

# UNR421x Series (UN421x Series)

Silicon NPN epitaxial planar type

For digital circuits

## ■ Features

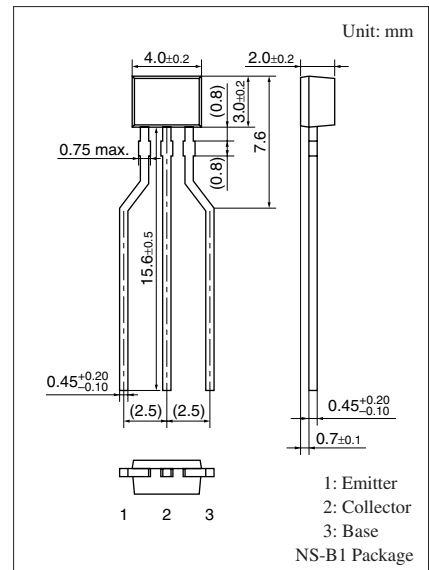
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts
- New S type package, allowing supply with the radial taping

## ■ Resistance by Part Number

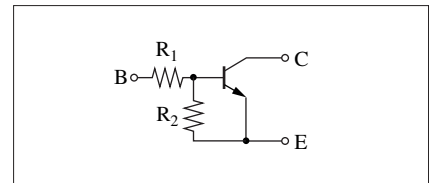
|                    | (R <sub>1</sub> ) | (R <sub>2</sub> ) |
|--------------------|-------------------|-------------------|
| • UNR4210 (UN4210) | 47 kΩ             | —                 |
| • UNR4211 (UN4211) | 10 kΩ             | 10 kΩ             |
| • UNR4212 (UN4212) | 22 kΩ             | 22 kΩ             |
| • UNR4213 (UN4213) | 47 kΩ             | 47 kΩ             |
| • UNR4214 (UN4214) | 10 kΩ             | 47 kΩ             |
| • UNR4215 (UN4215) | 10 kΩ             | —                 |
| • UNR4216 (UN4216) | 4.7 kΩ            | —                 |
| • UNR4217 (UN4217) | 22 kΩ             | —                 |
| • UNR4218 (UN4218) | 0.51 kΩ           | 5.1 kΩ            |
| • UNR4219 (UN4219) | 1 kΩ              | 10 kΩ             |
| • UNR421D (UN421D) | 47 kΩ             | 10 kΩ             |
| • UNR421E (UN421E) | 47 kΩ             | 22 kΩ             |
| • UNR421F (UN421F) | 4.7 kΩ            | 10 kΩ             |
| • UNR421K (UN421K) | 10 kΩ             | 4.7 kΩ            |
| • UNR421L (UN421L) | 4.7 kΩ            | 4.7 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>   | 300         | mW   |
| Junction temperature                  | T <sub>j</sub>   | 150         | °C   |
| Storage temperature                   | T <sub>stg</sub> | -55 to +150 | °C   |



## Internal Connection



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

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

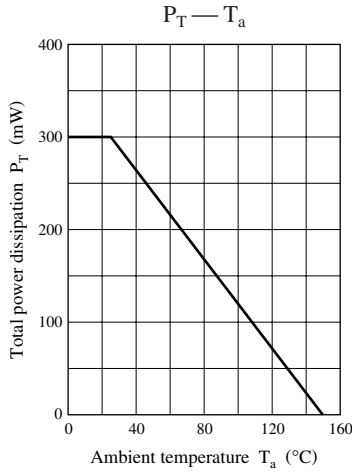
| Parameter                                          |                            | Symbol        | Conditions                                                           | Min  | Typ  | Max  | Unit          |
|----------------------------------------------------|----------------------------|---------------|----------------------------------------------------------------------|------|------|------|---------------|
| Collector-base voltage (Emitter open)              |                            | $V_{CBO}$     | $I_C = 10 \mu\text{A}, I_E = 0$                                      | 50   |      |      | V             |
| Collector-emitter voltage (Base open)              |                            | $V_{CEO}$     | $I_C = 2 \text{ mA}, I_B = 0$                                        | 50   |      |      | V             |
| Collector-base cutoff current (Emitter open)       |                            | $I_{CBO}$     | $V_{CB} = 50 \text{ V}, I_E = 0$                                     |      |      | 0.1  | $\mu\text{A}$ |
| Collector-emitter cutoff current (Base open)       |                            | $I_{CEO}$     | $V_{CE} = 50 \text{ V}, I_B = 0$                                     |      |      | 0.5  | $\mu\text{A}$ |
| Emitter-base<br>cutoff current<br>(Collector open) | UNR4210/4215/4216/4217     | $I_{EBO}$     | $V_{EB} = 6 \text{ V}, I_C = 0$                                      |      |      | 0.01 | mA            |
|                                                    | UNR4213                    |               |                                                                      |      |      | 0.1  |               |
|                                                    | UNR4212/4214/421D/421E     |               |                                                                      |      |      | 0.2  |               |
|                                                    | UNR4211                    |               |                                                                      |      |      | 0.5  |               |
|                                                    | UNR421F/421K               |               |                                                                      |      |      | 1.0  |               |
|                                                    | UNR4219                    |               |                                                                      |      |      | 1.5  |               |
|                                                    | UNR4218/421L               |               |                                                                      |      |      | 2.0  |               |
| Forward current<br>transfer ratio                  | UNR4218/421K/421L          | $h_{FE}$      | $V_{CE} = 10 \text{ V}, I_C = 5 \text{ mA}$                          | 20   |      |      | —             |
|                                                    | UNR4219/421D/421F          |               |                                                                      | 30   |      |      |               |
|                                                    | UNR4211                    |               |                                                                      | 35   |      |      |               |
|                                                    | UNR4212/421E               |               |                                                                      | 60   |      |      |               |
|                                                    | UNR4213/4214               |               |                                                                      | 80   |      |      |               |
|                                                    | UNR4210*/4215*/4216*/4217* |               |                                                                      | 160  |      | 460  |               |
| Collector-emitter saturation voltage               |                            | $V_{CE(sat)}$ | $I_C = 10 \text{ mA}, I_B = 0.3 \text{ mA}$                          |      |      | 0.25 | V             |
| Output voltage high-level                          |                            | $V_{OH}$      | $V_{CC} = 5 \text{ V}, V_B = 0.5 \text{ V}, R_L = 1 \text{ k}\Omega$ | 4.9  |      |      | V             |
| Output voltage low-level                           |                            | $V_{OL}$      | $V_{CC} = 5 \text{ V}, V_B = 2.5 \text{ V}, R_L = 1 \text{ k}\Omega$ |      |      | 0.2  | V             |
|                                                    | UNR4213/421K               |               | $V_{CC} = 5 \text{ V}, V_B = 3.5 \text{ V}, R_L = 1 \text{ k}\Omega$ |      |      |      |               |
|                                                    | UNR421D                    |               | $V_{CC} = 5 \text{ V}, V_B = 10 \text{ V}, R_L = 1 \text{ k}\Omega$  |      |      |      |               |
|                                                    | UNR421E                    |               | $V_{CC} = 5 \text{ V}, V_B = 6 \text{ V}, R_L = 1 \text{ k}\Omega$   |      |      |      |               |
| Transition frequency                               |                            | $f_T$         | $V_{CB} = 10 \text{ V}, I_E = -2 \text{ mA}, f = 200 \text{ MHz}$    |      | 150  |      | MHz           |
| Input<br>resistance                                | UNR4218                    | $R_1$         |                                                                      | -30% | 0.51 | +30% | k $\Omega$    |
|                                                    | UNR4219                    |               |                                                                      |      | 1.0  |      |               |
|                                                    | UNR4216/421F/421L          |               |                                                                      |      | 4.7  |      |               |
|                                                    | UNR4211/4214/4215/421K     |               |                                                                      |      | 10   |      |               |
|                                                    | UNR4212/4217               |               |                                                                      |      | 22   |      |               |
|                                                    | UNR4210/4213/421D/421E     |               |                                                                      |      | 47   |      |               |
| Resistance<br>ratio                                | UNR4218/4219               | $R_1/R_2$     |                                                                      | 0.08 | 0.10 | 0.12 | —             |
|                                                    | UNR4214                    |               |                                                                      | 0.17 | 0.21 | 0.25 |               |
|                                                    | UNR421F                    |               |                                                                      | 0.37 | 0.47 | 0.57 |               |
|                                                    | UNR4211/4212/4213/421L     |               |                                                                      | 0.8  | 1.0  | 1.2  |               |
|                                                    | UNR421K                    |               |                                                                      | 1.70 | 2.13 | 2.60 |               |
|                                                    | UNR421E                    |               |                                                                      | 1.70 | 2.14 | 2.60 |               |
|                                                    | UNR421D                    |               |                                                                      | 3.7  | 4.7  | 5.7  |               |

