

# UN1211/1212/1213/1214/1215/1216/1217/1218/1219/1210/ 121D/121E/121F/121K/121L

## Silicon NPN epitaxial planer transistor

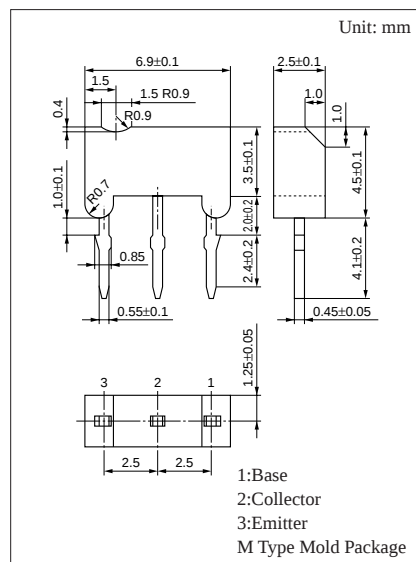
For digital circuits

### Features

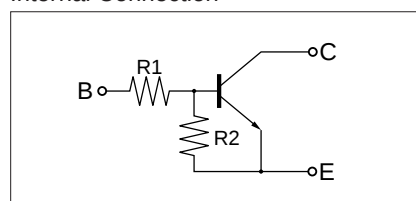
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts.
- M type package allowing easy automatic and manual insertion as well as stand-alone fixing to the printed circuit board.

### Resistance by Part Number

|          | (R <sub>1</sub> ) | (R <sub>2</sub> ) |
|----------|-------------------|-------------------|
| • UN1211 | 10kΩ              | 10kΩ              |
| • UN1212 | 22kΩ              | 22kΩ              |
| • UN1213 | 47kΩ              | 47kΩ              |
| • UN1214 | 10kΩ              | 47kΩ              |
| • UN1215 | 10kΩ              | —                 |
| • UN1216 | 4.7kΩ             | —                 |
| • UN1217 | 22kΩ              | —                 |
| • UN1218 | 0.51kΩ            | 5.1kΩ             |
| • UN1219 | 1kΩ               | 10kΩ              |
| • UN1210 | 47kΩ              | —                 |
| • UN121D | 47kΩ              | 10kΩ              |
| • UN121E | 47kΩ              | 22kΩ              |
| • UN121F | 4.7kΩ             | 10kΩ              |
| • UN121K | 10kΩ              | 4.7kΩ             |
| • UN121L | 4.7kΩ             | 4.7kΩ             |



### Internal Connection



### Absolute Maximum Ratings (Ta=25°C)

| Parameter                    | Symbol           | Ratings     | Unit |
|------------------------------|------------------|-------------|------|
| Collector to base voltage    | V <sub>CBO</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>   | 400         | mW   |
| Junction temperature         | T <sub>j</sub>   | 150         | °C   |
| Storage temperature          | T <sub>stg</sub> | -55 to +150 | °C   |

UN1211/1212/1213/1214/1215/1216/1217/1218/  
Transistors with built-in Resistor 1219/1210/121D/121E/121F/121K/121L

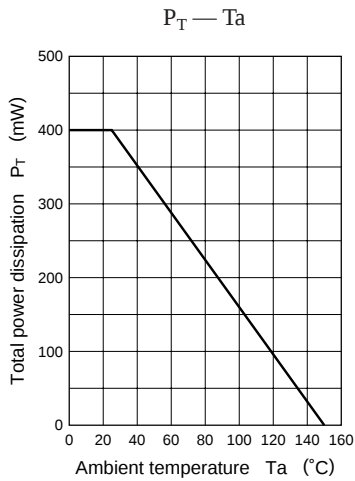
■ Electrical Characteristics (Ta=25°C)

| Parameter                               |                           | Symbol                         | Conditions                                                        | min    | typ  | max     | Unit |
|-----------------------------------------|---------------------------|--------------------------------|-------------------------------------------------------------------|--------|------|---------|------|
| Collector cutoff current                |                           | I <sub>CBO</sub>               | V <sub>CB</sub> = 50V, I <sub>E</sub> = 0                         |        |      | 0.1     | μA   |
|                                         |                           | I <sub>CEO</sub>               | V <sub>CE</sub> = 50V, I <sub>B</sub> = 0                         |        |      | 0.5     | μA   |
| Emitter cutoff current                  | UN1211                    | I <sub>EBO</sub>               | V <sub>EB</sub> = 6V, I <sub>C</sub> = 0                          |        |      | 0.5     | mA   |
|                                         | UN1212/1214/121E/121D     |                                |                                                                   |        |      | 0.2     |      |
|                                         | UN1213                    |                                |                                                                   |        |      | 0.1     |      |
|                                         | UN1215/1216/1217/1210     |                                |                                                                   |        |      | 0.01    |      |
|                                         | UN121F/121K               |                                |                                                                   |        |      | 1.0     |      |
|                                         | UN1219                    |                                |                                                                   |        |      | 1.5     |      |
|                                         | UN1218/121L               |                                |                                                                   |        |      | 2.0     |      |
| Collector to base voltage               |                           | V <sub>CBO</sub>               | I <sub>C</sub> = 10μA, I <sub>E</sub> = 0                         | 50     |      |         | V    |
| Collector to emitter voltage            |                           | V <sub>CEO</sub>               | I <sub>C</sub> = 2mA, I <sub>B</sub> = 0                          | 50     |      |         | V    |
| Forward current transfer ratio          | UN1211                    | h <sub>FE</sub>                | V <sub>CE</sub> = 10V, I <sub>C</sub> = 5mA                       | 35     |      |         |      |
|                                         | UN1212/121E               |                                |                                                                   | 60     |      |         |      |
|                                         | UN1213/1214               |                                |                                                                   | 80     |      |         |      |
|                                         | UN1215*/1216*/1217*/1210* |                                |                                                                   | 160    |      | 460     |      |
|                                         | UN121F/121D/1219          |                                |                                                                   | 30     |      |         |      |
|                                         | UN1218/121K/121L          |                                |                                                                   | 20     |      |         |      |
| Collector to emitter saturation voltage |                           | V <sub>CE(sat)</sub>           | I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.3mA                     |        |      | 0.25    | V    |
| Output voltage high level               |                           | V <sub>OH</sub>                | V <sub>CC</sub> = 5V, V <sub>B</sub> = 0.5V, R <sub>L</sub> = 1kΩ | 4.9    |      |         | V    |
| Output voltage low level                |                           | V <sub>OL</sub>                | V <sub>CC</sub> = 5V, V <sub>B</sub> = 2.5V, R <sub>L</sub> = 1kΩ |        |      | 0.2     | V    |
|                                         |                           |                                | V <sub>CC</sub> = 5V, V <sub>B</sub> = 3.5V, R <sub>L</sub> = 1kΩ |        |      | 0.2     |      |
|                                         |                           |                                | V <sub>CC</sub> = 5V, V <sub>B</sub> = 10V, R <sub>L</sub> = 1kΩ  |        |      | 0.2     |      |
|                                         |                           |                                | V <sub>CC</sub> = 5V, V <sub>B</sub> = 6V, R <sub>L</sub> = 1kΩ   |        |      | 0.2     |      |
| Transition frequency                    |                           | f <sub>T</sub>                 | V <sub>CB</sub> = 10V, I <sub>E</sub> = −2mA, f = 200MHz          |        | 80   |         | MHz  |
| Input resistance                        | UN1211/1214/1215/121K     | R <sub>i</sub>                 |                                                                   | (−30%) | 10   | ( +30%) | kΩ   |
|                                         | UN1212/1217               |                                |                                                                   |        | 22   |         |      |
|                                         | UN1213/121D/121E/1210     |                                |                                                                   |        | 47   |         |      |
|                                         | UN1216/121F/121L          |                                |                                                                   |        | 4.7  |         |      |
|                                         | UN1218                    |                                |                                                                   |        | 0.51 |         |      |
|                                         | UN1219                    |                                |                                                                   |        | 1    |         |      |
| Resistance ratio                        | UN1211/1212/1213/121L     | R <sub>1</sub> /R <sub>2</sub> |                                                                   | 0.8    | 1.0  | 1.2     |      |
|                                         | UN1214                    |                                |                                                                   | 0.17   | 0.21 | 0.25    |      |
|                                         | UN1218/1219               |                                |                                                                   | 0.08   | 0.1  | 0.12    |      |
|                                         | UN121D                    |                                |                                                                   |        | 4.7  |         |      |
|                                         | UN121E                    |                                |                                                                   |        | 2.14 |         |      |
|                                         | UN121F                    |                                |                                                                   |        | 0.47 |         |      |
|                                         | UN121K                    |                                |                                                                   |        | 2.13 |         |      |

