

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

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SILICON POWER TRANSISTORS  
**2SA1069, 1069A**

PNP SILICON EPITAXIAL TRANSISTOR  
 FOR HIGH-SPEED SWITCHING

The 2SA1069/1069A are the mold power transistors developed for high-speed switching, and is ideal for use as a driver in devices such as switching regulators, DC/DC converters, and high-frequency power amplifiers.

**FEATURES**

- Low collector saturation voltage
- Fast switching speed

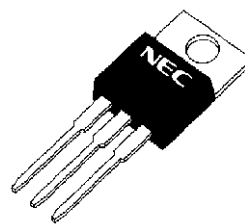
**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)**

| Parameter                    | Symbol                | Conditions                       | Ratings     | Unit |
|------------------------------|-----------------------|----------------------------------|-------------|------|
| Collector to base voltage    | V <sub>CB0</sub>      |                                  | -80         | V    |
| Collector to emitter voltage | V <sub>CE0</sub>      |                                  | -60/-80     | V    |
| Emitter to base voltage      | V <sub>EB0</sub>      |                                  | -12         | V    |
| Collector current (DC)       | I <sub>C(DC)</sub>    |                                  | -5.0        | A    |
| Collector current (pulse)    | I <sub>C(pulse)</sub> | PW ≤ 300 μs,<br>duty cycle ≤ 10% | -10         | A    |
| Base current (DC)            | I <sub>B(DC)</sub>    |                                  | -2.5        | A    |
| Total power dissipation      | P <sub>T</sub>        | T <sub>C</sub> = 25°C            | 30          | W    |
|                              |                       | T <sub>A</sub> = 25°C            | 1.5         | W    |
| Junction temperature         | T <sub>j</sub>        |                                  | 150         | °C   |
| Storage temperature          | T <sub>stg</sub>      |                                  | -55 to +150 | °C   |

<R> **ORDERING INFORMATION**

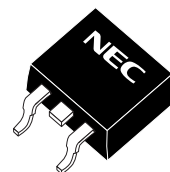
| Part No.   | Package               |
|------------|-----------------------|
| 2SA1069    | TO-220AB<br>(MP-25)   |
| 2SA1069A   |                       |
| 2SA1069-Z  | TO-220SMD<br>(MP-25Z) |
| 2SA1069A-Z |                       |

(TO-220AB)



<R>

(TO-220SMD)



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**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

