

# UNR921xJ Series (UN921xJ Series)

## Silicon NPN epitaxial planar type

For digital circuits

### ■ Features

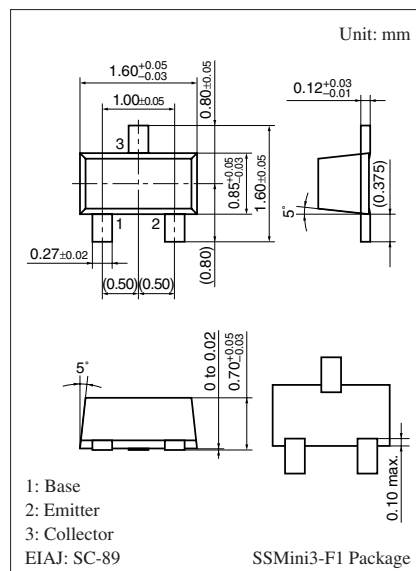
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts.
- SS-Mini type package, allowing automatic insertion through tape packing.

### ■ Resistance by Part Number

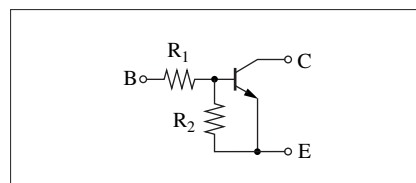
|                      | Marking Symbol | (R <sub>1</sub> ) | (R <sub>2</sub> ) |
|----------------------|----------------|-------------------|-------------------|
| • UNR9210J (UN9210J) | 8L             | 47 kΩ             | —                 |
| • UNR9211J (UN9211J) | 8A             | 10 kΩ             | 10 kΩ             |
| • UNR9212J (UN9212J) | 8B             | 22 kΩ             | 22 kΩ             |
| • UNR9213J (UN9213J) | 8C             | 47 kΩ             | 47 kΩ             |
| • UNR9214J (UN9214J) | 8D             | 10 kΩ             | 47 kΩ             |
| • UNR9215J (UN9215J) | 8E             | 10 kΩ             | —                 |
| • UNR9216J (UN9216J) | 8F             | 4.7 kΩ            | —                 |
| • UNR9217J (UN9217J) | 8H             | 22 kΩ             | —                 |
| • UNR9218J (UN9218J) | 8I             | 0.51 kΩ           | 5.1 kΩ            |
| • UNR9219J (UN9219J) | 8K             | 1 kΩ              | 10 kΩ             |
| • UNR921AJ           | 8X             | 100 kΩ            | 100 kΩ            |
| • UNR921BJ           | 8Y             | 100 kΩ            | —                 |
| • UNR921CJ           | 8Z             | —                 | 47 kΩ             |
| • UNR921DJ (UN921DJ) | 8M             | 47 kΩ             | 10 kΩ             |
| • UNR921EJ (UN921EJ) | 8N             | 47 kΩ             | 22 kΩ             |
| • UNR921FJ (UN921FJ) | 8O             | 4.7 kΩ            | 10 kΩ             |
| • UNR921KJ (UN921KJ) | 8P             | 10 kΩ             | 4.7 kΩ            |
| • UNR921LJ (UN921LJ) | 8Q             | 4.7 kΩ            | 4.7 kΩ            |
| • UNR921MJ           | EL             | 2.2 kΩ            | 47 kΩ             |
| • UNR921NJ           | EX             | 4.7 kΩ            | 47 kΩ             |
| • UNR921TJ (UN921TJ) | EZ             | 22 kΩ             | 47 kΩ             |
| • UNR921VJ           | FD             | 2.2 kΩ            | 2.2 kΩ            |

### ■ Absolute Maximum Ratings T<sub>a</sub> = 25°C

| Parameter                             | Symbol           | Rating      | Unit |
|---------------------------------------|------------------|-------------|------|
| Collector-base voltage (Emitter open) | V <sub>CBO</sub> | 50          | V    |
| Collector-emitter voltage (Base open) | V <sub>CEO</sub> | 50          | V    |
| Collector current                     | I <sub>C</sub>   | 100         | mA   |
| Total power dissipation               | P <sub>T</sub>   | 125         | mW   |
| Junction temperature                  | T <sub>j</sub>   | 125         | °C   |
| Storage temperature                   | T <sub>stg</sub> | −55 to +125 | °C   |



### Internal Connection



Note) The part numbers in the parenthesis show conventional part number.

■ Electrical Characteristics  $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

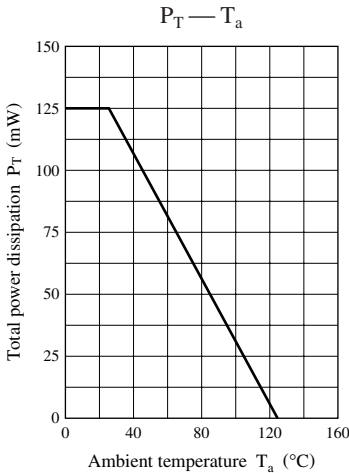
| Parameter                                                 |                                                  | Symbol               | Conditions                                                           | Min      | Typ             | Max                                           | Unit |
|-----------------------------------------------------------|--------------------------------------------------|----------------------|----------------------------------------------------------------------|----------|-----------------|-----------------------------------------------|------|
| Collector-base voltage (Emitter open)                     |                                                  | V <sub>CBO</sub>     | I <sub>C</sub> = 10 μA, I <sub>E</sub> = 0                           | 50       |                 |                                               | V    |
| Collector-emitter voltage (Base open)                     |                                                  | V <sub>CEO</sub>     | I <sub>C</sub> = 2 mA, I <sub>B</sub> = 0                            | 50       |                 |                                               | V    |
| Collector-base cut-off current (Emitter open)             |                                                  | I <sub>CBO</sub>     | V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0                           |          |                 | 0.1                                           | μA   |
| Collector-emitter cut-off current (Base open)             |                                                  | I <sub>CEO</sub>     | V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0                           |          |                 | 0.5                                           | μA   |
| Emitter-base<br>cut-off<br>current<br>(Collector<br>open) | UNR9210J/9215J/<br>9216J/9217J/921BJ             | I <sub>EBO</sub>     | V <sub>EB</sub> = 6 V, I <sub>C</sub> = 0                            |          |                 | 0.01                                          | mA   |
|                                                           | UNR9213J/921AJ                                   |                      |                                                                      |          |                 | 0.1                                           |      |
|                                                           | UNR9212J/9214J/921DJ/<br>921EJ/921MJ/921NJ/921TJ |                      |                                                                      |          |                 | 0.2                                           |      |
|                                                           | UNR9211J                                         |                      |                                                                      |          |                 | 0.5                                           |      |
|                                                           | UNR921FJ/921KJ                                   |                      |                                                                      |          |                 | 1.0                                           |      |
|                                                           | UNR9219J                                         |                      |                                                                      |          |                 | 1.5                                           |      |
|                                                           | UNR9218J/921CJ/921LJ/921VJ                       |                      |                                                                      |          |                 | 2.0                                           |      |
|                                                           | Forward<br>current<br>transfer<br>ratio          |                      |                                                                      | UNR921VJ | h <sub>FE</sub> | V <sub>CE</sub> = 10 V, I <sub>C</sub> = 5 mA |      |
| UNR9218J/921KJ/921LJ                                      |                                                  | 20                   |                                                                      |          |                 |                                               |      |
| UNR9219J/921DJ/921FJ                                      |                                                  | 30                   |                                                                      |          |                 |                                               |      |
| UNR9211J                                                  |                                                  | 35                   |                                                                      |          |                 |                                               |      |
| UNR9212J/921EJ                                            |                                                  | 60                   |                                                                      |          |                 |                                               |      |
| UNR9213J/9214J/921AJ/<br>921CJ/921MJ                      |                                                  | 80                   |                                                                      |          |                 |                                               |      |
| UNR921NJ/921TJ                                            |                                                  | 80                   |                                                                      | 400      |                 |                                               |      |
| UNR9210J/9215J/9216J/<br>9217J/921BJ                      |                                                  | 160                  |                                                                      | 460      |                 |                                               |      |
| Collector-emitter saturation voltage                      |                                                  | V <sub>CE(sat)</sub> | I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0.3 mA                      |          |                 | 0.25                                          | V    |
| Output voltage high-level                                 |                                                  | V <sub>OH</sub>      | V <sub>CC</sub> = 5 V, V <sub>B</sub> = 0.5 V, R <sub>L</sub> = 1 kΩ | 4.9      |                 |                                               | V    |
| Output voltage low-level                                  |                                                  | V <sub>OL</sub>      | V <sub>CC</sub> = 5 V, V <sub>B</sub> = 2.5 V, R <sub>L</sub> = 1 kΩ |          |                 | 0.2                                           | V    |
|                                                           | UNR9213J/921BJ/921KJ                             |                      | V <sub>CC</sub> = 5 V, V <sub>B</sub> = 3.5 V, R <sub>L</sub> = 1 kΩ |          |                 |                                               |      |
|                                                           | UNR921DJ                                         |                      | V <sub>CC</sub> = 5 V, V <sub>B</sub> = 10 V, R <sub>L</sub> = 1 kΩ  |          |                 |                                               |      |
|                                                           | UNR921EJ                                         |                      | V <sub>CC</sub> = 5 V, V <sub>B</sub> = 6 V, R <sub>L</sub> = 1 kΩ   |          |                 |                                               |      |
|                                                           | UNR921AJ                                         |                      | V <sub>CC</sub> = 5 V, V <sub>B</sub> = 5 V, R <sub>L</sub> = 1 kΩ   |          |                 |                                               |      |
| Transition frequency                                      |                                                  | f <sub>T</sub>       | V <sub>CB</sub> = 10 V, I <sub>E</sub> = −2 mA, f = 200 MHz          |          | 150             |                                               | MHz  |
| Input<br>resistance                                       | UNR9218J                                         | R <sub>I</sub>       |                                                                      | −30%     | 0.51            | +30%                                          | kΩ   |
|                                                           | UNR9219J                                         |                      |                                                                      |          | 1               |                                               |      |
|                                                           | UNR921MJ/921VJ                                   |                      |                                                                      |          | 2.2             |                                               |      |
|                                                           | UNR9216J/921FJ/921LJ/921NJ                       |                      |                                                                      |          | 4.7             |                                               |      |
|                                                           | UNR9211J/9214J/9215J/921KJ                       |                      |                                                                      |          | 10              |                                               |      |
|                                                           | UNR9212J/9217J/921TJ                             |                      |                                                                      |          | 22              |                                               |      |
|                                                           | UNR9210J/9213J/921DJ/921EJ                       |                      |                                                                      |          | 47              |                                               |      |
|                                                           | UNR921AJ/921BJ                                   |                      |                                                                      |          | 100             |                                               |      |

■ Electrical Characteristics (continued)  $T_a = 25^{\circ}\text{C} \pm 3^{\circ}\text{C}$