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

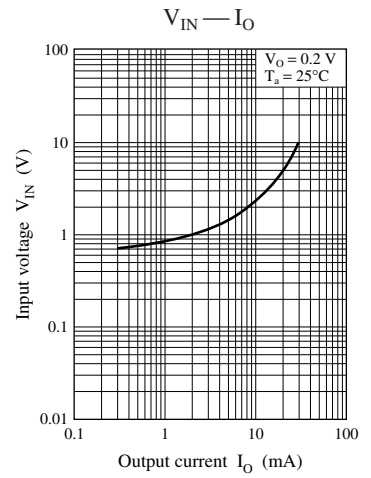
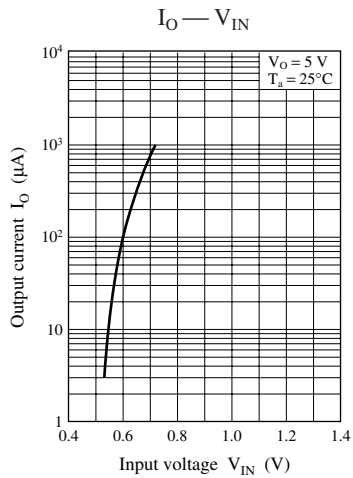
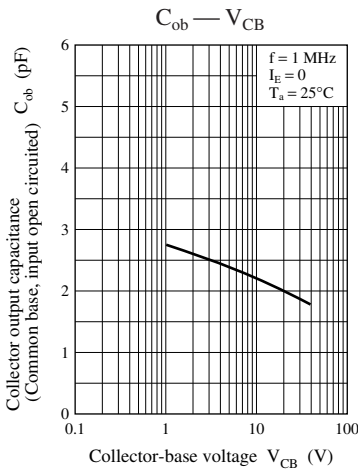
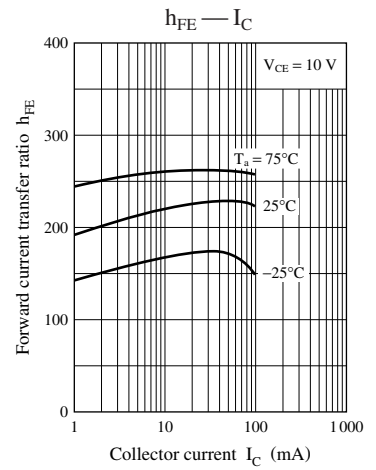
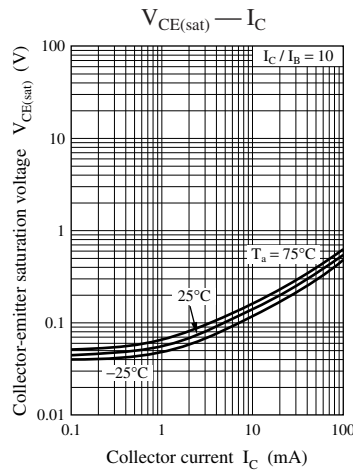
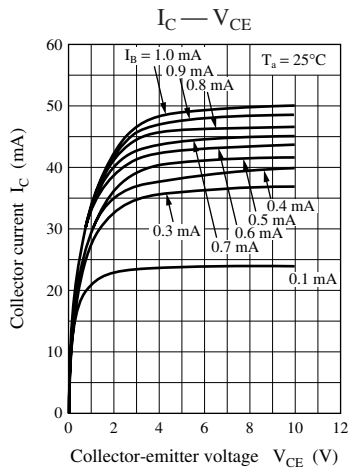
2. \*: Rank classification

| Rank     | Q          | R          | S          | No-rank    |
|----------|------------|------------|------------|------------|
| $h_{FE}$ | 160 to 260 | 210 to 340 | 290 to 460 | 160 to 460 |

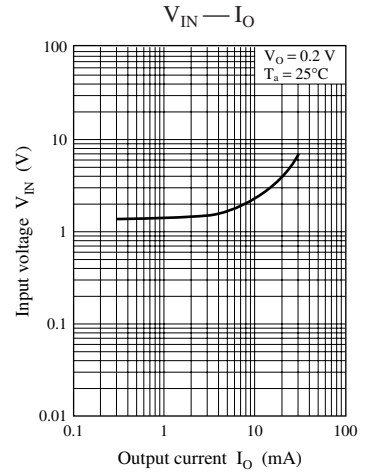
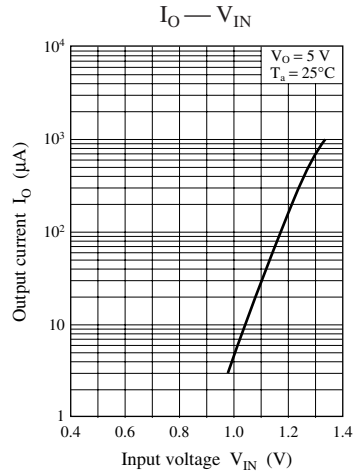
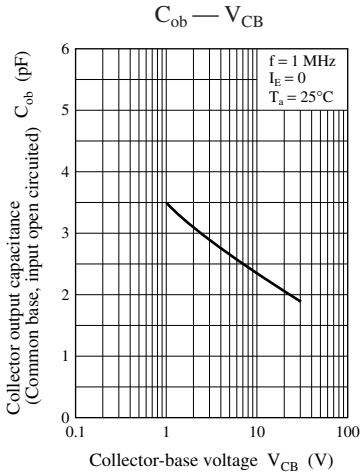
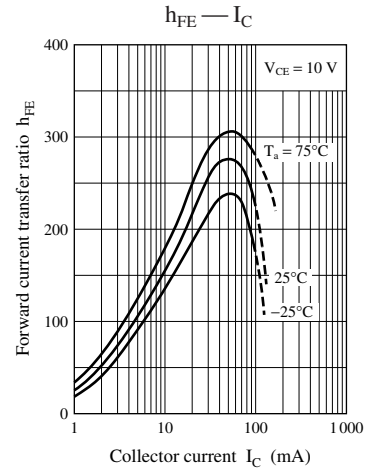
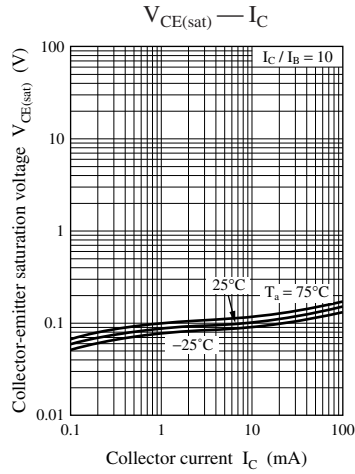
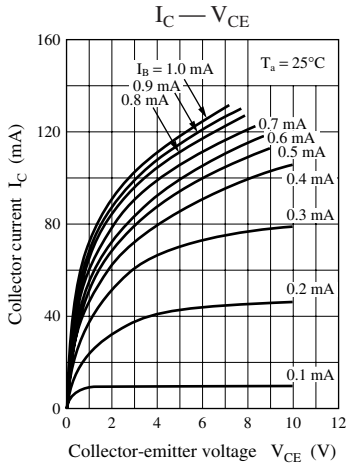
Common characteristics chart



