

# UNRL210/211/213/214/215/216

## Silicon NPN epitaxial planer type

For digital circuit

### ■ Features

- Mold leadless type package, allowing downsizing and thinning of the equipment and automatic insertion through the tape packing.
- The PCB mounting area is 1/10 of that of lead type package (3-pin MINI-type package).

### ■ Resistance by Part Number

|           | Marking Symbol | (R <sub>1</sub> ) | (R <sub>2</sub> ) |
|-----------|----------------|-------------------|-------------------|
| • UNRL210 | P              | 47 kΩ             | —                 |
| • UNRL211 | A              | 10 kΩ             | 10 kΩ             |
| • UNRL213 | B              | 47 kΩ             | 47 kΩ             |
| • UNRL214 | R              | 10 kΩ             | 47 kΩ             |
| • UNRL215 | M              | 10 kΩ             | —                 |
| • UNRL216 | N              | 4.7 kΩ            | —                 |

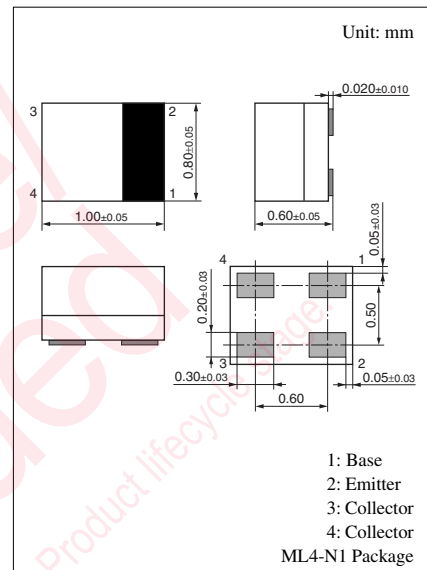
### ■ Absolute Maximum Ratings T<sub>a</sub> = 25°C

| Parameter                    | Symbol           | Rating      | Unit |
|------------------------------|------------------|-------------|------|
| Collector to base voltage    | V <sub>CB0</sub> | 50          | V    |
| Collector to emitter voltage | V <sub>CEO</sub> | 50          | V    |
| Collector current            | I <sub>C</sub>   | 100         | mA   |
| Total power dissipation*     | P <sub>T</sub>   | 150         | mW   |
| Junction temperature         | T <sub>j</sub>   | 125         | °C   |
| Storage temperature          | T <sub>stg</sub> | -55 to +125 | °C   |

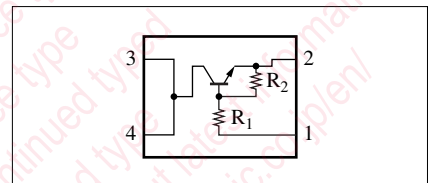
Note) \*: Printed circuit board copper foil for collector portion  
area: 20.0 mm<sup>2</sup> or more, thickness: 1.6 mm

### ■ Electrical Characteristics T<sub>a</sub> = 25°C ± 3°C

| Parameter                               | Symbol               | Conditions                                      | Min | Typ | Max  | Unit |
|---|----------------------|---|-----|-----|------|------|
| Collector cutoff current                | I <sub>CB0</sub>     | V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0      |     |     | 0.1  | μA   |
|   | I <sub>CEO</sub>     | V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0      |     |     | 0.5  |      |
| Emitter cutoff current                  | I <sub>EBO</sub>     | V <sub>EB</sub> = 6 V, I <sub>C</sub> = 0       |     |     | 0.5  | mA   |
|   |                      |   |     |     | 0.2  |      |
|   |                      |   |     |     | 0.1  |      |
|   |                      |   |     |     | 0.01 |      |
| Collector to base voltage               | V <sub>CB0</sub>     | I <sub>C</sub> = 10 μA, I <sub>E</sub> = 0      | 50  |     |      | V    |
| Collector to emitter voltage            | V <sub>CEO</sub>     | I <sub>C</sub> = 2 mA, I <sub>B</sub> = 0       | 50  |     |      | V    |
| Forward current transfer ratio          | h <sub>FE</sub>      | V <sub>CE</sub> = 10 V, I <sub>C</sub> = 5 mA   |     |     | 35   |      |
|   |                      |   |     |     | 80   |      |
|   |                      |   |     |     | 160  | 460  |
| Collector to emitter saturation voltage | V <sub>CE(sat)</sub> | I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0.3 mA |     |     | 0.25 | V    |