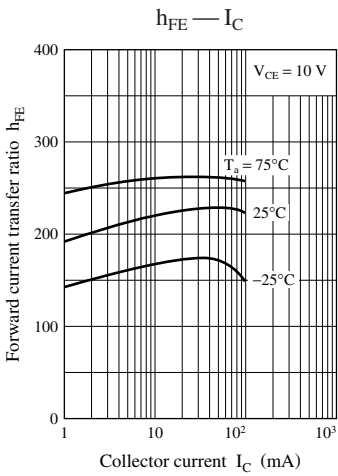
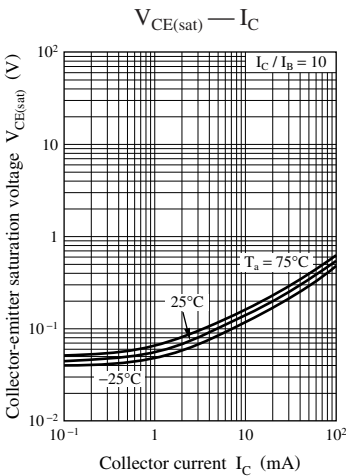
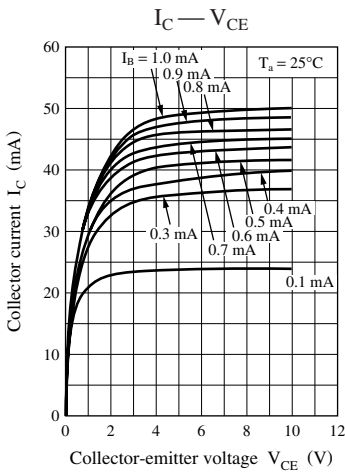
| Parameter               |                            | Symbol    | Conditions | Min  | Typ   | Max  | Unit             |
|-------------------------|----------------------------|-----------|------------|------|-------|------|------------------|
| Emitter-base resistance |                            | UNR921CJ  | $R_2$      | -30% | 47    | +30% | $\text{k}\Omega$ |
| Resistance ratio        | UNR921MJ                   | $R_1/R_2$ |            |      | 0.047 |      | —                |
|                         | UNR921NJ                   |           |            |      | 0.1   |      |                  |
|                         | UNR9218J/9219J             |           |            | 0.08 | 0.10  | 0.12 |                  |
|                         | UNR9214J                   |           |            | 0.17 | 0.21  | 0.25 |                  |
|                         | UNR921TJ                   |           |            |      | 0.47  |      |                  |
|                         | UNR921FJ                   |           |            | 0.37 | 0.47  | 0.57 |                  |
|                         | UNR921AJ/921VJ             |           |            |      | 1.0   |      |                  |
|                         | UNR9211J/9212J/9213J/921LJ |           |            | 0.8  | 1.0   | 1.2  |                  |
|                         | UNR921KJ                   |           |            | 1.70 | 2.13  | 2.60 |                  |
|                         | UNR921EJ                   |           |            | 1.70 | 2.14  | 2.60 |                  |
|                         | UNR921DJ                   |           |            | 3.7  | 4.7   | 5.7  |                  |

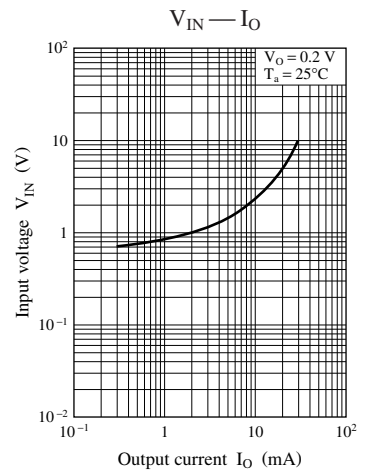
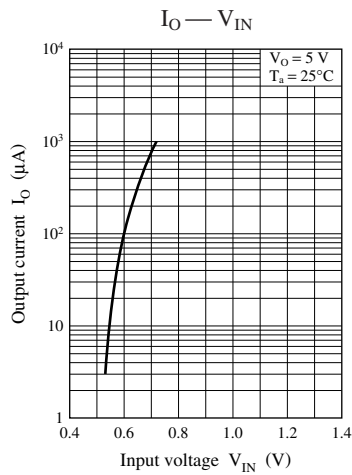
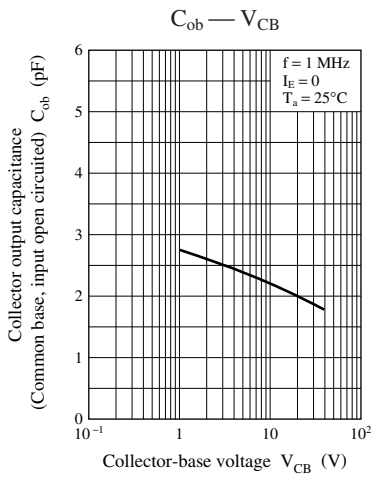
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

Common characteristics chart

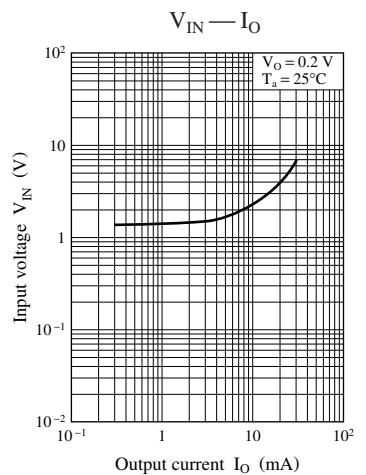
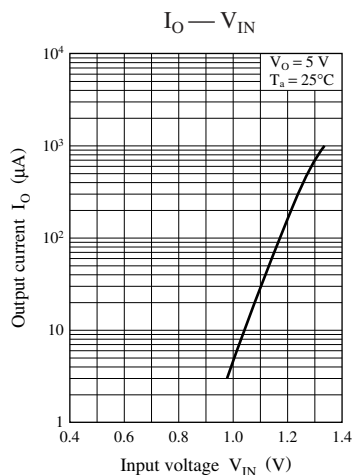
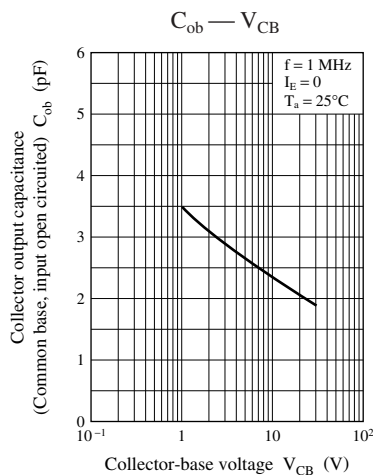
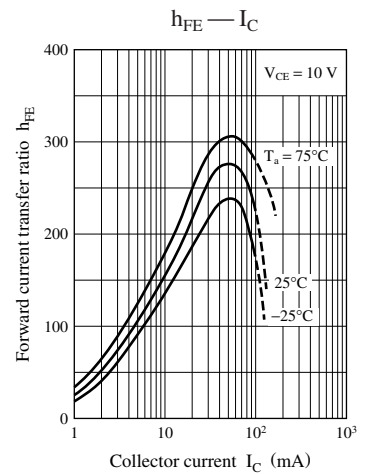
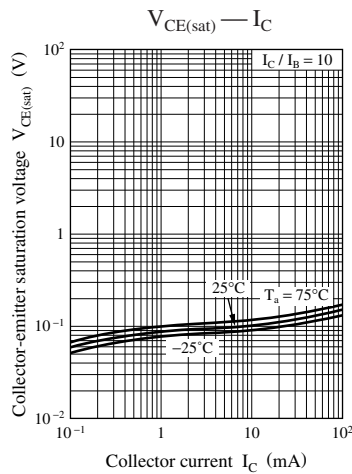
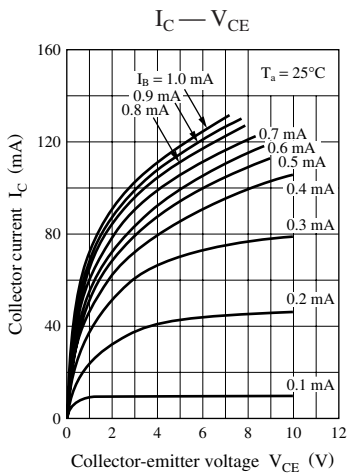