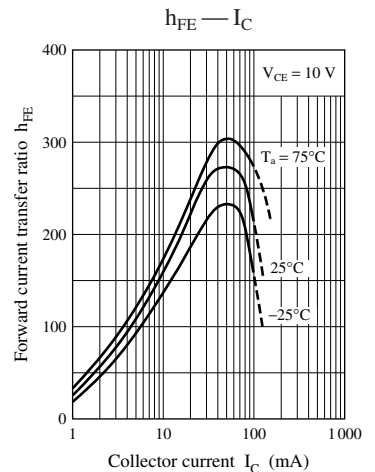
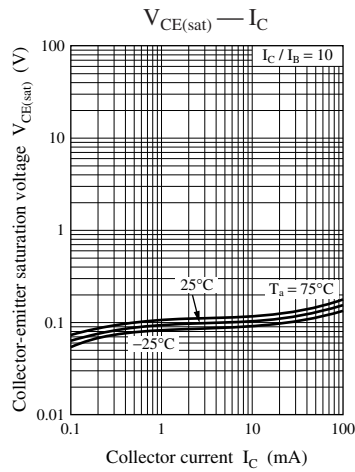
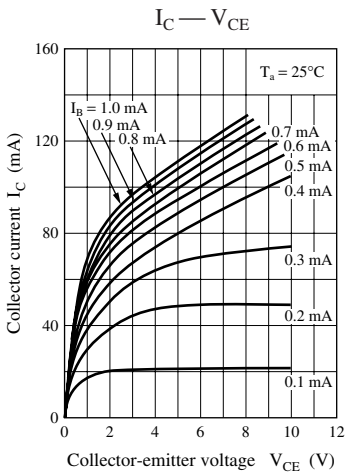
Characteristics charts of UNR4210

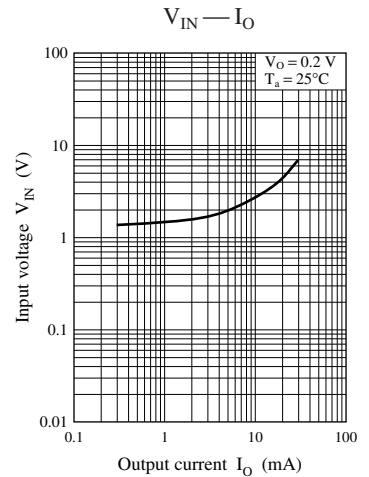
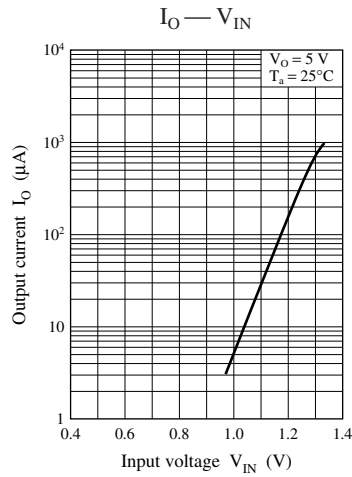
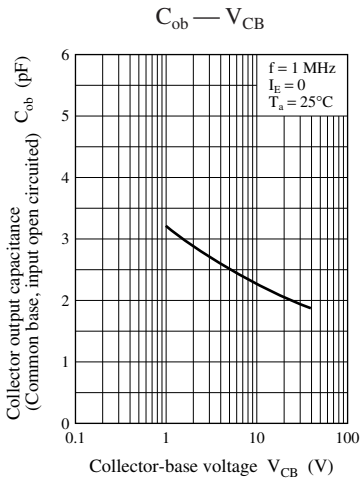


Characteristics charts of UNR4211

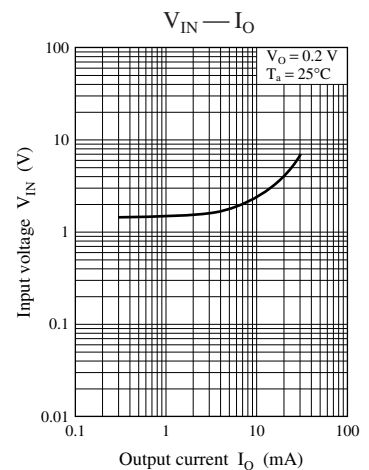
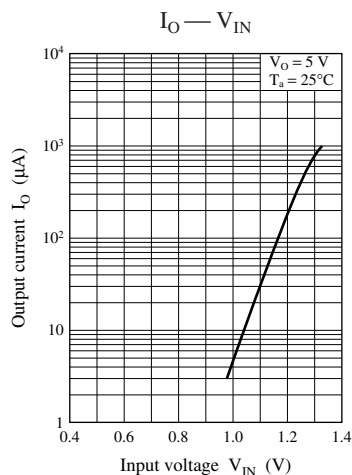
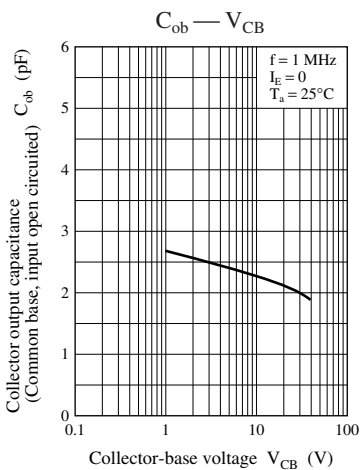
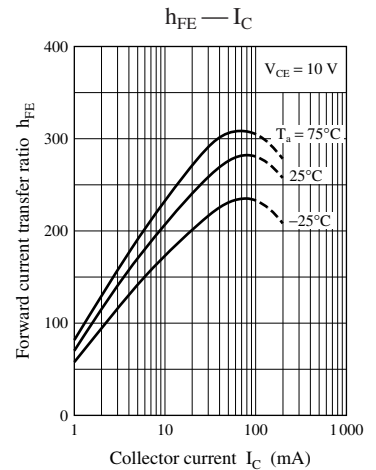
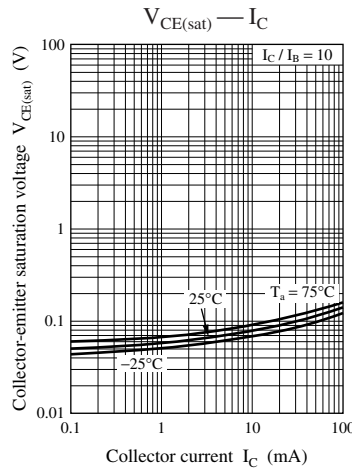
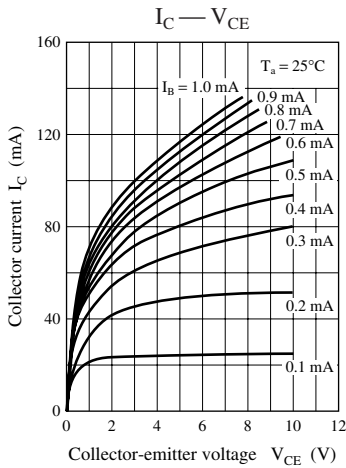