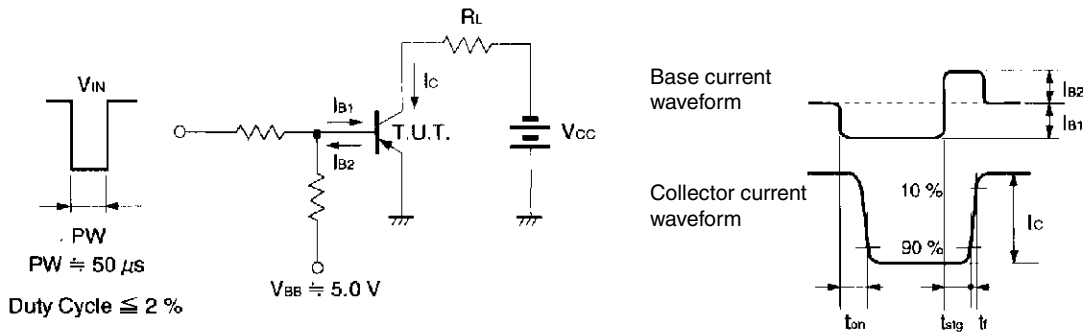
| Parameter                    | Symbol                 | Conditions                                                                                                                    | MIN.    | TYP. | MAX. | Unit |
|------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------|------|------|------|
| Collector to emitter voltage | V <sub>CE0(SUS)</sub>  | I <sub>C</sub> = -3.0 V, I <sub>B1</sub> = -0.3 A, L = 1 mH                                                                   | -60/-80 |      |      | V    |
| Collector to emitter voltage | V <sub>CEX(SUS)1</sub> | I <sub>C</sub> = -3.0 A, I <sub>B1</sub> = -I <sub>B2</sub> = -0.3 A, V <sub>BE(OFF)</sub> = 5.0 V, L = 180 μH, clamped       | -60/-80 |      |      | V    |
| Collector to emitter voltage | V <sub>CEX(SUS)2</sub> | I <sub>C</sub> = -6.0 A, I <sub>B1</sub> = -0.6 A, I <sub>B2</sub> = 0.3 A, V <sub>BE(OFF)</sub> = 5.0 V, L = 180 μH, clamped | -60/-80 |      |      | V    |
| Collector cutoff current     | I <sub>CBO</sub>       | V <sub>CB</sub> = -60/-80 V, I <sub>E</sub> = 0 A                                                                             |         |      | -10  | μA   |
| Collector cutoff current     | I <sub>CER</sub>       | V <sub>CE</sub> = -60/-80 V, R <sub>BE</sub> = 51 Ω, T <sub>A</sub> = 125 °C                                                  |         |      | -1.0 | mA   |
| Collector cutoff current     | I <sub>CEX1</sub>      | V <sub>CE</sub> = -60/-80 V, V <sub>BE(OFF)</sub> = 1.5 V                                                                     |         |      | -10  | μA   |
| Collector cutoff current     | I <sub>CEX2</sub>      | V <sub>CE</sub> = -60/-80 V, V <sub>BE(OFF)</sub> = 1.5 V, T <sub>A</sub> = 125 °C                                            |         |      | -1.0 | mA   |
| Emitter cutoff current       | I <sub>EBO</sub>       | V <sub>EB</sub> = -5.0 V, I <sub>C</sub> = 0 A                                                                                |         |      | -10  | μA   |
| DC current gain              | h <sub>FE1</sub>       | V <sub>CE</sub> = -5.0 V, I <sub>C</sub> = -0.3 A <sup>Note</sup>                                                             | 40      |      |      |      |
| DC current gain              | h <sub>FE2</sub>       | V <sub>CE</sub> = -5.0 V, I <sub>C</sub> = -0.3 A <sup>Note</sup>                                                             | 40      |      | 200  |      |
| Collector saturation voltage | V <sub>CE(sat)</sub>   | I <sub>C</sub> = -3.0 A, I <sub>B</sub> = -0.3 A <sup>Note</sup>                                                              |         |      | -0.6 | V    |
| Base saturation voltage      | V <sub>BE(sat)</sub>   | I <sub>C</sub> = -3.0 A, I <sub>B</sub> = -0.3 A <sup>Note</sup>                                                              |         |      | -1.5 | V    |
| Turn-on time                 | t <sub>on</sub>        | I <sub>C</sub> = -3.0 A, R <sub>L</sub> = 17 Ω, I <sub>B1</sub> = -I <sub>B2</sub> = -0.3 A, V <sub>CC</sub> ≅ -50 V          |         |      | 0.5  | μs   |
| Storage time                 | t <sub>stg</sub>       | Refer to the test circuit.                                                                                                    |         |      | 2.5  | μs   |
| Fall time                    | t <sub>f</sub>         |                                                                                                                               |         |      | 0.5  | μs   |