Characteristics charts of UNR9210J

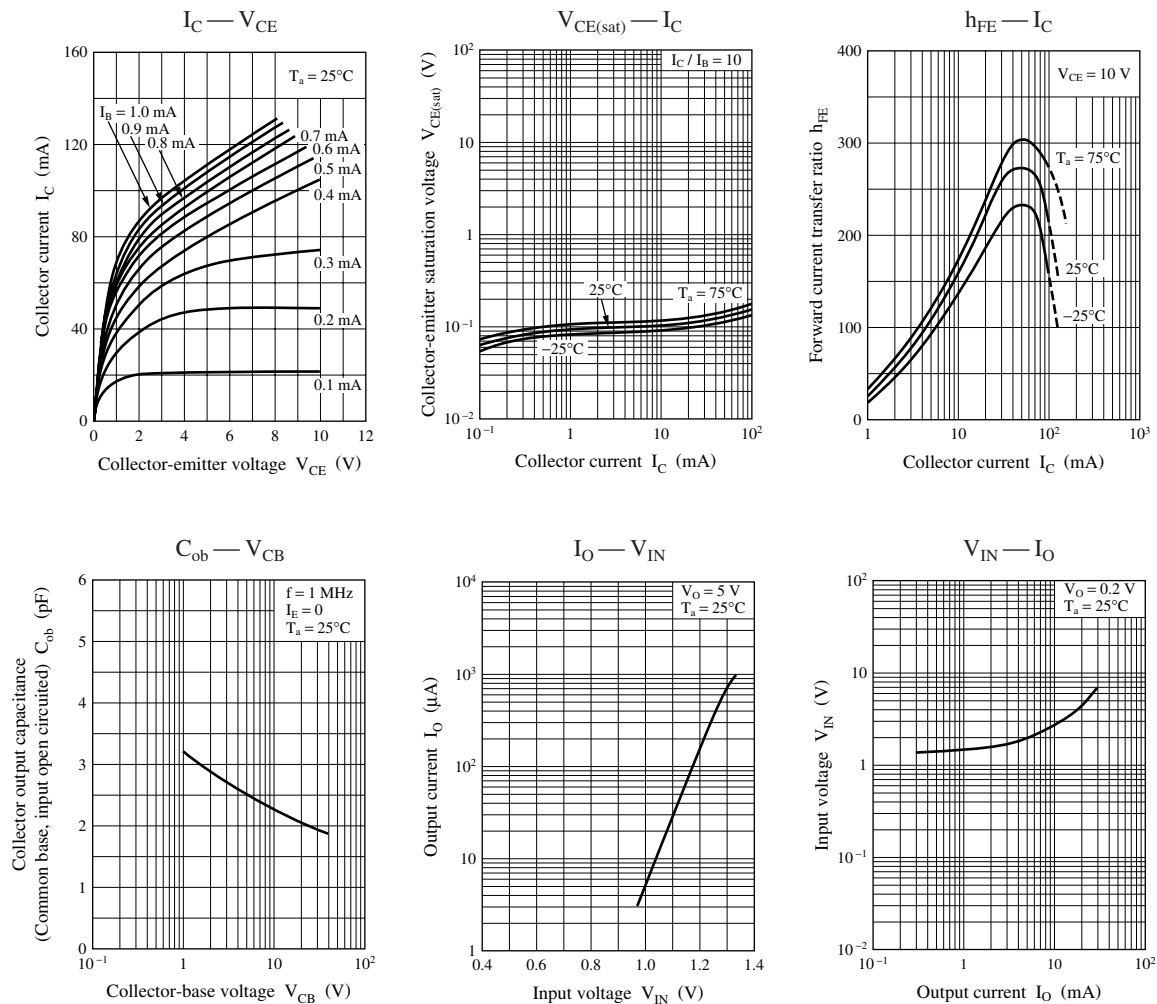




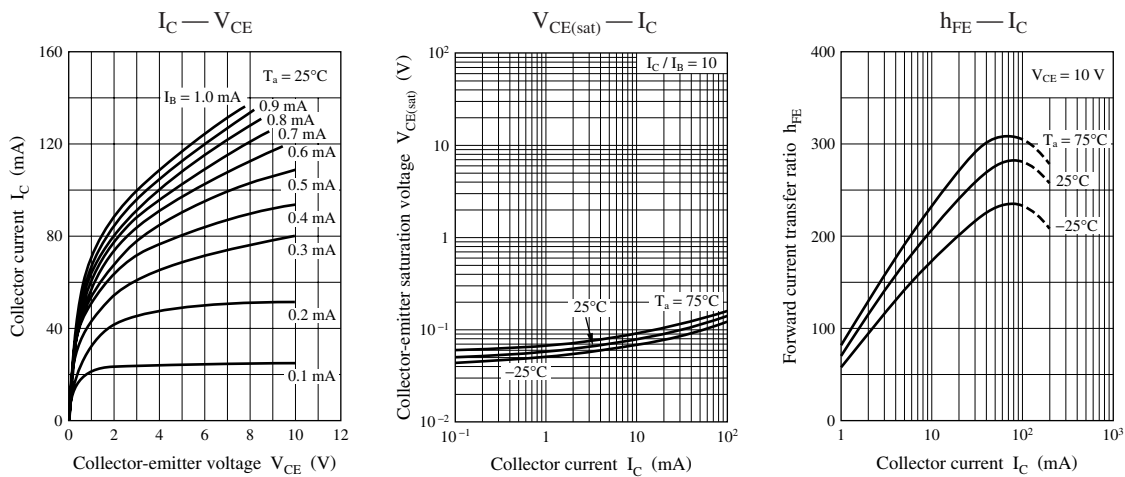
Characteristics charts of UNR9211J

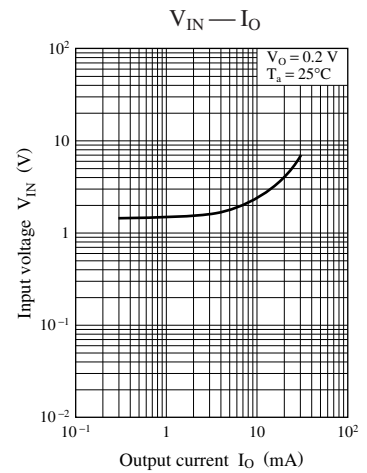
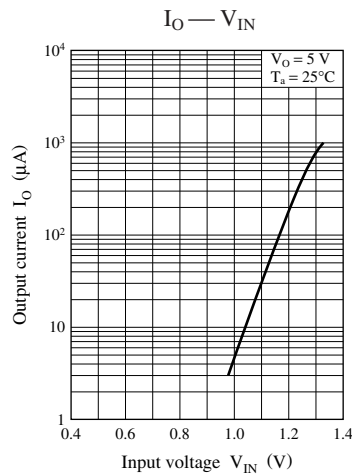
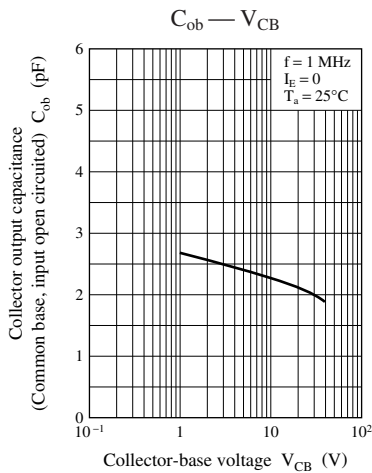


Characteristics charts of UNR9212J

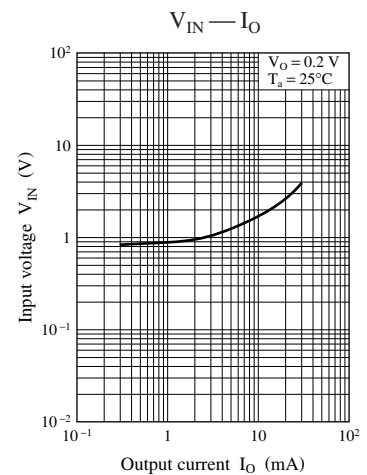
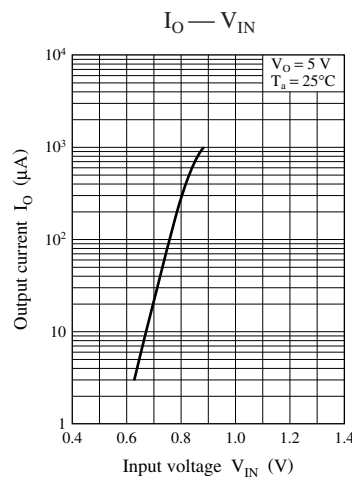
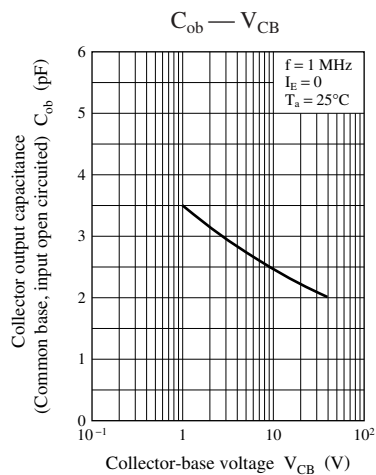
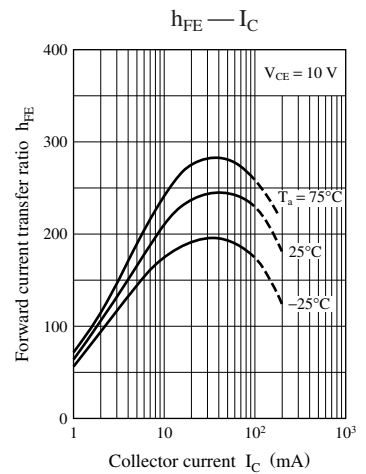
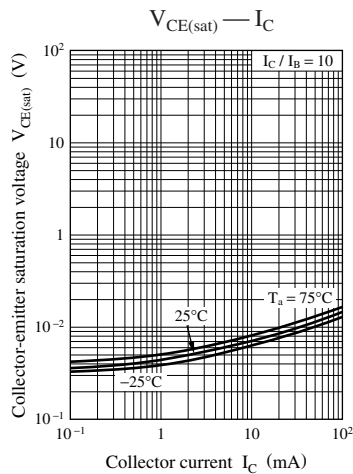
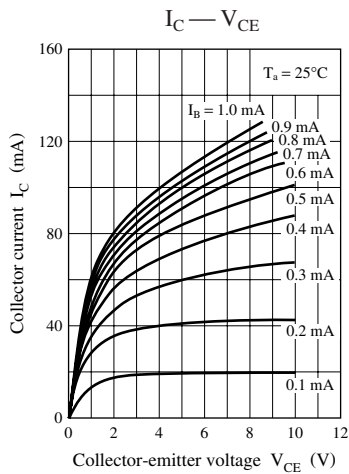


