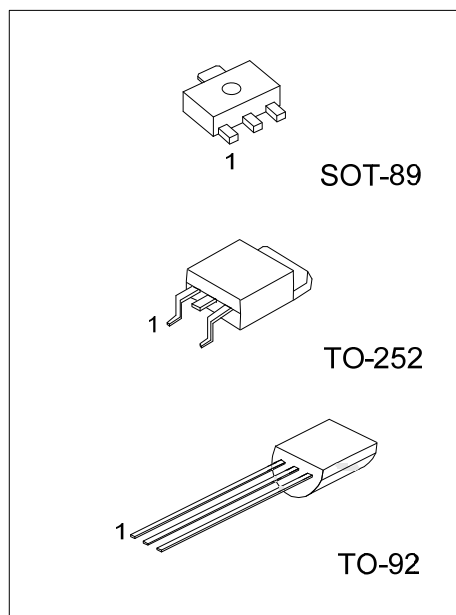


**2SD965/A****NPN SILICON TRANSISTOR****LOW VOLTAGE HIGH  
CURRENT TRANSISTOR****■ FEATURES**

- \* Collector current up to 5A
- \* UTC **2SD965**: Collector-Emitter voltage up to 20 V
- \* UTC **2SD965A**: Collector-Emitter voltage up to 30 V

**■ APPLICATIONS**

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

**■ ORDERING INFORMATION**

| Ordering Number  |                  | Package | Pin Assignment |   |   | Packing   |
|------------------|------------------|---------|----------------|---|---|-----------|
| Lead Free        | Halogen Free     |         | 1              | 2 | 3 |           |
| 2SD965L-x-AB3-R  | 2SD965G-x-AB3-R  | SOT-89  | B              | C | E | Tape Reel |
| 2SD965L-x-T92-B  | 2SD965G-x-T92-B  | TO-92   | E              | C | B | Tape Box  |
| 2SD965L-x-T92-K  | 2SD965G-x-T92-K  | TO-92   | E              | C | B | Bulk      |
| 2SD965L-x-TN3-R  | 2SD965G-x-TN3-R  | TO-252  | B              | C | E | Tape Reel |
| 2SD965AL-x-AB3-R | 2SD965AG-x-AB3-R | SOT-89  | B              | C | E | Tape Reel |
| 2SD965AL-x-T92-B | 2SD965AG-x-T92-B | TO-92   | E              | C | B | Tape Box  |
| 2SD965AL-x-T92-K | 2SD965AG-x-T92-K | TO-92   | E              | C | B | Bulk      |
| 2SD965AL-x-TN3-R | 2SD965AG-x-TN3-R | TO-252  | B              | C | E | Tape Reel |

|                        |  |                  |                                             |
|------------------------|--|------------------|---------------------------------------------|
| <b>2SD965L-x-AB3-R</b> |  | (1) Packing Type | (1) R: Tape Reel, B: Tape Box, K: Bulk      |
|                        |  | (2) Package Type | (2) AB3: SOT-89, T92: TO-92, TN3: TO-252    |
|                        |  | (3) Rank         | (3) x: refer to Classification of $h_{FE2}$ |
|                        |  | (4) Lead Plating | (4) L: Lead Free, G: Halogen Free           |

### ■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C)

| PARAMETER                 | SYMBOL           | RATINGS    | UNIT |
|---------------------------|------------------|------------|------|
| Collector-Base Voltage    | V <sub>CBO</sub> | 40         | V    |
| Collector-Emitter Voltage | V <sub>CEO</sub> | 20         | V    |
|                           |                  | 30         | V    |
| Emitter-Base Voltage      | V <sub>EBO</sub> | 7          | V    |
| Collector Dissipation     | SOT-89           | 500        | mW   |
|                           | TO-92            | 750        | mW   |
|                           | TO-252           | 1          | W    |
| Collector Current         | I <sub>C</sub>   | 5          | A    |
| Junction Temperature      | T <sub>J</sub>   | 150        | °C   |
| Storage Temperature       | T <sub>STG</sub> | -65 ~ +150 | °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<sub>A</sub>=25°C, unless otherwise specified)

