

# DTB9K

## List

|                                                         |   |
|---------------------------------------------------------|---|
| List.....                                               | 1 |
| Package outline.....                                    | 2 |
| Features.....                                           | 2 |
| Mechanical data.....                                    | 2 |
| Maximum ratings .....                                   | 2 |
| Electrical characteristics.....                         | 2 |
| Rating and characteristic curves.....                   | 3 |
| Pinning information.....                                | 4 |
| Marking.....                                            | 4 |
| Suggested solder pad layout.....                        | 4 |
| Package Information.....                                | 5 |
| Reel packing.....                                       | 6 |
| Suggested thermal profiles for soldering processes..... | 6 |

# DTB9K

## PNP Silicon Surface Mount Transistors with Monolithic Bias Resistor Network

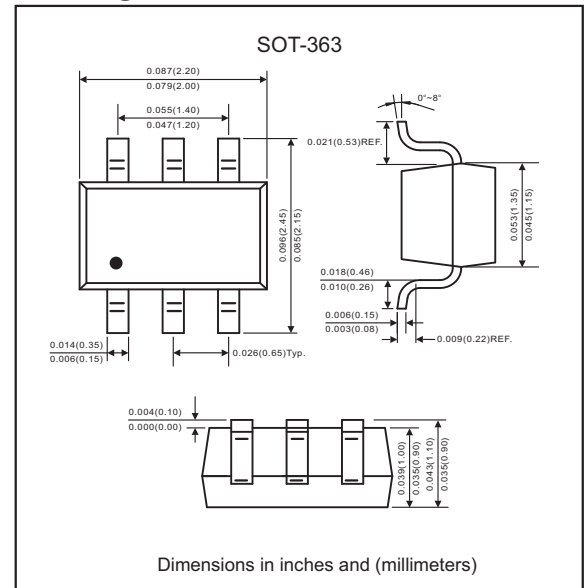
### Features

- For Switching and interface circuit and drive circuit applications.
- Simplify circuit design.
- Reduce a quantity of parts and manufacturing process.
- We declare that the material of product compliance with RoHS requirements.
- Suffix "-H" indicates Halogen free parts, ex. DTB9K-H.

### Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-363
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any

### Package outline



### Maximum ratings (At $T_A=25^\circ\text{C}$ unless otherwise noted, Common for $Q_1$ and $Q_2$ )

| Parameter                 | Symbol    | Value       | Unit             |
|---------------------------|-----------|-------------|------------------|
| Supply voltage            | $-V_{CC}$ | 50          | V                |
| Input voltage             | $-V_{IN}$ | 40~-6       | V                |
| Output current            | $-I_C$    | 100         | mA               |
| Power dissipation (Note1) | $P_D$     | 150         | mW               |
| Junction temperature      | $T_J$     | +150        | $^\circ\text{C}$ |
| Storage temperature range | $T_{stg}$ | -55 to +150 | $^\circ\text{C}$ |

### Electrical characteristics (At $T_A=25^\circ\text{C}$ unless otherwise noted, Common for $Q_1$ and $Q_2$ ) (Continued)

| Parameter            | Conditions                       | Symbol          | Min. | Typ. | Max. | Unit       |
|----------------------|----------------------------------|-----------------|------|------|------|------------|
| Input voltage        | $V_{CC}=-5V, I_{OUT}=-100\mu A$  | $-V_{IN(OFF)}$  |      |      | 0.3  | V          |
|                      | $V_{OUT}=-0.3V, I_{OUT}=-1mA$    | $-V_{(BR)CEO}$  | 1.4  |      |      | V          |
| Output voltage       | $I_{OUT}/I_{IN}=-5mA/-0.25mA$    | $-V_{OUT(ON)O}$ |      | 0.1  | 0.3  | V          |
| Input current        | $V_{IN}=-5V$                     | $-I_{IN}$       |      |      | 880  | nA         |
| Out current          | $V_{CC}=-50V, V_{IN}=0V$         | $-I_{OUT(OFF)}$ |      |      | 0.5  | $\mu A$    |
| DC current gain      | $V_{OUT}=-5V, I_{OUT}=-5mA$      | $h_{FE}$        | 68   |      |      |            |
| Input resistance     |                                  | $R_1$           | 7    | 10   | 13   | K $\Omega$ |
| Resistance ratio     |                                  | $R_2/R_1$       | 3.7  | 4.7  | 5.7  |            |
| Transition Frequency | $V_{CE}=-10V, I_E=5mA, f=100MHz$ | $R_1$           |      | 250  |      | MHZ        |

