $V_{CC}$ | 50V |
| $I_{C(MAX.)}$ | 100mA |
| $R_1$ | 1.0kΩ |
| $R_2$ | 10kΩ |

## ●Outline

SOT-323




MARKING:E21




(1) IN (BASE)
(2) GND (EMITTER)
(3) OUT (COLLECTOR)

## ●Absolute maximum ratings ($T_a$ = 25°C)

| Parameter | Symbol | Values | Unit |
|---|---|---|---|
| Supply voltage | $V_{CC}$ | 50 | V |
| Input voltage | $V_{IN}$ | -5 to 10 | V |
| Output current | $I_O$ | 100 | mA |
| Collector current | $I_{C(MAX)}$ *1 | 100 | mA |
| Power dissipation | $P_D$ *2 | 200 | mW |
| Junction temperature | $T_j$ | 150 | ℃ |
| Range of storage temperature | $T_{stg}$ | -55 to +150 | ℃ |

## ●Electrical characteristics ($T_a$ = 25°C)

| Parameter | Symbol | Conditions | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Input voltage | $V_{I(off)}$ | $V_{CC}$ = 5V, $I_O$ = 100μA | - | - | 0.3 | V |
| | $V_{I(on)}$ | $V_O$ = 0.3V, $I_O$ = 20mA | 3.0 | - | - | |
| Output voltage | $V_{O(on)}$ | $I_O$ = 10mA, $I_I$ = 0.5mA | - | 100 | 300 | mV |
| Input current | $I_I$ | $V_I$ = 5V | - | - | 7.2 | mA |
| Output current | $I_{O(off)}$ | $V_{CC}$ = 50V, $V_I$ = 0V | - | - | 500 | nA |
| DC current gain | $G_I$ | $V_O$ = 5V, $I_O$ = 5mA | 33 | - | - | - |
| Input resistance | $R_1$ | - | 0.7 | 1.0 | 1.3 | kΩ |
| Resistance ratio | $R_2/R_1$ | - | 8 | 10 | 12 | - |
| Transition frequency | $f_T$*1 | $V_{CE}$ = 10V, $I_E$ = -5mA, f = 100MHz | - | 250 | - | MHz |

*1 Characteristics of built-in transistor

*2 Each terminal mounted on a reference land.

## ●Electrical characteristic curves ($T_a$ =25°C)

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

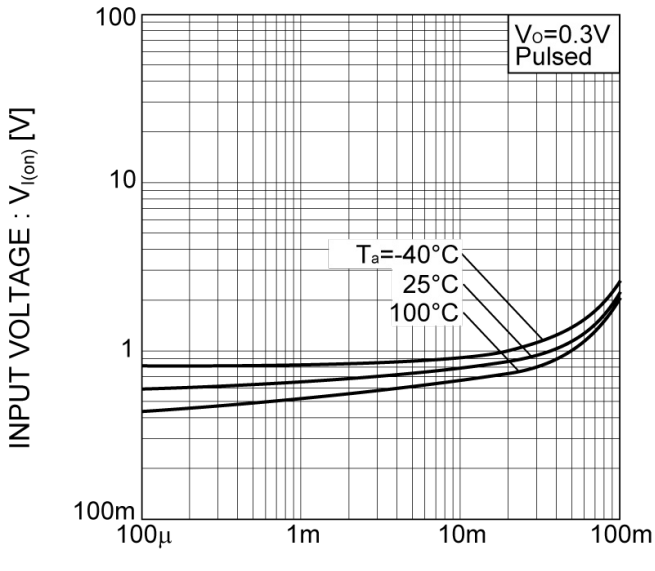



Fig.2 Output current vs. input voltage (OFF characteristics)