Characteristics charts of UNR9213J

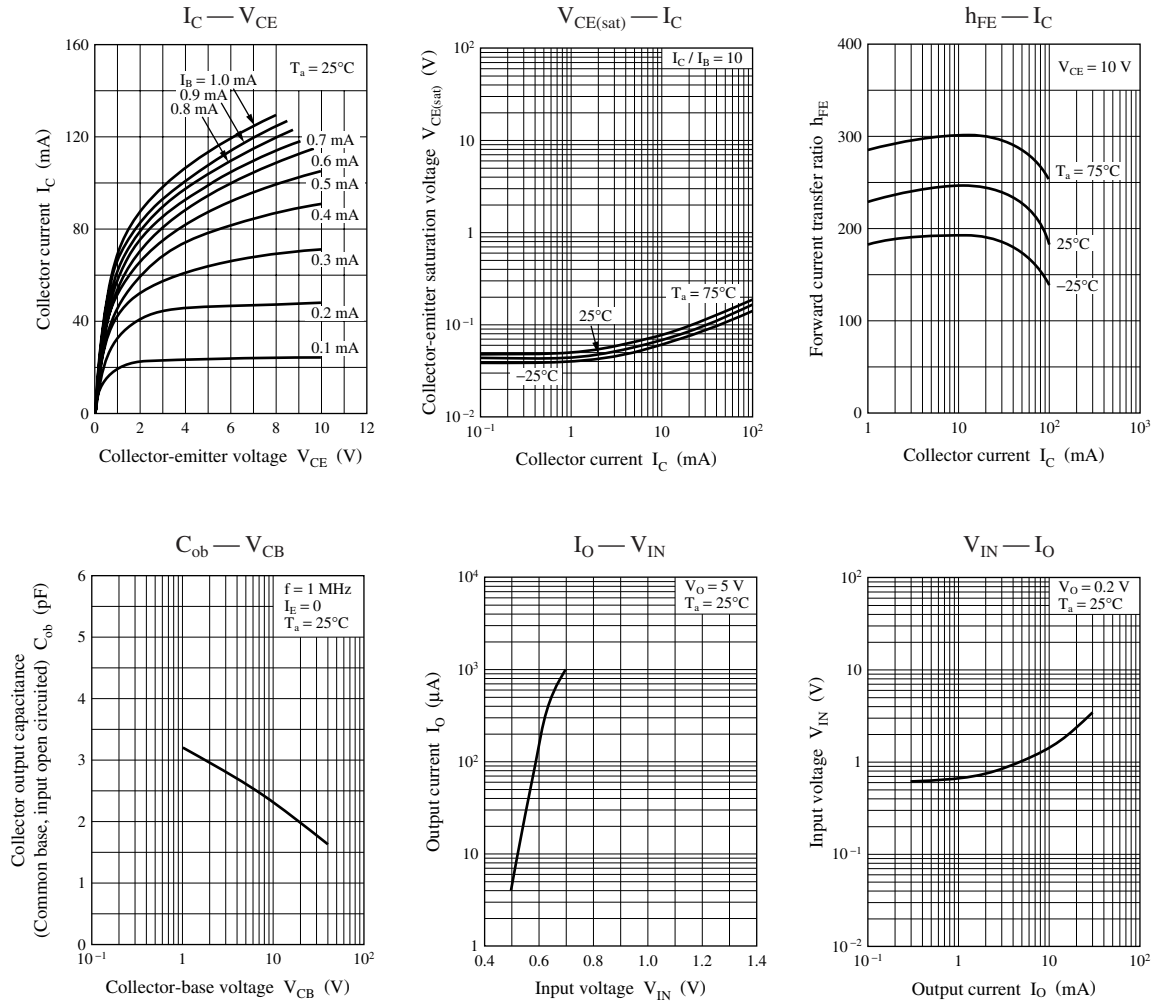




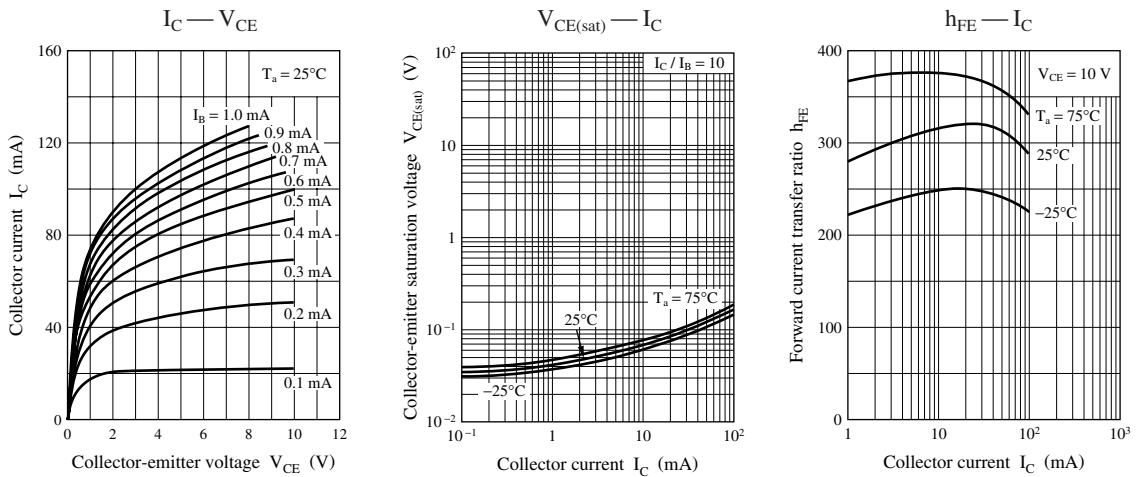
Characteristics charts of UNR9214J

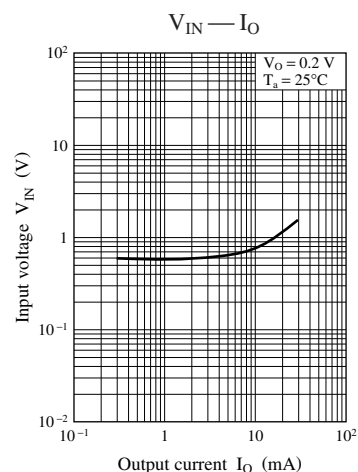
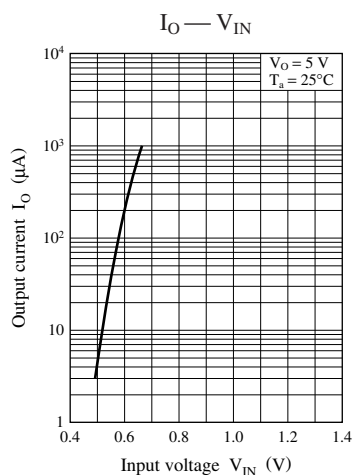
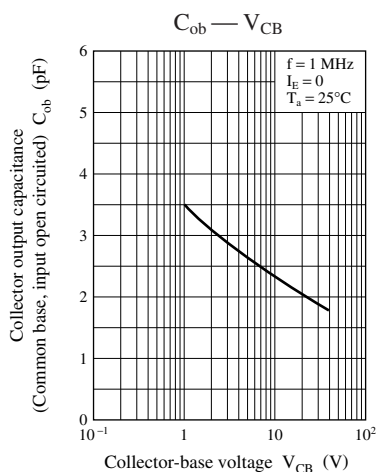


Characteristics charts of UNR9215J

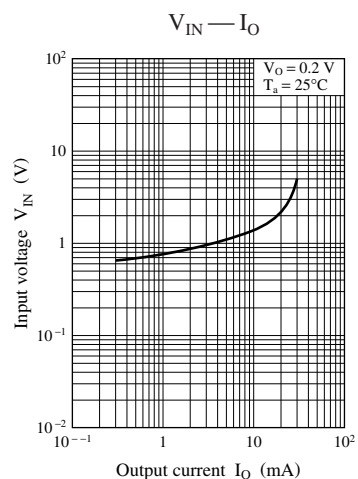
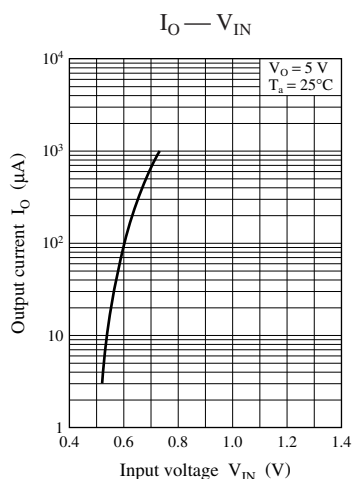
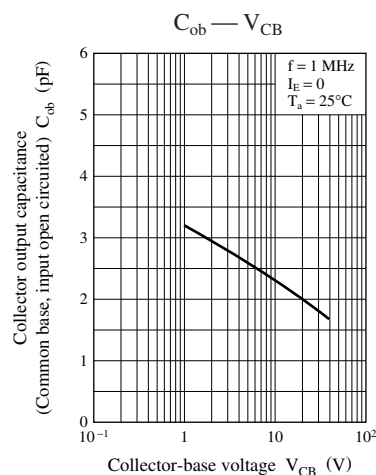
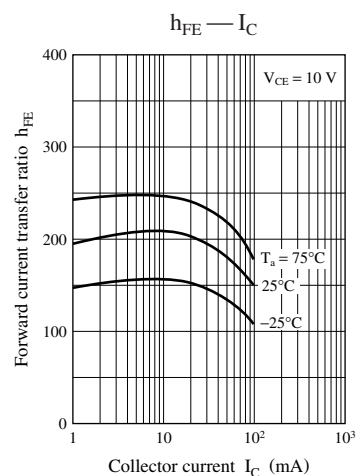
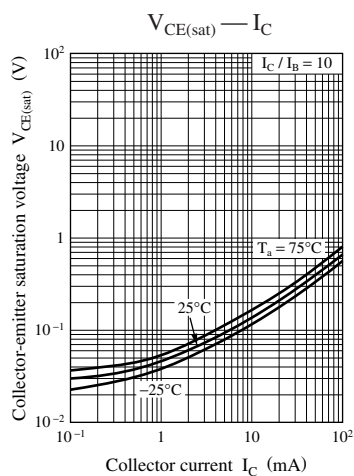
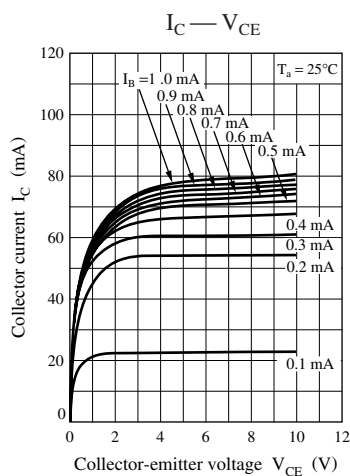