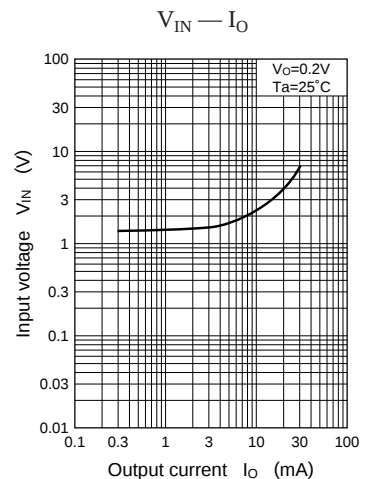
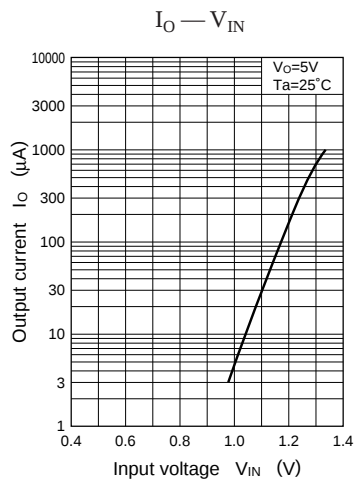
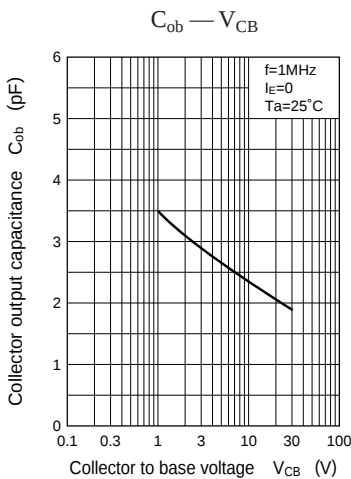
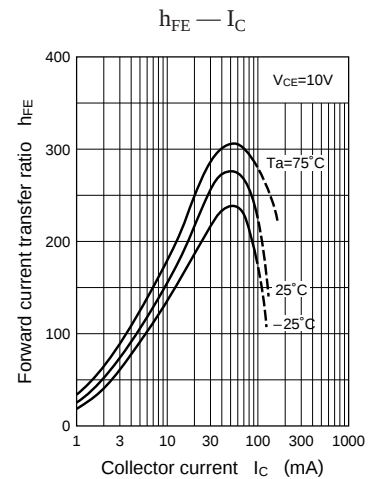
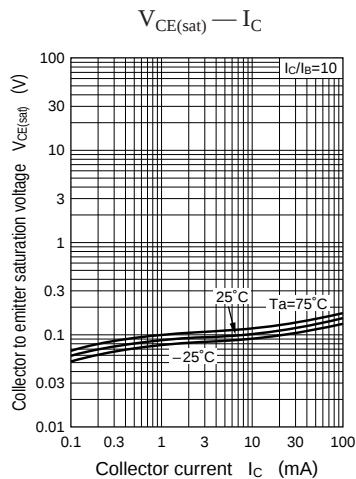
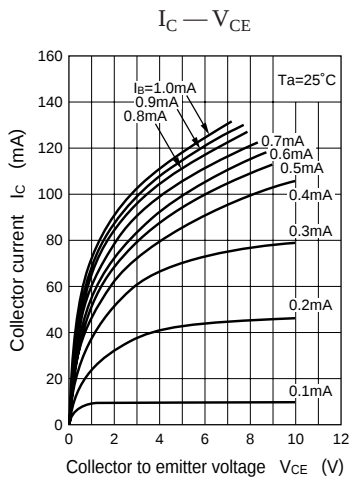
\* h<sub>FE</sub> rank classification (UN1215/1216/1217/1210)

| Rank            | Q          | R          | S          |
|-----------------|------------|------------|------------|
| h <sub>FE</sub> | 160 to 260 | 210 to 340 | 290 to 460 |

