

# UP0121M

## Silicon NPN epitaxial planar type

For switching circuits

For digital circuits

### ■ Features

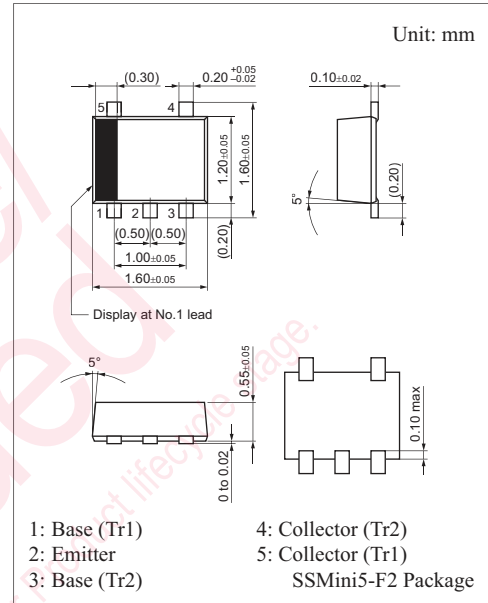
- Two elements incorporated into one package  
(Emitter-coupled transistors with built-in resistor)
- SSMini type package, reduction of the mounting area and assembly cost

### ■ Basic Part Number

- UNR221M × 2

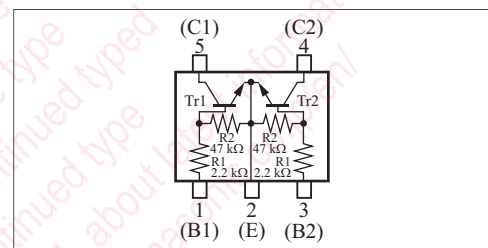
### ■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

| Parameter                             | Symbol           | Rating      | Unit             |
|---------------------------------------|------------------|-------------|------------------|
| Collector-base voltage (Emitter open) | $V_{\text{CBO}}$ | 50          | V                |
| Collector-emitter voltage (Base open) | $V_{\text{CEO}}$ | 50          | V                |
| Collector current                     | $I_{\text{C}}$   | 100         | mA               |
| Total power dissipation               | $P_{\text{T}}$   | 125         | mW               |
| Junction temperature                  | $T_{\text{j}}$   | 125         | $^\circ\text{C}$ |
| Storage temperature                   | $T_{\text{stg}}$ | -55 to +125 | $^\circ\text{C}$ |