Characteristics charts of UNR9216J



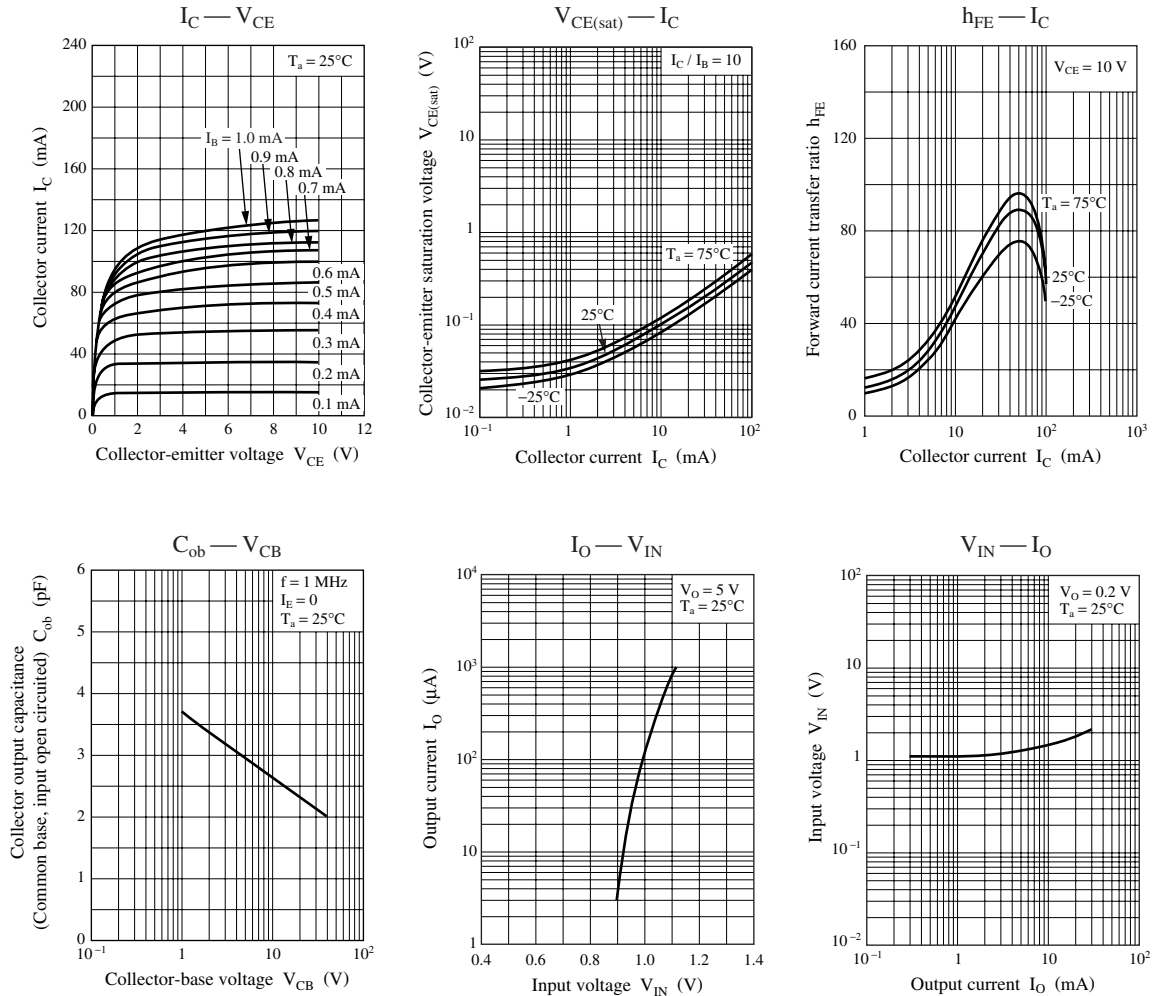


Characteristics charts of UNR9217J

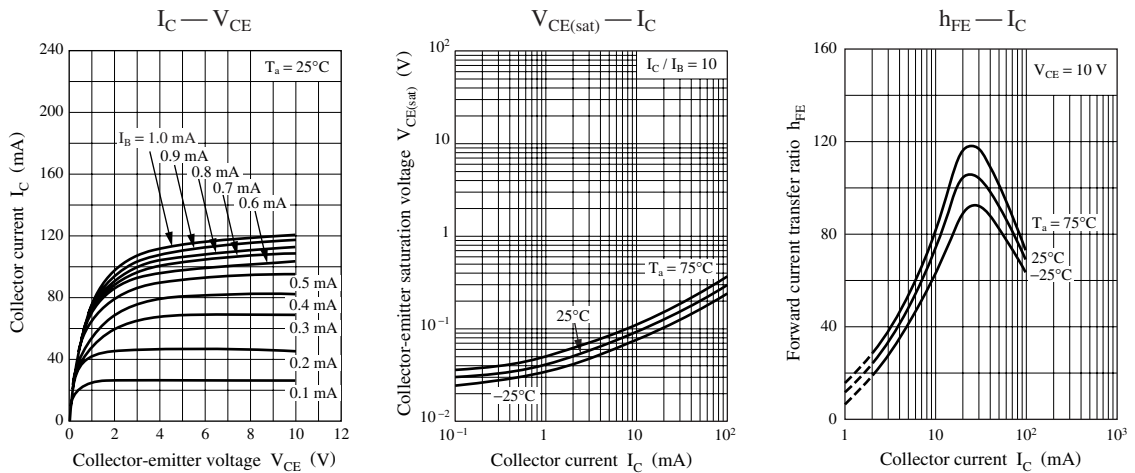


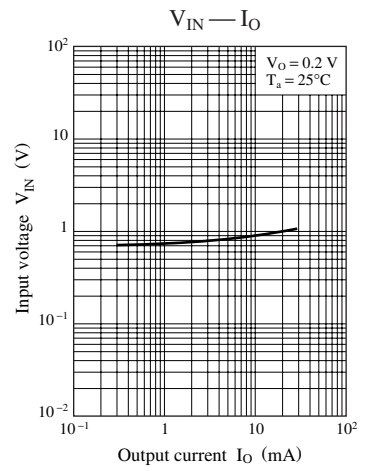
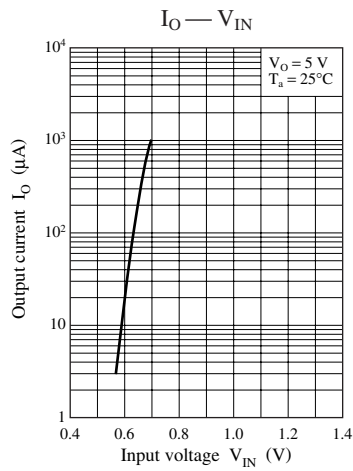
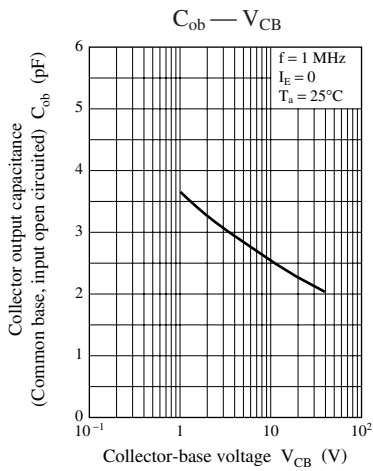


Characteristics charts of UNR9218J

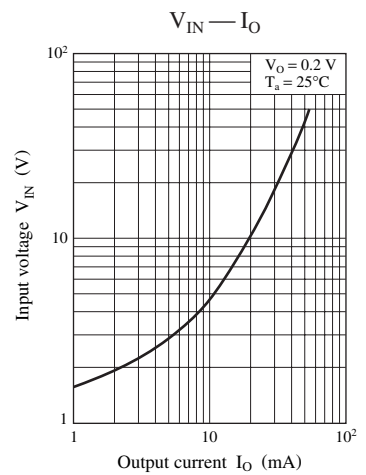
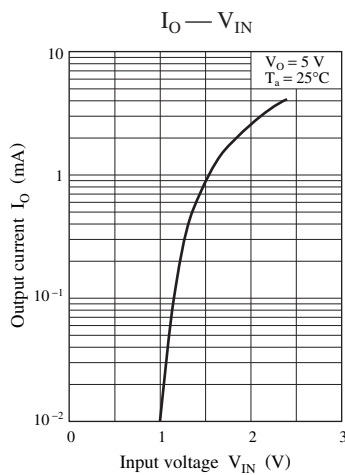
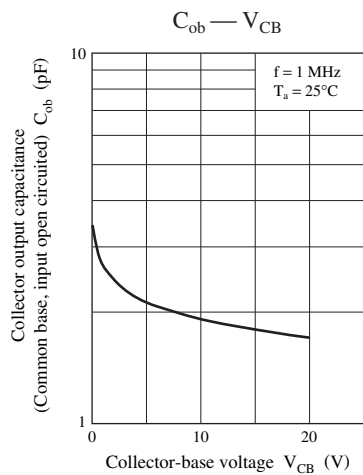
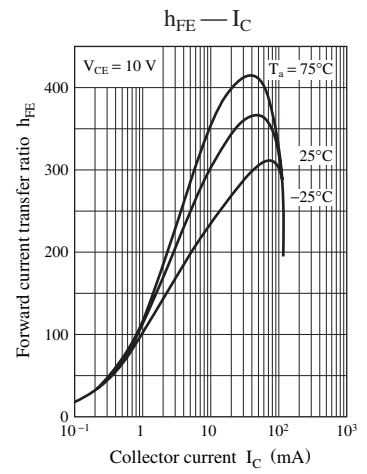
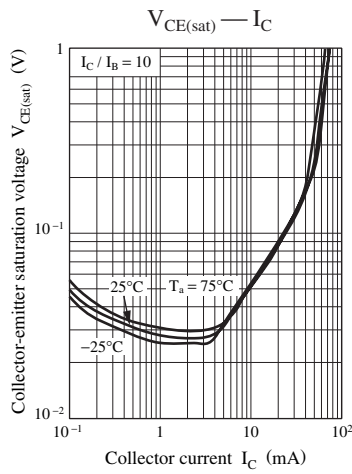
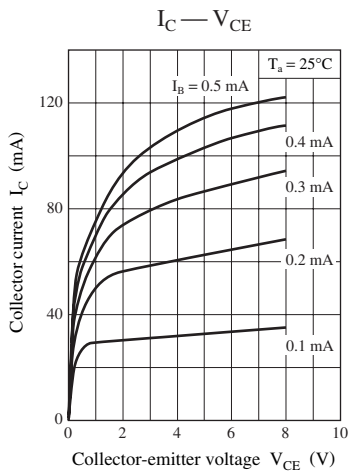


