

UP03397G

Silicon NPN epitaxial planar type (Tr1)

Silicon PNP epitaxial planar type (Tr2)

For 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

- UNR2154 + UNR2211

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

| | Parameter | Symbol | Rating | Unit |
|---------|---------------------------------------|------------------|-------------|------------------|
| Tr1 | Collector-base voltage (Emitter open) | V_{CBO} | 50 | V |
| | Collector-emitter voltage (Base open) | V_{CEO} | 50 | V |
| | Collector current | I_{C} | 100 | mA |
| Tr2 | Collector-base voltage (Emitter open) | V_{CBO} | -30 | V |
| | Collector-emitter voltage (Base open) | V_{CEO} | -30 | V |
| | Collector current | I_{C} | -100 | mA |
| Overall | Total power dissipation | P_{T} | 125 | mW |
| | Junction temperature | T_{j} | 125 | $^\circ\text{C}$ |
| | Storage temperature | T_{stg} | -55 to +125 | $^\circ\text{C}$ |

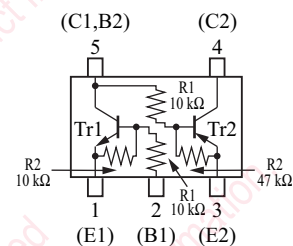
■ Package

- Code
SSMini5-F3
- Pin Name

| | |
|------------------|--------------------|
| 1: Emitter (Tr1) | 4: Collector (Tr2) |
| 2: Base (Tr1) | 5: Collector (Tr1) |
| 3: Emitter (Tr2) | Base (Tr2) |

■ Marking Symbol: 3M

■ Internal Connection



■ 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_{CBO} | $I_{\text{C}} = 10 \mu\text{A}, I_{\text{E}} = 0$ | 50 | | | V |
| Collector-emitter voltage (Base open) | V_{CEO} | $I_{\text{C}} = 2 \text{ mA}, I_{\text{B}} = 0$ | 50 | | | V |
| Collector-base cutoff current (Emitter open) | I_{CBO} | $V_{\text{CB}} = 50 \text{ V}, I_{\text{E}} = 0$ | | | 0.1 | μA |
| Collector-emitter cutoff current (Base open) | I_{CEO} | $V_{\text{CE}} = 50 \text{ V}, I_{\text{B}} = 0$ | | | 0.5 | μA |
| Emitter-base cutoff current (Collector open) | I_{EBO} | $V_{\text{EB}} = 6 \text{ V}, I_{\text{C}} = 0$ | | | 0.5 | mA |
| Forward current transfer ratio | h_{FE} | $V_{\text{CE}} = 10 \text{ V}, I_{\text{C}} = 5 \text{ mA}$ | 35 | | | — |
| 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_{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_{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_{I} | | -30% | 10 | +30% | $\text{k}\Omega$ |
| Resistance ratio | $R_{\text{I}} / R_{\text{2}}$ | | 0.8 | 1.0 | 1.2 | — |
| Transition frequency | f_{T} | $V_{\text{CB}} = 10 \text{ V}, I_{\text{E}} = -2 \text{ mA}, f = 200 \text{ MHz}$ | | 150 | | MHz |

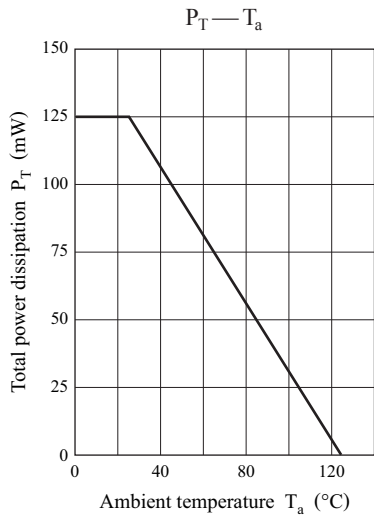
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

