



# UNISONIC TECHNOLOGIES CO., LTD

## 2SD965B

### NPN EPITAXIAL SILICON TRANSISTOR

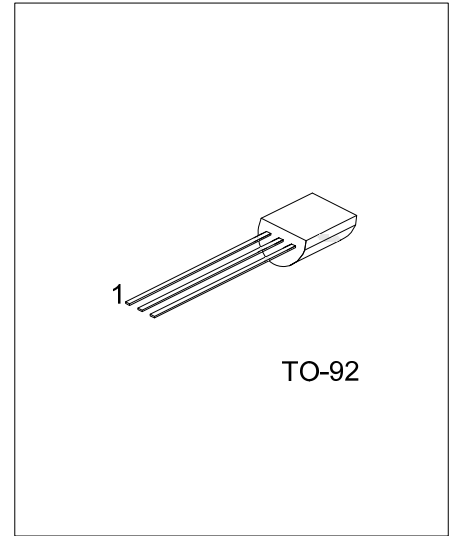
## LOW VOLTAGE HIGH CURRENT NPN TRANSISTOR

### FEATURES

- \* Collector current up to 5A
- \* Collector-Emitter voltage up to 30V

### APPLICATIONS

- \* Audio amplifier
- \* Flash unit of camera
- \* Switching circuit



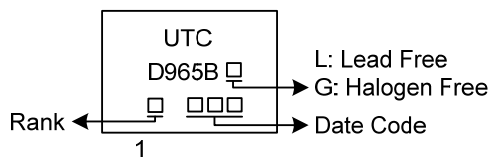
### ORDERING INFORMATION

| Order Number      |                  | Package | Pin Assignment |   |   | Packing  |
|-------------------|------------------|---------|----------------|---|---|----------|
| Lead Free Plating | Halogen Free     |         | 1              | 2 | 3 |          |
| 2SD965BL-x-T92-B  | 2SD965BG-x-T92-B | TO-92   | E              | C | B | Tape Box |
| 2SD965BL-x-T92-K  | 2SD965BG-x-T92-K | TO-92   | E              | C | B | Bulk     |

Note: Pin Assignment: E: Emitter    C: Collector    B: Base

|   |   |
|---|---|
| <p>2SD965BG-x-T92-B</p> <p>(1) Packing Type<br/>(2) Package Type<br/>(3) Rank<br/>(4) Green Package</p> | <p>(1) B: Tape Box, K: Bulk<br/>(2) T92: TO-92<br/>(3) x: refer to Classification of <math>h_{FE2}</math><br/>(4) G: Halogen Free and Lead Free, L: Lead Free</p> |
|---|---|

### MARKING



■ ABSOLUTE MAXIMUM RATING ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

| PARAMETER                 | SYMBOL    | RATINGS    | UNIT             |
|---------------------------|-----------|------------|------------------|
| Collector-base voltage    | $V_{CBO}$ | 40         | V                |
| Collector-emitter voltage | $V_{CEO}$ | 30         | V                |
| Emitter-base voltage      | $V_{EBO}$ | 7          | V                |
| Collector dissipation     | $P_C$     | 750        | mW               |
| Collector current         | $I_C$     | 5          | A                |
| Junction Temperature      | $T_J$     | 125        | $^\circ\text{C}$ |
| Operating Temperature     | $T_{OPR}$ | -20 ~ +85  | $^\circ\text{C}$ |
| Storage Temperature       | $T_{STG}$ | -40 ~ +150 | $^\circ\text{C}$ |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