Characteristics charts of UNR9219J

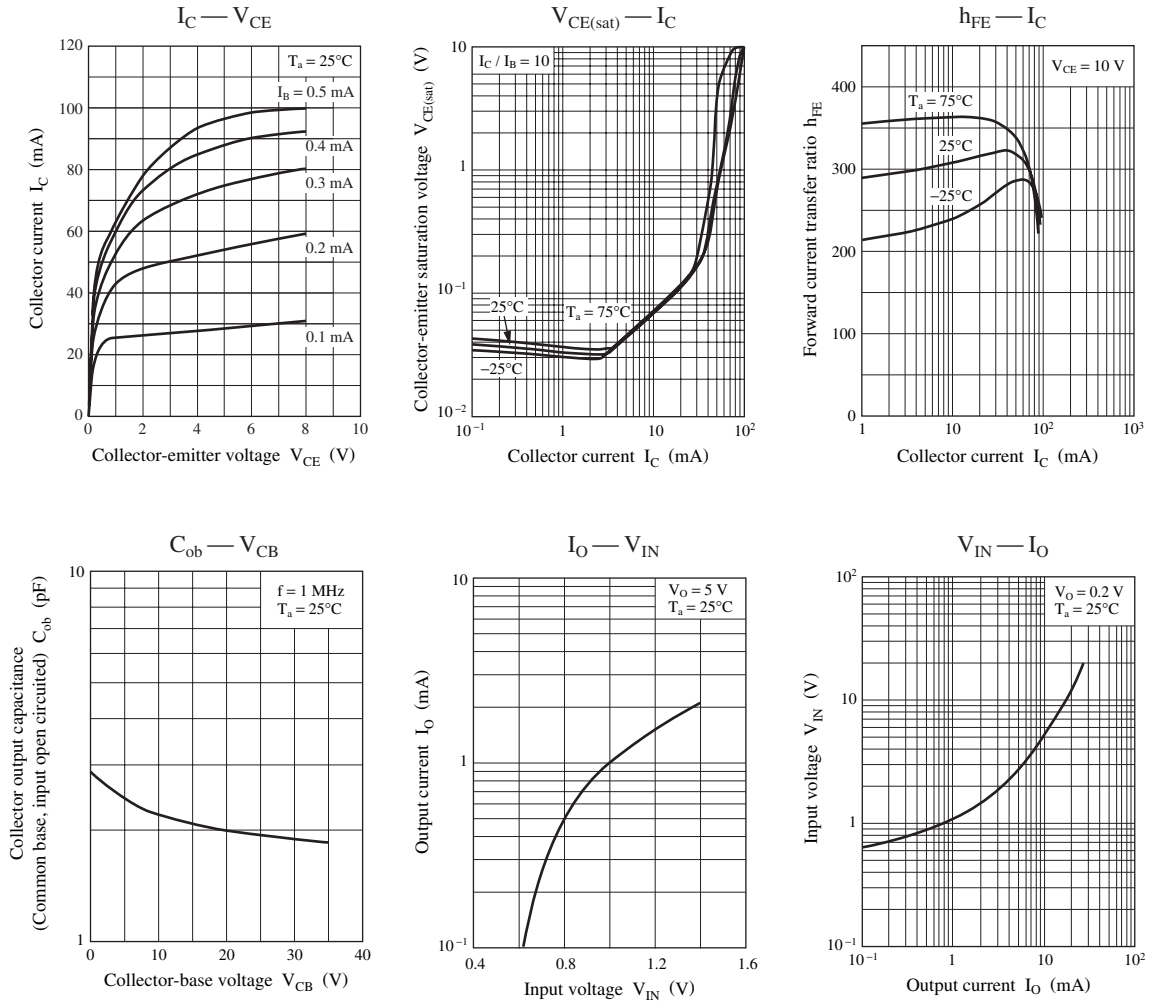




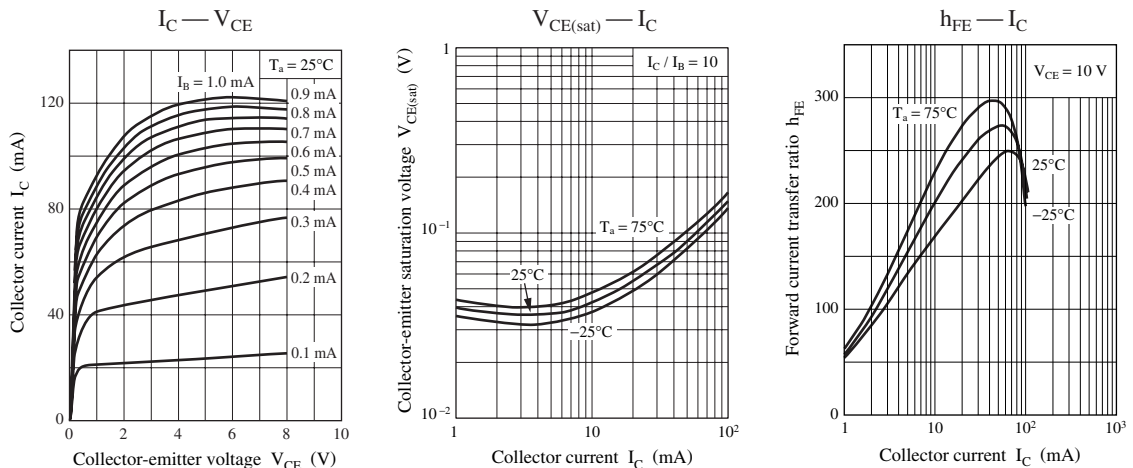
## Characteristics charts of UNR921AJ

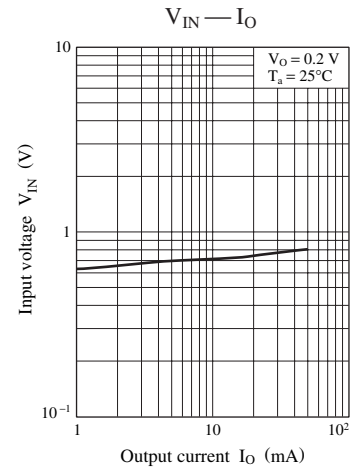
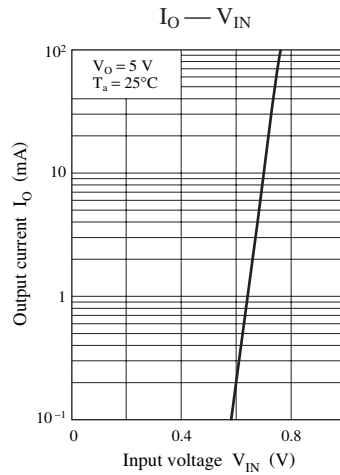
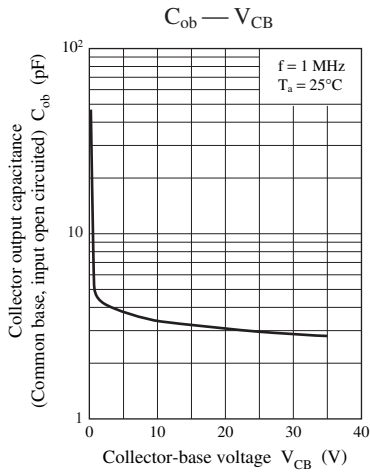


Characteristics charts of UNR921BJ

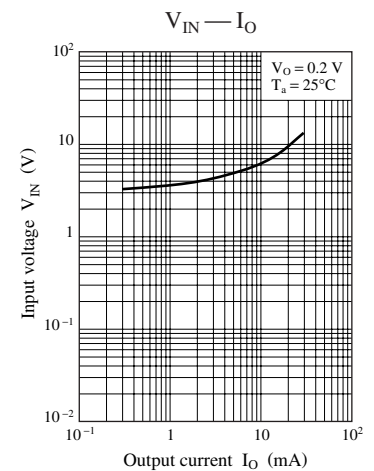
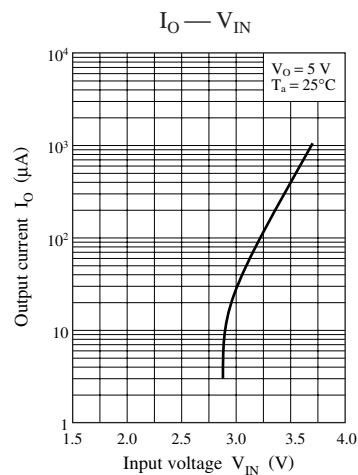
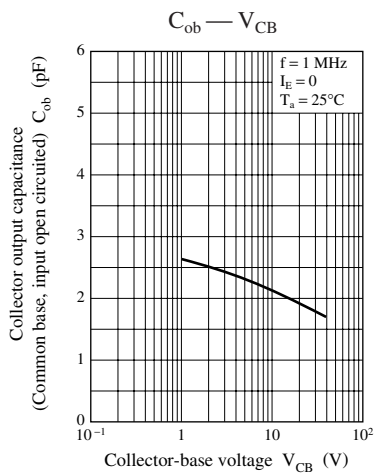
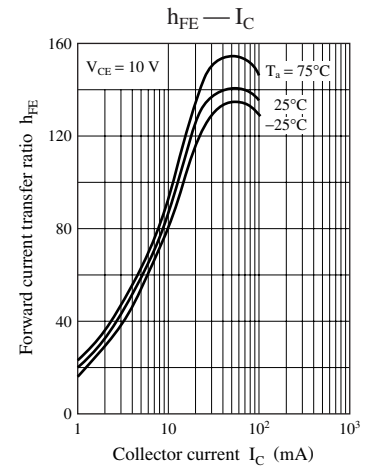
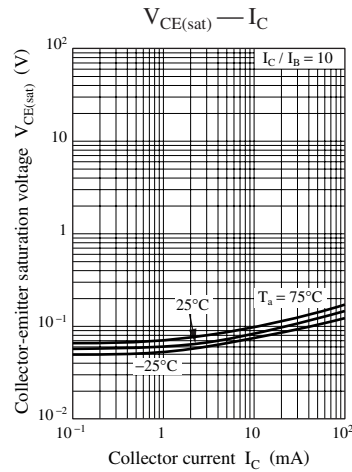
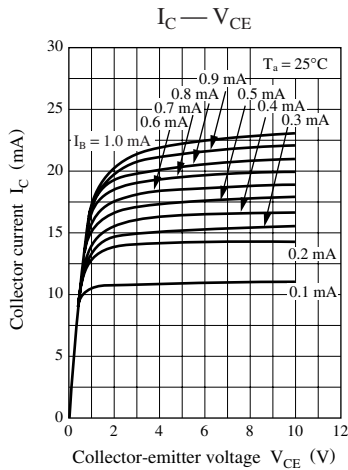


Characteristics charts of UNR921CJ

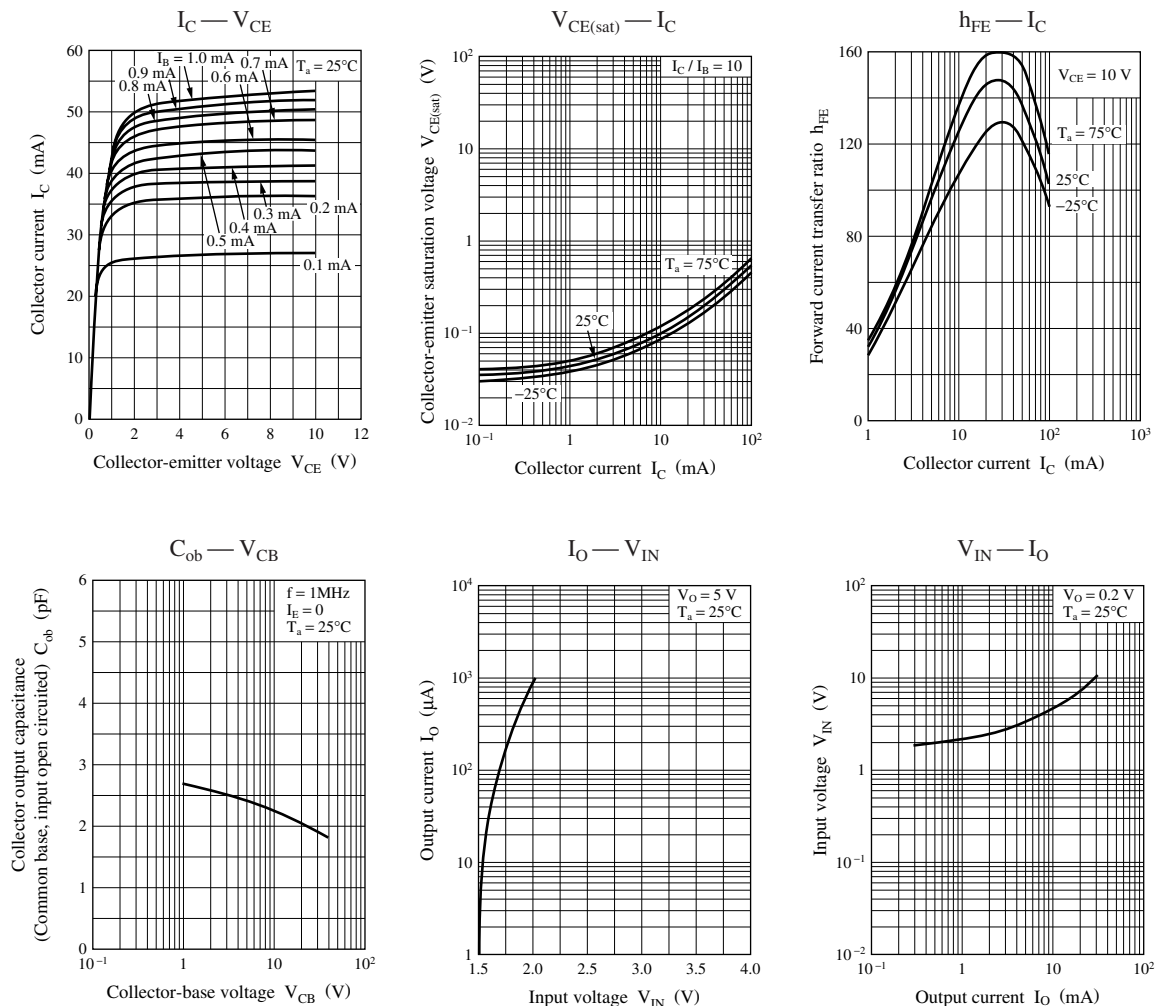




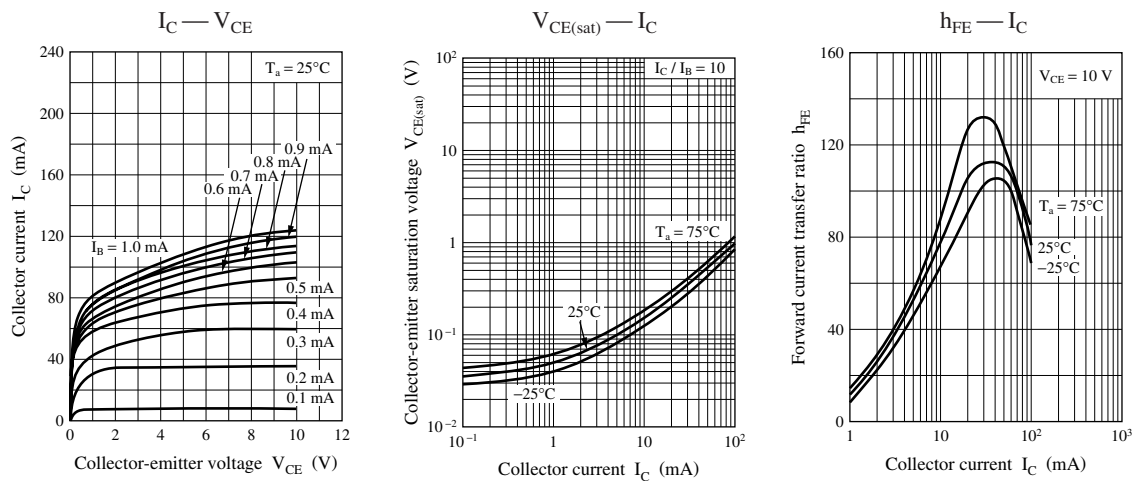
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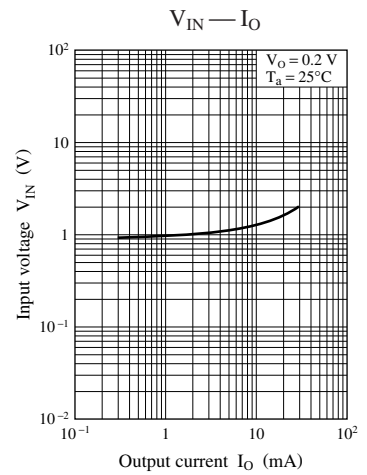
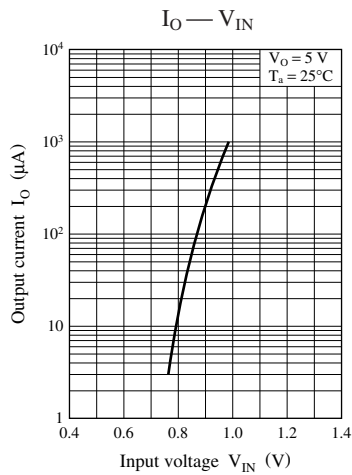
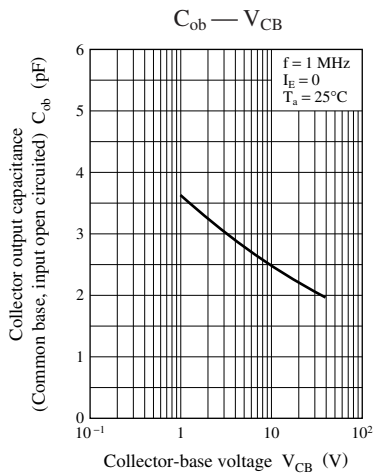