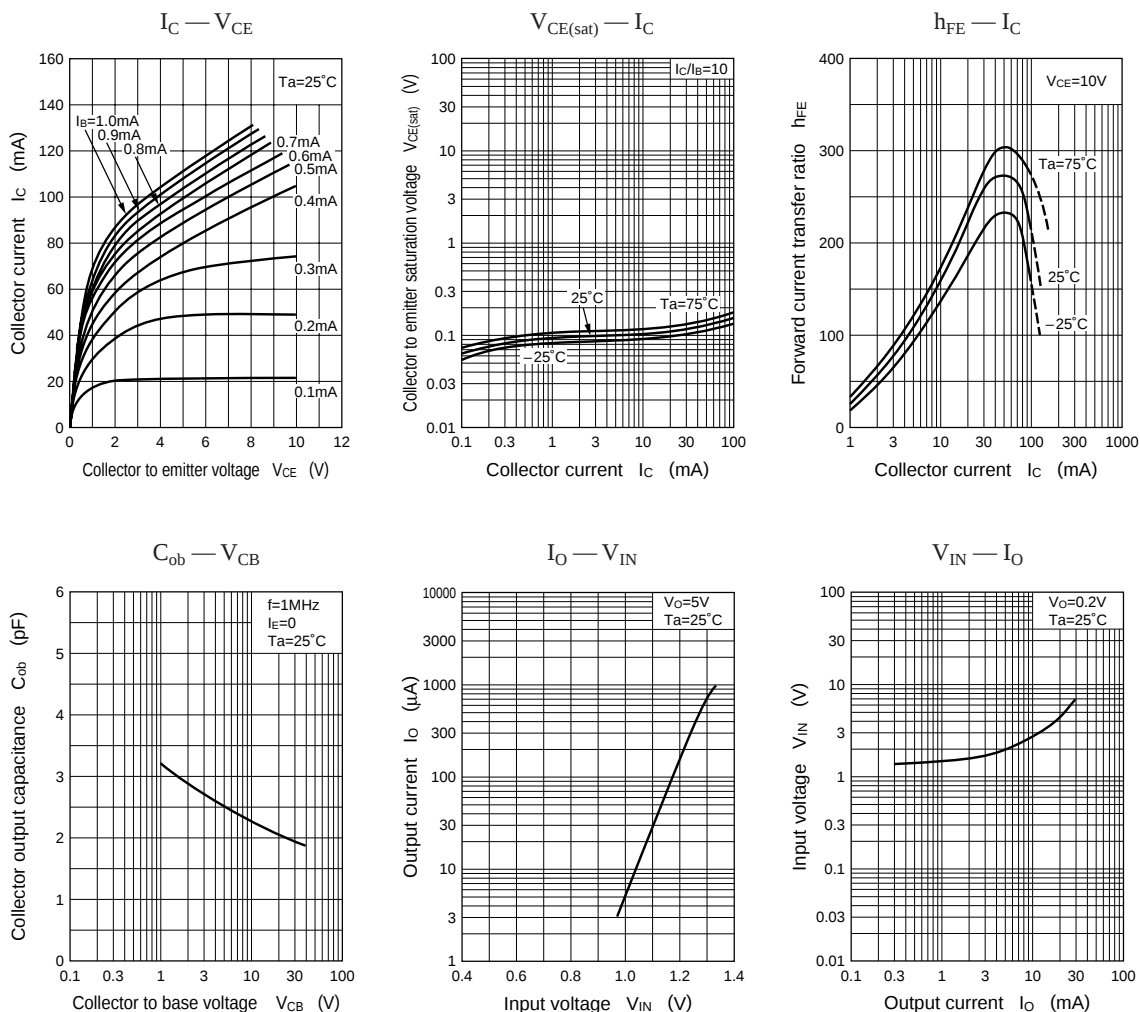
Common characteristics chart



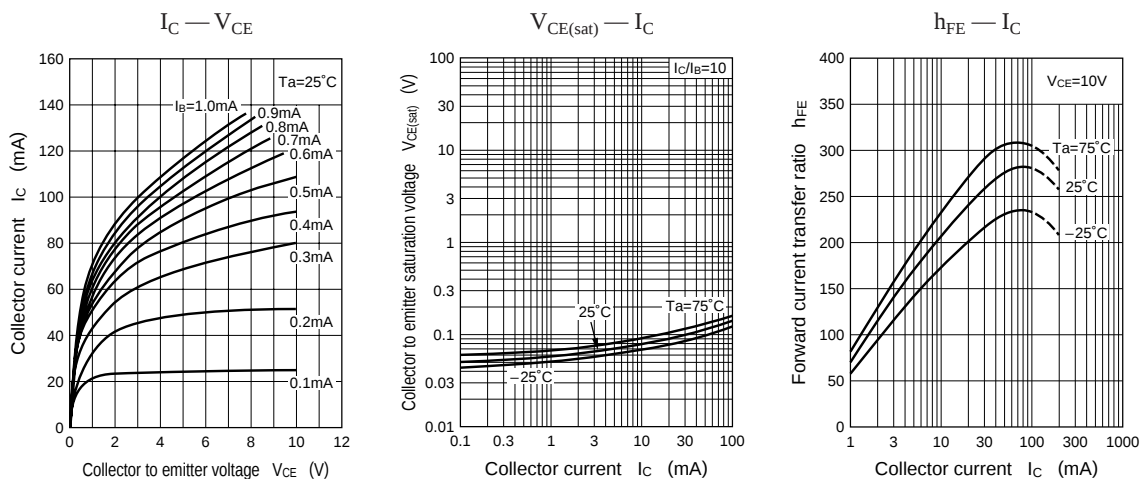
Characteristics charts of UN1211

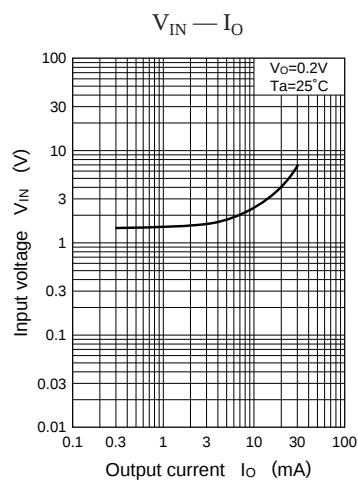
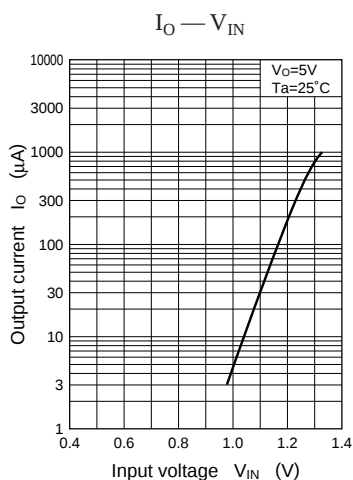
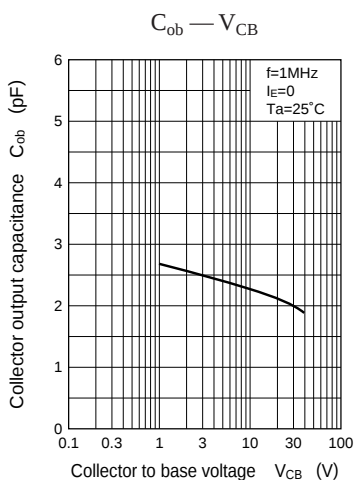


Characteristics charts of UN1212

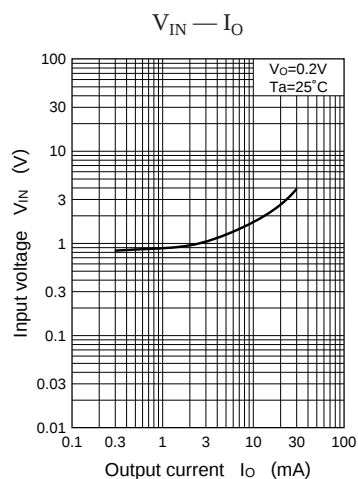
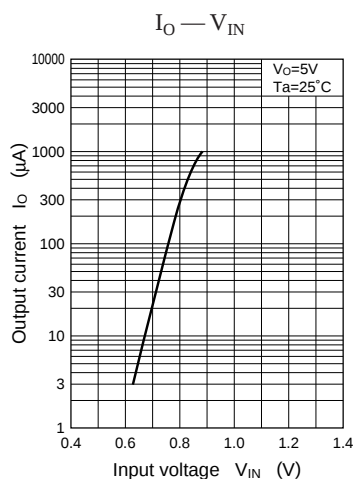
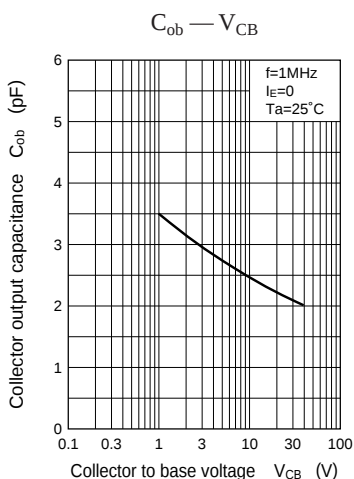
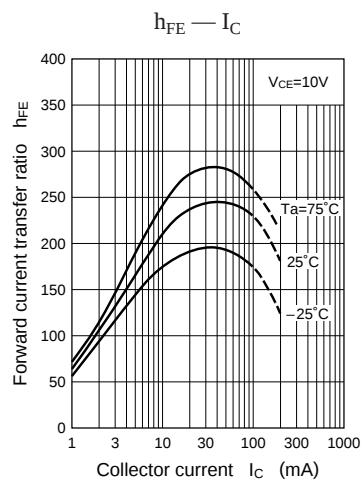
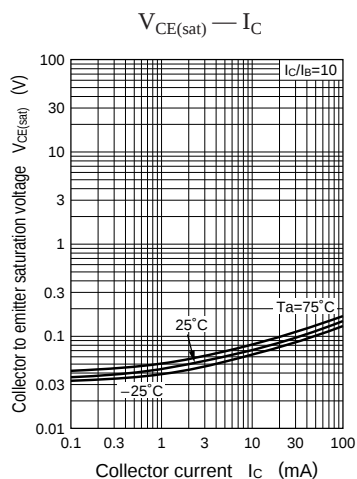
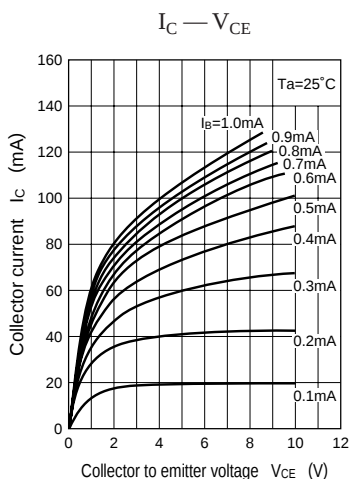