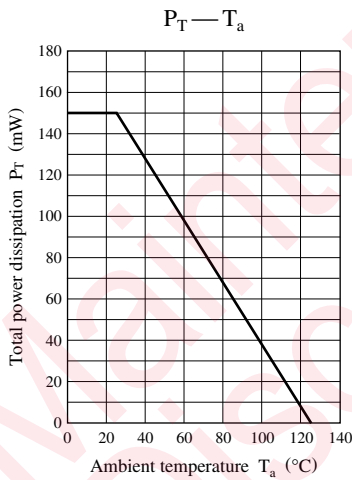
### Internal Connection



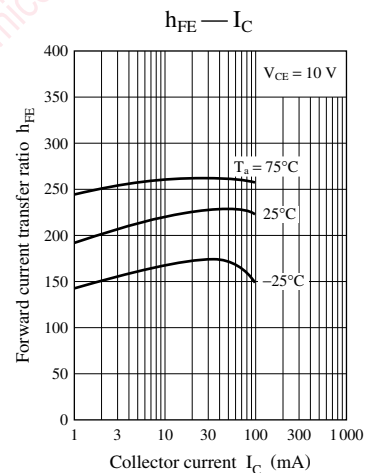
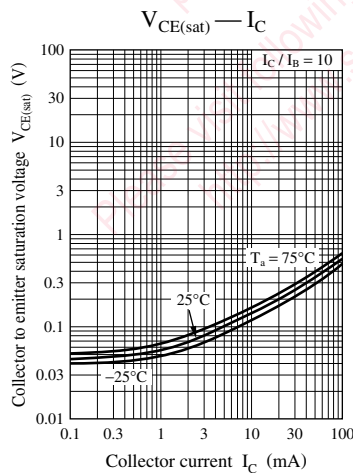
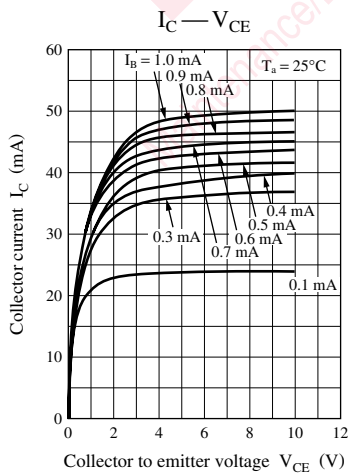
■ Electrical Characteristics(continued)  $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