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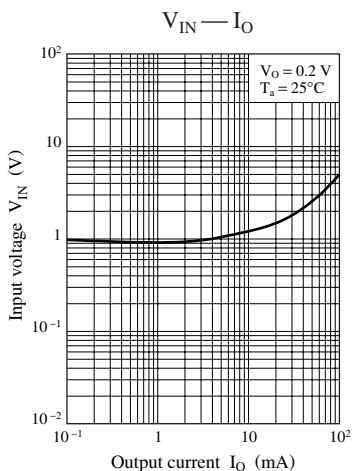
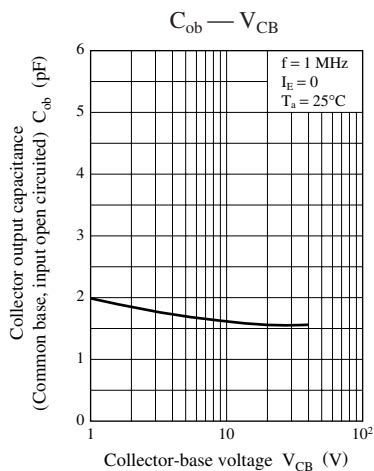
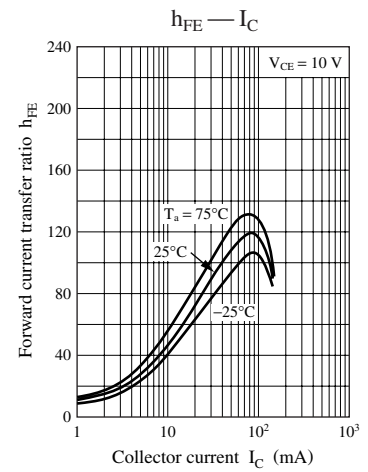
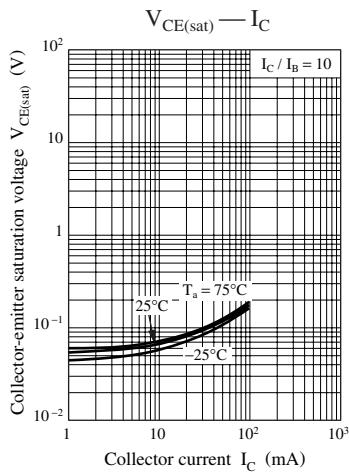
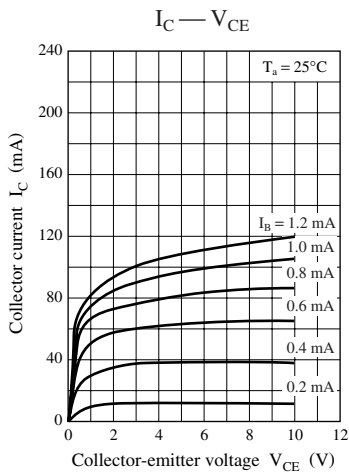


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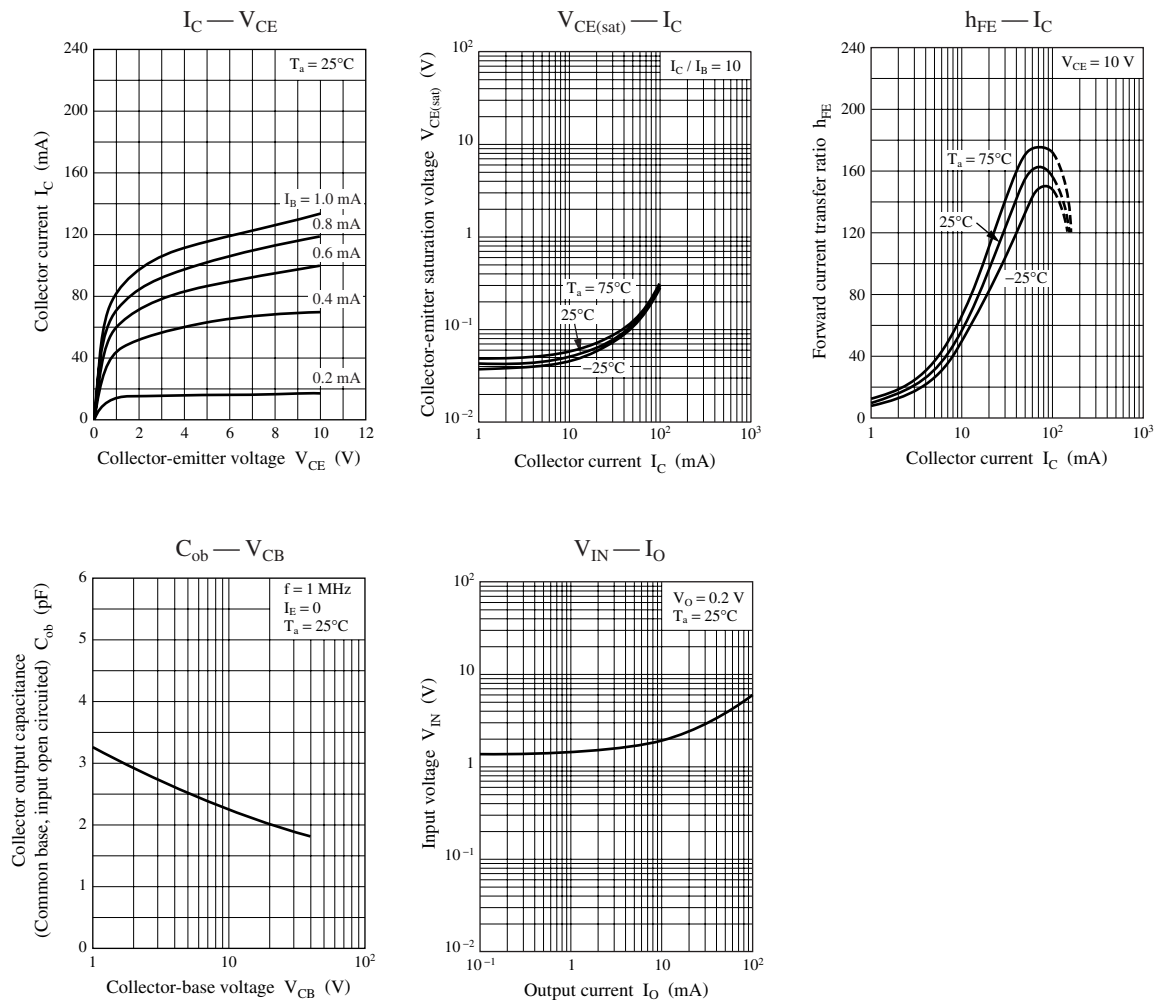




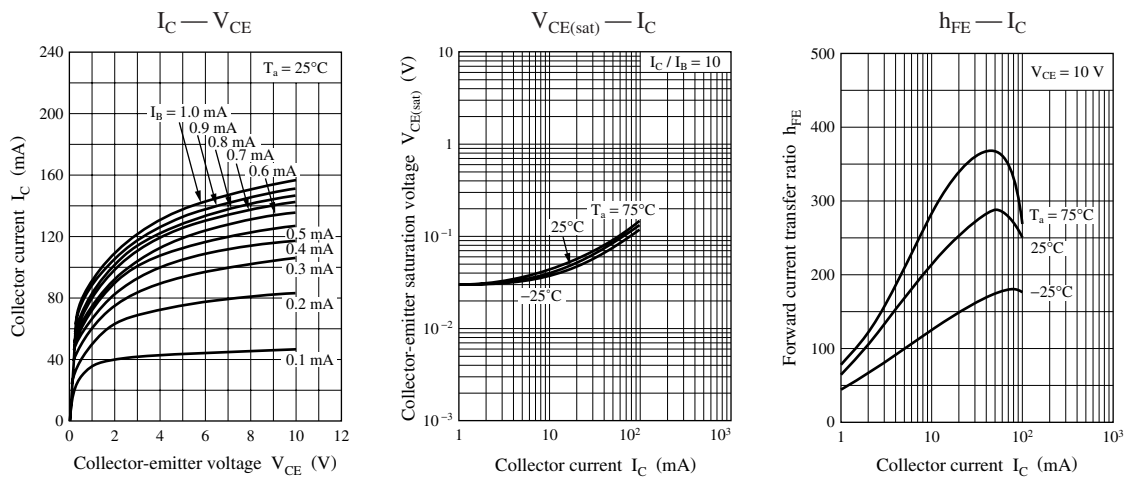
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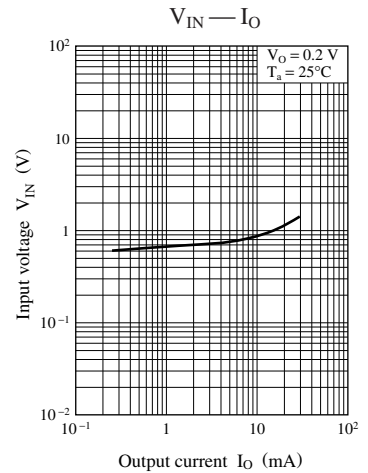
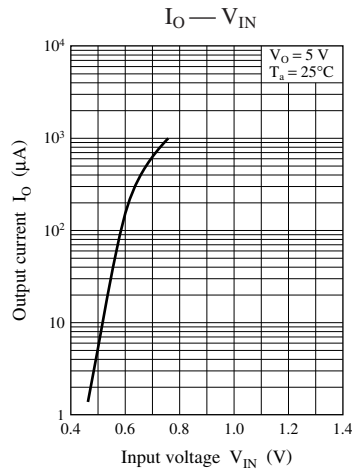
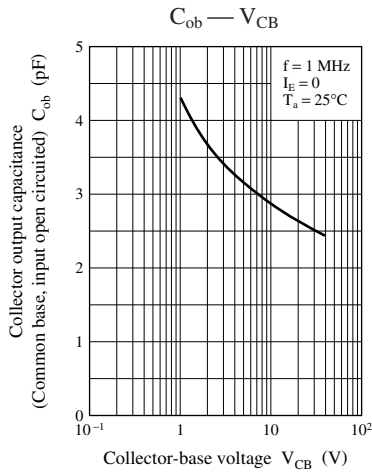