Marking Symbol: EM

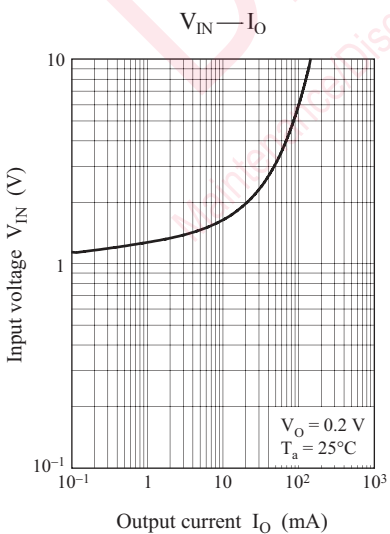
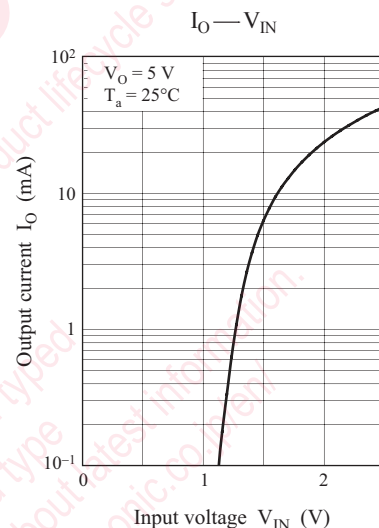
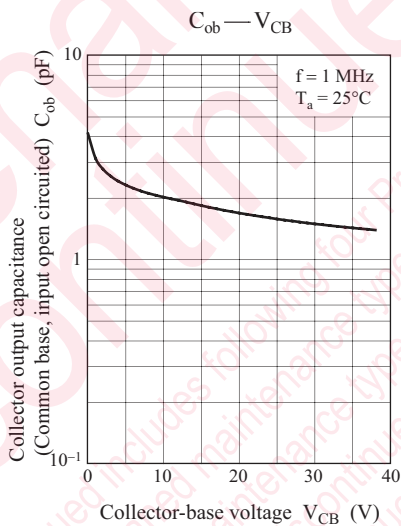
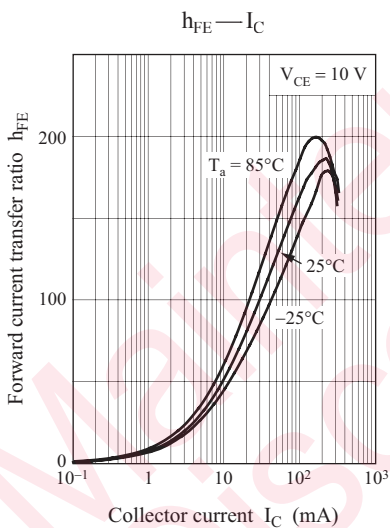
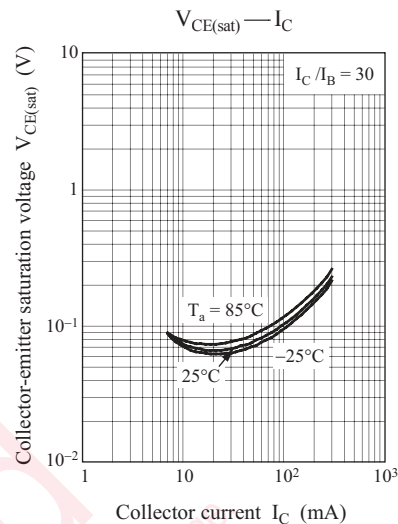
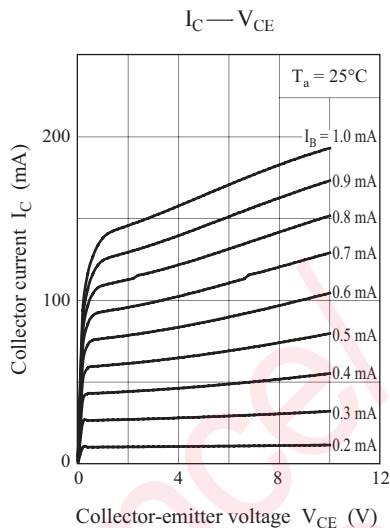
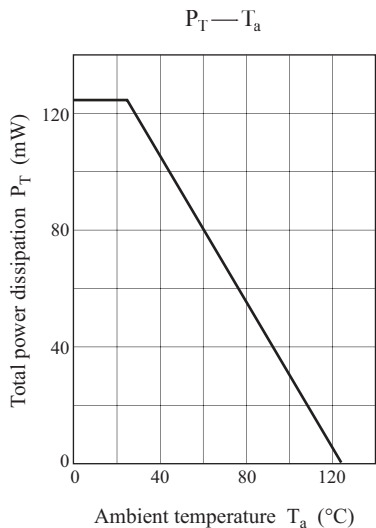
Internal Connection



### ■ 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)        | $V_{\text{CBO}}$              | $I_{\text{C}} = 10 \mu\text{A}$ , $I_{\text{E}} = 0$  | 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) | $I_{\text{EBO}}$              | $V_{\text{EB}} = 6 \text{ V}$ , $I_{\text{C}} = 0$  |      |       | 0.2  | mA               |
| Forward current transfer ratio               | $h_{\text{FE}}$               | $V_{\text{CE}} = 10 \text{ V}$ , $I_{\text{C}} = 5 \text{ mA}$                                      | 80   |       |      | —                |
| 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% | 2.2   | +30% | $\text{k}\Omega$ |
| Resistance ratio                             | $R_{\text{I}} / R_{\text{2}}$ |   |      | 0.047 |      | —                |
| 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.



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