Characteristics charts of UN1213

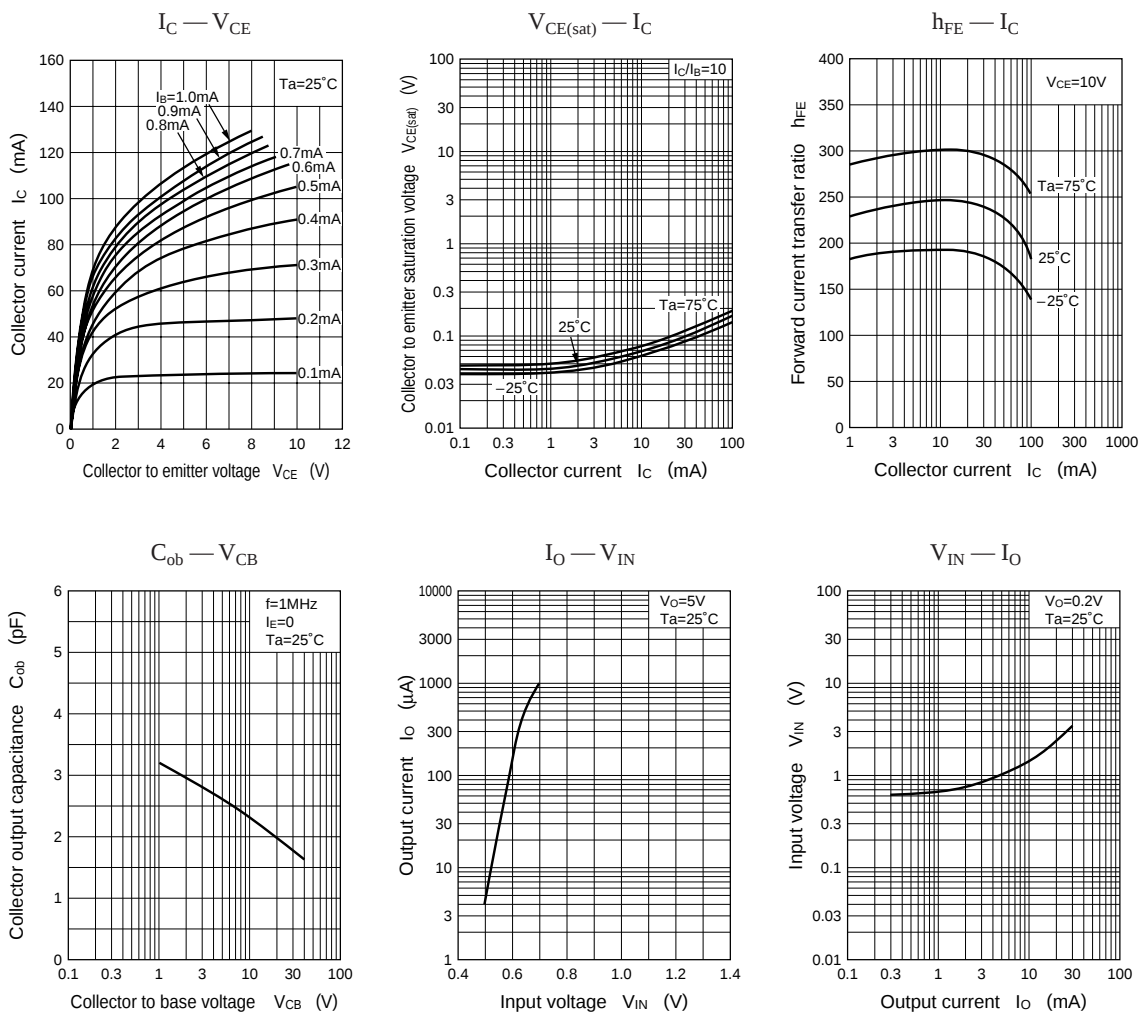




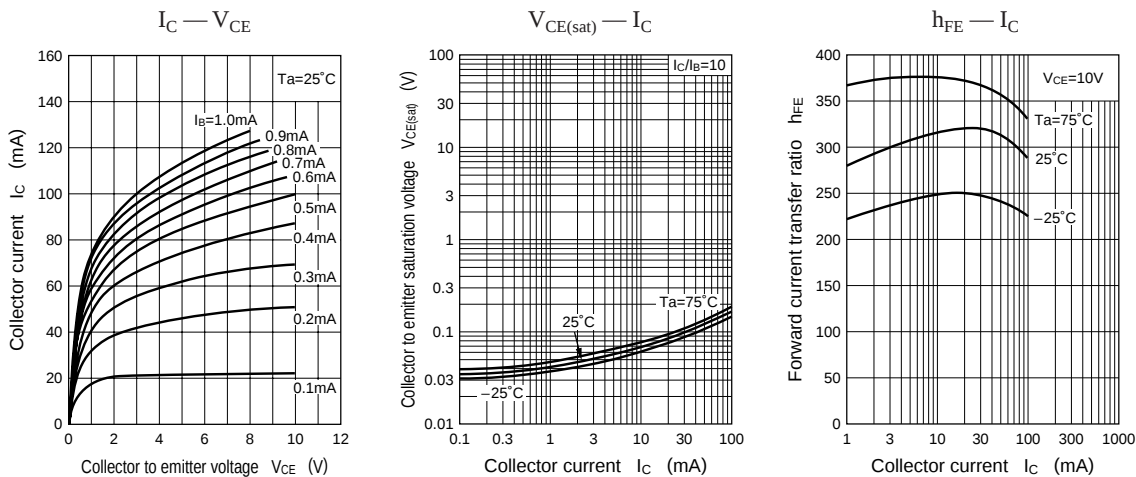
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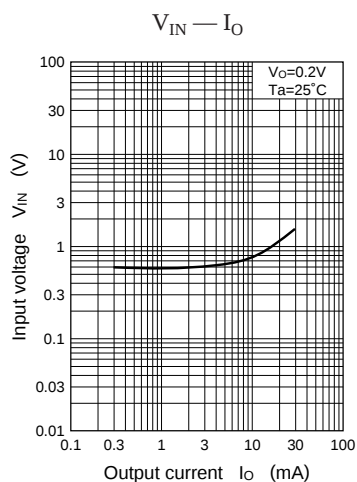
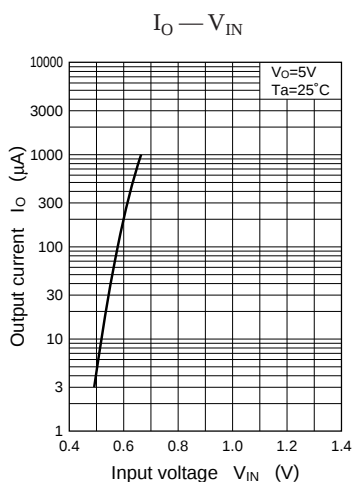
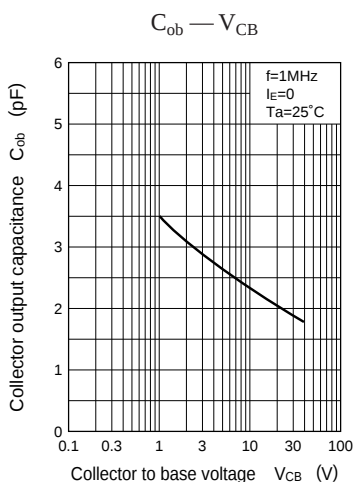