• Tr2

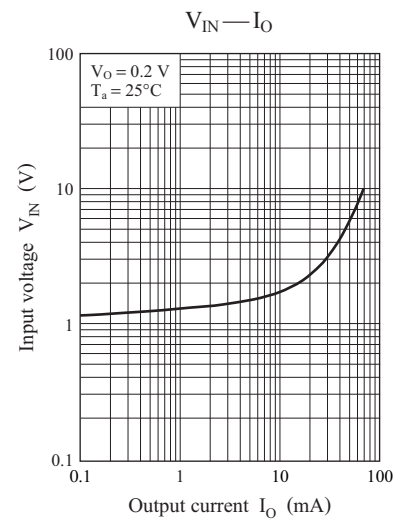
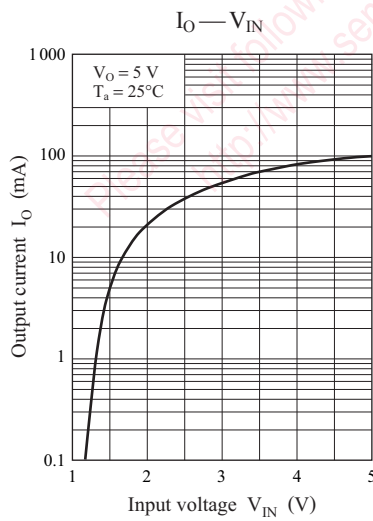
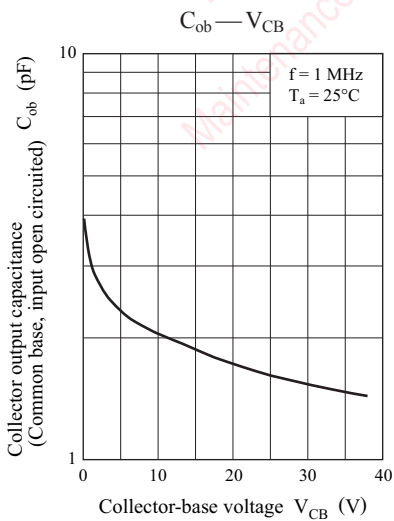
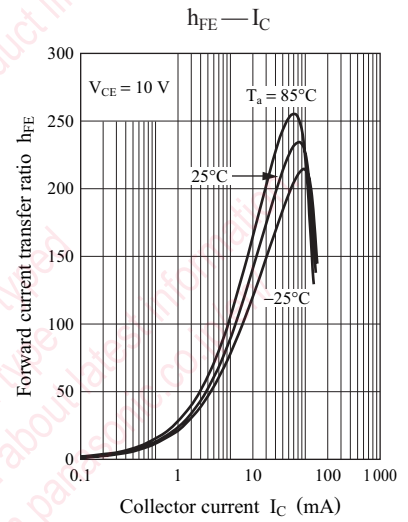
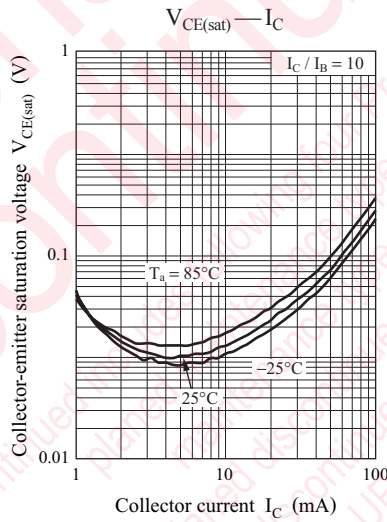
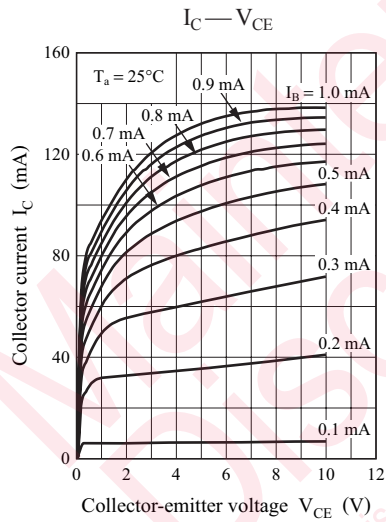
| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|--|---------------|--|------|-------|------|------------------|
| Collector-base voltage (Emitter open) | V_{CBO} | $I_C = -10 \mu A, I_E = 0$ | -30 | | | V |
| Collector-emitter voltage (Base open) | V_{CEO} | $I_C = -2 \text{ mA}, I_B = 0$ | -30 | | | V |
| Collector-base cutoff current (Emitter open) | I_{CBO} | $V_{CB} = -30 \text{ V}, I_E = 0$ | | | -0.1 | μA |
| Collector-emitter cutoff current (Base open) | I_{CEO} | $V_{CE} = -30 \text{ V}, I_B = 0$ | | | -0.5 | μA |
| Emitter-base cutoff current (Collector open) | I_{EBO} | $V_{EB} = -3 \text{ V}, I_C = 0$ | | | -0.1 | mA |
| Forward current transfer ratio | h_{FE} | $V_{CE} = -10 \text{ V}, I_C = -5 \text{ mA}$ | 80 | | | — |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C = -50 \text{ mA}, I_B = -0.33 \text{ mA}$ | | | -1.2 | V |
| Output voltage high-level | V_{OH} | $V_{CC} = -5 \text{ V}, V_B = -0.5 \text{ V}, R_L = 1 \text{ k}\Omega$ | -4.9 | | | V |
| Output voltage low-level | V_{OL} | $V_{CC} = -5 \text{ V}, V_B = -2.5 \text{ V}, R_L = 1 \text{ k}\Omega$ | | | -0.2 | V |
| Input resistance | R_1 | | -30% | 10 | +30% | $\text{k}\Omega$ |
| Resistance ratio | R_1 / R_2 | | | 0.213 | | — |
| Transition frequency | f_T | $V_{CB} = -10 \text{ V}, I_E = 1 \text{ mA}, f = 200 \text{ MHz}$ | | 80 | | MHz |

