

UNA0228 (UN228)

Silicon PNP epitaxial planar type (2 elements)
 Silicon NPN epitaxial planar type (2 elements)

For motor drives

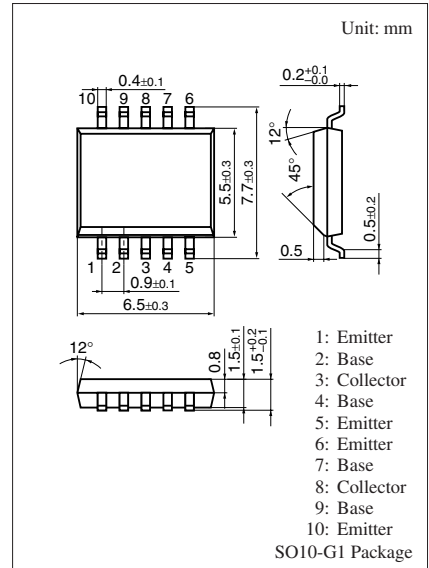
■ Features

- Small and lightweight
- Low power consumption
- Low voltage drive
- With 4 elements incorporated

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

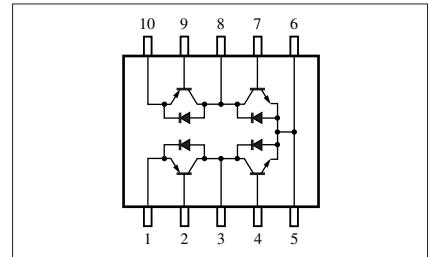
| | Parameter | Symbol | Rating | Unit |
|---------|---------------------------------------|-----------|-------------|------------------|
| PNP | Collector-base voltage (Emitter open) | V_{CBO} | -12 | V |
| | Collector-emitter voltage (Base open) | V_{CEO} | -10 | V |
| | Emitter-base voltage (Collector open) | V_{EBO} | -7 | V |
| | Collector current | I_C | -1 | A |
| | Peak collector current | I_{CP} | -2.5 | A |
| NPN | Collector-base voltage (Emitter open) | V_{CBO} | 12 | V |
| | Collector-emitter voltage (Base open) | V_{CEO} | 10 | V |
| | Emitter-base voltage (Collector open) | V_{EBO} | 7 | V |
| | Collector current | I_C | 1 | A |
| | Peak collector current | I_{CP} | 2.5 | A |
| Overall | Total power dissipation * | P_T | 0.5 | W |
| | Junction temperature | T_j | 150 | $^\circ\text{C}$ |
| | Storage temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

Note) *: When the dissipation on one device is $T_C = 25^\circ\text{C}$



Marking Symbol: UN228

Internal Connection



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

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

• PNP

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---------------|---|-----|------|------|---------------|
| Collector-base voltage (Emitter open) | V_{CBO} | $I_C = -10 \mu\text{A}, I_E = 0$ | -12 | | | V |
| Collector-emitter voltage (Base open) | V_{CEO} | $I_C = -1 \text{ mA}, I_B = 0$ | -10 | | | V |
| Emitter-base voltage (Collector open) | V_{EBO} | $I_E = -10 \mu\text{A}, I_C = 0$ | -7 | | | V |
| Collector-base cutoff current (Emitter open) | I_{CBO} | $V_{CB} = -10 \text{ V}, I_E = 0$ | | | -1 | μA |
| Forward current transfer ratio *1 | h_{FE} | $V_{CE} = -1 \text{ V}, I_C = -0.5 \text{ A}$ | 200 | | 800 | — |
| Collector-emitter saturation voltage *1 | $V_{CE(sat)}$ | $I_C = -1 \text{ A}, I_B = -30 \text{ mA}$ | | -0.2 | -0.3 | V |
| Transition frequency | f_T | $V_{CB} = -6 \text{ V}, I_E = 50 \text{ mA}, f = 200 \text{ MHz}$ | | 150 | | MHz |
| Collector output capacitance (Common base, input open circuited) | C_{ob} | $V_{CB} = -10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$ | | 65 | | pF |
| Forward voltage *2 | V_F | $I_F = -1 \text{ A}$ | | | -1.5 | V |