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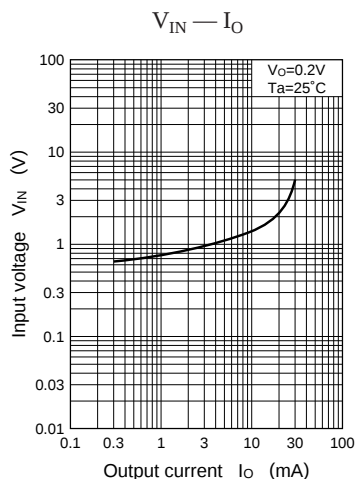
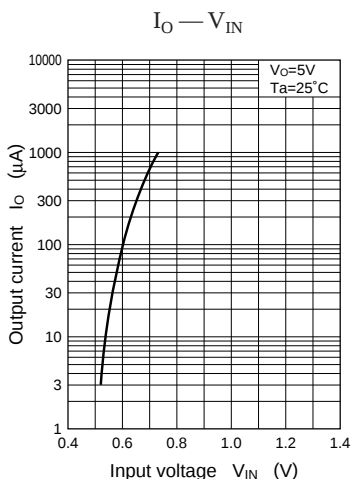
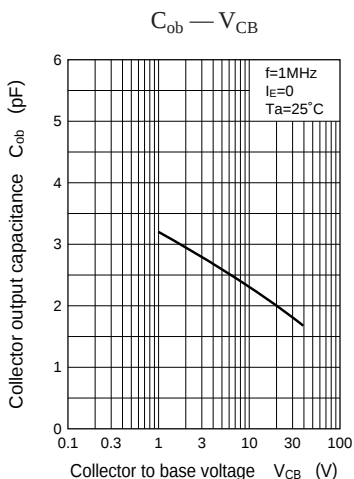
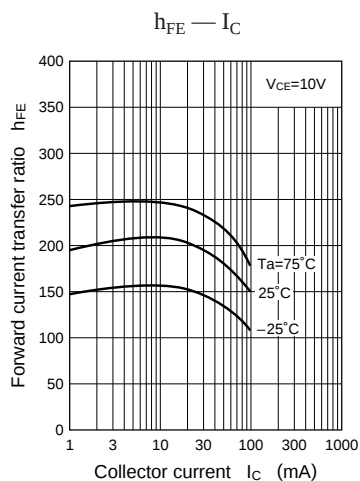
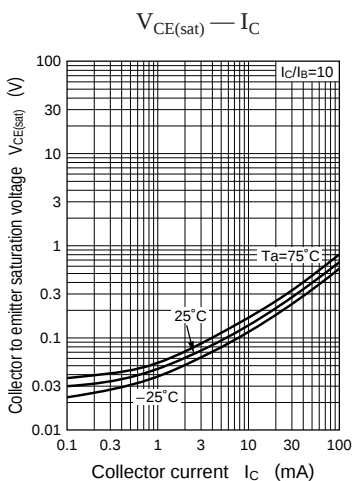
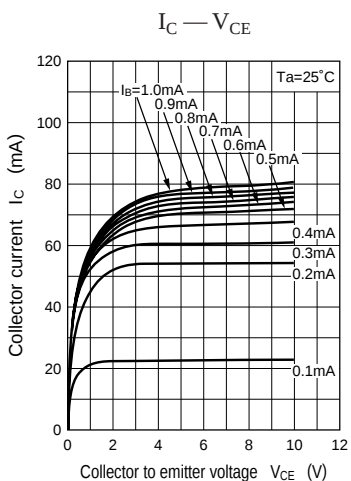


