

# XP04316 (XP4316)

Silicon NPN epitaxial planar type (Tr1)  
Silicon PNP epitaxial planar type (Tr2)

For switching/digital circuits

## ■ Features

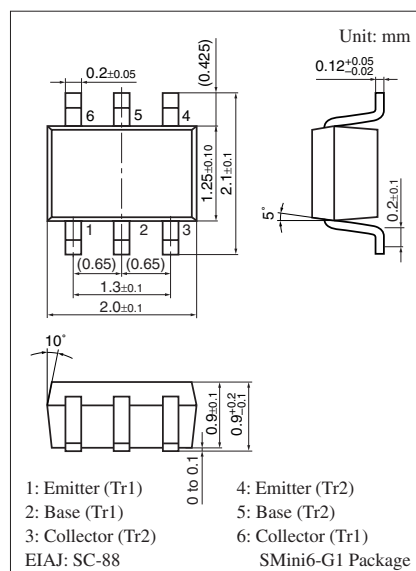
- Two elements incorporated into one package  
(Transistors with built-in resistor)
- Reduction of the mounting area and assembly cost by one half

## ■ Basic Part Number

- UNR2216 (UN2216) + UNR2116 (UN2116)

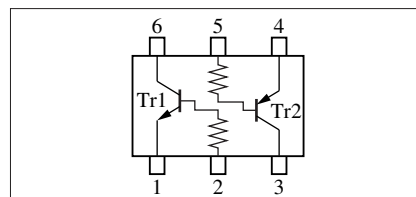
## ■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

|         | Parameter                                | Symbol    | Rating      | Unit             |
|---------|------------------------------------------|-----------|-------------|------------------|
| Tr1     | Collector-base voltage<br>(Emitter open) | $V_{CBO}$ | 50          | V                |
|         | Collector-emitter voltage<br>(Base open) | $V_{CEO}$ | 50          | V                |
|         | Collector current                        | $I_C$     | 100         | mA               |
| Tr2     | Collector-base voltage<br>(Emitter open) | $V_{CBO}$ | -50         | V                |
|         | Collector-emitter voltage<br>(Base open) | $V_{CEO}$ | -50         | V                |
|         | Collector current                        | $I_C$     | -100        | mA               |
| Overall | Total power dissipation                  | $P_T$     | 150         | mW               |
|         | Junction temperature                     | $T_j$     | 150         | $^\circ\text{C}$ |
|         | Storage temperature                      | $T_{stg}$ | -55 to +150 | $^\circ\text{C}$ |



Marking Symbol: 7U

Internal Connection



Note) The part number in the parenthesis shows conventional part number.

