To our customers,

## Old Company Name in Catalogs and Other Documents

On April 1st, 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 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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DATA SHEET

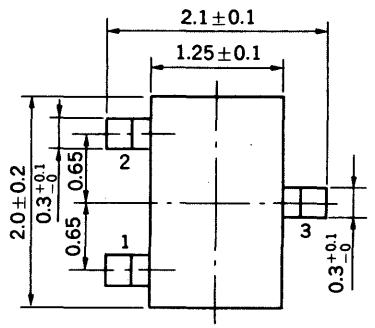
RENESAS

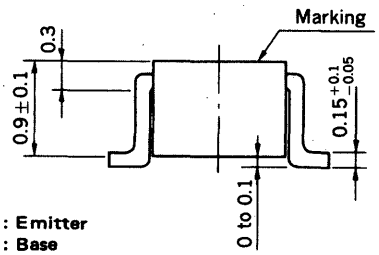
# SILICON TRANSISTOR

# GA1A4M

## MEDIUM SPEED SWITCHING
## RESISTOR BUILT-IN TYPE NPN TRANSISTOR

**PACKAGE DIMENSIONS**
in millimeters



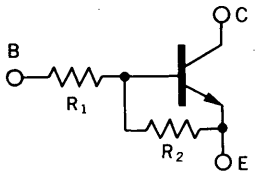




1 : Emitter
2 : Base
3 : Collector

Marking: L33

### FEATURES

- Resistors Built-in TYPE




$R_1$ = 10 kΩ
$R_2$ = 10 kΩ

- Complementary to GN1A4M

### ABSOLUTE MAXIMUM RATINGS

| | | | |
|---|---|---|---|
| Maximum Voltages and Currents ($T_a$ = 25 °C) | | | |
| Collector to Base Voltage | $V_{CBO}$ | 60 | V |
| Collector to Emitter Voltage | $V_{CEO}$ | 50 | V |
| Emitter to Base Voltage | $V_{EBO}$ | 10 | V |
| Collector Current (DC) | $I_C$ | 100 | mA |
| Collector Current (Pulse) | $I_C$ | 200 | mA |
| Maximum Power Dissipation | | | |
| Total Power Dissipation at 25 °C Ambient Temperature | $P_T$ | 150 | mW |
| Maximum Temperatures | | | |
| Junction Temperature | $T_j$ | 150 | °C |
| Storage Temperature Range | $T_{stg}$ | −55 to +150 | °C |

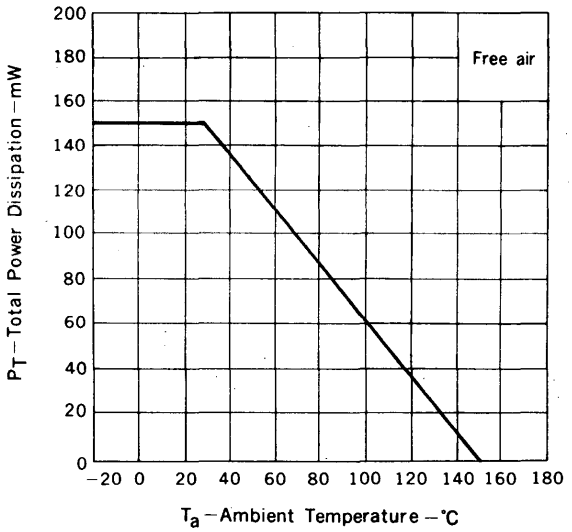
### ELECTRICAL CHARACTERISTICS ($T_a$ = 25 °C)

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|---|---|---|---|---|---|
| Collector Cutoff Current | $I_{CBO}$ | | | 100 | nA | $V_{CB}$ = 50 V, $I_E$ = 0 |
| DC Current Gain | $h_{FE1}$* | 35 | 62 | 100 | | $V_{CE}$ = 5.0 V, $I_C$ = 5.0 mA |
| DC Current Gain | $h_{FE2}$* | 80 | 230 | | | $V_{CE}$ = 5.0 V, $I_C$ = 50 mA |
| Collector Saturation Voltage | $V_{CE(sat)}$* | | 0.05 | 0.2 | V | $I_C$ = 5.0 mA, $I_B$ = 0.25 mA |
| Low-Level Input Voltage | $V_{IL}$* | | 1.08 | 0.8 | V | $V_{CE}$ = 5.0 V, $I_C$ = 100 μA |
| High-Level Input Voltage | $V_{IH}$* | 3.0 | 1.4 | | V | $V_{CE}$ = 0.2 V, $I_C$ = 5.0 mA |
| Input Resistor | $R_1$ | 7.0 | 10 | 13 | kΩ | |
| Resistor Ratio | $R_1/R_2$ | 0.9 | 1.0 | 1.1 | | |
| Turn-on Time | $t_{on}$ | | 0.06 | 0.2 | μs | $V_{CC}$ = 5 V, $V_{in}$ = 5 V<br>$R_L$ = 1 kΩ<br>PW = 2 μs, Duty Cycle ≦ 2 % |
| Storage Time | $t_{stg}$ | | 2.0 | 5.0 | μs | |
| Turn-off Time | $t_{off}$ | | 2.15 | 6.0 | μs | |

