

DTB143EK

PNP -500mA -50V Digital Transistors (Bias Resistor Built-in Transistors) Datasheet

| Parameter            | Value  |
|----------------------|--------|
| V <sub>CC</sub>      | -50V   |
| I <sub>C(MAX.)</sub> | -500mA |
| R <sub>1</sub>       | 4.7kΩ  |
| R <sub>2</sub>       | 4.7kΩ  |

#### Features

- 1) Built-In Biasing Resistors,  $R1 = R2 = 4.7k\Omega$ .
- Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner circuit).
- The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of completely eliminating parasitic effects.
- 4) Only the on/off conditions need to be set for operation, making the circuit design easy.
- 5) Complementary NPN Types :DTD143EK
- 6) Lead Free/RoHS Compliant.

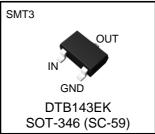
#### Application

Switching circuit, Inverter circuit, Interface circuit, Driver circuit

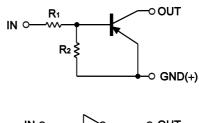
#### Packaging specifications

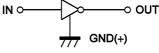
| Part No. | Package | Package<br>size<br>(mm) | Taping<br>code | Reel size<br>(mm) | Tape width<br>(mm) | Basic<br>ordering<br>unit (pcs) | Marking |
|----------|---------|-------------------------|----------------|-------------------|--------------------|---------------------------------|---------|
| DTB143EK | SMT3    | 2928                    | T146           | 180               | 8                  | 3,000                           | F13     |

Outline



#### Inner circuit





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

| Parameter                    | Symbol                                | Values      | Unit |
|------------------------------|---------------------------------------|-------------|------|
| Supply voltage               | V <sub>cc</sub>                       | -50         | V    |
| Input voltage                | V <sub>IN</sub>                       | -30 to +10  | V    |
| Collector current            | <sup>*1</sup><br>ا <sub>C(MAX.)</sub> | -500        | mA   |
| Power dissipation            | $P_{D}^{*2}$                          | 200         | mW   |
| Junction temperature         | Тj                                    | 150         | °C   |
| Range of storage temperature | T <sub>stg</sub>                      | -55 to +150 | °C   |

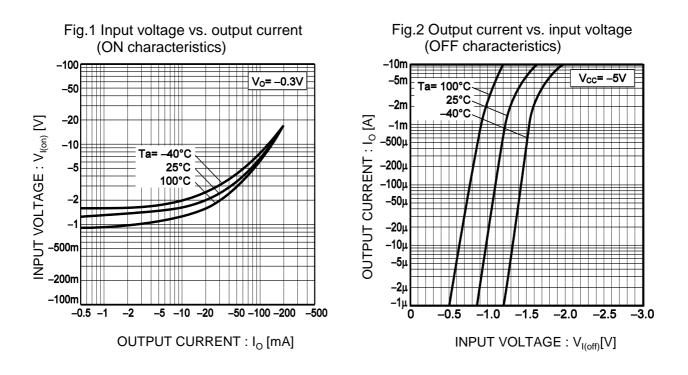
# •Electrical characteristics(Ta = 25°C)

| Parameter            | Symbol                       | Conditions   | Min. | Тур. | Max. | Unit |
|----------------------|------------------------------|--|------|------|------|------|
| Input voltage        | V <sub>I(off)</sub>          | $V_{CC} = -5V, I_{O} = -100 \mu A$                           | -    | -    | -0.5 | V    |
| Input voltage        | V <sub>I(on)</sub>           | $V_0 = -0.3V, I_0 = -20mA$                                   | -3.0 | -    | -    | V    |
| Output voltage       | V <sub>O(on)</sub>           | I <sub>O</sub> / I <sub>I</sub> = -50mA / -2.5mA             | -    | -0.1 | -0.3 | V    |
| Input current        | I <sub>I</sub>               | $V_1 = -5V$  | -    | -    | -1.8 | mA   |
| Output current       | I <sub>O(off)</sub>          | $V_{CC} = -50V, V_1 = 0V$                                    | -    | -    | -0.5 | μA   |
| DC current gain      | G <sub>I</sub>               | $V_0 = -5V, I_0 = -50mA$                                     | 47   | -    | -    | -    |
| Input resistance     | R <sub>1</sub>               | -  | 3.29 | 4.7  | 6.11 | kΩ   |
| Resistance ratio     | $R_2/R_1$                    | -  | 0.8  | 1.0  | 1.2  | -    |
| Transition frequency | f <sub>T</sub> <sup>*1</sup> | V <sub>CE</sub> = -10V, I <sub>E</sub> = 50mA,<br>f = 100MHz | -    | 200  | -    | MHz  |