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

## • Tr1

| Parameter                                    | Symbol               | Conditions                                                                                          | Min  | Typ | Max  | Unit             |
|----------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------|------|-----|------|------------------|
| Collector-base voltage (Emitter open)        | $V_{\text{CBO}}$     | $I_{\text{C}} = 10\ \mu\text{A}$ , $I_{\text{E}} = 0$                                               | 50   |     |      | V                |
| Collector-emitter voltage (Base open)        | $V_{\text{CEO}}$     | $I_{\text{C}} = 2\ \text{mA}$ , $I_{\text{B}} = 0$                                                  | 50   |     |      | V                |
| Collector-base cutoff current (Emitter open) | $I_{\text{CBO}}$     | $V_{\text{CB}} = 50\ \text{V}$ , $I_{\text{E}} = 0$                                                 |      |     | 0.1  | $\mu\text{A}$    |
| Collector-emitter cutoff current (Base open) | $I_{\text{CEO}}$     | $V_{\text{CE}} = 50\ \text{V}$ , $I_{\text{B}} = 0$                                                 |      |     | 0.5  | $\mu\text{A}$    |
| Emitter-base cutoff current (Collector open) | $I_{\text{EBO}}$     | $V_{\text{EB}} = 6\ \text{V}$ , $I_{\text{C}} = 0$                                                  |      |     | 0.01 | mA               |
| Forward current transfer ratio               | $h_{\text{FE}}$      | $V_{\text{CE}} = 10\ \text{V}$ , $I_{\text{C}} = 5\ \text{mA}$                                      | 160  |     | 460  | —                |
| Collector-emitter saturation voltage         | $V_{\text{CE(sat)}}$ | $I_{\text{C}} = 10\ \text{mA}$ , $I_{\text{B}} = 0.3\ \text{mA}$                                    |      |     | 0.25 | V                |
| Output voltage high-level                    | $V_{\text{OH}}$      | $V_{\text{CC}} = 5\ \text{V}$ , $V_{\text{B}} = 0.5\ \text{V}$ , $R_{\text{L}} = 1\ \text{k}\Omega$ | 4.9  |     |      | V                |
| Output voltage low-level                     | $V_{\text{OL}}$      | $V_{\text{CC}} = 5\ \text{V}$ , $V_{\text{B}} = 2.5\ \text{V}$ , $R_{\text{L}} = 1\ \text{k}\Omega$ |      |     | 0.2  | V                |
| Input resistance                             | $R_{\text{I}}$       |                                                                                                     | -30% | 4.7 | +30% | $\text{k}\Omega$ |
| Transition frequency                         | $f_{\text{T}}$       | $V_{\text{CB}} = 10\ \text{V}$ , $I_{\text{E}} = -2\ \text{mA}$ , $f = 200\ \text{MHz}$             |      | 150 |      | MHz              |

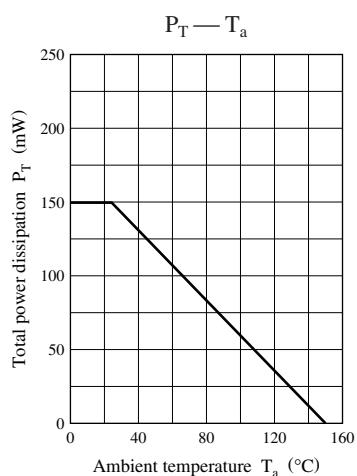
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