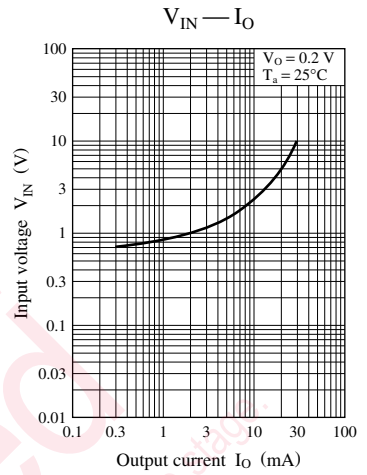
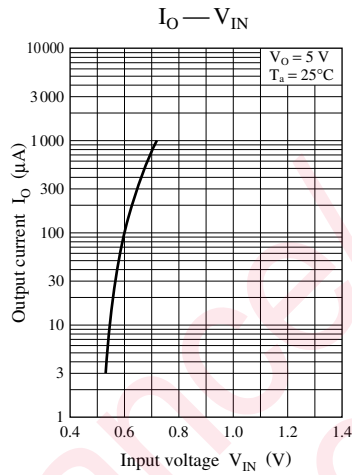
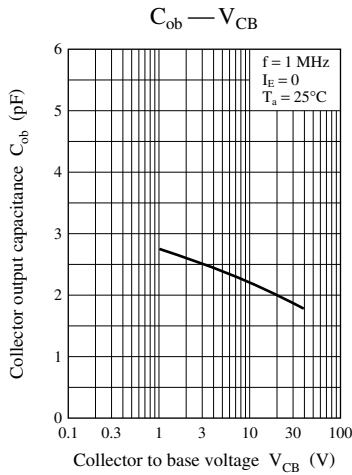
| Parameter                 | Symbol          | Conditions  | Min  | Typ  | Max  | Unit       |
|---------------------------|-----------------|---|------|------|------|------------|
| High-level output voltage | $V_{OH}$        | $V_{CC} = 5\text{ V}, V_B = 0.5\text{ V}, R_L = 1\text{ k}\Omega$ | 4.9  |      |      | V          |
| Low-level output voltage  | $V_{OL}$        | $V_{CC} = 5\text{ V}, V_B = 2.5\text{ V}, R_L = 1\text{ k}\Omega$ |      |      | 0.2  | V          |
|                           |                 | $V_{CC} = 5\text{ V}, V_B = 3.5\text{ V}, R_L = 1\text{ k}\Omega$ |      |      |      |            |
| Transition frequency      | $f_T$           | $V_{CB} = 10\text{ V}, I_E = -2\text{ mA}, f = 200\text{ MHz}$    |      | 150  |      | MHz        |
| Input resistance          | UNRL216         | $R_1$   | -30% | 4.7  | +30% | k $\Omega$ |
|                           | UNRL211/214/215 |   |      | 10   |      |            |
|                           | UNRL210/213     |   |      | 47   |      |            |
| Resistance ratio          | UNRL211/213     | $R_1/R_2$   | 0.8  | 1.0  | 1.2  |            |
|                           | UNRL214         |   | 0.17 | 0.21 | 0.25 |            |

Common characteristics chart

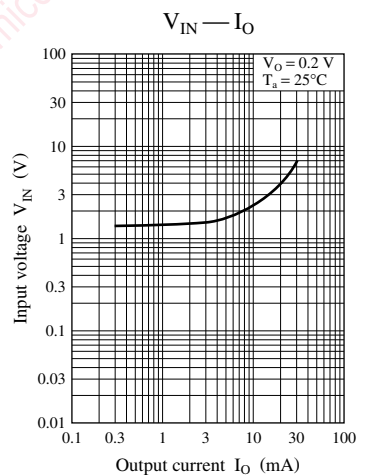
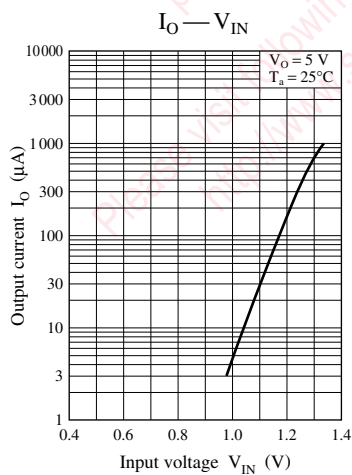
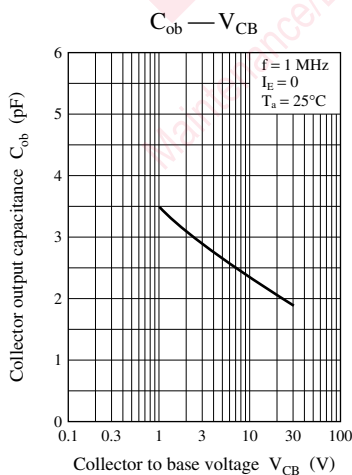
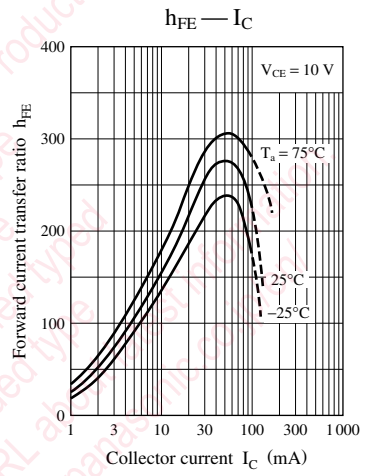
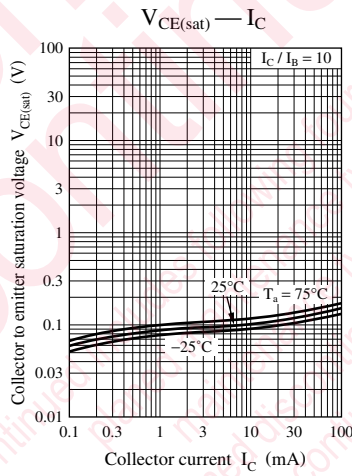
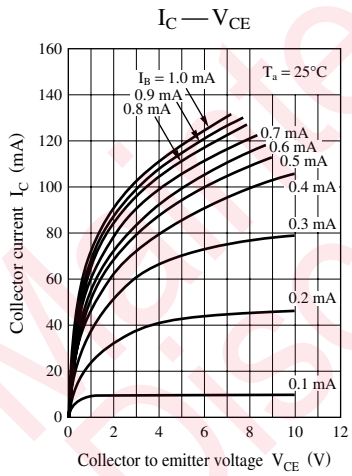


