

To our customers,

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## Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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on-chip resistor NPN silicon epitaxial transistor  
For mid-speed switching

The CE1F3P is a transistor of on-chip high hFE resistor incorporating dumper diode in collector to emitter and zener diode in collector to base as protect elements. This transistor is ideal for actuator drives of OA equipments and electric equipments.

\* PW≤10 ms, duty cycle≤50 %

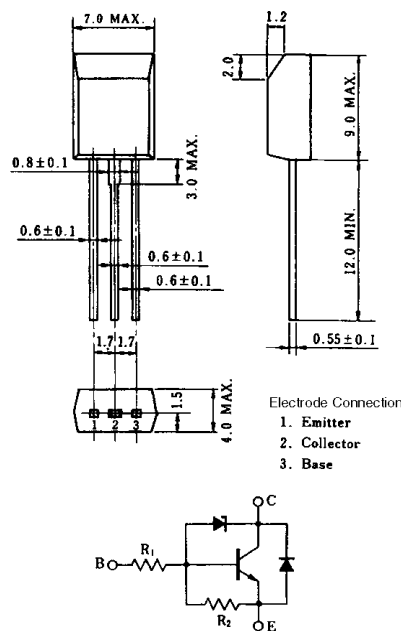
FEATURES

- On-chip zener diode for surge voltage absorption
- On-chip bias resistor: R1 = 2.2 kΩ, R2 = 10 kΩ
- Low power consumption during driving:  
VOL = 0.12 V @VI = 5.0 V, IC = 0.5 A
- On-chip dumper diode for reverse cable

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

| Parameter                    | Symbol                  | Ratings     | Unit |
|------------------------------|-------------------------|-------------|------|
| Collector to base voltage    | V <sub>CB0</sub>        | 60±10       | V    |
| Collector to emitter voltage | V <sub>CE0</sub>        | 60±10       | V    |
| Emitter to base voltage      | V <sub>EBO</sub>        | 15          | V    |
| Collector current (DC)       | I <sub>C(DC)</sub>      | ±2.0        | A    |
| Collector current (Pulse)    | I <sub>C(pulse)</sub> * | ±3.0        | A    |
| Base current (DC)            | I <sub>B(DC)</sub>      | 0.03        | A    |
| Total power dissipation      | P <sub>T</sub>          | 1.0         | W    |
| Junction temperature         | T <sub>j</sub>          | 150         | °C   |
| Storage temperature          | T <sub>stg</sub>        | -55 to +150 | °C   |

PACKAGE DRAWING (UNIT: mm)