Characteristics charts of UNR921LJ

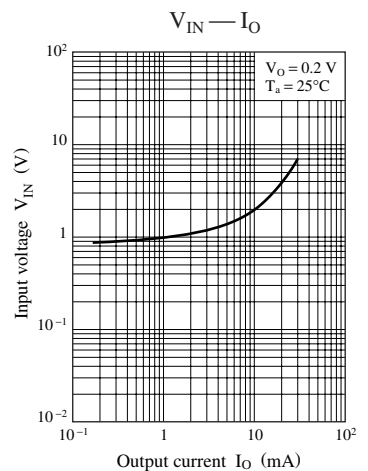
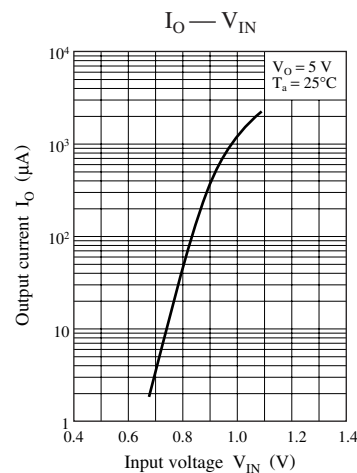
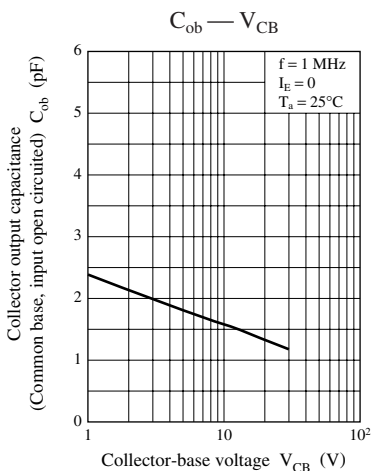
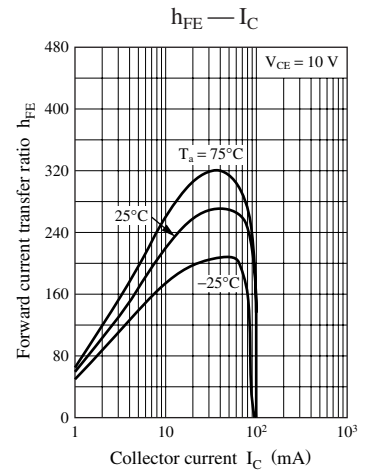
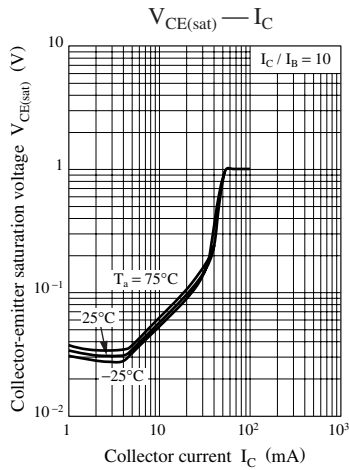
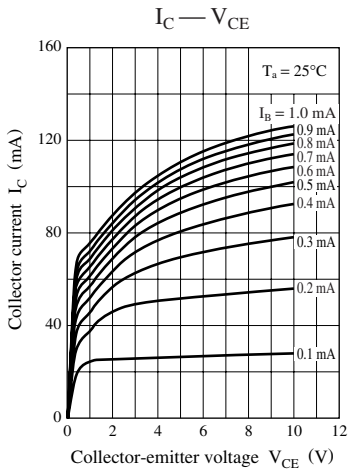


Characteristics charts of UNR921MJ



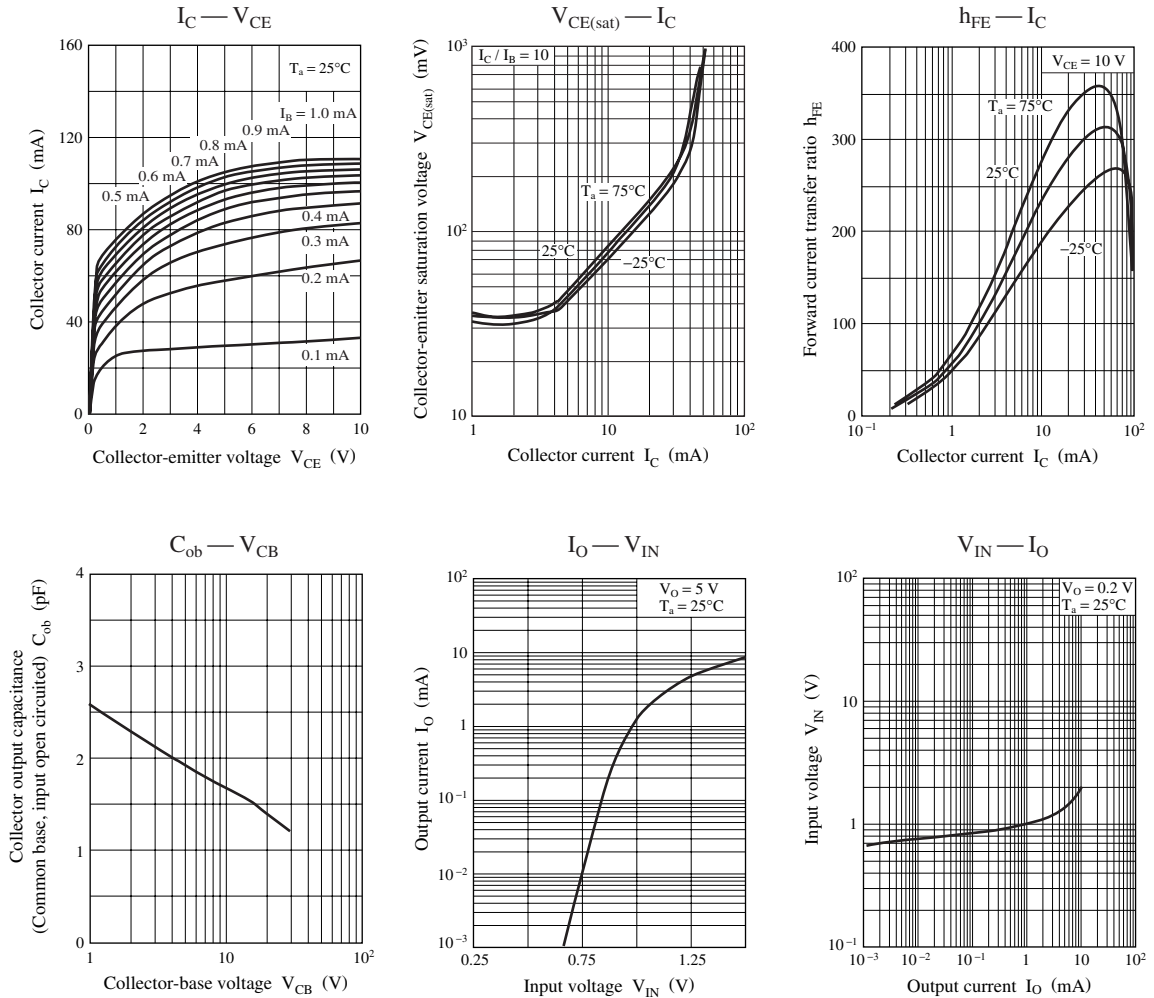


Characteristics charts of UNR921NJ

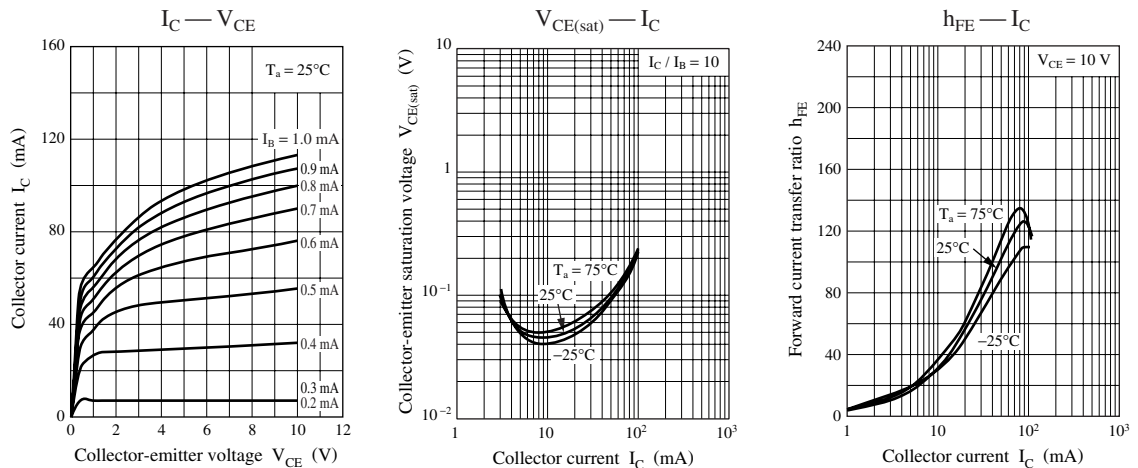


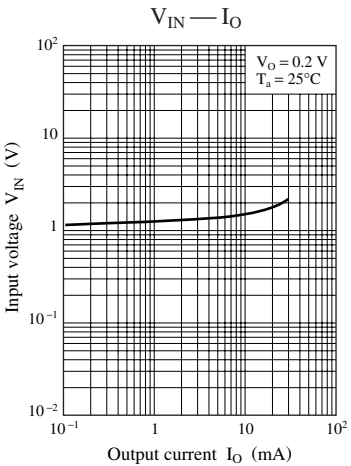
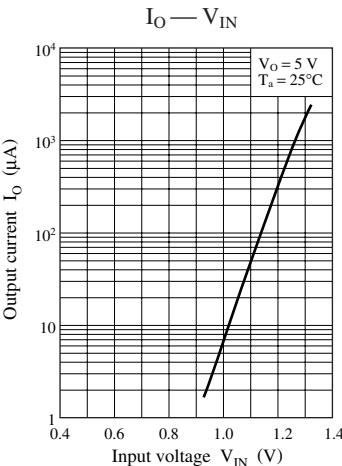
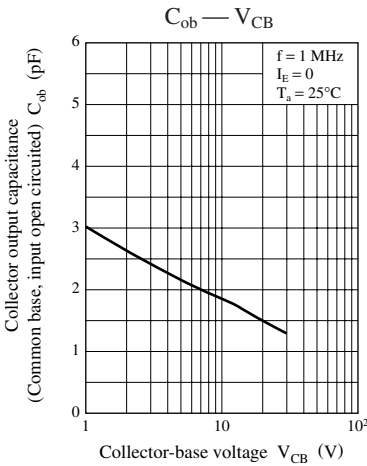


Characteristics charts of UNR921TJ



Characteristics charts of UNR921VJ





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