Characteristics charts of UNRL210

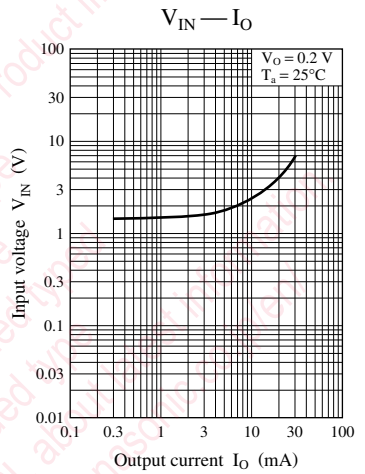
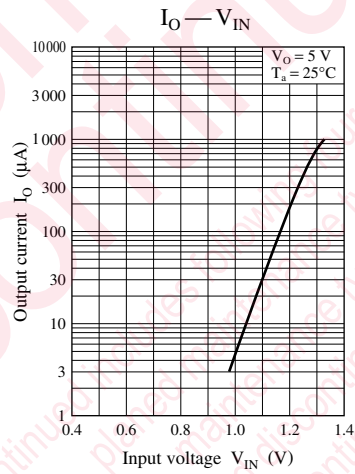
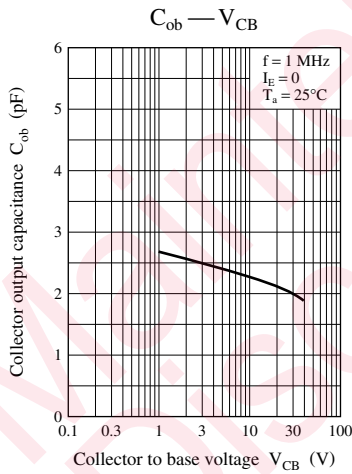
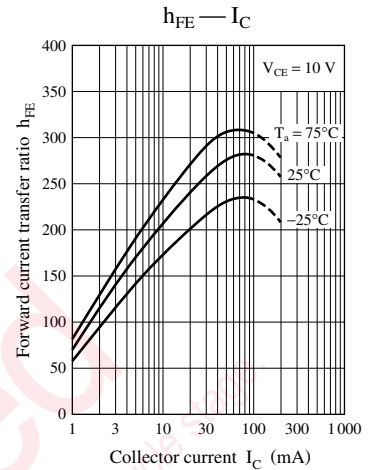
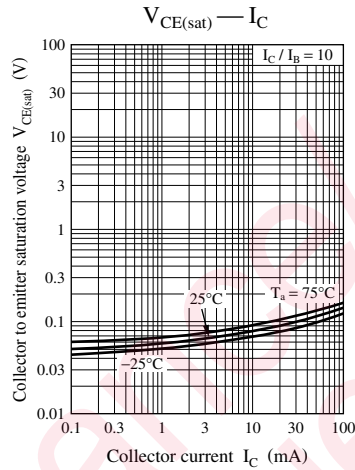
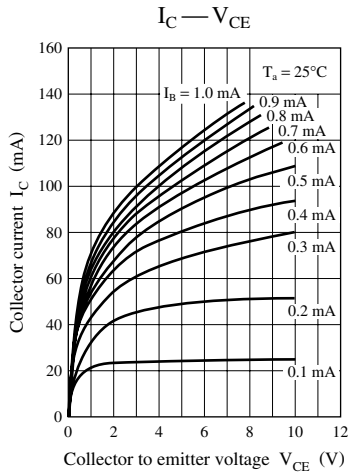




