

XN09D58

Silicon PNP epitaxial planar type (Tr)
Silicon epitaxial planar type (SBD)

For DC-DC converter

■ Features

- Two elements incorporated into one package (Tr + SBD)
- Reduction of the mounting area and assembly cost by one half
- Low collector-emitter saturation voltage $V_{CE(sat)}$

■ Basic Part Number

- XN9D57 + MA3ZD12

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

| | Parameter | Symbol | Rating | Unit |
|---------|---|-------------|-------------|------------------|
| Tr | Collector-base voltage (Emitter open) | V_{CBO} | -15 | V |
| | Collector-emitter voltage (Base open) | V_{CEO} | -15 | V |
| | Emitter-base voltage (Collector open) | V_{EBO} | -5 | V |
| | Collector current | I_C | -2.5 | A |
| | Peak collector current | I_{CP} | -10 | A |
| SBD | Reverse voltage | V_R | 20 | V |
| | Repetitive peak reverse voltage | V_{RRM} | 25 | V |
| | Forward current (Average) | $I_{F(AV)}$ | 700 | mA |
| | Non-repetitive peak forward surge current | I_{FSM} | 2 | A |
| Overall | Total power dissipation * | P_T | 600 | mW |
| | Junction temperature | T_j | 125 | $^\circ\text{C}$ |
| | Storage temperature | T_{stg} | -55 to +125 | $^\circ\text{C}$ |

Note) *: Measuring on ceramic substrate at 15 mm × 15 mm × 0.6 mm

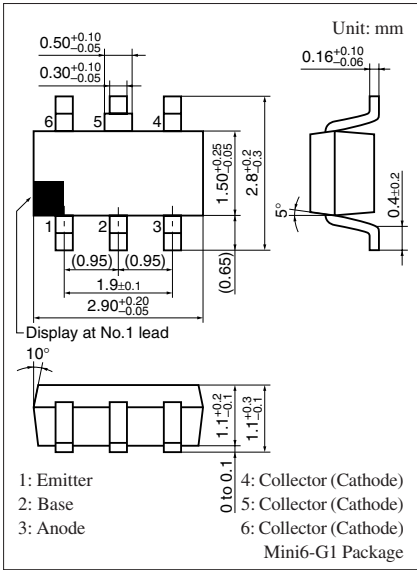
■ Electrical Characteristics $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

- Tr

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|--|---------------|---|-----|------|------|---------------|
| Collector-base voltage (Emitter open) | V_{CBO} | $I_C = -10 \mu\text{A}$, $I_E = 0$ | -15 | | | V |
| Collector-emitter voltage (Base open) | V_{CEO} | $I_C = -1 \text{ mA}$, $I_B = 0$ | -15 | | | V |
| Emitter-base voltage (Collector open) | V_{EBO} | $I_E = -10 \mu\text{A}$, $I_C = 0$ | -5 | | | V |
| Collector-base cutoff current (Emitter open) | I_{CBO} | $V_{CB} = -10 \text{ V}$, $I_E = 0$ | | | -0.1 | μA |
| Forward current transfer ratio * | h_{FE1} | $V_{CE} = -2 \text{ V}$, $I_C = -100 \text{ mA}$ | 200 | | 560 | — |
| | h_{FE2} | $V_{CE} = -2 \text{ V}$, $I_C = -2.5 \text{ A}$ | 100 | | | — |
| Collector-emitter saturation voltage * | $V_{CE(sat)}$ | $I_C = -1 \text{ A}$, $I_B = -10 \text{ mA}$ | | -140 | | mV |
| | | $I_C = -2.5 \text{ A}$, $I_B = -50 \text{ mA}$ | | -270 | -320 | |

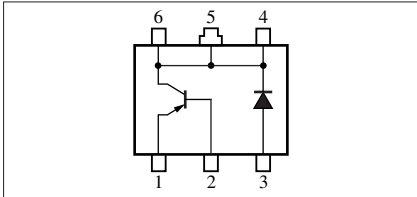
Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

2. *: Pulse measurement



Marking Symbol: EF

Internal Connection



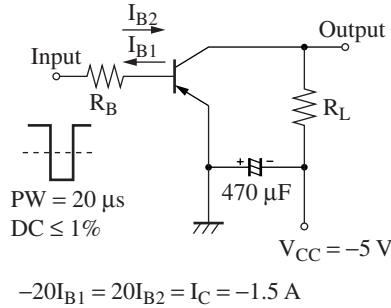
■ Electrical Characteristics (continued) $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

• Tr (continued)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|-----------|---|-----|-----|-----|------|
| Collector output capacitance (Common base, input open circuited) | C_{ob} | $V_{CB} = -10\text{ V}$, $I_E = 0$, $f = 1\text{ MHz}$ | | 40 | | pF |
| Transition frequency | f_T | $V_{CB} = -10\text{ V}$, $I_E = 50\text{ mA}$, $f = 200\text{ MHz}$ | | 180 | | MHz |
| Turn-on time | t_{on} | Refer to the switching time measurement circuit | | 35 | | ns |
| Storage time | t_{stg} | | | 110 | | ns |
| Turn-off time | t_{off} | | | 10 | | ns |