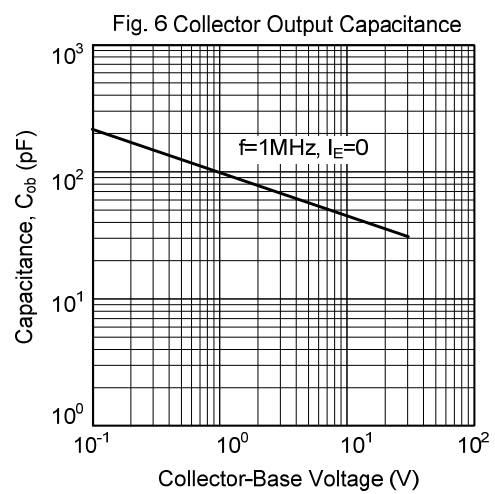
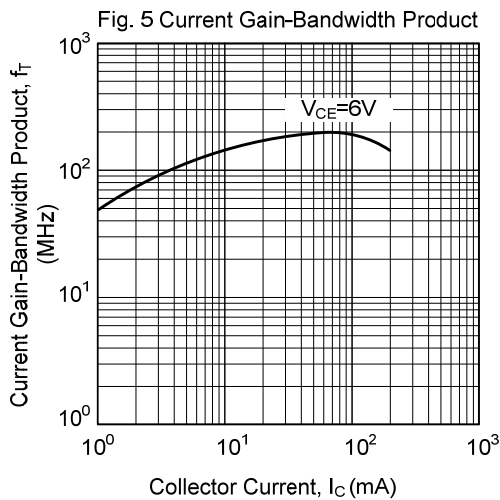
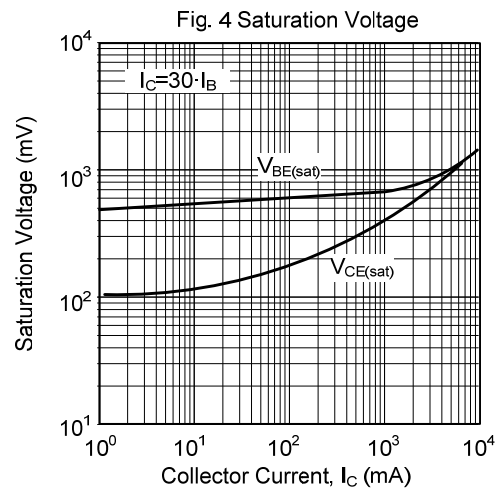
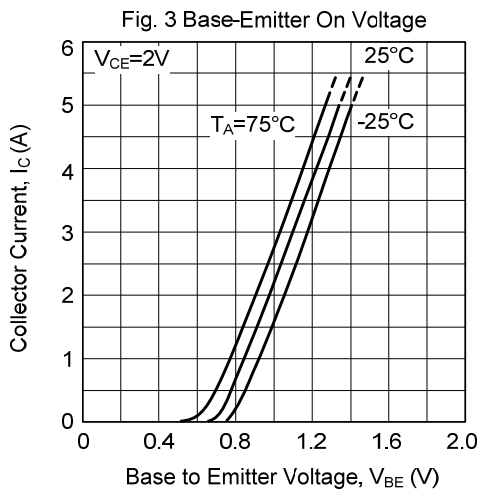
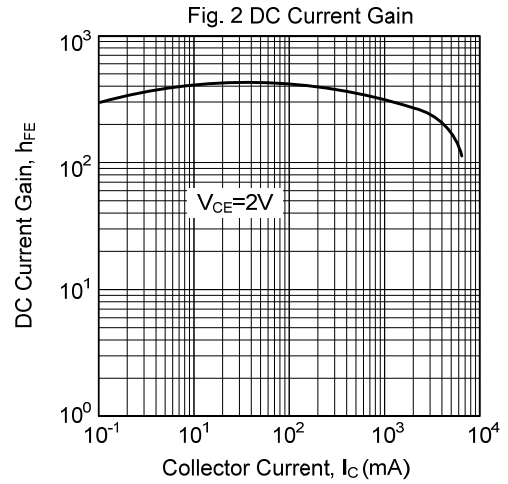
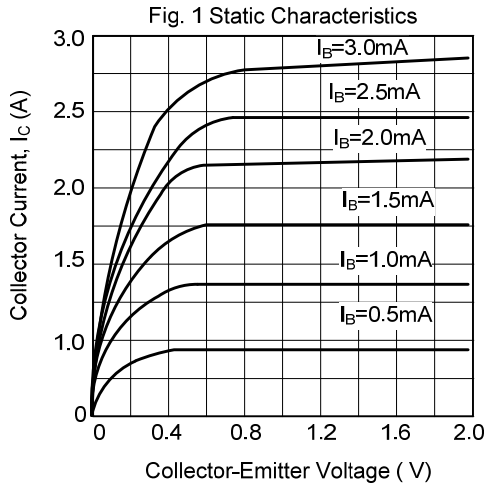
■ ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

| PARAMETER                            | SYMBOL        | TEST CONDITIONS                           | MIN | TYP | MAX | UNIT |
|--------------------------------------|---------------|---|-----|-----|-----|------|
| Collector-base breakdown voltage     | $BV_{CBO}$    | $I_C=100\mu\text{A}, I_E=0$               | 40  |     |     | V    |
| Collector-emitter breakdown voltage  | $BV_{CEO}$    | $I_C=1\text{mA}, I_B=0$                   | 30  |     |     | V    |
| Emitter-base breakdown voltage       | $BV_{EBO}$    | $I_E=10\mu\text{A}, I_C=0$                | 7   |     |     | V    |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB}=30\text{V}, I_E=0$                |     |     | 200 | nA   |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB}=7\text{V}, I_C=0$                 |     |     | 200 | nA   |
| DC current gain (note)               | $h_{FE1}$     | $V_{CE}=2\text{V}, I_C=1\text{mA}$        |     | 200 |     |      |
|                                      | $h_{FE2}$     | $V_{CE}=2\text{V}, I_C=0.5\text{A}$       | 230 |     | 800 |      |
|                                      | $h_{FE3}$     | $V_{CE}=2\text{V}, I_C=2\text{A}$         | 150 |     |     |      |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C=3\text{A}, I_B=0.1\text{A}$          |     |     | 1   | V    |
| Current gain bandwidth product       | $f_T$         | $V_{CE}=6\text{V}, I_C=50\text{mA}$       |     | 150 |     | MHz  |
| Output capacitance                   | $C_{ob}$      | $V_{CB}=20\text{V}, I_E=0, f=1\text{MHz}$ |     |     | 50  | pF   |

■ CLASSIFICATION OF  $h_{FE2}$

| RANK  | Q       | R       | S       |
|-------|---------|---------|---------|
| RANGE | 230-380 | 340-600 | 560-800 |

## ■ TYPICAL CHARACTERISTICS



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