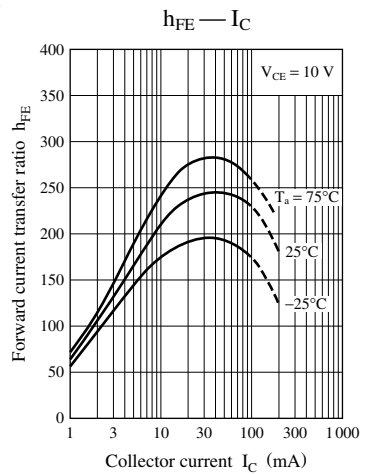
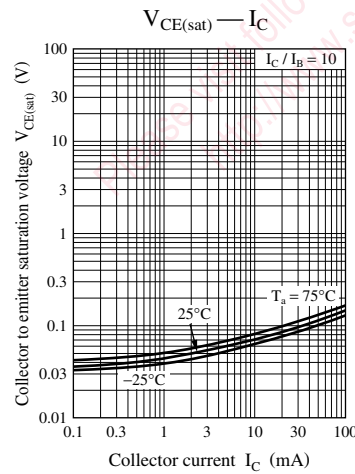
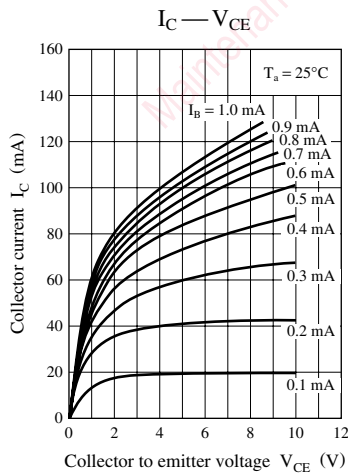
Characteristics charts of UNRL211

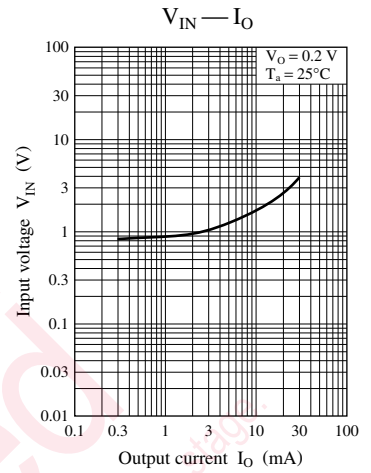
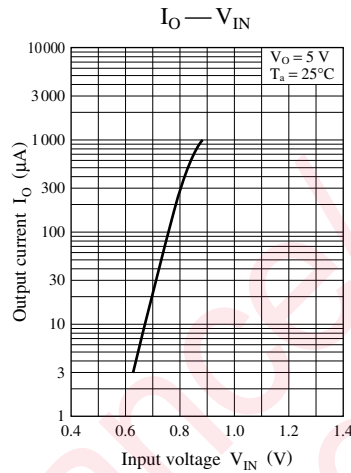
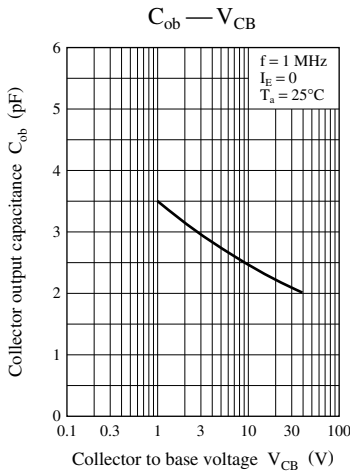