## • Tr2

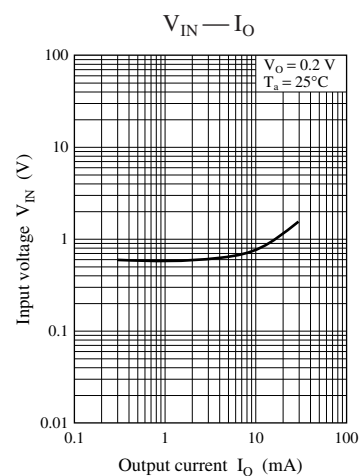
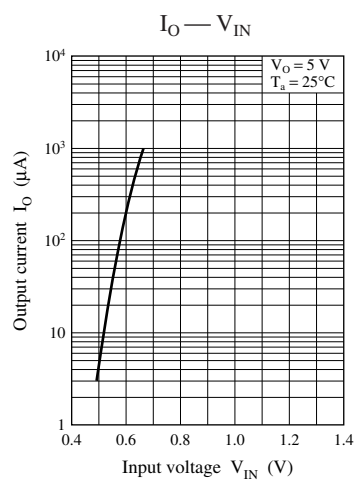
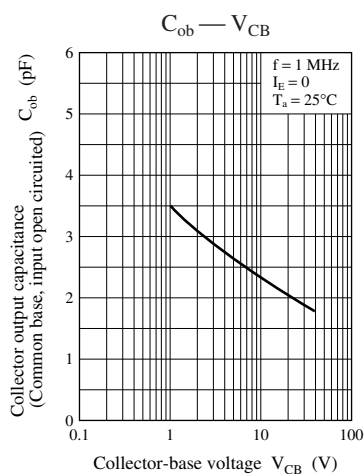
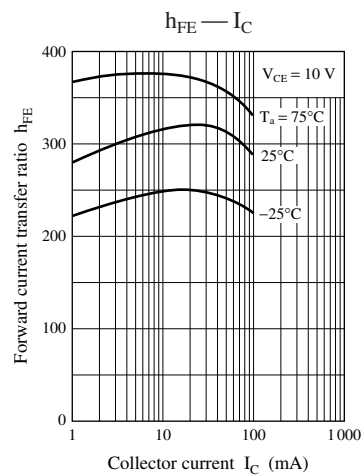
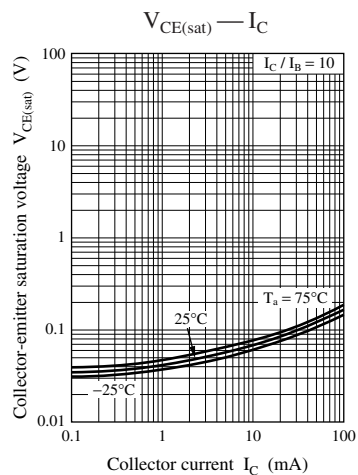
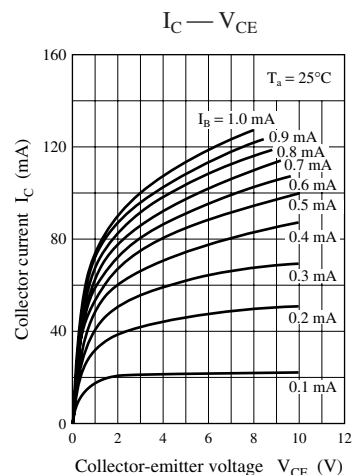
| Parameter                                    | Symbol               | Conditions                                                                                            | Min  | Typ | Max   | Unit             |
|----------------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------|------|-----|-------|------------------|
| Collector-base voltage (Emitter open)        | $V_{\text{CBO}}$     | $I_{\text{C}} = -10\ \mu\text{A}$ , $I_{\text{E}} = 0$                                                | -50  |     |       | V                |
| Collector-emitter voltage (Base open)        | $V_{\text{CEO}}$     | $I_{\text{C}} = -2\ \text{mA}$ , $I_{\text{B}} = 0$                                                   | -50  |     |       | V                |
| Collector-base cutoff current (Emitter open) | $I_{\text{CBO}}$     | $V_{\text{CB}} = -50\ \text{V}$ , $I_{\text{E}} = 0$                                                  |      |     | -0.1  | $\mu\text{A}$    |
| Collector-emitter cutoff current (Base open) | $I_{\text{CEO}}$     | $V_{\text{CE}} = -50\ \text{V}$ , $I_{\text{B}} = 0$                                                  |      |     | -0.5  | $\mu\text{A}$    |
| Emitter-base cutoff current (Collector open) | $I_{\text{EBO}}$     | $V_{\text{EB}} = -6\ \text{V}$ , $I_{\text{C}} = 0$                                                   |      |     | -0.01 | mA               |
| Forward current transfer ratio               | $h_{\text{FE}}$      | $V_{\text{CE}} = -10\ \text{V}$ , $I_{\text{C}} = -5\ \text{mA}$                                      | 160  |     | 460   | —                |
| Collector-emitter saturation voltage         | $V_{\text{CE(sat)}}$ | $I_{\text{C}} = -10\ \text{mA}$ , $I_{\text{B}} = -0.3\ \text{mA}$                                    |      |     | -0.25 | V                |
| Output voltage high-level                    | $V_{\text{OH}}$      | $V_{\text{CC}} = -5\ \text{V}$ , $V_{\text{B}} = -0.5\ \text{V}$ , $R_{\text{L}} = 1\ \text{k}\Omega$ | -4.9 |     |       | V                |
| Output voltage low-level                     | $V_{\text{OL}}$      | $V_{\text{CC}} = -5\ \text{V}$ , $V_{\text{B}} = -2.5\ \text{V}$ , $R_{\text{L}} = 1\ \text{k}\Omega$ |      |     | -0.2  | V                |
| Input resistance                             | $R_{\text{I}}$       |                                                                                                       | -30% | 4.7 | +30%  | $\text{k}\Omega$ |
| Transition frequency                         | $f_{\text{T}}$       | $V_{\text{CB}} = -10\ \text{V}$ , $I_{\text{E}} = 1\ \text{mA}$ , $f = 200\ \text{MHz}$               |      | 80  |       | MHz              |