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

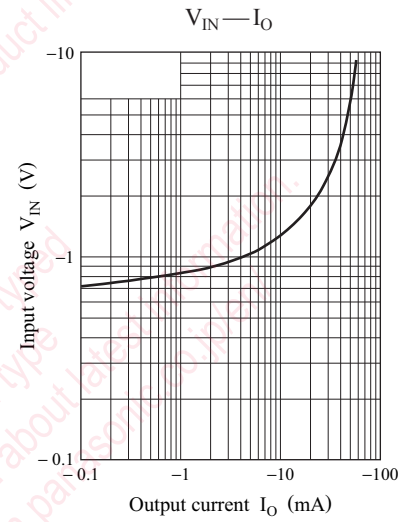
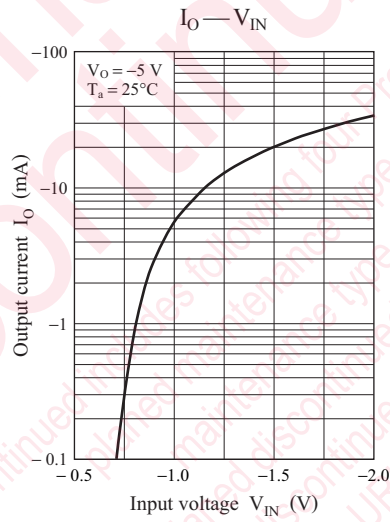
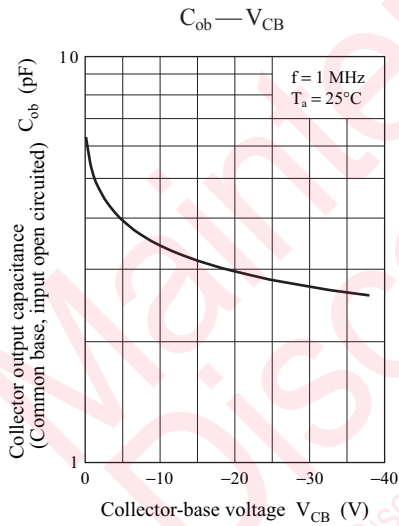
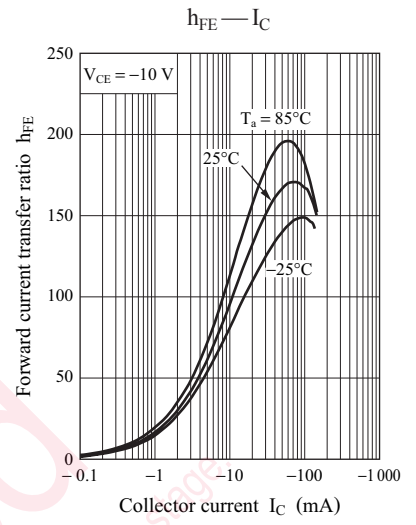
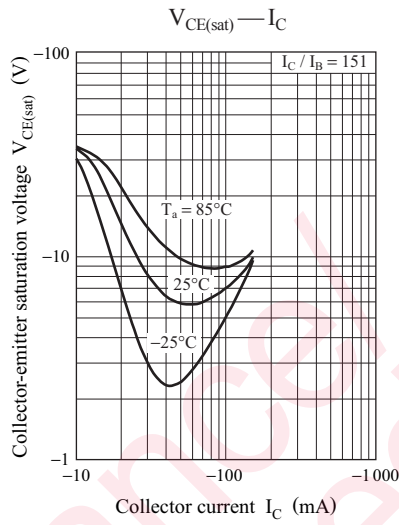
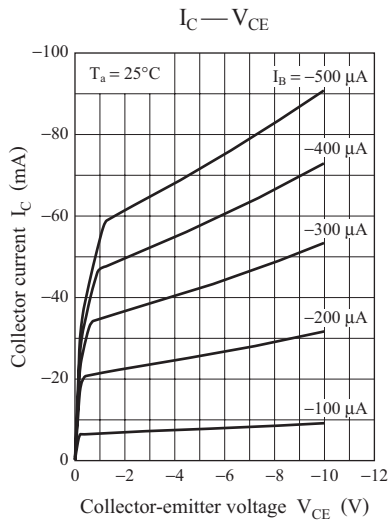
Common characteristics chart