Note : 1. FR-4 @Minimum pad

## Rating and characteristic curves (DTB9K)

Fig.1 Input Voltage vs Output Current  
(On Characteristics)

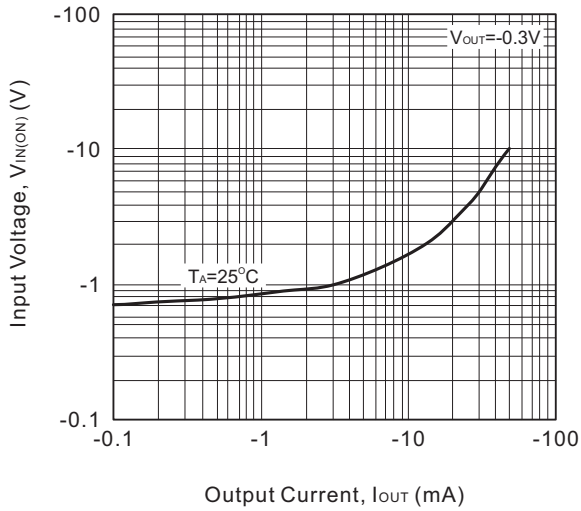


Fig.2 Output Current vs Input Voltage  
(On Characteristics)

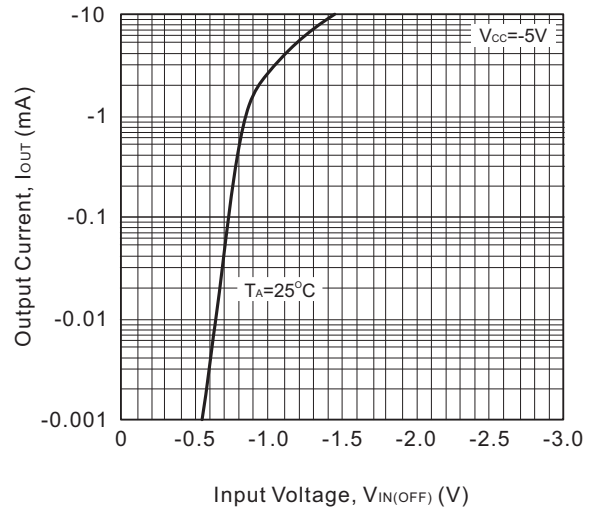


Fig.3 DC Current Gain vs Output Current

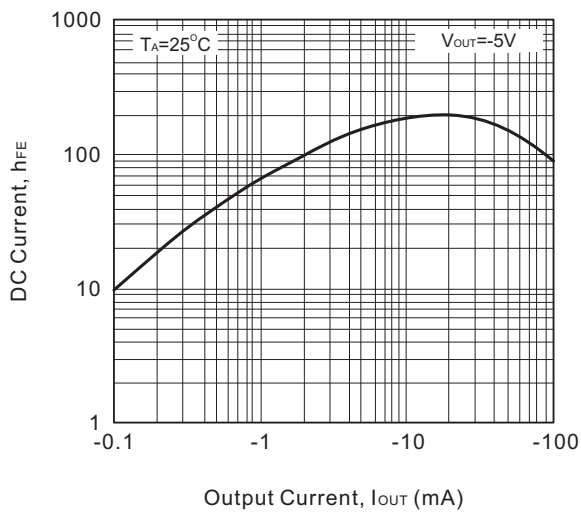
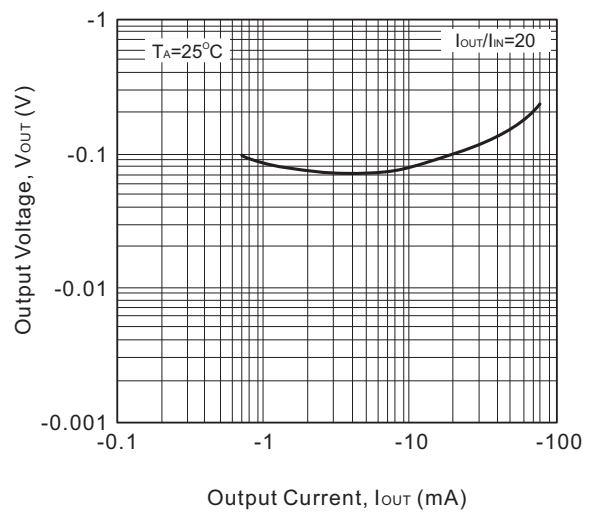
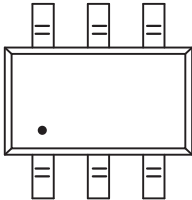
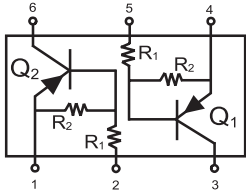


Fig.4 Output Voltage vs Output Current

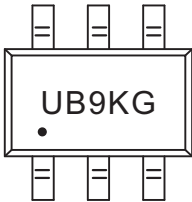


DTB9K

Pinning information

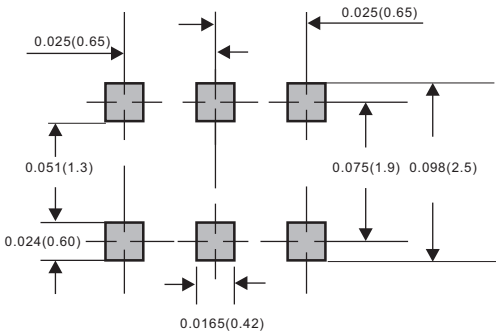
| Pin                                                  | Simplified outline                                                                | Symbol                                                                              |
|------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Pin2, 5 Base<br>Pin1, 4 Emitter<br>Pin3, 6 Collector |  |  |

Marking

| Type numbe | Marking code                                                                       |
|------------|------------------------------------------------------------------------------------|
| DTB9K      |  |