Characteristics charts of UN1216

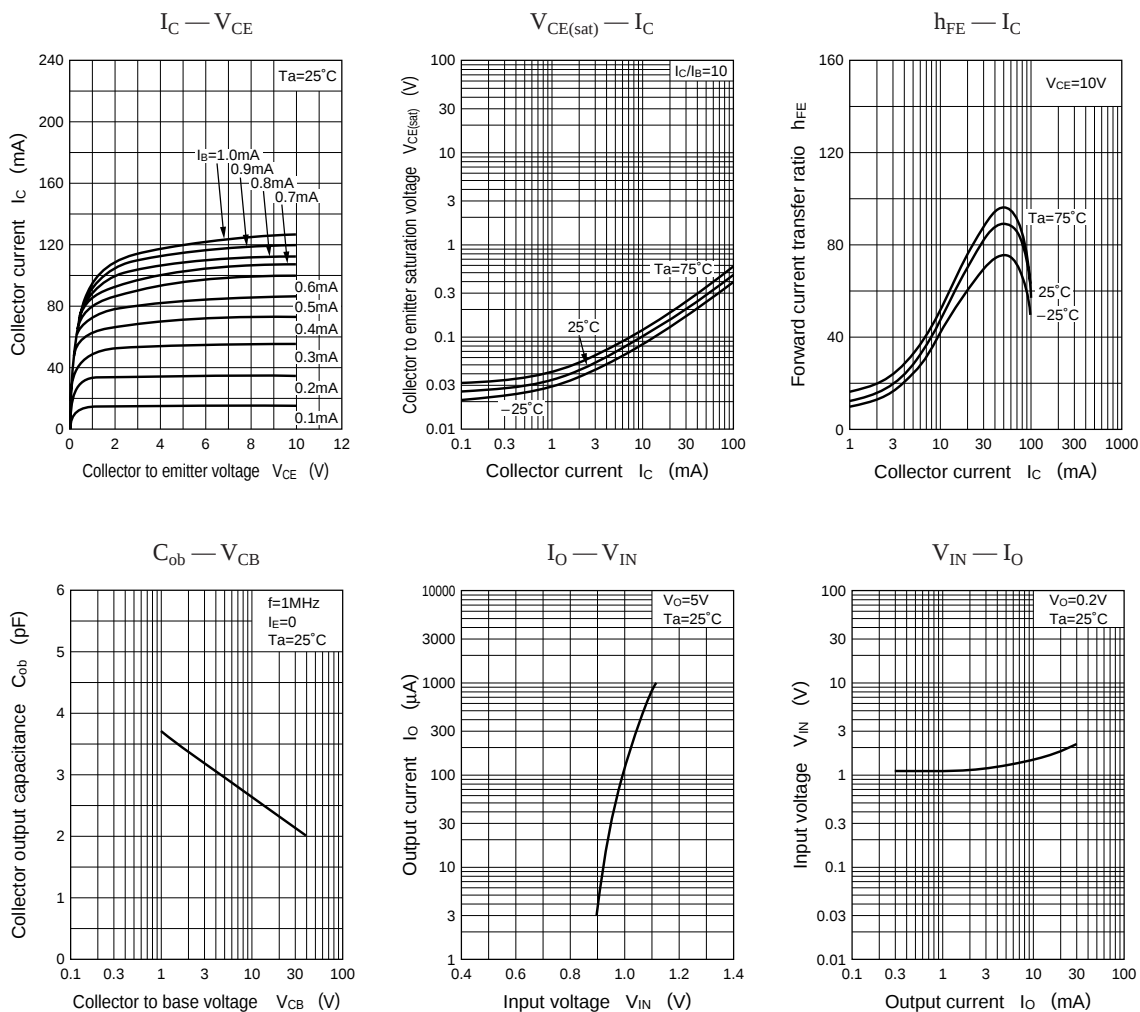




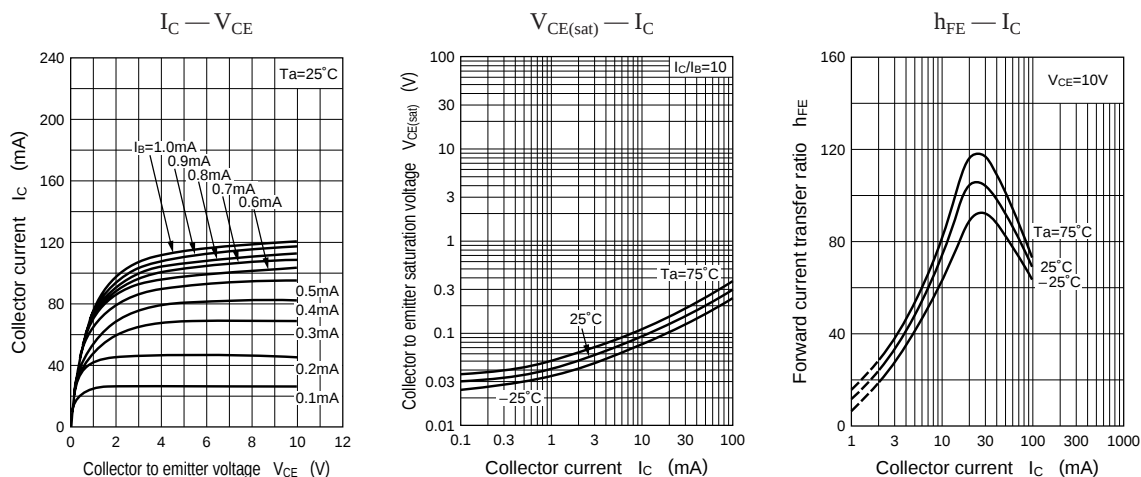
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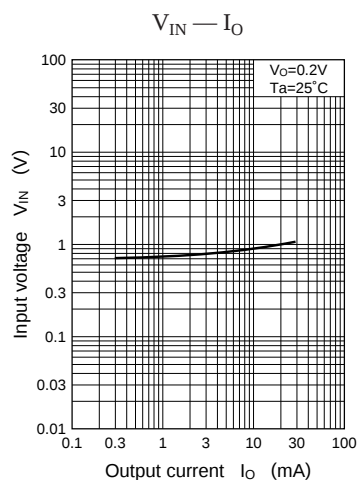
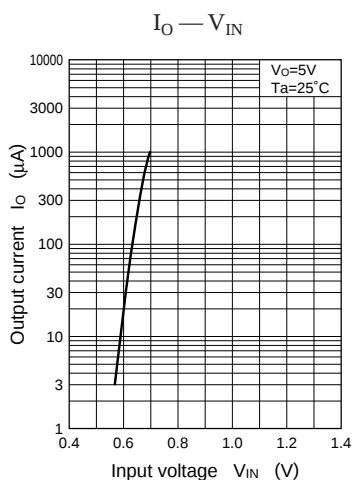
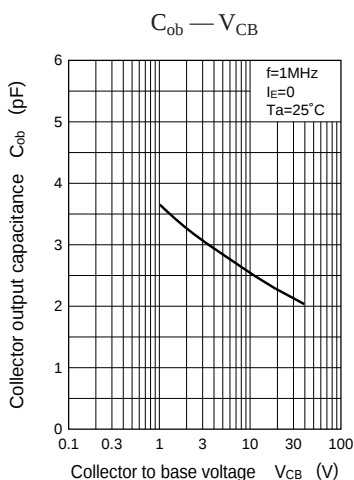


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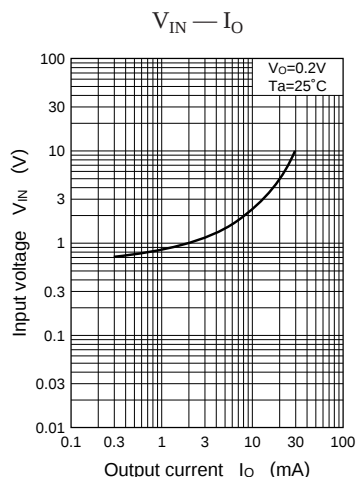
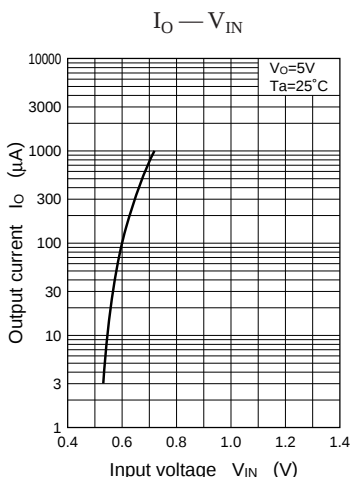
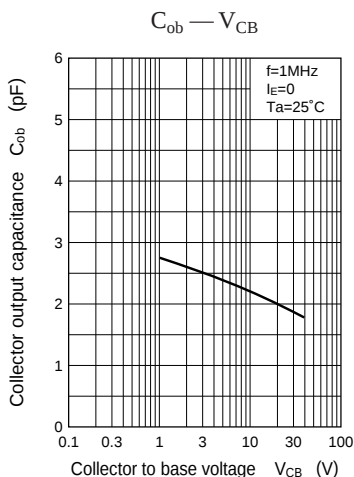
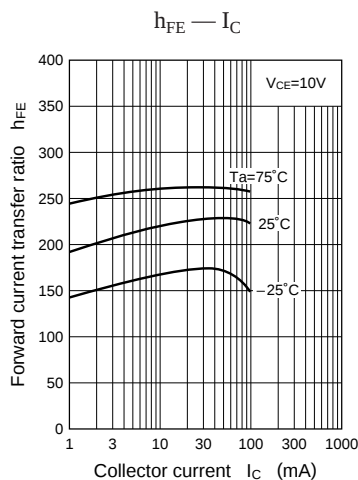
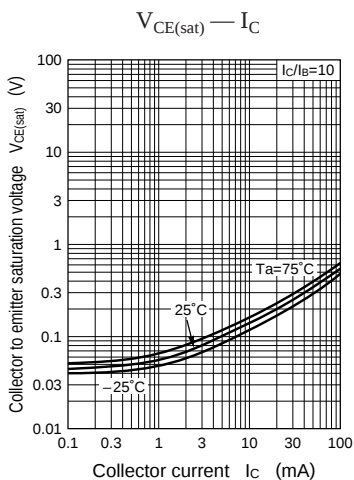
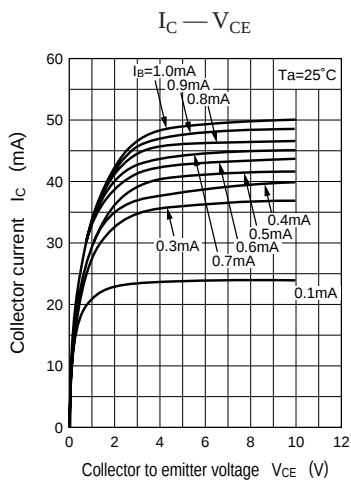