Characteristics charts of UNR4212

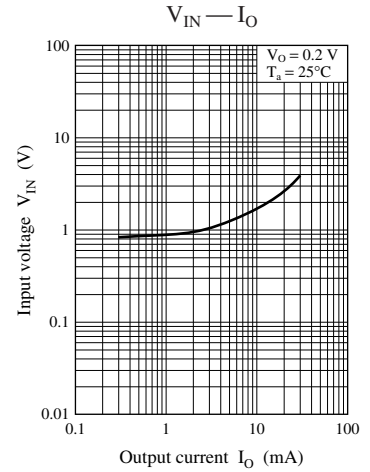
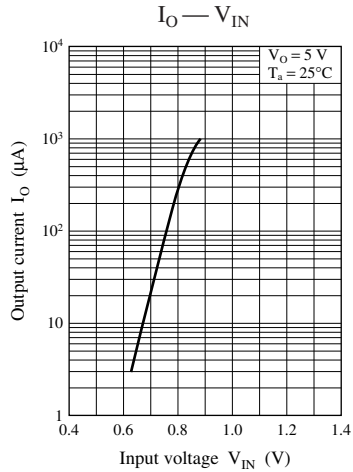
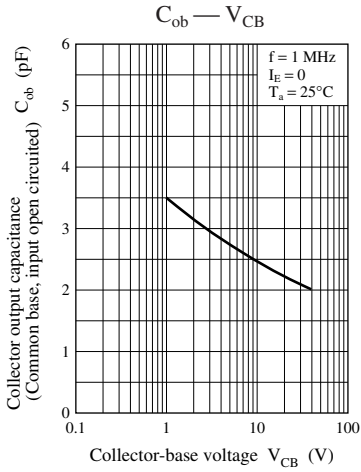
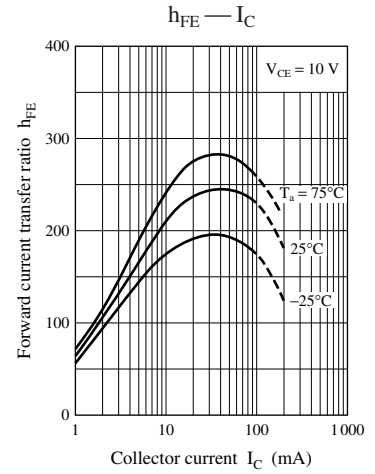
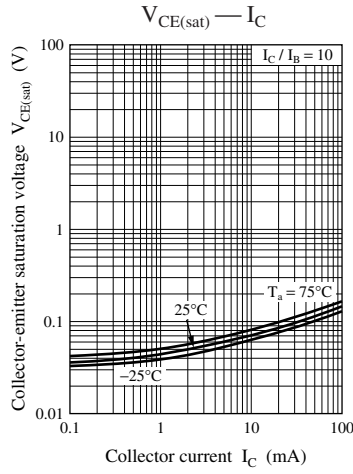
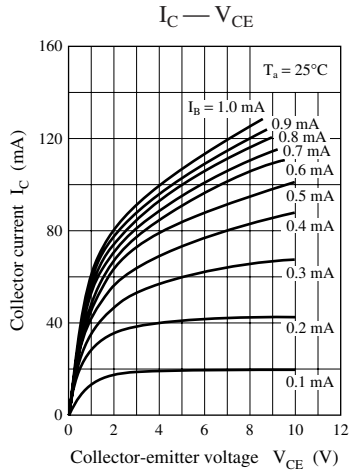




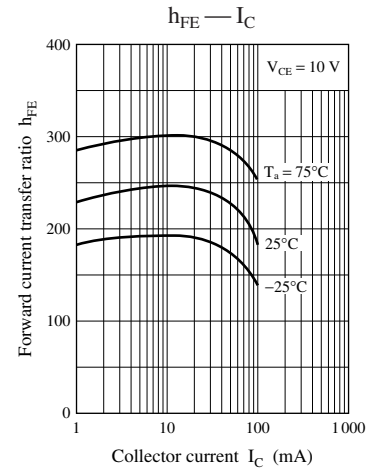
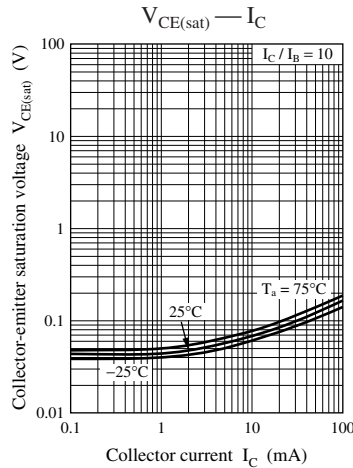
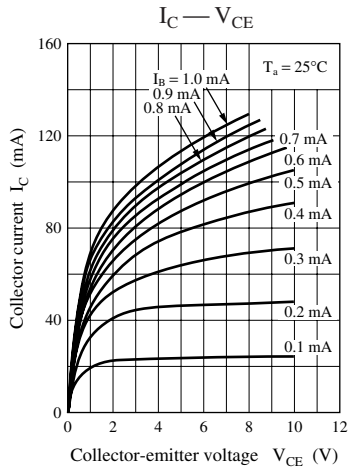
Characteristics charts of UNR4213

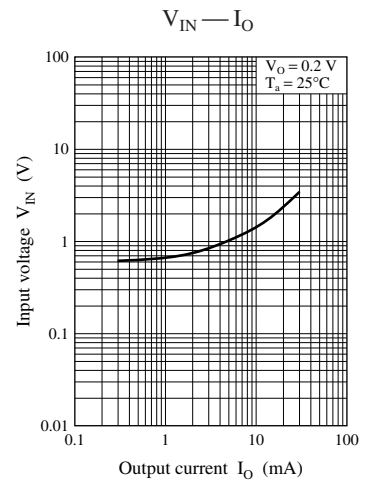
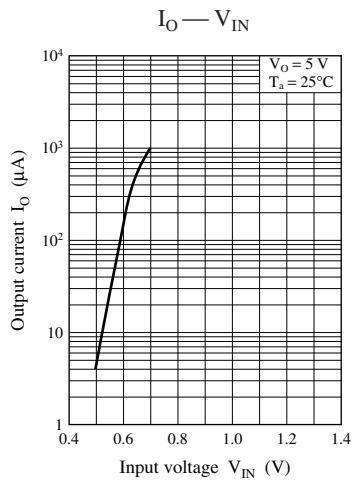
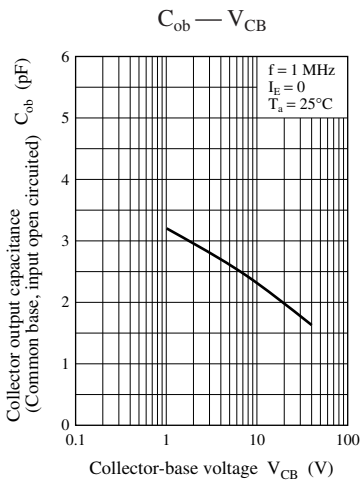