Suggested solder pad layout

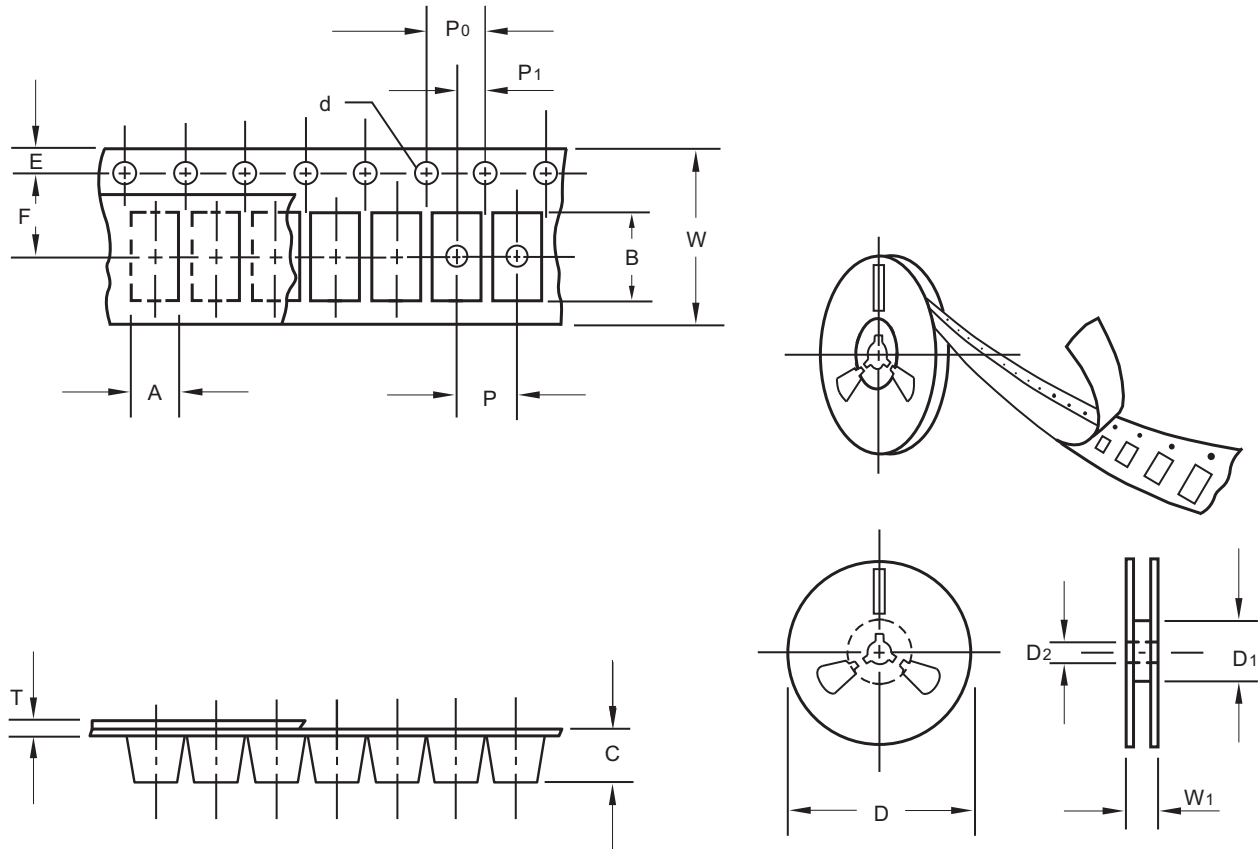
SOT-363



Dimensions in inches and (millimeters)

## DTB9K

## Packing information



unit:mm

| Item                      | Symbol | Tolerance | SOT-363 |
|---------------------------|--------|-----------|---------|
| Carrier width             | A      | 0.1       | 2.36    |
| Carrier length            | B      | 0.1       | 2.40    |
| Carrier depth             | C      | 0.1       | 1.20    |
| Sprocket hole             | d      | 0.1       | 1.50    |
| 13" Reel outside diameter | D      | 2.0       | -       |
| 13" Reel inner diameter   | D1     | min       | -       |
| 7" Reel outside diameter  | D      | 2.0       | 178.00  |
| 7" Reel inner diameter    | D1     | min       | 62.00   |
| Feed hole diameter        | D2     | 0.5       | 13.00   |
| Sprocket hole position    | E      | 0.1       | 1.75    |
| Punch hole position       | F      | 0.1       | 3.50    |
| Punch hole pitch          | P      | 0.1       | 4.00    |
| Sprocket hole pitch       | P0     | 0.1       | 4.00    |
| Embossment center         | P1     | 0.1       | 2.00    |
| Overall tape thickness    | T      | 0.1       | 0.23    |
| Tape width                | W      | 0.3       | 8.00    |
| Reel width                | W1     | 1.0       | 11.40   |