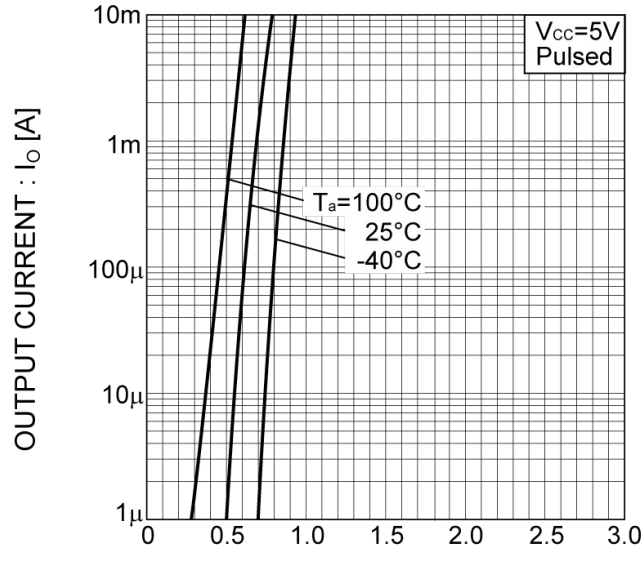


Fig.3 Output current vs. output voltage

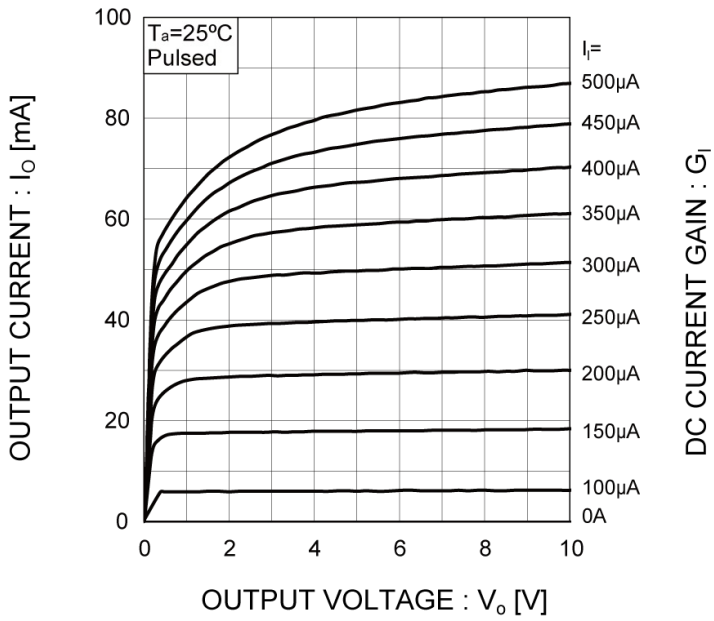
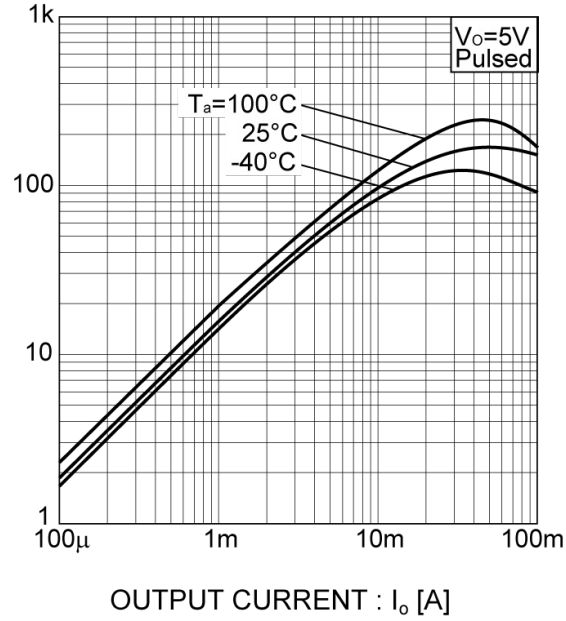
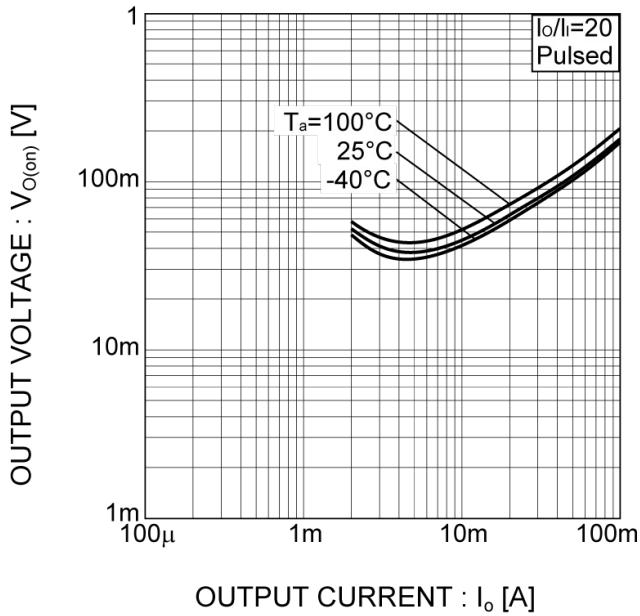