Characteristics charts of UNR4214

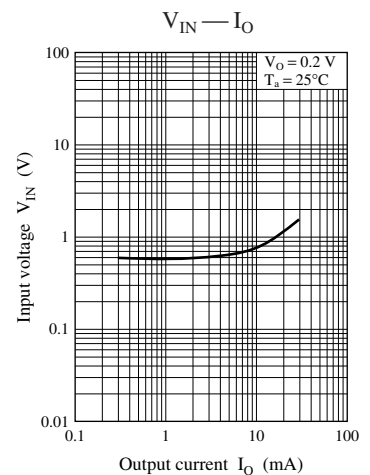
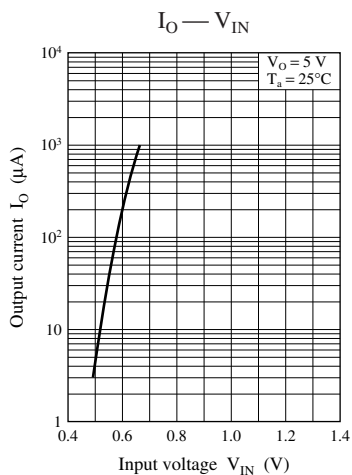
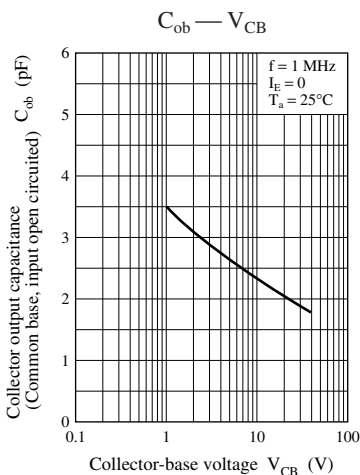
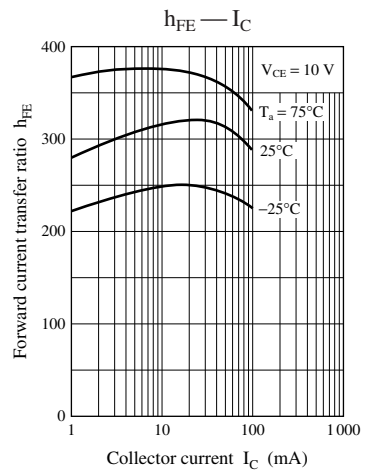
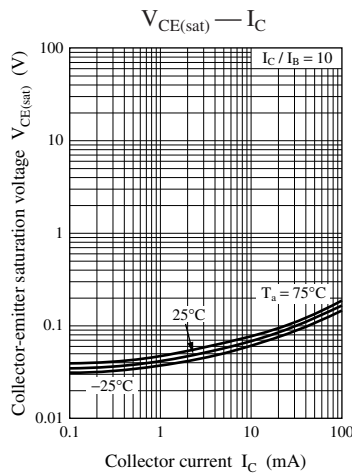
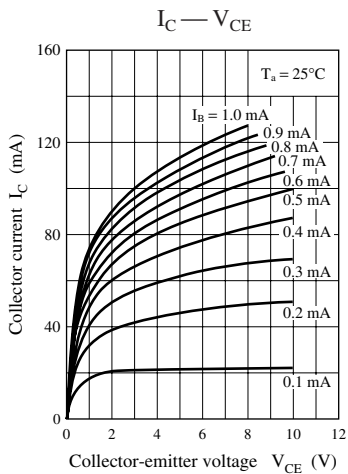


Characteristics charts of UNR4215

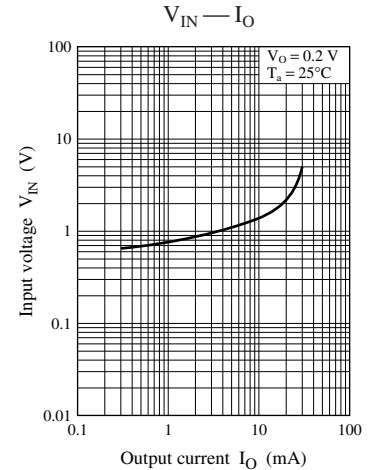
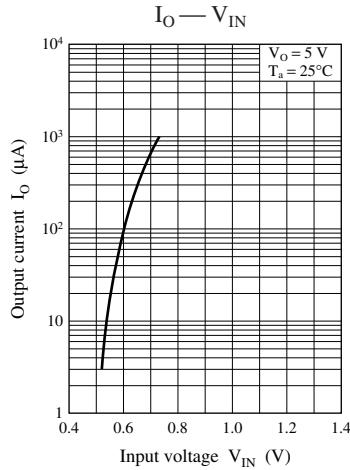
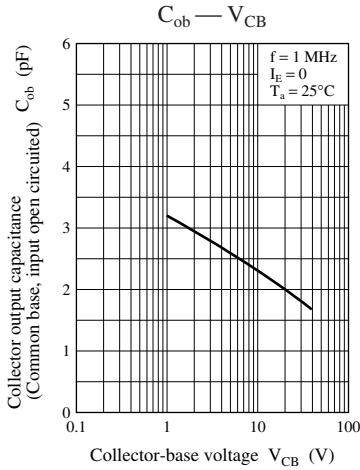
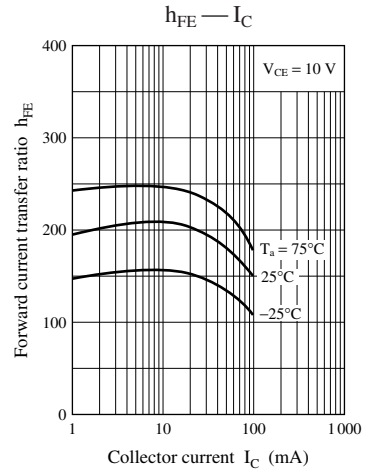
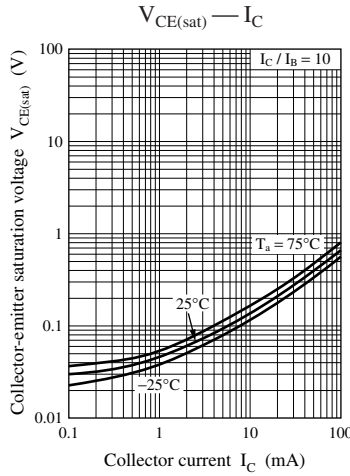
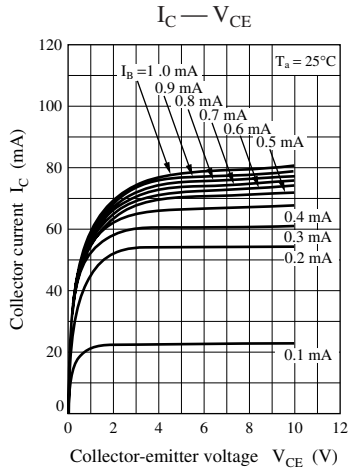




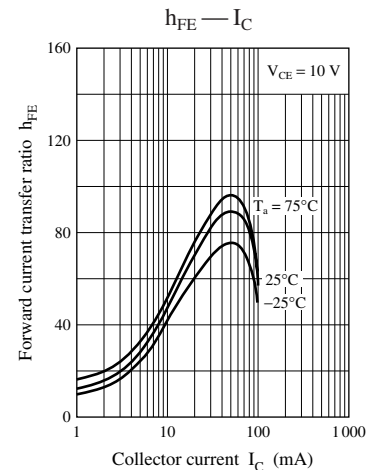
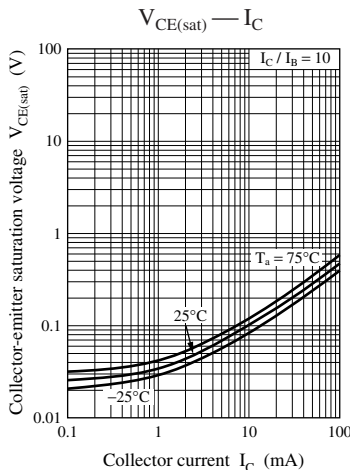
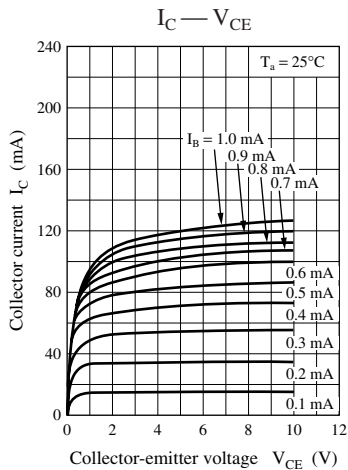
Characteristics charts of UNR4216