Characteristics charts of UNRL213

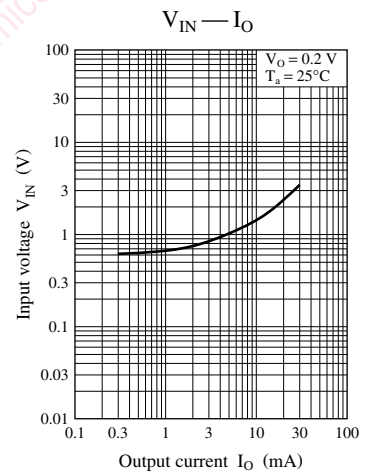
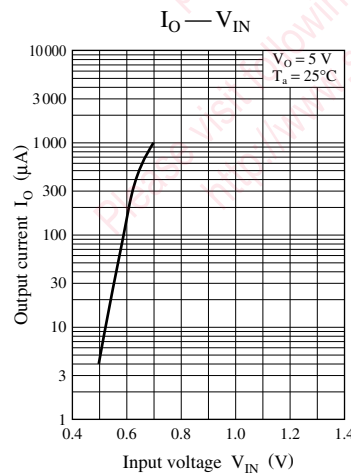
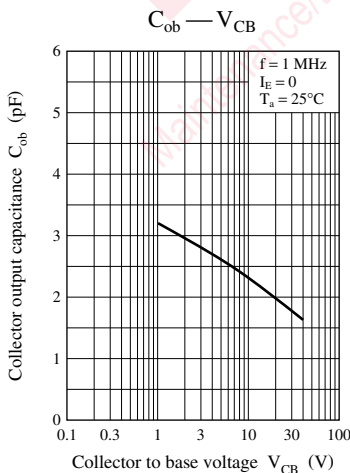
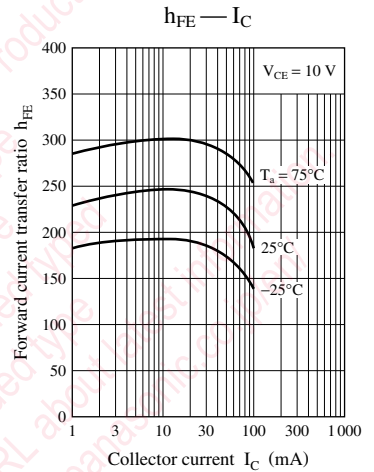
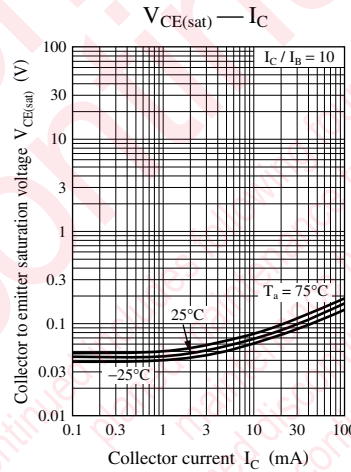
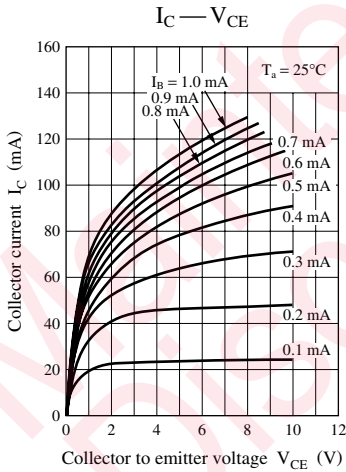