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

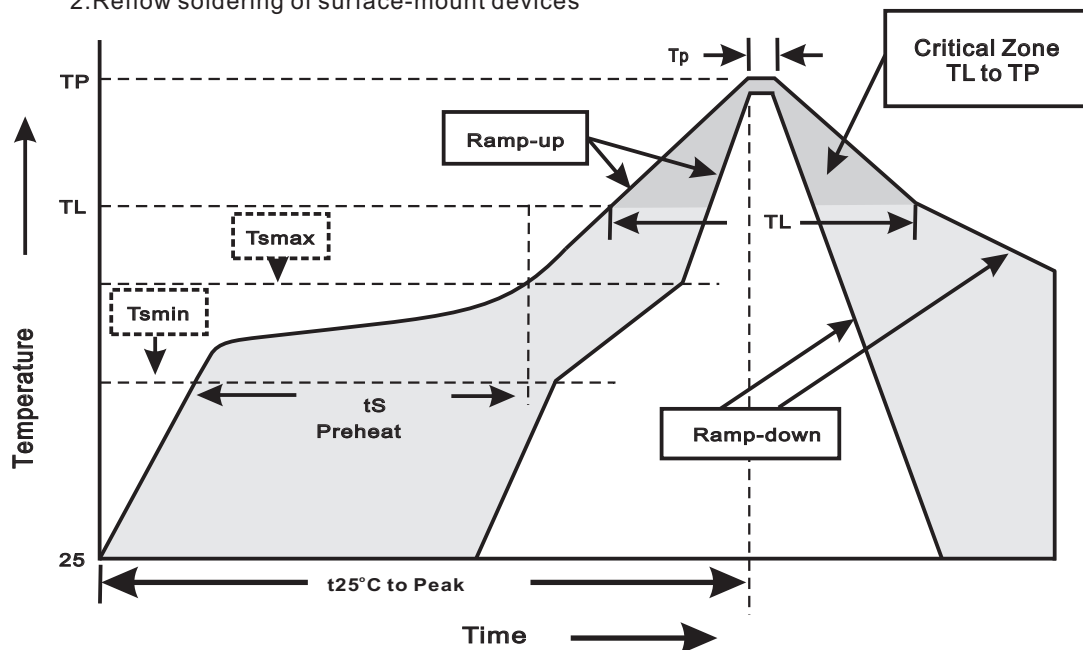
## DTB9K

## Reel packing

| PACKAGE | REEL SIZE | REEL (pcs) | COMPONENT SPACING (m/m) | BOX (pcs) | INNER BOX (m/m) | REEL DIA, (m/m) | CARTON SIZE (m/m) | CARTON (pcs) | APPROX. GROSS WEIGHT (kg) |
|---------|-----------|------------|-------------------------|-----------|-----------------|-----------------|-------------------|--------------|---------------------------|
| SOT-363 | 7"        | 3,000      | 4.0                     | 30,000    | 183*183*123     | 178             | 382*262*387       | 240,000      | 9.50                      |

## Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



## 3.Reflow soldering

| Profile Feature                                                                                           | Soldering Condition         |
|-----------------------------------------------------------------------------------------------------------|-----------------------------|
| Average ramp-up rate( $T_L$ to $T_P$ )                                                                    | <3°C/sec                    |
| Preheat<br>-Temperature Min( $T_{smin}$ )<br>-Temperature Max( $T_{smax}$ )<br>-Time(min to max)( $t_s$ ) | 150°C<br>200°C<br>60~120sec |
| $T_{smax}$ to $T_L$<br>-Ramp-upRate                                                                       | <3°C/sec                    |
| Time maintained above:<br>-Temperature( $T_L$ )<br>-Time( $t_L$ )                                         | 217°C<br>60~260sec          |
| Peak Temperature( $T_P$ )                                                                                 | 255°C-0/+5°C                |
| Time within 5°C of actual Peak Temperature( $t_P$ )                                                       | 10~30sec                    |
| Ramp-down Rate                                                                                            | <6°C/sec                    |
| Time 25°C to Peak Temperature                                                                             | <6minutes                   |