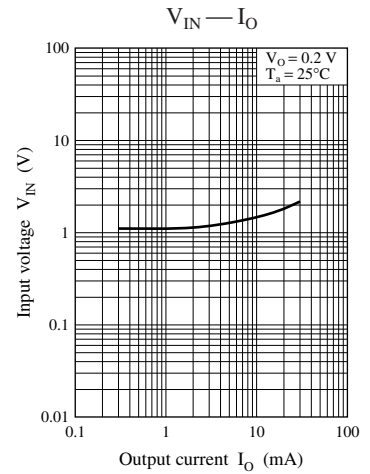
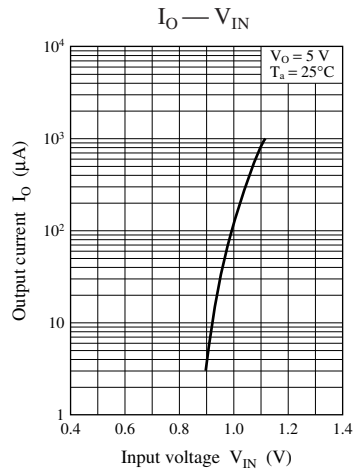
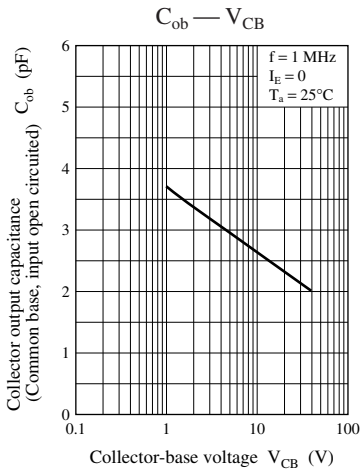
Characteristics charts of UNR4217



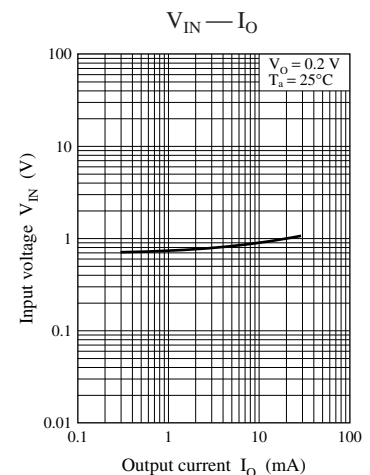
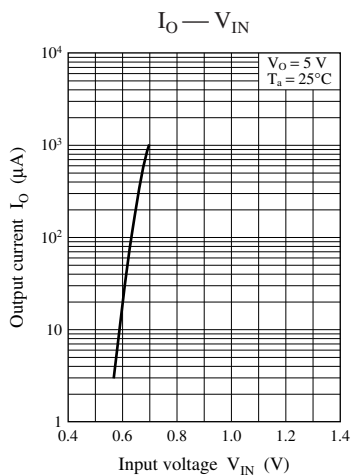
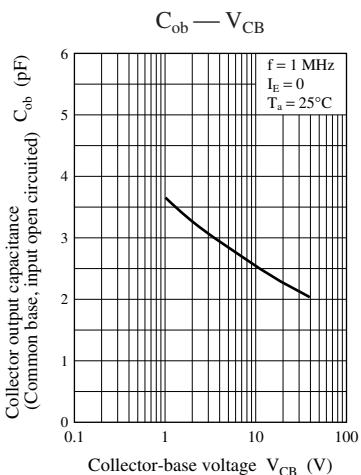
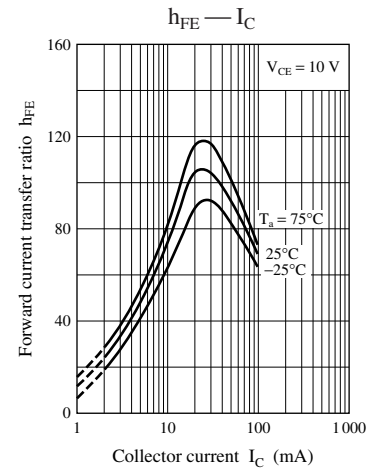
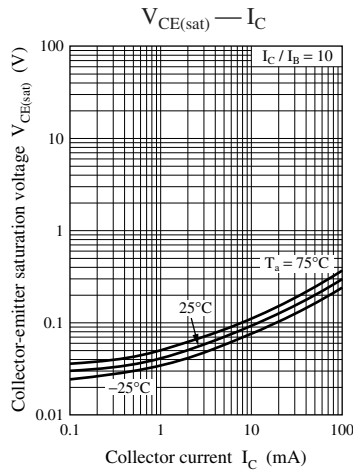
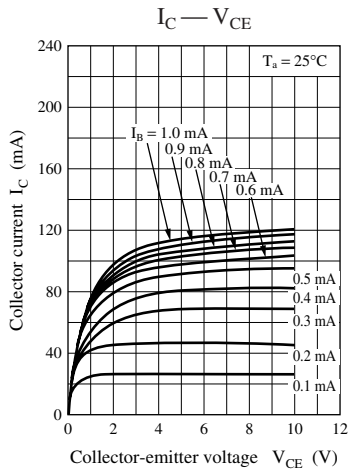
Characteristics charts of UNR4218



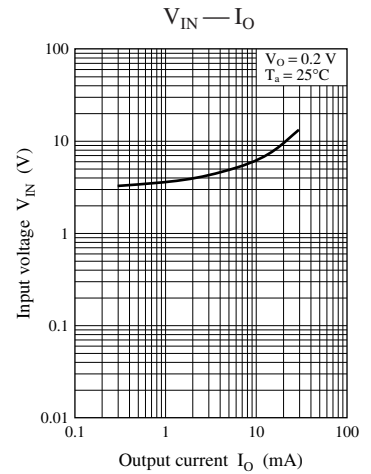
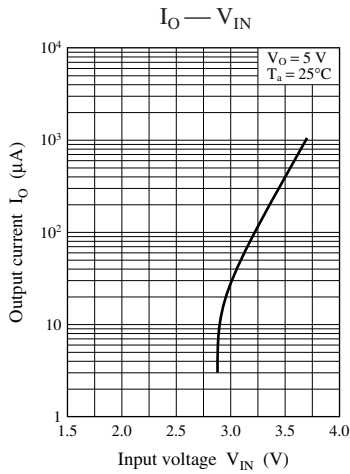
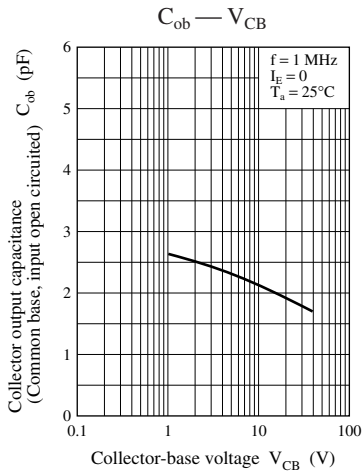
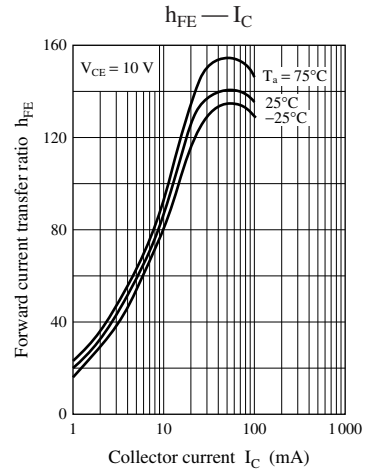
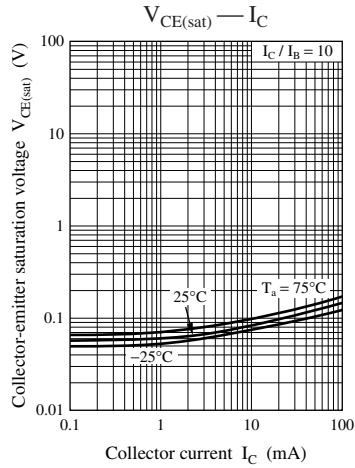
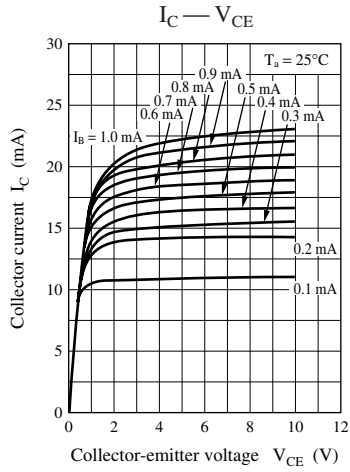




