

To our customers,

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## Old Company Name in Catalogs and Other Documents

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On April 1<sup>st</sup>, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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

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

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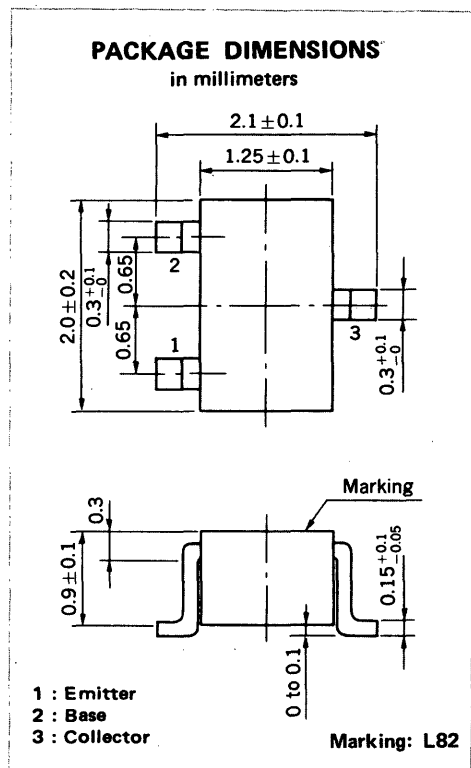
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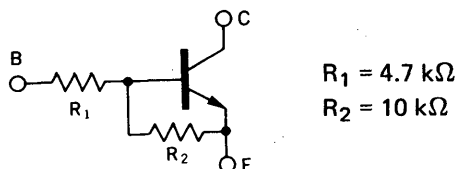
## MEDIUM SPEED SWITCHING

## RESISTOR BUILT-IN TYPE NPN TRANSISTOR



### FEATURES

- Resistors Built-in TYPE



- Complementary to GN1L3N

### ABSOLUTE MAXIMUM RATINGS

Maximum Voltages and Currents ( $T_a = 25^\circ\text{C}$ )

|                              |           |     |    |
|------------------------------|-----------|-----|----|
| Collector to Base Voltage    | $V_{CB0}$ | 60  | V  |
| Collector to Emitter Voltage | $V_{CEO}$ | 50  | V  |
| Emitter to Base Voltage      | $V_{EBO}$ | 5   | V  |
| Collector Current (DC)       | $I_C$     | 100 | mA |
| Collector Current (Pulse)    | $I_C$     | 200 | mA |

Maximum Power Dissipation

|                                                                      |       |     |    |
|----------------------------------------------------------------------|-------|-----|----|
| Total Power Dissipation<br>at $25^\circ\text{C}$ Ambient Temperature | $P_T$ | 150 | mW |
|----------------------------------------------------------------------|-------|-----|----|

Maximum Temperatures

|                           |           |             |                  |
|---------------------------|-----------|-------------|------------------|
| Junction Temperature      | $T_j$     | 150         | $^\circ\text{C}$ |
| Storage Temperature Range | $T_{stg}$ | -55 to +150 | $^\circ\text{C}$ |

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

| CHARACTERISTIC               | SYMBOL          | MIN. | TYP. | MAX. | UNIT             | TEST CONDITIONS                                                                                                               |
|------------------------------|-----------------|------|------|------|------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Collector Cutoff Current     | $I_{CBO}$       |      |      | 100  | nA               | $V_{CB} = 50 \text{ V}, I_E = 0$                                                                                              |
| DC Current Gain              | $h_{FE1}^*$     | 35   | 60   | 100  |                  | $V_{CE} = 5.0 \text{ V}, I_C = 5.0 \text{ mA}$                                                                                |
| DC Current Gain              | $h_{FE2}^*$     | 80   | 230  |      |                  | $V_{CE} = 5.0 \text{ V}, I_C = 50 \text{ mA}$                                                                                 |
| Collector Saturation Voltage | $V_{CE(sat)}^*$ |      | 0.05 | 0.2  | V                | $I_C = 5.0 \text{ mA}, I_B = 0.25 \text{ mA}$                                                                                 |
| Low-Level Input Voltage      | $V_{IL}^*$      |      | 0.9  | 0.6  | V                | $V_{CE} = 5.0 \text{ V}, I_C = 100 \mu\text{A}$                                                                               |
| High-Level Input Voltage     | $V_{IH}^*$      | 3.0  | 1.5  |      | V                | $V_{CE} = 0.2 \text{ V}, I_C = 5.0 \text{ mA}$                                                                                |
| Input Resistor               | $R_1$           | 3.29 | 4.7  | 6.11 | $\text{k}\Omega$ |                                                                                                                               |
| E-B Resistor                 | $R_2$           | 7    | 10   | 13   | $\text{k}\Omega$ |                                                                                                                               |
| Turn-on Time                 | $t_{on}$        |      |      | 0.2  | $\mu\text{s}$    | $V_{CC} = 5 \text{ V}, V_{in} = 5 \text{ V}$<br>$R_L = 1 \text{ k}\Omega$<br>$PW = 2 \mu\text{s}, \text{Duty Cycle} \leq 2\%$ |
| Storage Time                 | $t_{stg}$       |      |      | 5.0  | $\mu\text{s}$    |                                                                                                                               |
| Turn-off Time                | $t_{off}$       |      |      | 6.0  | $\mu\text{s}$    |                                                                                                                               |

\* Pulsed:  $PW \leq 350 \mu\text{s}, \text{Duty Cycle} \leq 2\%$

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