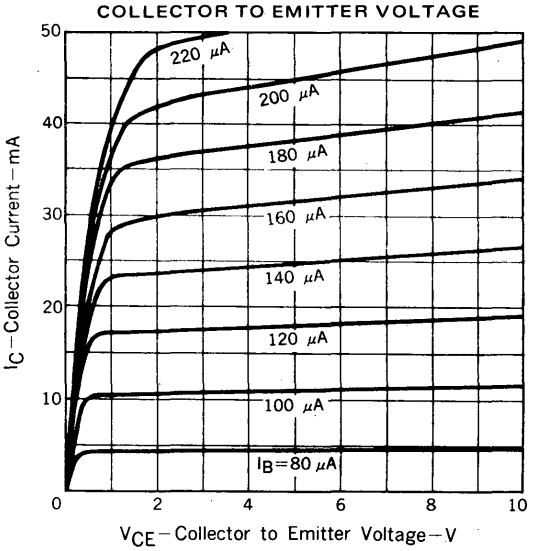
* Pulsed: PW ≦ 350 μs, Duty Cycle ≦ 2 %

## TYPICAL CHARACTERISTICS ($T_a$ = 25 °C)

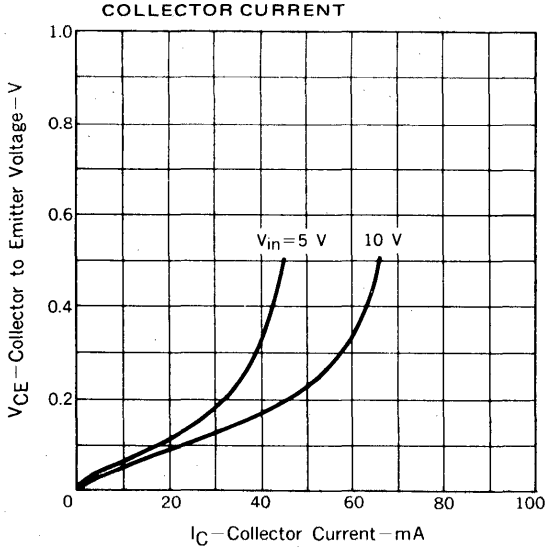
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