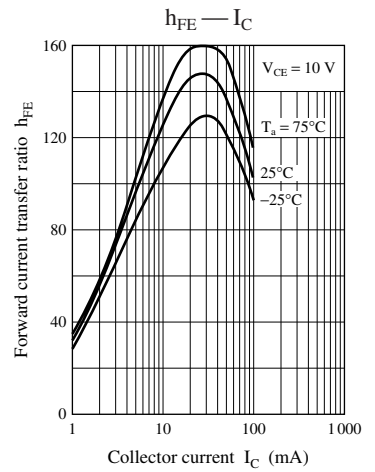
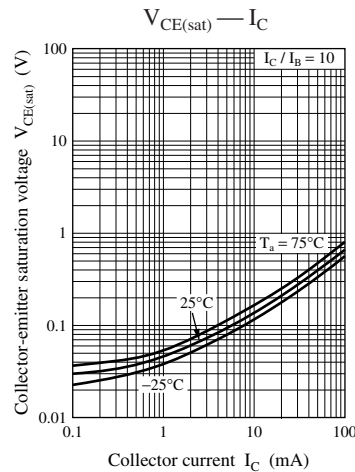
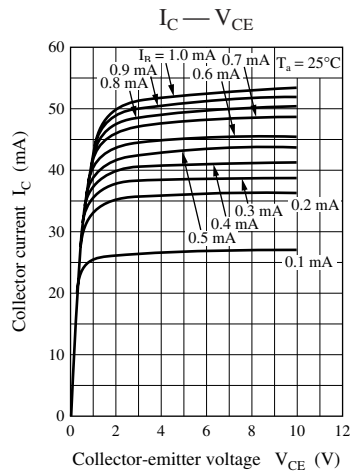
Characteristics charts of UNR4219

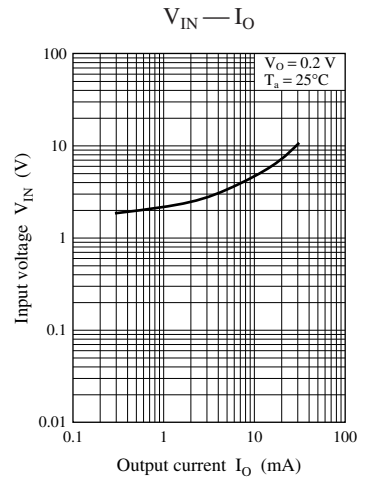
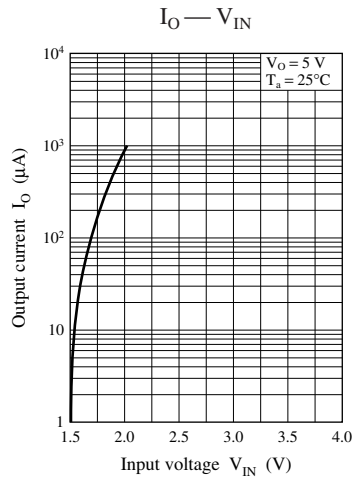
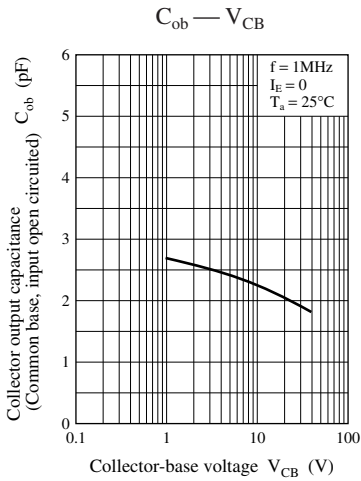


Characteristics charts of UNR421D

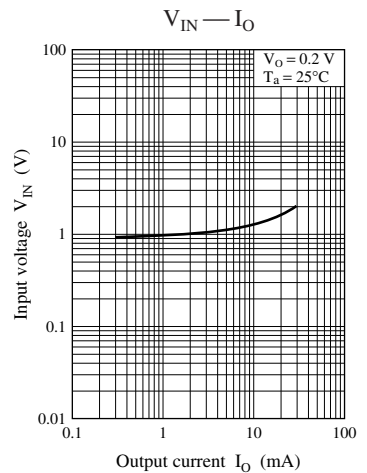
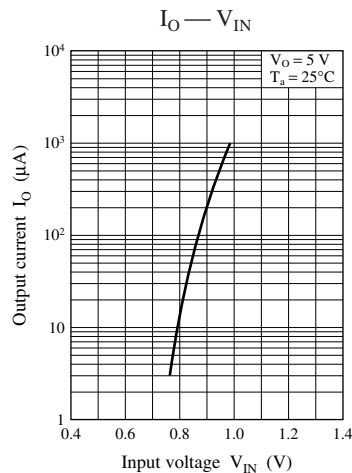
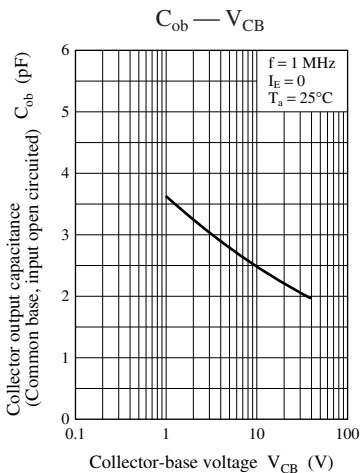
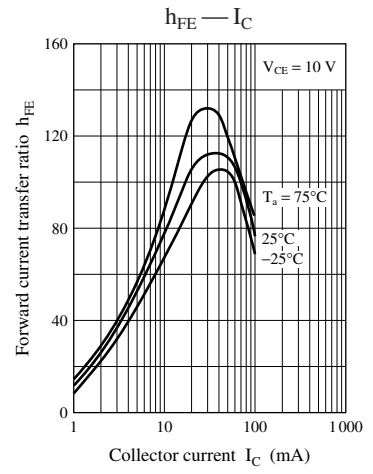
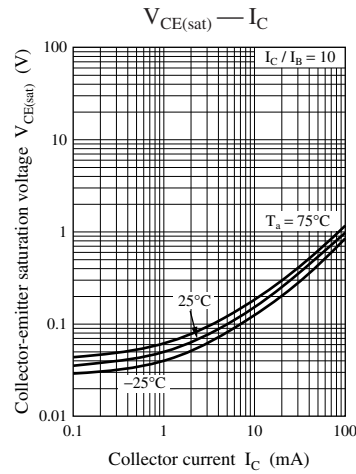
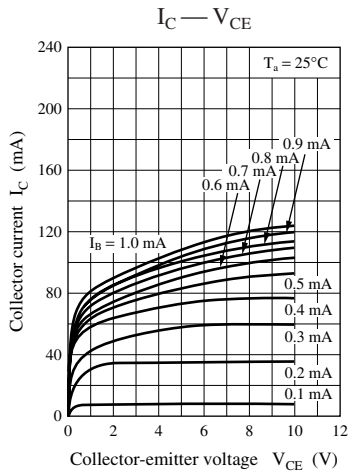