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

Switching time measurement circuit



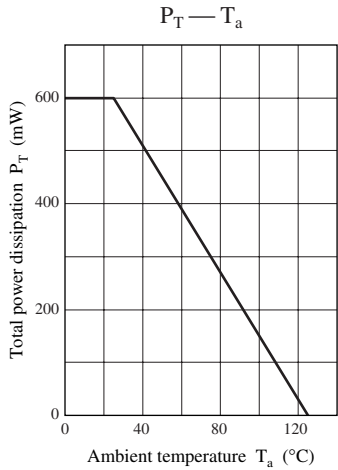
• SBD

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|-----------------------|----------|--|-----|-----|------|---------------|
| Forward voltage | V_F | $I_F = 700\text{ mA}$ | | | 0.45 | V |
| Reverse current | I_R | $V_R = 20\text{ V}$ | | | 200 | μA |
| Terminal capacitance | C_t | $V_R = 0$, $f = 1\text{ MHz}$ | | 100 | | pF |
| Reverse recovery time | t_{rr} | $I_F = I_R = 100\text{ mA}$, $I_{rr} = 10\text{ mA}$ $R_L = 100\ \Omega$ | | 7 | | ns |

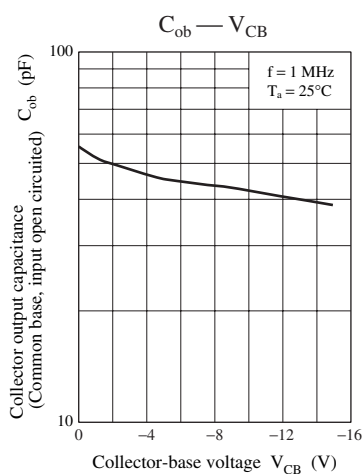
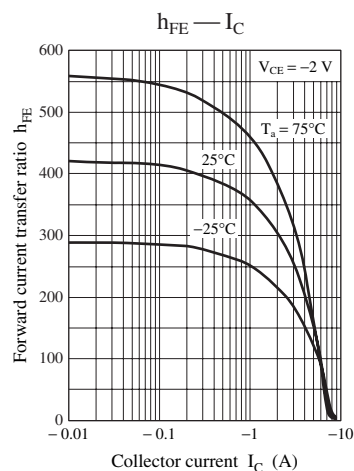
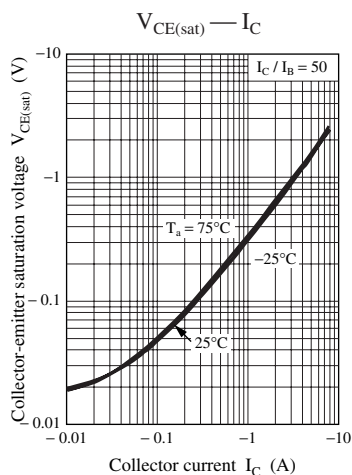
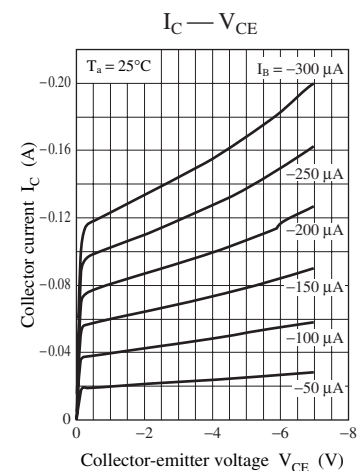
Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7031 Measuring methods for diodes.

2. Schottky barrier diode is frail with static electricity, and it should be kept in safety from shock of static electricity and static electricity level.

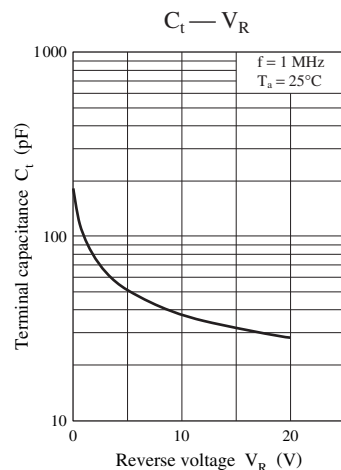
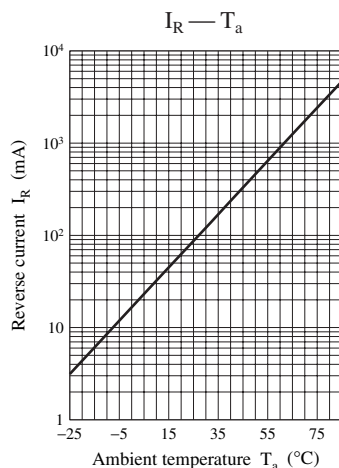
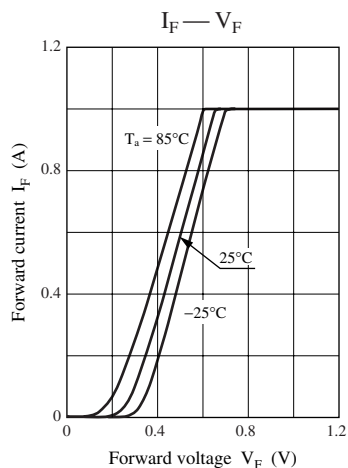
Common characteristics chart



Characteristics charts of Tr



Characteristics charts of SBD



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