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

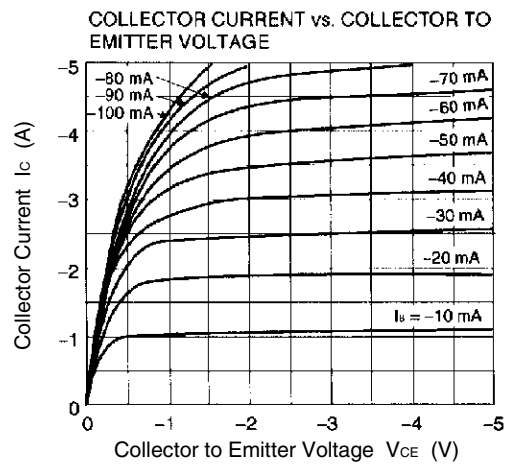
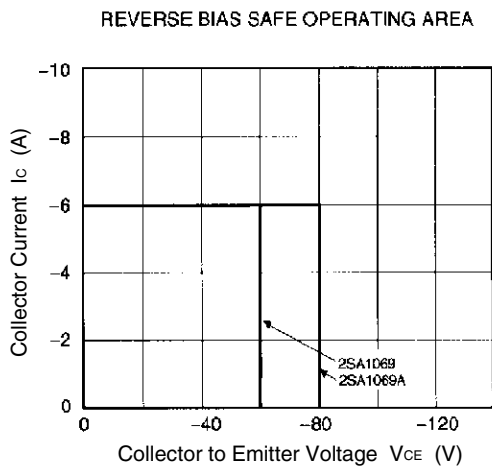
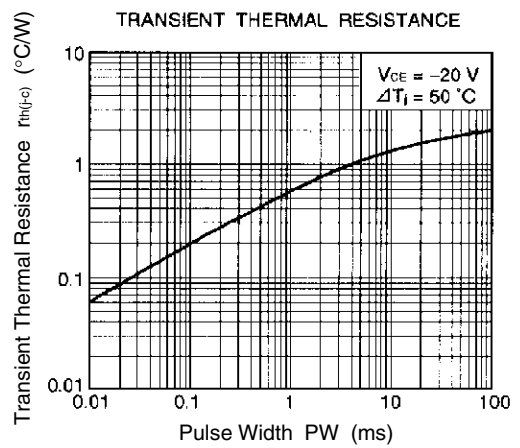
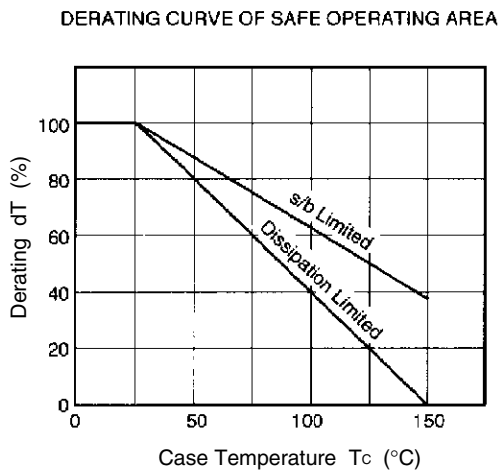
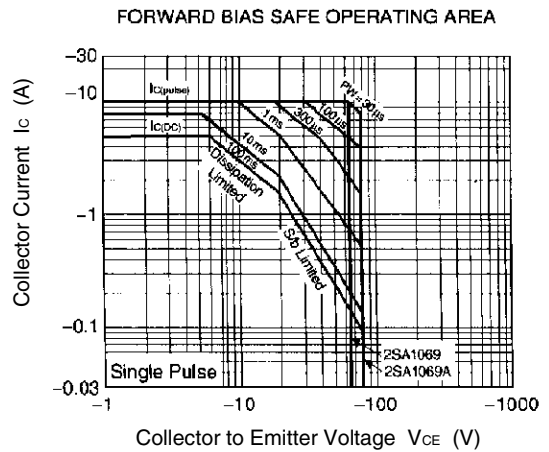
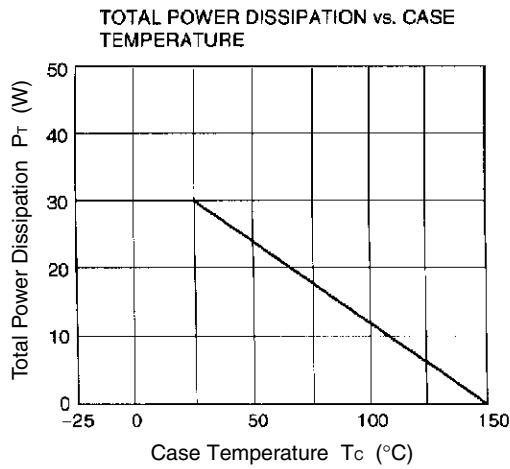
**h<sub>FE</sub> CLASSIFICATION**