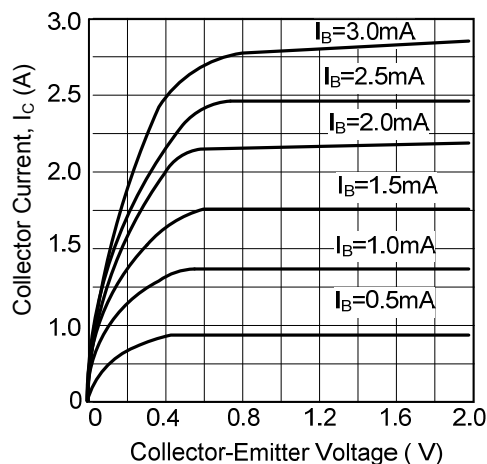
| PARAMETER                            | SYMBOL               | TEST CONDITIONS                                 | MIN | TYP | MAX | UNIT |
|--------------------------------------|----------------------|-------------------------------------------------|-----|-----|-----|------|
| Collector-Base Breakdown Voltage     | BV <sub>CBO</sub>    | I <sub>C</sub> =100μA, I <sub>E</sub> =0        | 40  |     |     | V    |
| Collector-Emitter Breakdown Voltage  | BV <sub>CEO</sub>    | I <sub>C</sub> =1mA, I <sub>B</sub> =0          | 20  |     |     | V    |
|                                      |                      |                                                 | 30  |     |     | V    |
| Emitter-Base Breakdown Voltage       | BV <sub>EBO</sub>    | I <sub>E</sub> =10μA, I <sub>C</sub> =0         | 7   |     |     | V    |
| Collector Cut-off Current            | I <sub>CBO</sub>     | V <sub>CB</sub> =10V, I <sub>E</sub> =0         |     |     | 100 | nA   |
| Emitter Cut-off Current              | I <sub>EBO</sub>     | V <sub>EB</sub> =7V, I <sub>C</sub> =0          |     |     | 100 | nA   |
| DC Current Gain(note)                | h <sub>FE</sub>      | V <sub>CE</sub> =2V, I <sub>C</sub> =1mA        |     | 200 |     |      |
|                                      |                      | V <sub>CE</sub> =2V, I <sub>C</sub> =0.5A       | 230 |     | 800 |      |
|                                      |                      | V <sub>CE</sub> =2V, I <sub>C</sub> =2A         | 150 |     |     |      |
| Collector-Emitter Saturation Voltage | V <sub>CE(SAT)</sub> | I <sub>C</sub> =3A, I <sub>B</sub> =0.1A        |     |     | 1   | V    |
| Current Gain Bandwidth Product       | f <sub>T</sub>       | V <sub>CE</sub> =6V, I <sub>C</sub> =50mA       |     | 150 |     | MHz  |
| Output Capacitance                   | C <sub>ob</sub>      | V <sub>CB</sub> =20V, I <sub>E</sub> =0, f=1MHz |     |     | 50  | pF   |

### ■ CLASSIFICATION OF h<sub>FE2</sub>

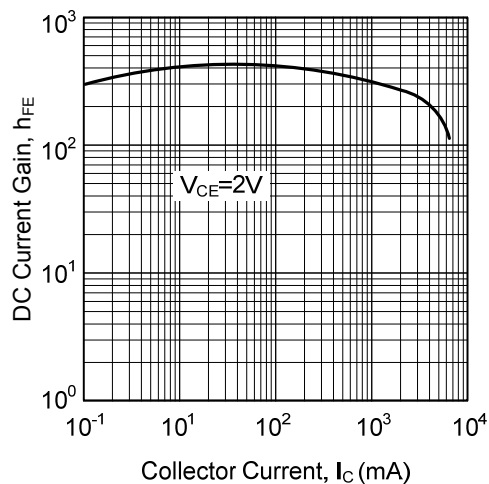
| RANK  | Q       | R       | S       |
|-------|---------|---------|---------|
| RANGE | 230-380 | 340-600 | 560-800 |