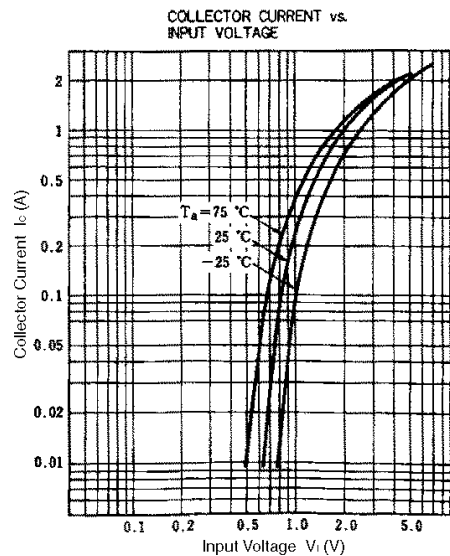
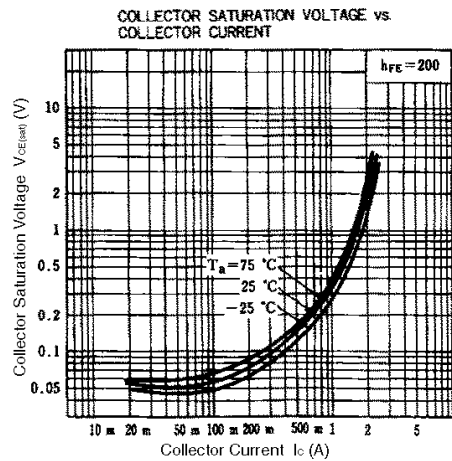
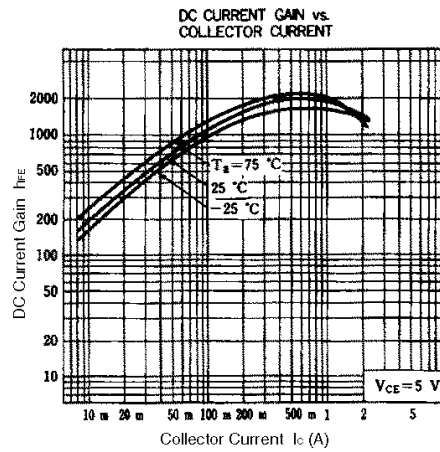
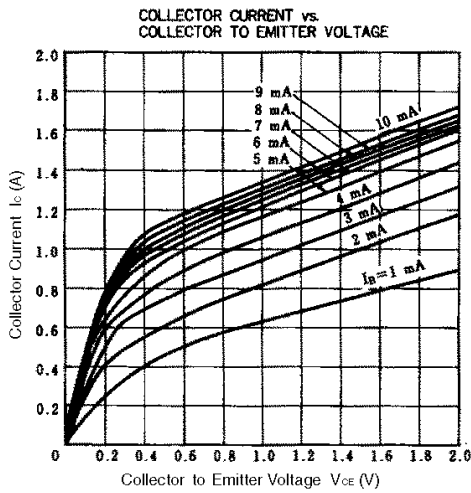
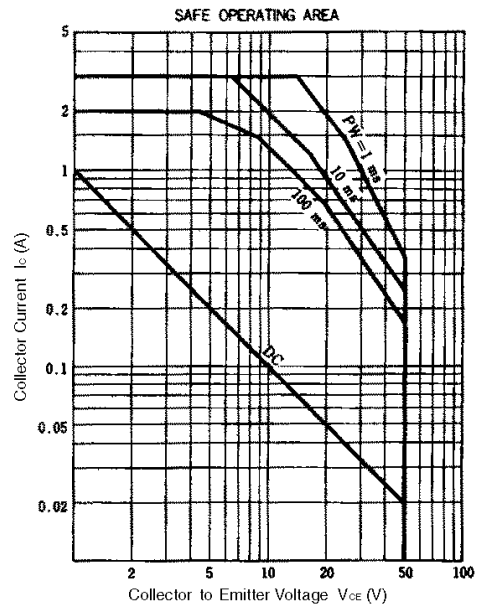
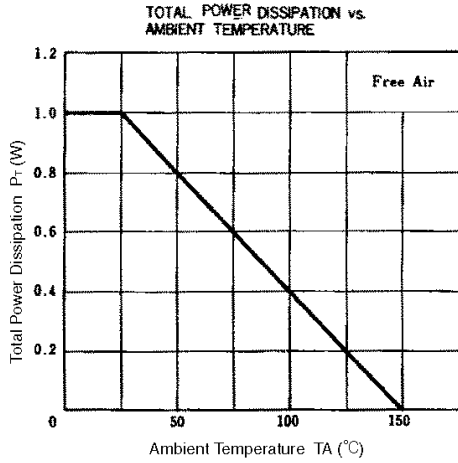
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| Parameter                    | Symbol                | Conditions  | MIN. | TYP. | MAX. | Unit |
|------------------------------|-----------------------|---|------|------|------|------|
| Collector to emitter voltage | V <sub>CE0(SUS)</sub> | I <sub>C</sub> = 2.0 A, I <sub>B</sub> = 5.0 mA, L = 6.0 mH | 50   | 60   |      | V    |
| Collector cutoff current     | I <sub>CB0</sub>      | V <sub>CB</sub> = 40 V, I <sub>E</sub> = 0                  |      |      | 100  | nA   |
| DC current gain              | h <sub>FE1</sub> **   | V <sub>CE</sub> = 5.0 V, I <sub>C</sub> = 0.2 A             | 700  | 1200 |      | -    |
| DC current gain              | h <sub>FE2</sub> **   | V <sub>CE</sub> = 5.0 V, I <sub>C</sub> = 1.0 A             | 1000 | 1600 | 3000 | -    |
| DC current gain              | h <sub>FE3</sub> **   | V <sub>CE</sub> = 5.0 V, I <sub>C</sub> = 2.0 A             | 500  | 1200 |      | -    |
| Low level output voltage     | V <sub>OL</sub> **    | V <sub>I</sub> = 5.0 V, I <sub>C</sub> = 0.5 A              |      | 0.12 | 0.3  | V    |
| Low level input voltage      | V <sub>IL</sub> **    | V <sub>CE</sub> = 12 V, I <sub>C</sub> = 100 μA             |      | 0.5  | 0.4  | V    |
| Input resistance 1           | R <sub>1</sub>        |   | 1.54 | 2.2  | 2.86 | kΩ   |
| Input resistance 2           | R <sub>2</sub>        |   | 7.0  | 10.0 | 13.0 | kΩ   |
| Turn-on time                 | t <sub>on</sub>       | I <sub>C</sub> = 1.0 A                                      |      | 0.4  |      | μs   |
| Storage time                 | t <sub>stg</sub>      | I <sub>B1</sub> = -I <sub>B2</sub> = 10 mA                  |      | 1.4  |      | μs   |
| Fall time                    | t <sub>f</sub>        | V <sub>CC</sub> = 20 V, R <sub>L</sub> = 20 Ω               |      | 0.5  |      | μs   |

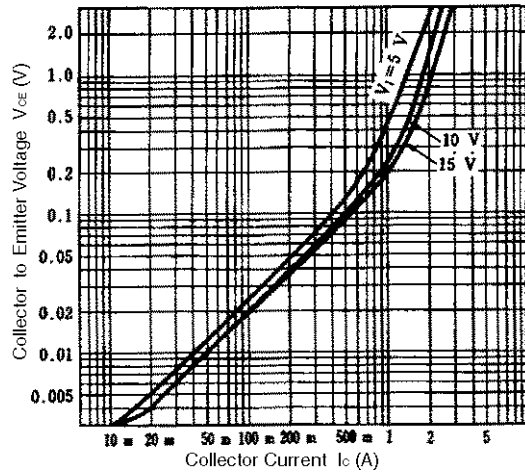
\*\* Pulse test PW ≤ 350 μs, duty cycle ≤ 2 %

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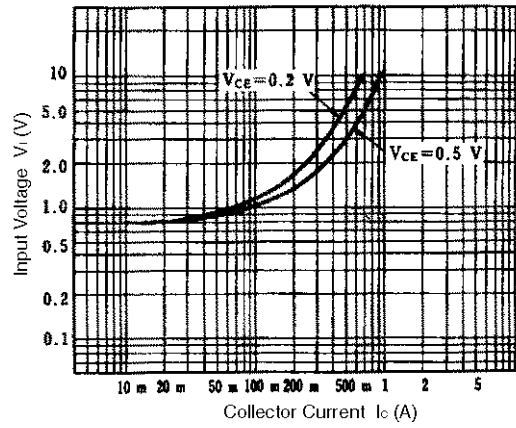
TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )



COLLECTOR TO EMITTER VOLTAGE vs. COLLECTOR CURRENT



INPUT VOLTAGE vs. COLLECTOR CURRENT



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