

# XP0431N

Silicon NPN epitaxial planer transistor (Tr1)  
 Silicon PNP epitaxial planer transistor (Tr2)

For switching/digital circuits

**■ Features**

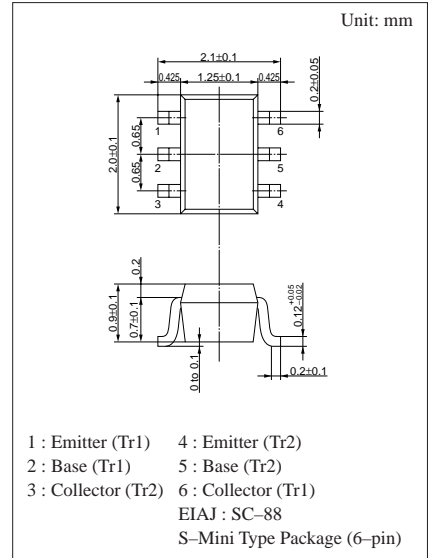
- Two elements incorporated into one package.  
 (Transistors with built-in resistor)
- Reduction of the mounting area and assembly cost by one half.

**■ Basic Part Number of Element**

- UN221N+UN211N

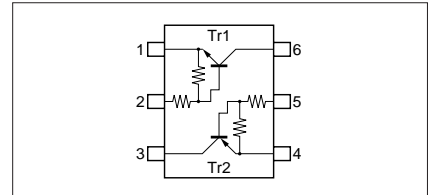
**■ Absolute Maximum Ratings (Ta=25°C)**

|         | Parameter                    | Symbol    | Ratings     | Unit |
|---------|------------------------------|-----------|-------------|------|
| Tr1     | Collector to base voltage    | $V_{CBO}$ | 50          | V    |
|         | Collector to emitter voltage | $V_{CEO}$ | 50          | V    |
|         | Collector current            | $I_C$     | 100         | mA   |
| Tr2     | Collector to base voltage    | $V_{CBO}$ | -50         | V    |
|         | Collector to emitter voltage | $V_{CEO}$ | -50         | V    |
|         | Collector current            | $I_C$     | -100        | mA   |
| Overall | Total power dissipation      | $P_T$     | 150         | mW   |
|         | Junction temperature         | $T_j$     | 150         | °C   |
|         | Storage temperature          | $T_{sig}$ | -55 to +150 | °C   |



Marking Symbol: HC

Internal Connection



### ■ Electrical Characteristics (Ta=25°C)

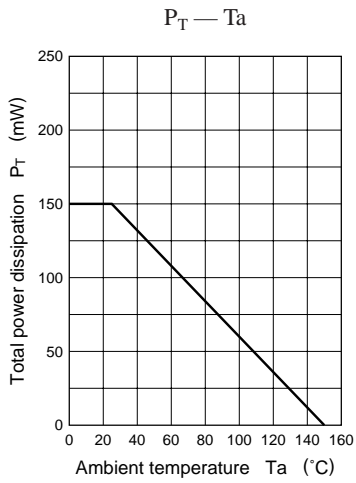
#### ● Tr1

| Parameter                               | Symbol        | Conditions                                | min  | typ | max  | Unit       |
|---|---------------|---|------|-----|------|------------|
| Collector to base voltage               | $V_{CBO}$     | $I_C = 10\mu A, I_E = 0$                  | 50   |     |      | V          |
| Collector to emitter voltage            | $V_{CEO}$     | $I_C = 2mA, I_B = 0$                      | 50   |     |      | V          |
| Collector cutoff current                | $I_{CBO}$     | $V_{CB} = 50V, I_E = 0$                   |      |     | 0.1  | $\mu A$    |
|   | $I_{CEO}$     | $V_{CE} = 50V, I_B = 0$                   |      |     | 0.5  | $\mu A$    |
| Emitter cutoff current                  | $I_{EBO}$     | $V_{EB} = 6V, I_C = 0$                    |      |     | 2    | mA         |
| Forward current transfer ratio          | $h_{FE}$      | $V_{CE} = 10V, I_C = 5mA$                 | 80   |     |      |            |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 10mA, I_B = 0.3mA$                 |      |     | 0.3  | V          |
| Output voltage high level               | $V_{OH}$      | $V_{CC} = 5V, V_B = 0.5V, R_L = 1k\Omega$ | 4.9  |     |      | V          |
| Output voltage low level                | $V_{OL}$      | $V_{CC} = 5V, V_B = 2.5V, R_L = 1k\Omega$ |      |     | 0.2  | V          |
| Input resistance                        | $R_1$         |   | -30% | 4.7 | +30% | k $\Omega$ |
| Resistance ratio                        | $R_1/R_2$     |   | 0.08 | 0.1 | 0.12 |            |
| Transition frequency                    | $f_T$         | $V_{CB} = 10V, I_E = -2mA, f = 200MHz$    |      | 150 |      | MHz        |

