

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

The CE1N2R 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.

FEATURES

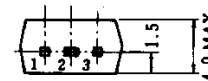
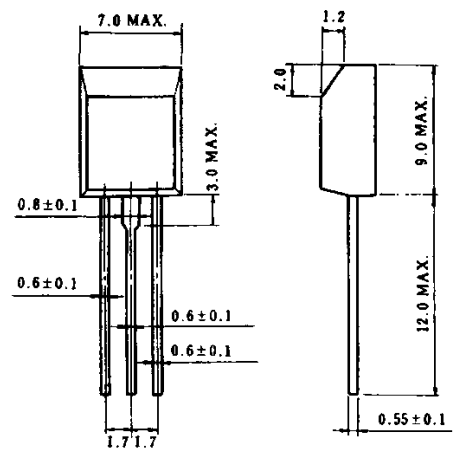
- On-chip zener diode for surge voltage absorption
- On-chip bias resistor: $R_1 = 680 \Omega$, $R_2 = 10 \text{ k}\Omega$
- Low power consumption during driving:
 $V_{OL} = 0.3 \text{ V MAX. @ } V_1 = 5.0 \text{ V, } I_C = 0.5 \text{ A}$
- On-chip dumper diode for reverse cable

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

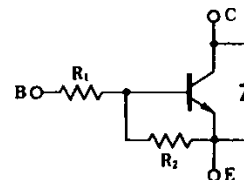
| Parameter | Symbol | Ratings | Unit |
|------------------------------|------------------|-------------|------------------|
| Collector to base voltage | V_{CBO} | 60 ± 10 | V |
| Collector to emitter voltage | V_{CEO} | 60 ± 10 | V |
| Emitter to base voltage | V_{EBO} | 15 | V |
| Collector current (DC) | $I_{C(DC)}$ | ± 2.0 | A |
| Collector current (Pulse) | $I_{C(pulse)}$ * | ± 3.0 | A |
| Base current (DC) | $I_{B(DC)}$ | 0.03 | A |
| Total power dissipation | P_T | 1.0 | W |
| Junction temperature | T_j | 150 | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

* $PW \leq 10 \text{ ms}$, duty cycle $\leq 50 \%$

PACKAGE DRAWING (UNIT: mm)



Electrode Connection
1. Emitter (E)
2. Collector (C)
3. Base (B)



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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|------------------------------|----------------|--|------|------|------|---------------|
| Collector to emitter voltage | $V_{CE0(SUS)}$ | $I_C = 2.0\text{ A}, I_B = 5.0\text{ mA}, L = 6.0\text{ mH}$ | 50 | 60 | | V |
| Collector cutoff current | I_{CBO} | $V_{CB} = 40\text{ V}, I_E = 0$ | | | 100 | nA |
| DC current gain | h_{FE1}^{**} | $V_{CE} = 5.0\text{ V}, I_C = 0.2\text{ A}$ | 700 | 1200 | | – |
| DC current gain | h_{FE2}^{**} | $V_{CE} = 5.0\text{ V}, I_C = 1.0\text{ A}$ | 1000 | 1700 | 3000 | – |
| DC current gain | h_{FE3}^{**} | $V_{CE} = 5.0\text{ V}, I_C = 2.0\text{ A}$ | 500 | 1300 | | – |
| Low level output voltage | V_{OL}^{**} | $V_I = 5.0\text{ V}, I_C = 0.5\text{ A}$ | | 0.12 | 0.3 | V |
| Low level input voltage | V_{IL}^{**} | $V_{CE} = 12\text{ V}, I_C = 100\text{ }\mu\text{A}$ | | 0.43 | 0.4 | V |
| Input resistance | R_1 | | 476 | 680 | 884 | Ω |
| E-to-B resistance | R_2 | | 7.0 | 10.0 | 13.0 | k Ω |
| Turn-on time | t_{on} | $I_C = 1.0\text{ A}$ | | 0.4 | | μs |
| Storage time | t_{stg} | $I_{B1} = -I_{B2} = 10\text{ mA}$ | | 1.4 | | μs |
| Fall time | t_f | $V_{CC} = 20\text{ V}, R_L = 20\text{ }\Omega$ | | 0.5 | | μs |

** Pulse test $PW \leq 350\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

RECOMMENDED SOLDERING CONDITIONS

This product should be soldered and mounted under the following recommended conditions.

For soldering methods and conditions other than those recommended below, contact an NEC sales representative.

[MEMO]

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