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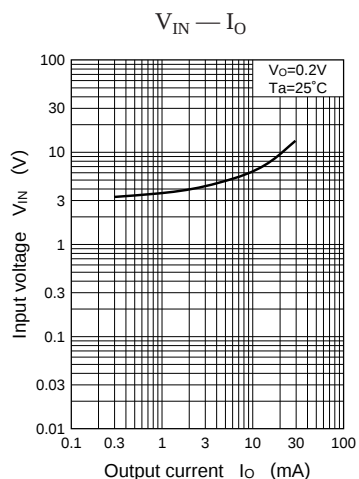
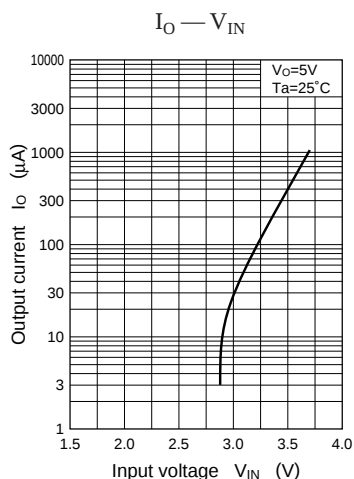
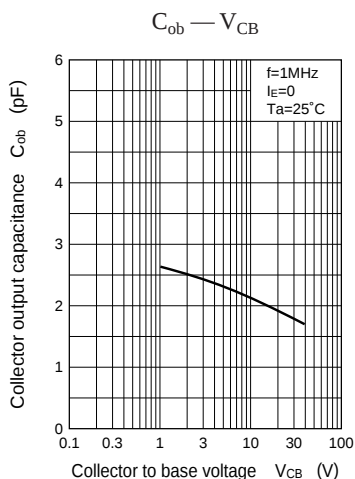
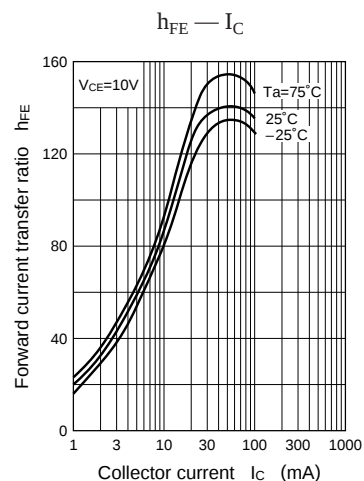
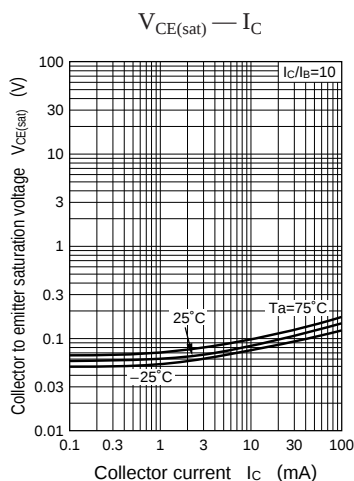
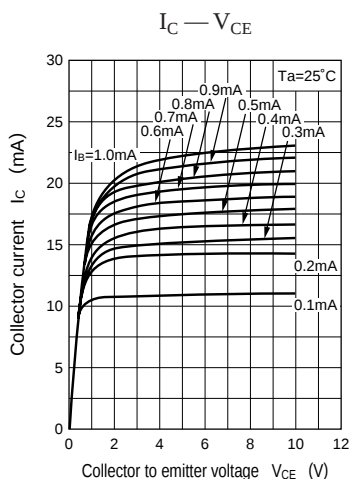




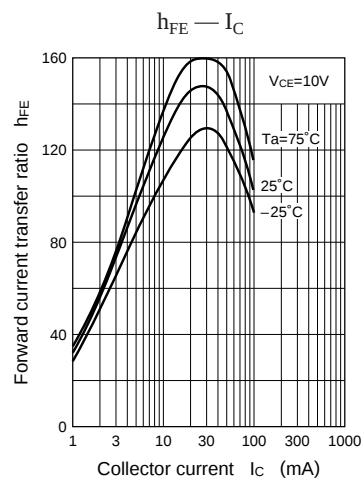
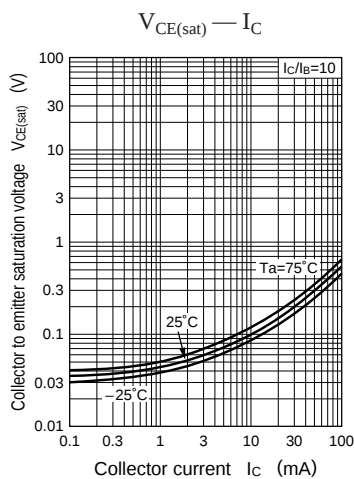
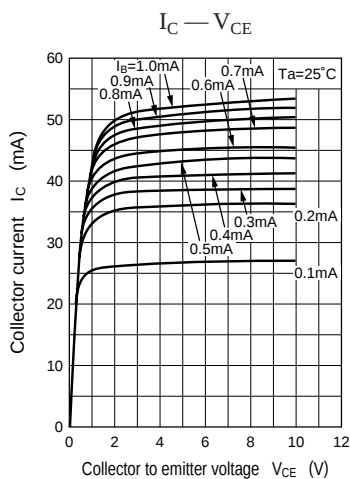
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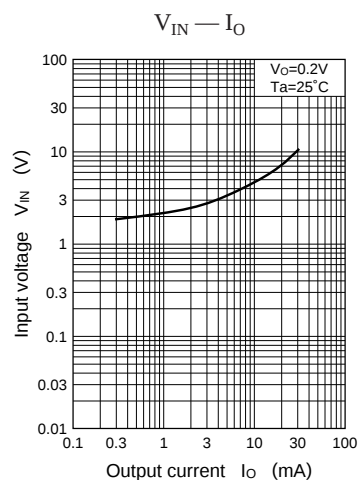
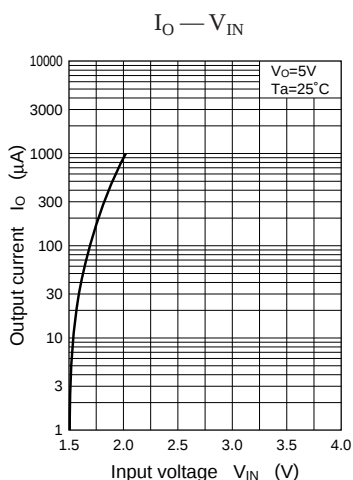
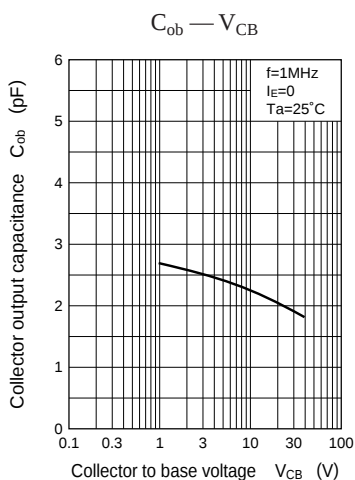