• NPN

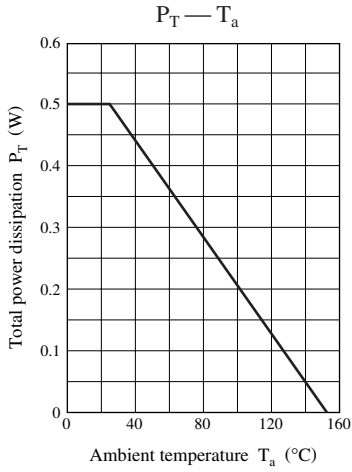
| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---------------|---|-----|-----|-----|---------------|
| Collector-base voltage (Emitter open) | V_{CBO} | $I_C = 10 \mu\text{A}, I_E = 0$ | 12 | | | V |
| Collector-emitter voltage (Base open) | V_{CEO} | $I_C = 1 \text{ mA}, I_B = 0$ | 10 | | | V |
| Emitter-base voltage (Collector open) | V_{EBO} | $I_E = 10 \mu\text{A}, I_C = 0$ | 7 | | | V |
| Collector-base cutoff current (Emitter open) | I_{CBO} | $V_{CB} = 10 \text{ V}, I_E = 0$ | | | 1 | μA |
| Forward current transfer ratio *1 | h_{FE} | $V_{CE} = 1 \text{ V}, I_C = 0.5 \text{ A}$ | 200 | | 800 | — |
| Collector-emitter saturation voltage *1 | $V_{CE(sat)}$ | $I_C = 1 \text{ A}, I_B = 30 \text{ mA}$ | | 0.2 | 0.3 | V |
| Transition frequency | f_T | $V_{CB} = 6 \text{ V}, I_E = -50 \text{ mA}, f = 200 \text{ MHz}$ | | 150 | | MHz |
| Collector output capacitance (Common base, input open circuited) | C_{ob} | $V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$ | | 50 | | pF |
| Forward voltage *2 | V_F | $I_F = 1 \text{ A}$ | | | 1.5 | V |

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

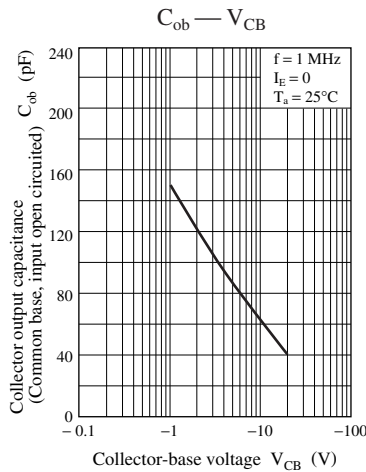
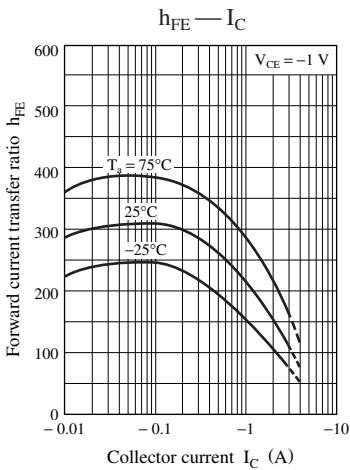
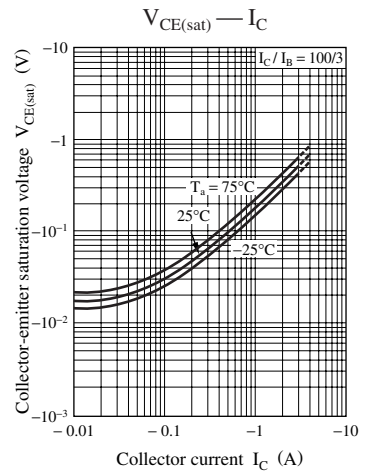
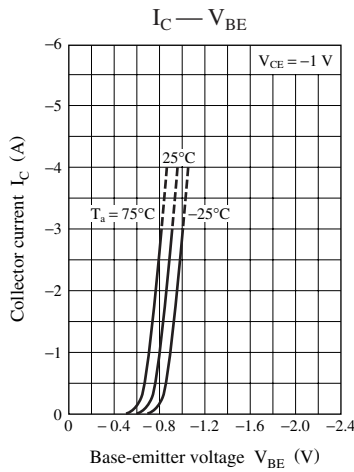
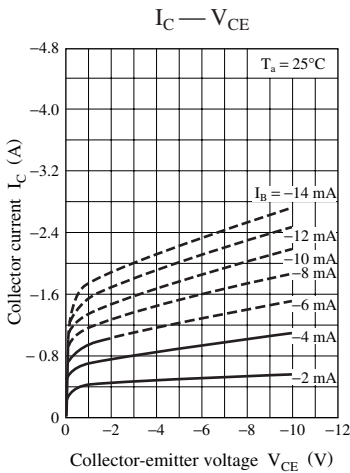
2. *1: Pulse measurement