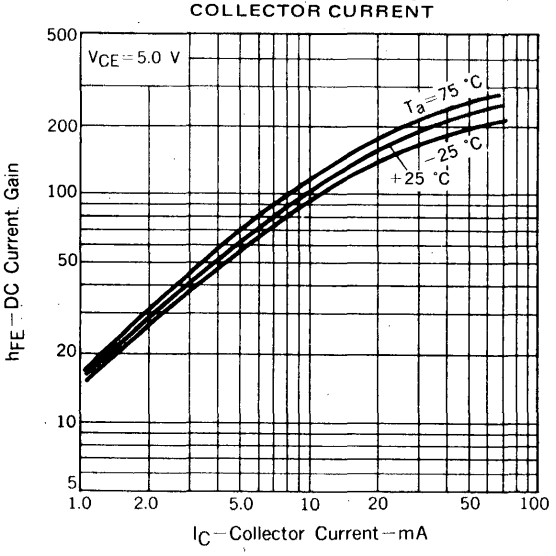

COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



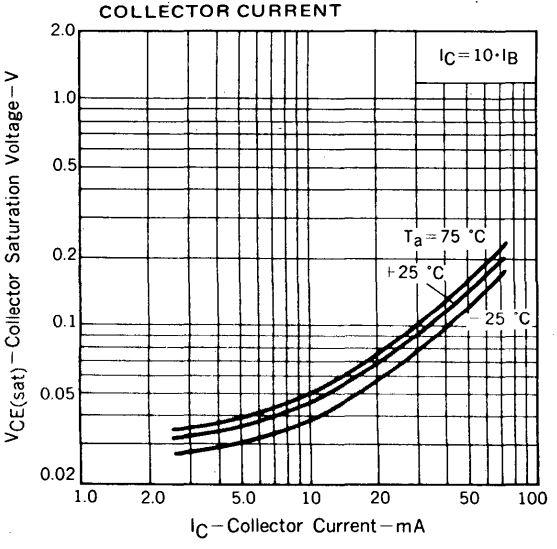

COLLECTOR TO EMITTER VOLTAGE vs. COLLECTOR CURRENT



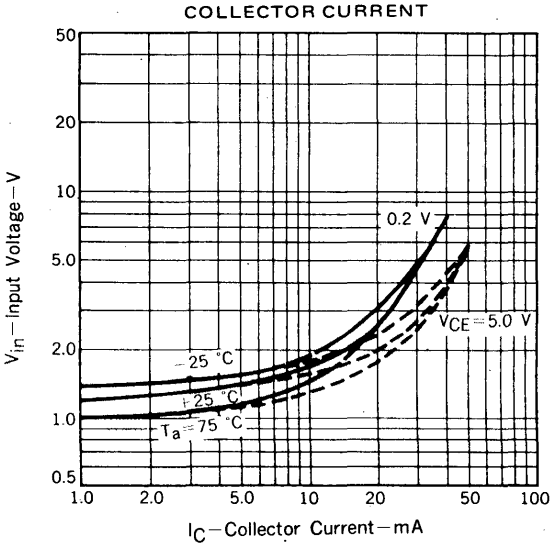

DC CURRENT GAIN vs. COLLECTOR CURRENT



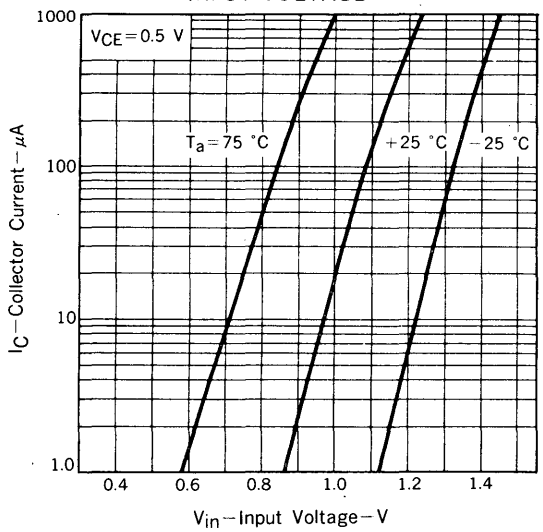

COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



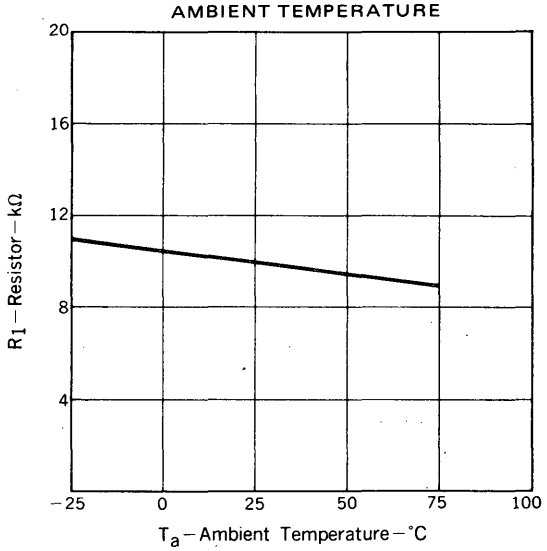

INPUT VOLTAGE vs. COLLECTOR CURRENT



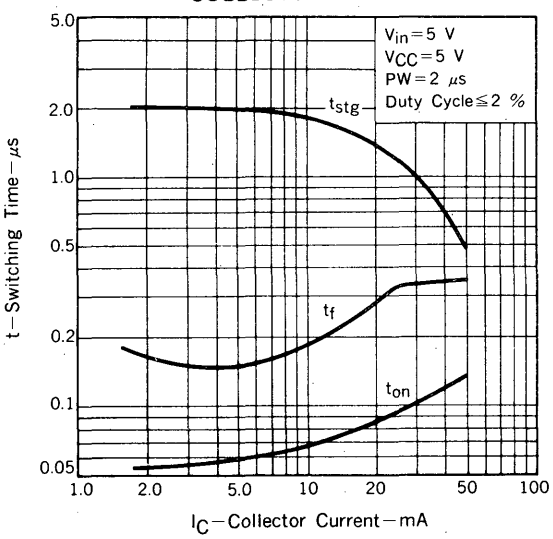
COLLECTOR CURRENT vs.
INPUT VOLTAGE




RESISTOR vs.
AMBIENT TEMPERATURE




SWITCHING TIME vs.
COLLECTOR CURRENT



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