Characteristics charts of UN121D

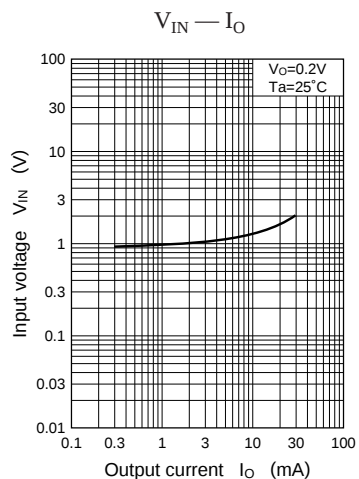
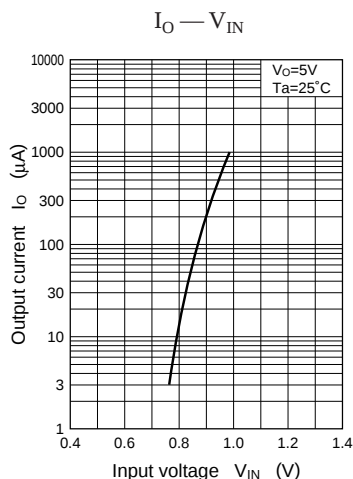
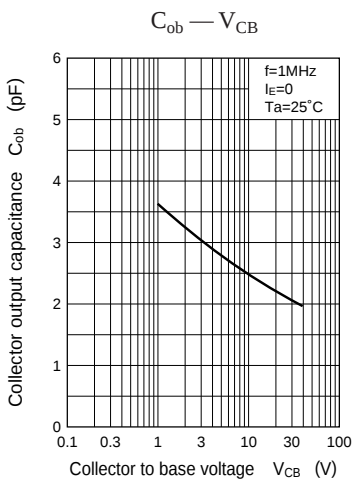
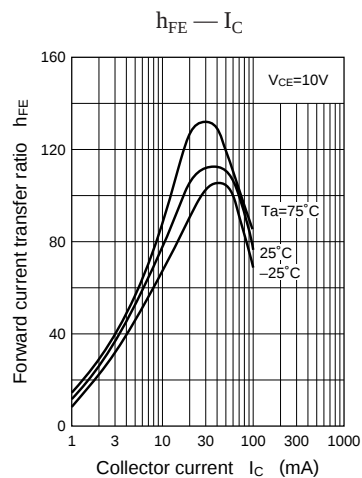
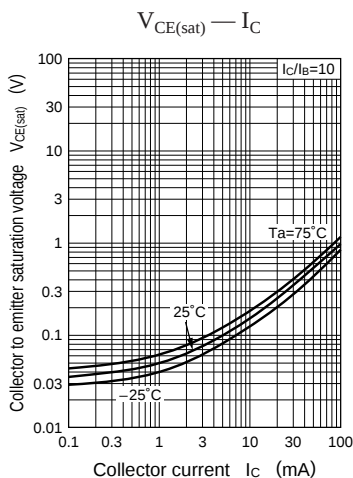
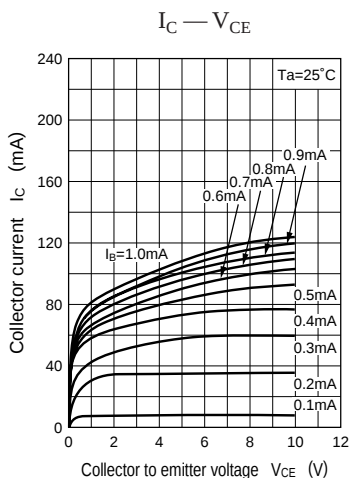


Characteristics charts of UN121E

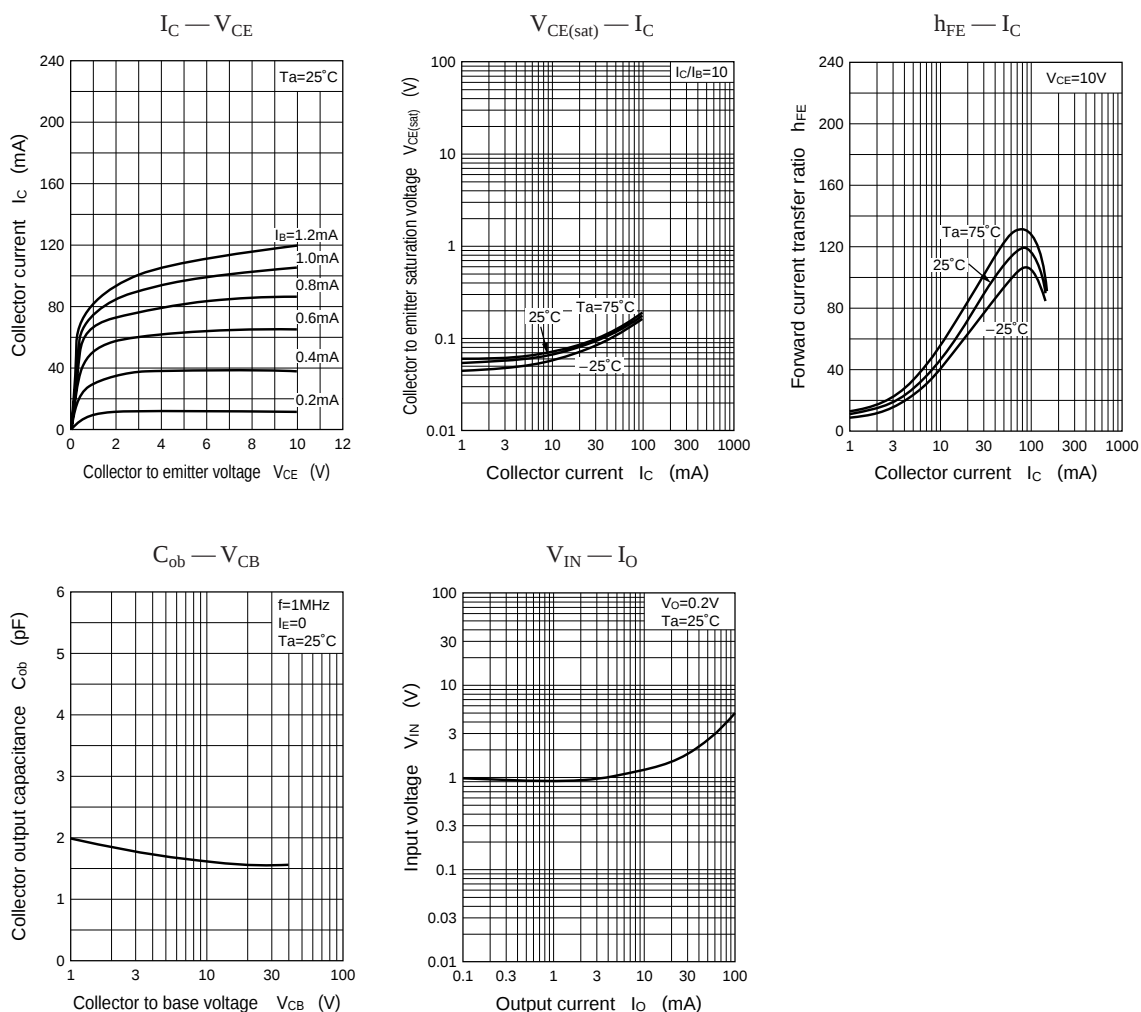




Characteristics charts of UN121F



Characteristics charts of UN121K



Characteristics charts of UN121L