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

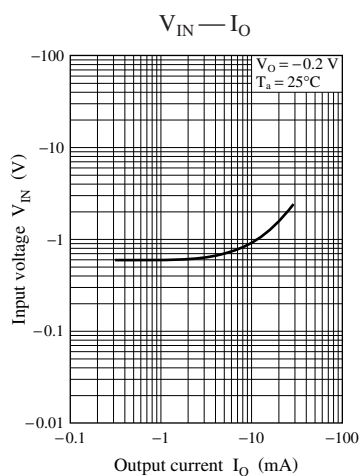
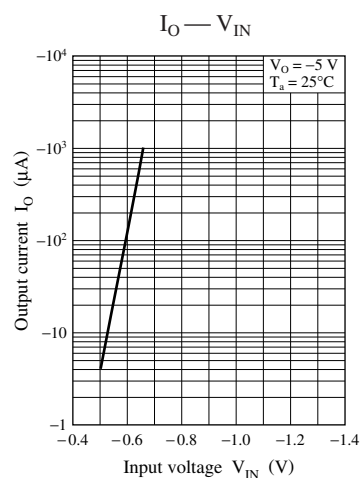
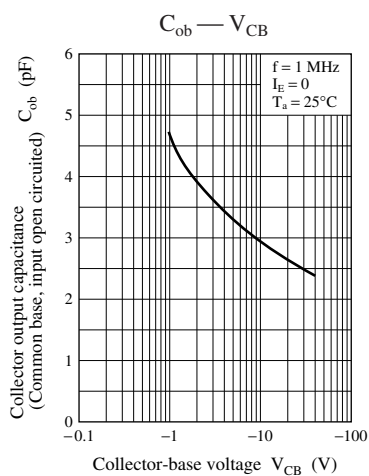
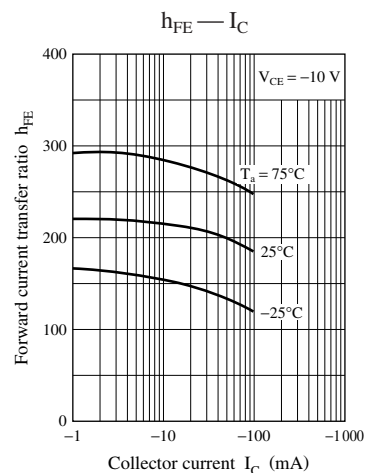
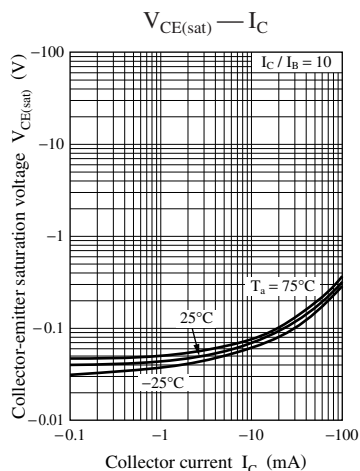
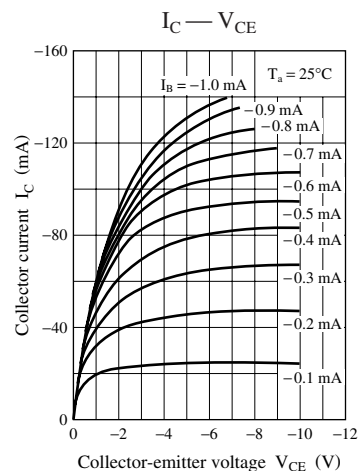
## Common characteristics chart



## Characteristics charts of Tr1



## Characteristics charts of Tr2



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