## TYPICAL CHARACTERISTICS

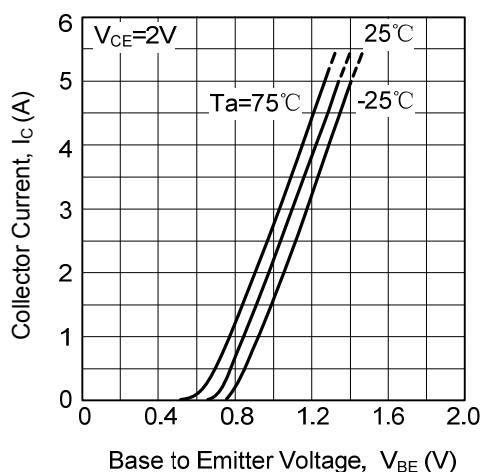
Static Characteristics



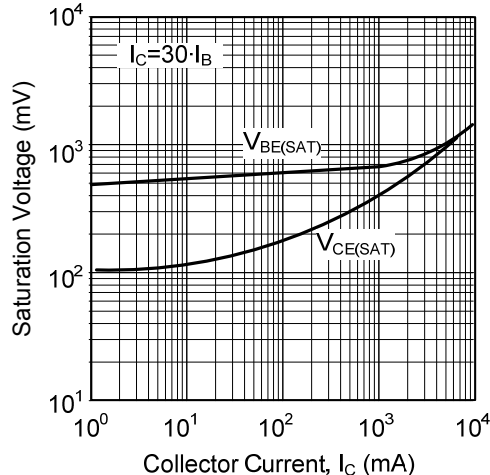
DC Current Gain



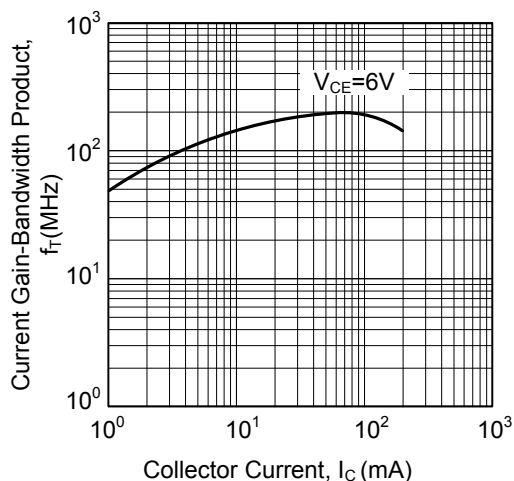
Base-Emitter on Voltage



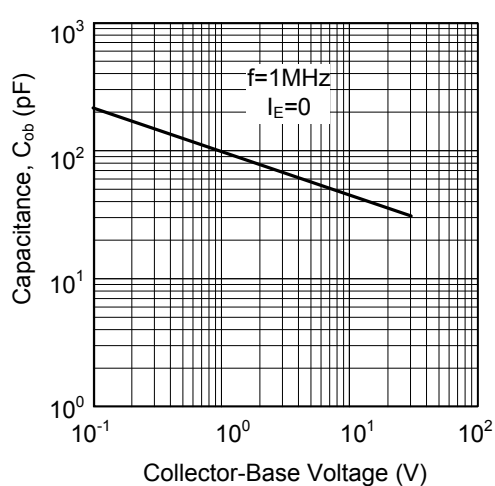
Saturation Voltage



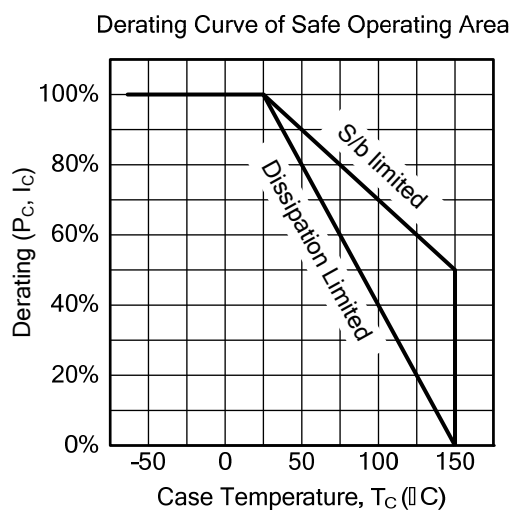
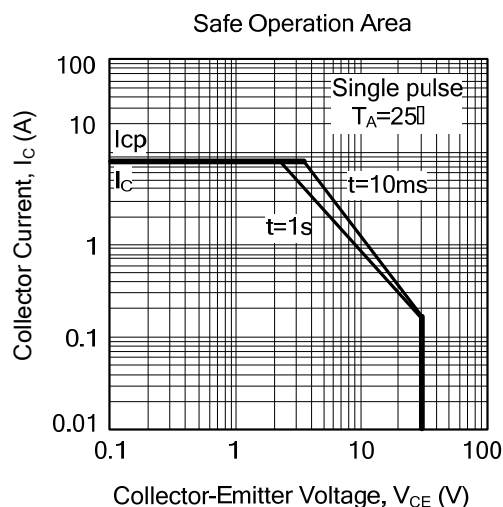
Current Gain-Bandwidth Product



Collector Output Capacitance



## ■ TYPICAL CHARACTERISTICS



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