Characteristics charts of UNRL214

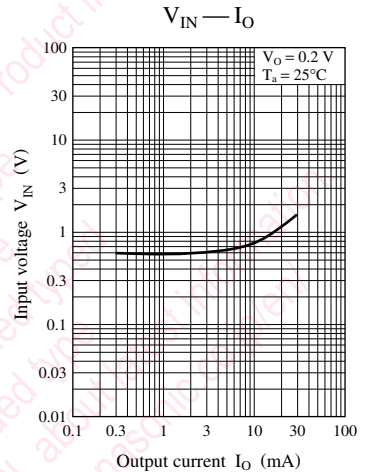
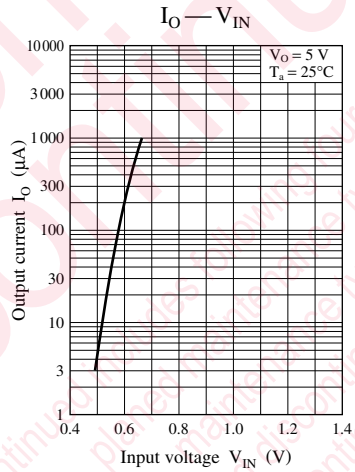
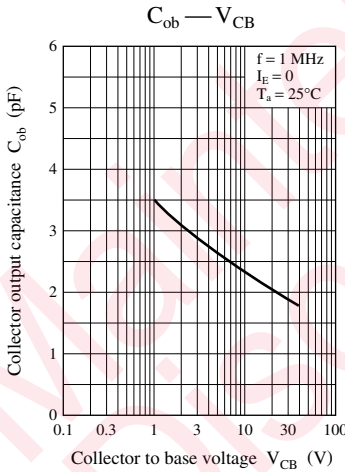
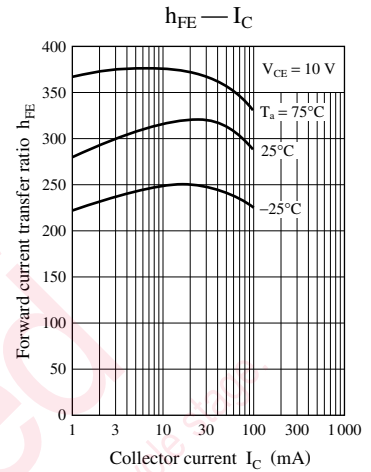
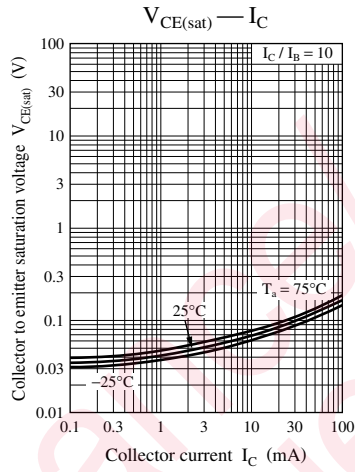
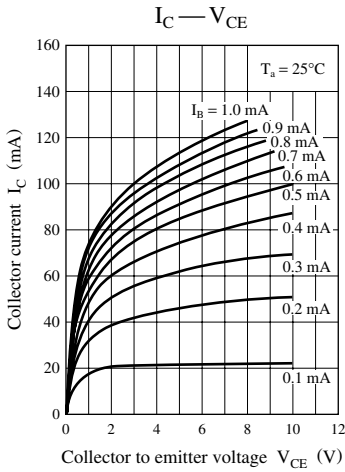




Characteristics charts of UNRL215



Characteristics charts of UNRL216



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