Characteristics charts of UNR421E

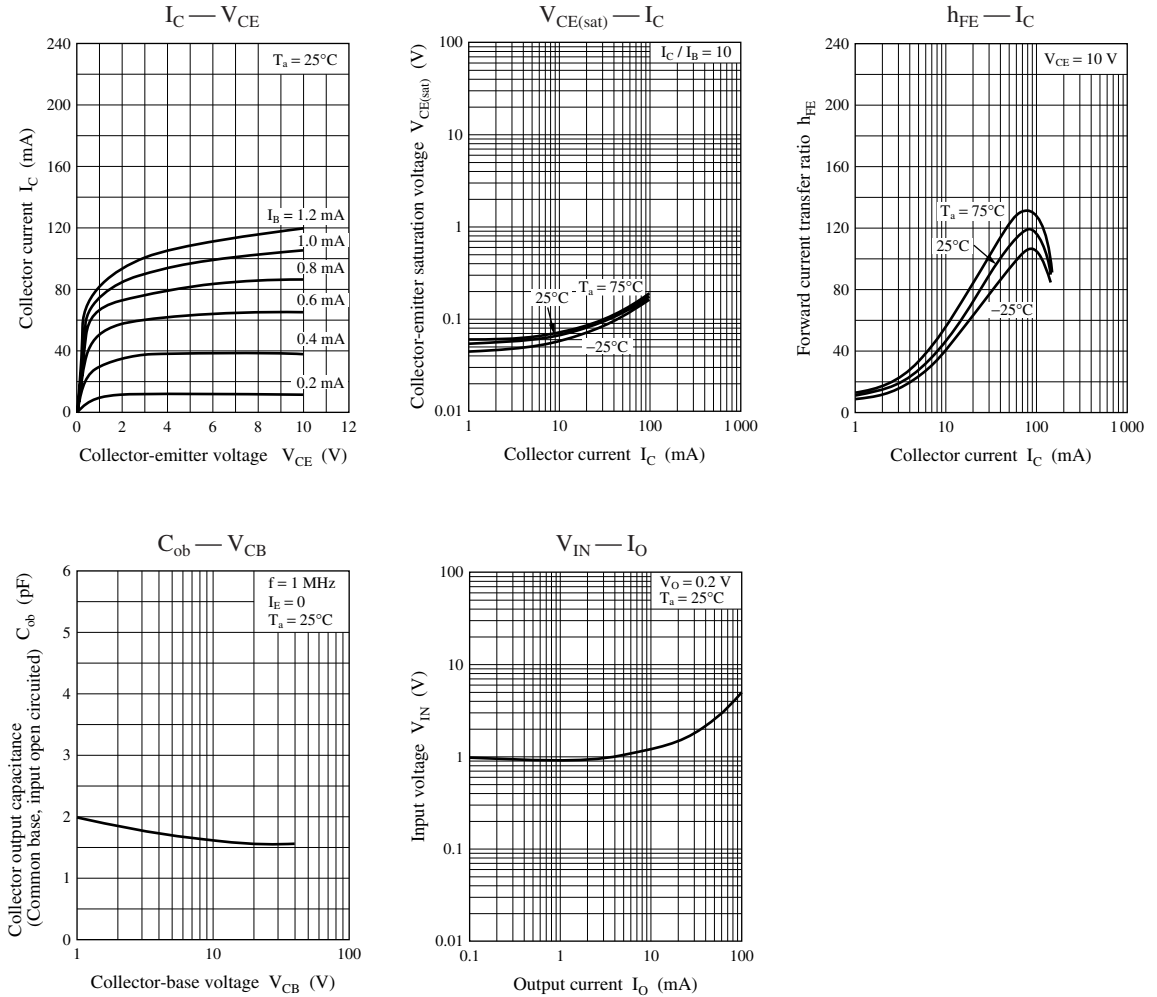




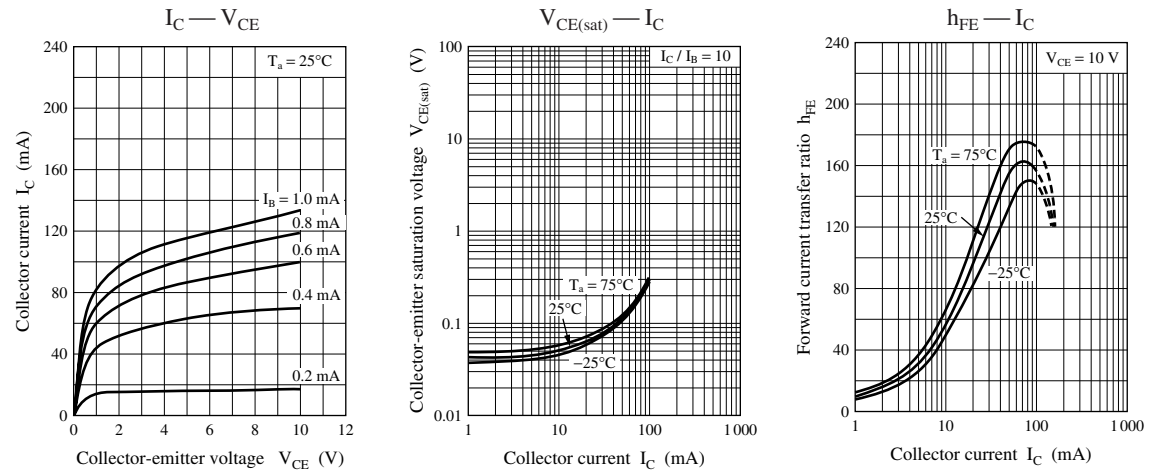
Characteristics charts of UNR421F

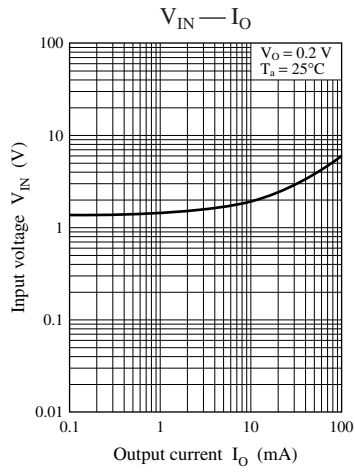
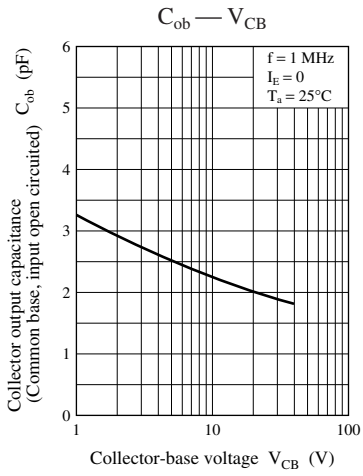


Characteristics charts of UNR421K



Characteristics charts of UNR421L





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