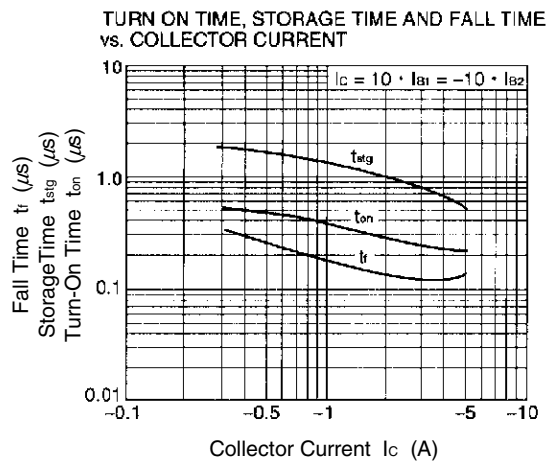
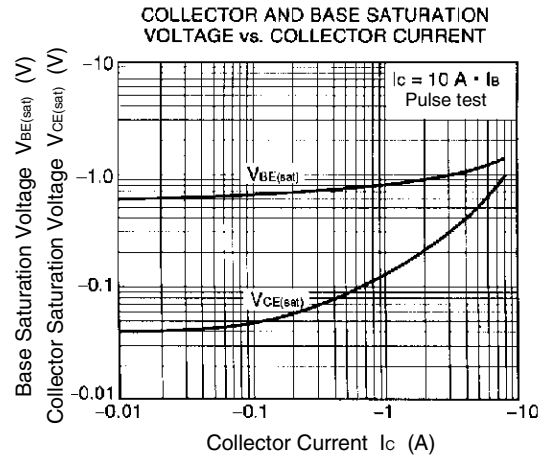
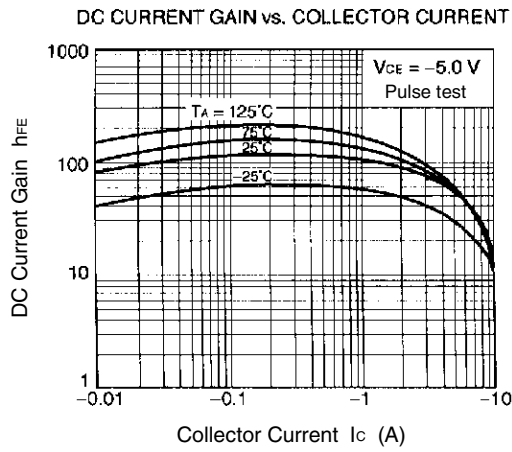
| Marking          | M        | L         | K          |
|------------------|----------|-----------|------------|
| h <sub>FE2</sub> | 40 to 80 | 60 to 120 | 100 to 200 |

**SWITCHING TIME (t<sub>on</sub>, t<sub>stg</sub>, t<sub>f</sub>) TEST CIRCUIT**



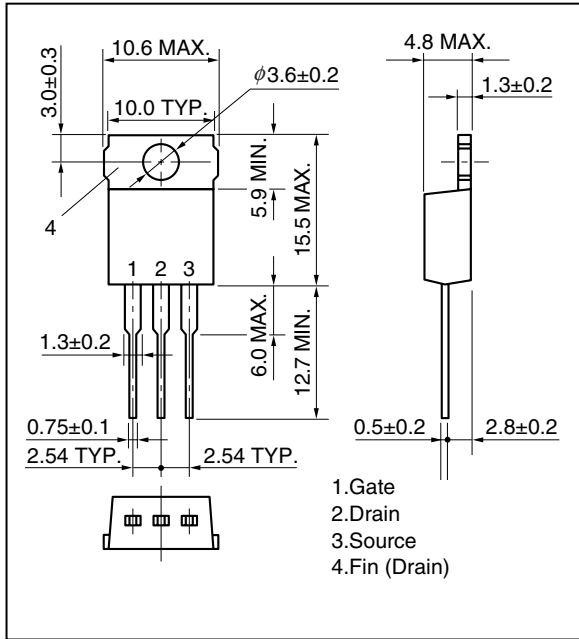
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



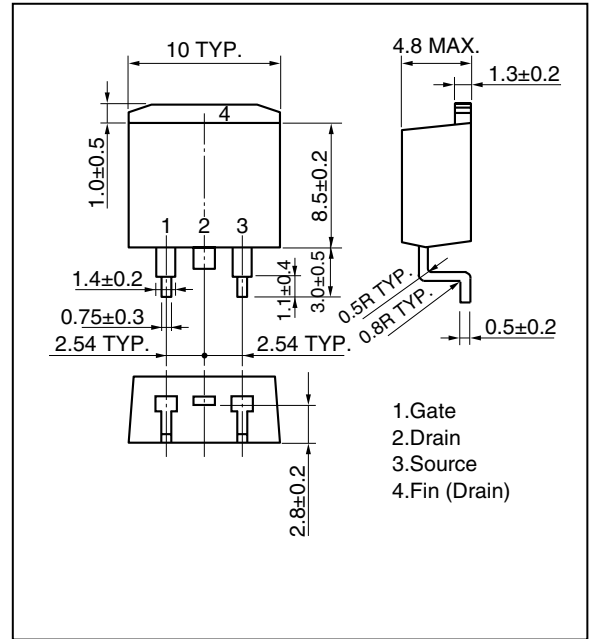


PACKAGE DRAWING (UNIT: mm)

(1) TO-220AB (MP-25)



<R> (2) TO-220SMD (MP-25Z) <sup>Note</sup>



**Note** This package is produced only in Japan.

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