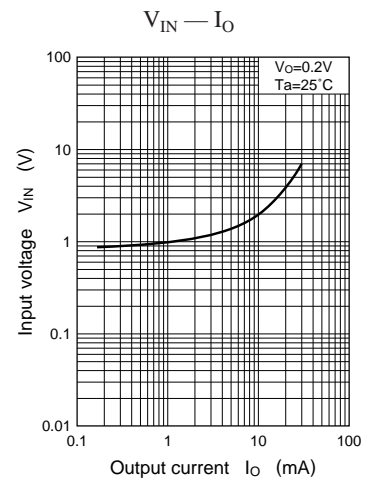
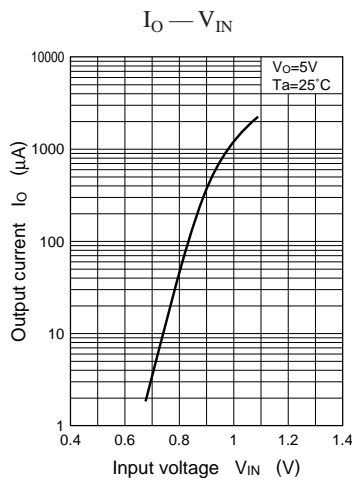
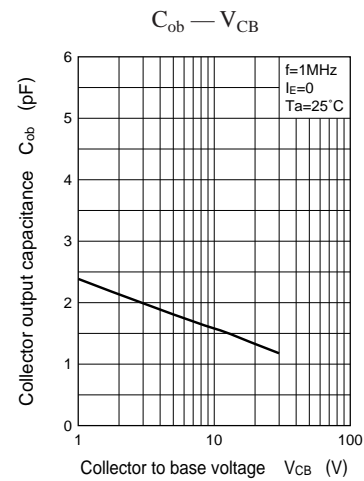
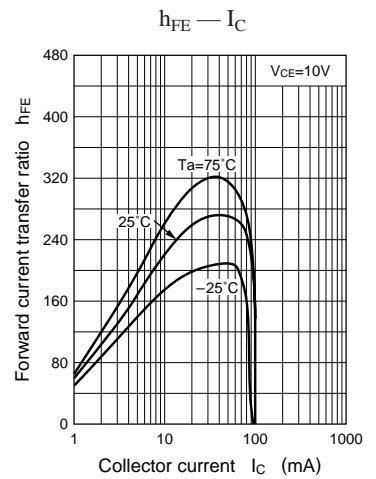
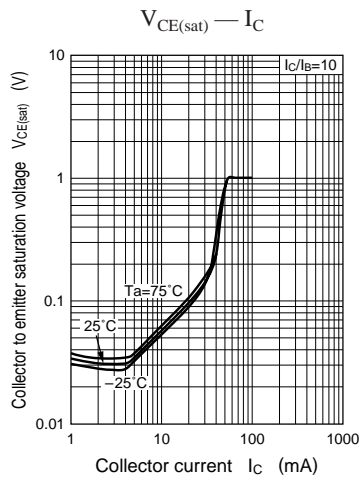
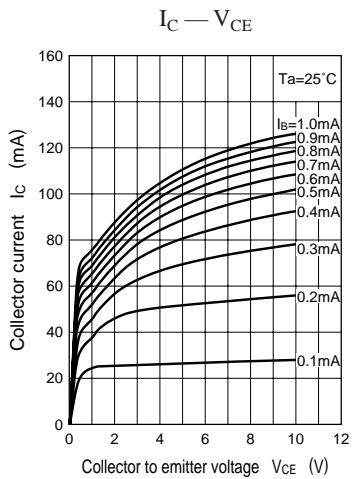
#### ● Tr2

| Parameter                               | Symbol        | Conditions                                  | min  | typ | max  | Unit       |
|---|---------------|---|------|-----|------|------------|
| Collector to base voltage               | $V_{CBO}$     | $I_C = -10\mu A, I_E = 0$                   | -50  |     |      | V          |
| Collector to emitter voltage            | $V_{CEO}$     | $I_C = -2mA, I_B = 0$                       | -50  |     |      | V          |
| Collector cutoff current                | $I_{CBO}$     | $V_{CB} = -50V, I_E = 0$                    |      |     | -0.1 | $\mu A$    |
|   | $I_{CEO}$     | $V_{CE} = -50V, I_B = 0$                    |      |     | -0.5 | $\mu A$    |
| Emitter cutoff current                  | $I_{EBO}$     | $V_{EB} = -6V, I_C = 0$                     |      |     | -2   | mA         |
| Forward current transfer ratio          | $h_{FE}$      | $V_{CE} = -10V, I_C = -5mA$                 | 80   |     |      |            |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | $I_C = -10mA, I_B = -0.3mA$                 |      |     | -0.3 | V          |
| Output voltage high level               | $V_{OH}$      | $V_{CC} = -5V, V_B = -0.5V, R_L = 1k\Omega$ | -4.9 |     |      | V          |
| Output voltage low level                | $V_{OL}$      | $V_{CC} = -5V, V_B = -2.5V, R_L = 1k\Omega$ |      |     | -0.2 | V          |
| Input resistance                        | $R_1$         |   | -30% | 4.7 | +30% | k $\Omega$ |
| Resistance ratio                        | $R_1/R_2$     |   | 0.08 | 0.1 | 0.12 |            |
| Transition frequency                    | $f_T$         | $V_{CB} = -10V, I_E = 2mA, f = 200MHz$      |      | 150 |      | MHz        |

Common characteristics chart



Characteristics charts of Tr1



Characteristics charts of Tr2