*2: Application to the built-in diode

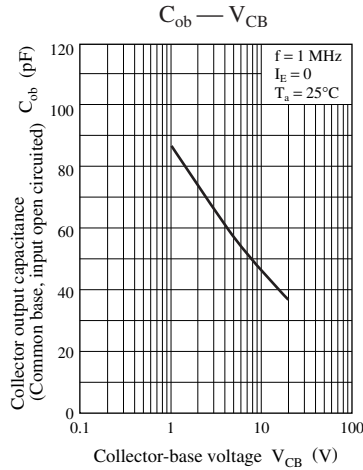
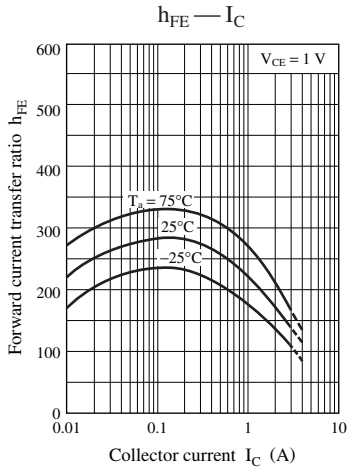
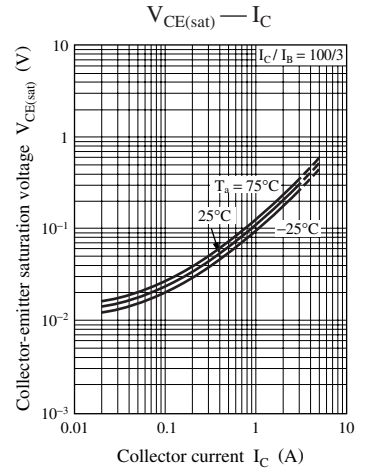
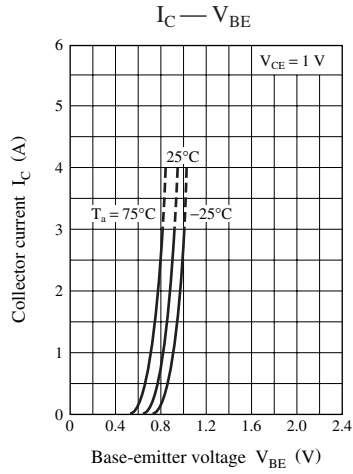
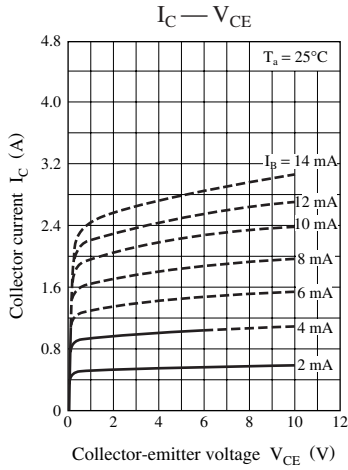
Common characteristics chart



Characteristics charts of PNP transistor block



Characteristics charts of NPN transistor block



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