\*1 Characteristics of built-in transistor

\*2 Each terminal mounted on a reference footprint

#### •Electrical characteristic curves(Ta = 25°C)



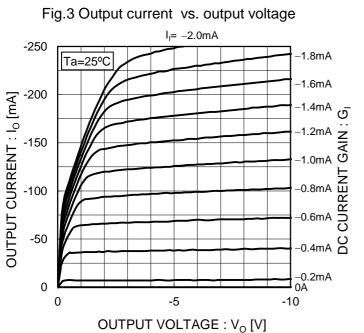
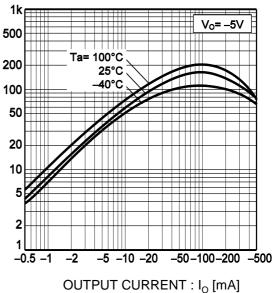


Fig.4 DC current gain vs. output current



### •Electrical characteristic curves(Ta = 25°C)

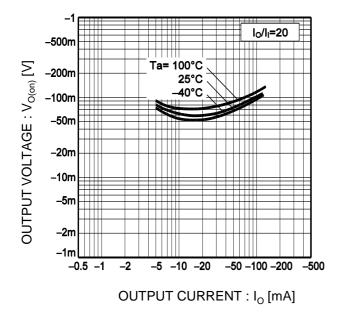
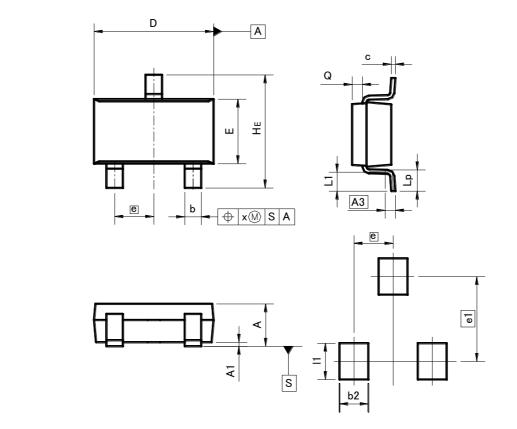


Fig.5 Output voltage vs. output current

SMT3

#### •Dimensions (Unit : mm)



#### Patterm of terminal position areas

| DIM | MILIM | ETERS | INC   | HES   |
|-----|-------|-------|-------|-------|
| DIM | MIN   | MAX   | MIN   | MAX   |
| А   | 1.00  | 1.30  | -     | 0.051 |
| A1  | 0.00  | 0.10  | 0     | 0.004 |
| A3  | 0.3   | 25    | 0.0   | 01    |
| b   | 0.35  | 0.50  | 0.014 | 0.02  |
| с   | 0.09  | 0.25  | 0.004 | 0.01  |
| D   | 2.80  | 3.00  | 0.11  | 0.118 |
| ш   | 1.50  | 1.80  | 0.059 | 0.071 |
| е   | 0.9   | 95    | 0.0   | 04    |
| HE  | 2.60  | 3.00  | 0.102 | 0.118 |
| L1  | 0.30  | 0.60  | 0.012 | 0.024 |
| Lp  | 0.40  | 0.70  | 0.016 | 0.028 |
| Q   | 0.20  | 0.30  | 0.008 | 0.012 |
| x   | _     | 0.10  | _     | 0.004 |
| У   | _     | 0.10  | _     | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |  |
|-----|------------|------|--------|-------|--|
| DIM | MIN        | MAX  | MIN    | MAX   |  |
| e1  | 2.10       |      | 0.08   |       |  |
| b2  |            | 0.60 | -      | 0.024 |  |
| 1   | -          | 0.90 | -      | 0.035 |  |

Dimension in mm/inches

|  | Notes   |
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