Fig.4 DC current gain vs. output current

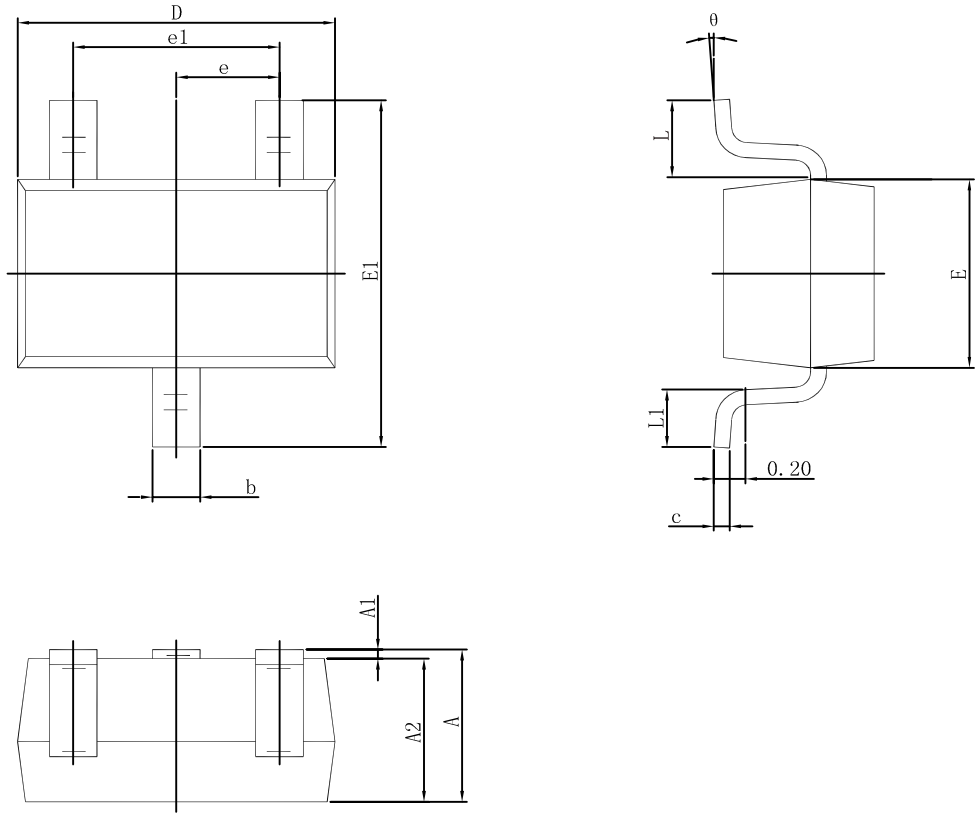



● **Electrical characteristic curves** ($T_a$ =25°C)

Fig.5 Output voltage vs. output current



SOT323 **PACKAGE OUTLINE DIMENSIONS**




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.100 | 0.035 | 0.043 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.000 | 0.035 | 0.039 |
| b | 0.200 | 0.400 | 0.008 | 0.016 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.000 | 2.200 | 0.079 | 0.087 |
| E | 1.150 | 1.350 | 0.045 | 0.053 |
| E1 | 2.150 | 2.450 | 0.085 | 0.096 |
| e | 0.650 TYP. | | 0.026 TYP. | |
| e1 | 1.200 | 1.400 | 0.047 | 0.055 |
| L | 0.525 REF. | | 0.021 REF. | |
| L1 | 0.260 | 0.460 | 0.010 | 0.018 |
| θ | 0° | 8° | 0° | 8° |