Characteristics charts of Tr1

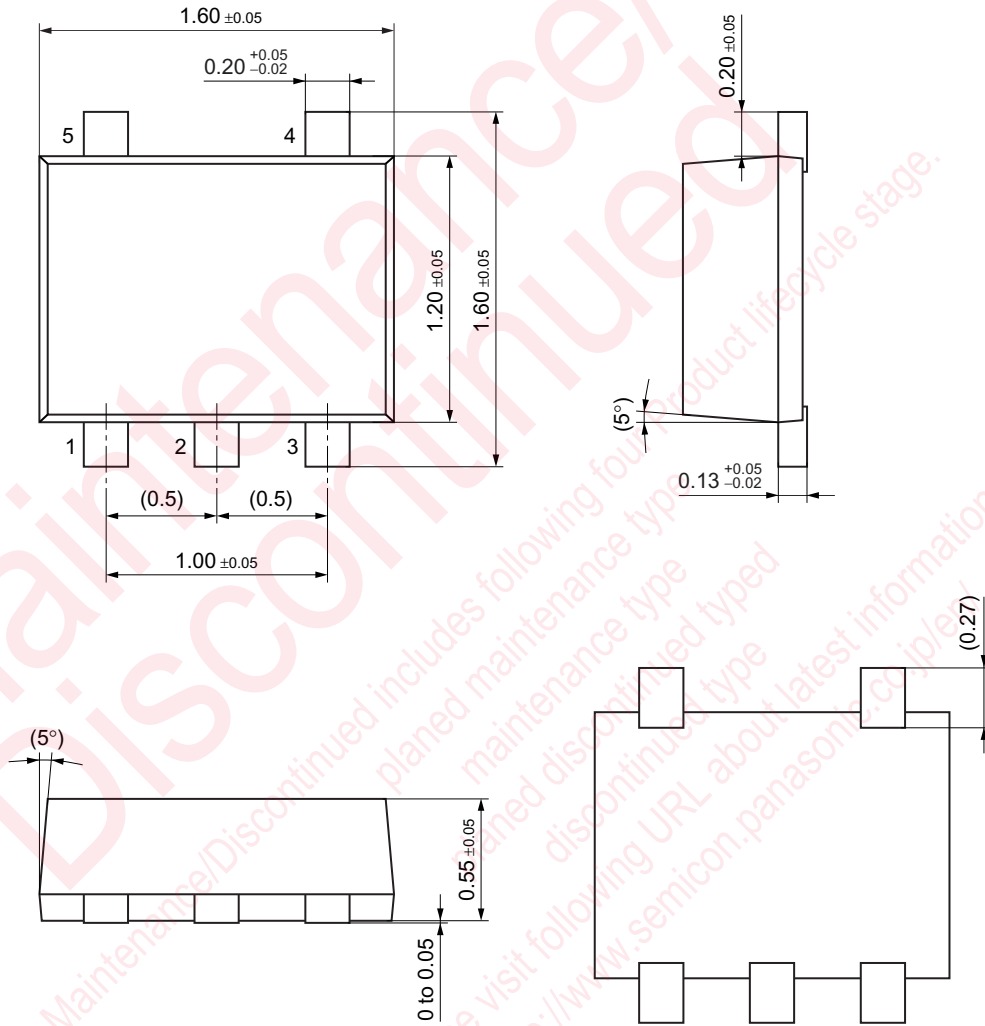


Characteristics charts of Tr2



SSMini5-F3

Unit: mm



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standard applications or general electronic equipment (such as office
and household appliances).

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reliability are required, or if the failure or malfunction of the prod-

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