

# SILICON TRANSISTORS

## 2SD1615, 2SD1615A

### NPN SILICON EPITAXIAL TRANSISTORS

#### POWER MINI MOLD

#### DESCRIPTION

2SD1615, 1615A are designed for audio frequency power amplifier and switching application, especially in Hybrid Integrated Circuits.

#### FEATURES

- World Standard Miniature Package
- Low  $V_{CE(sat)}$   $V_{CE(sat)} = 0.15$  V
- Complement to 2SB1115, 2SD1115A

#### ABSOLUTE MAXIMUM RATINGS

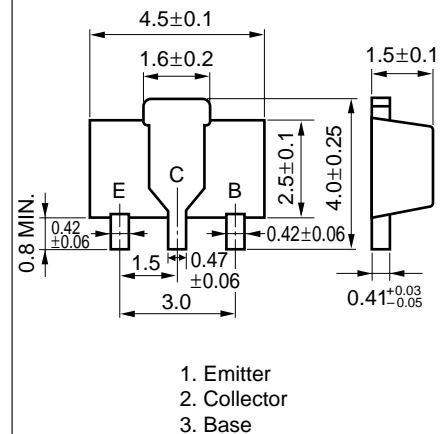
| Maximum Voltages and Currents ( $T_A = 25^\circ\text{C}$ ) |           | 2SD1615     | 2SD1615A |                  |
|--|-----------|-------------|----------|------------------|
| Collector to Base Voltage                                  | $V_{CBO}$ | 60          | 120      | V                |
| Collector to Emitter Voltage                               | $V_{CEO}$ | 50          | 60       | V                |
| Emitter to Base Voltage                                    | $V_{EBO}$ | 6           |          | V                |
| Collector Current (DC)                                     | $I_C$     | 1           |          | A                |
| Collector Current (Pulse)*                                 | $I_C$     | 2           |          | A                |
| Maximum Power Dissipation                                  |           |             |          |                  |
| Total Power Dissipation                                    |           |             |          |                  |
| at $25^\circ\text{C}$ Ambient Temperature**                | $P_T$     | 2.0         |          | W                |
| Maximum Temperatures                                       |           |             |          |                  |
| Junction Temperature                                       | $T_j$     | 150         |          | $^\circ\text{C}$ |
| Storage Temperature Range                                  | $T_{stg}$ | -55 to +150 |          | $^\circ\text{C}$ |

\*  $PW \leq 10$  ms, Duty Cycle  $\leq 50\%$

\*\* When mounted on ceramic substrate of  $16\text{ cm}^2 \times 0.7\text{ mm}$

#### PACKAGE DIMENSIONS

in millimeters



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

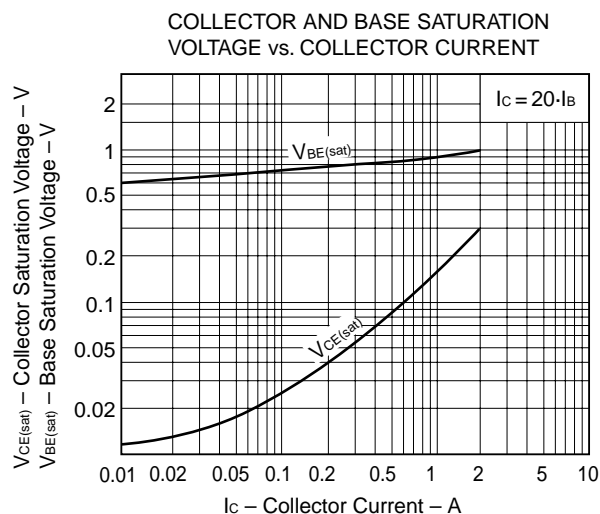
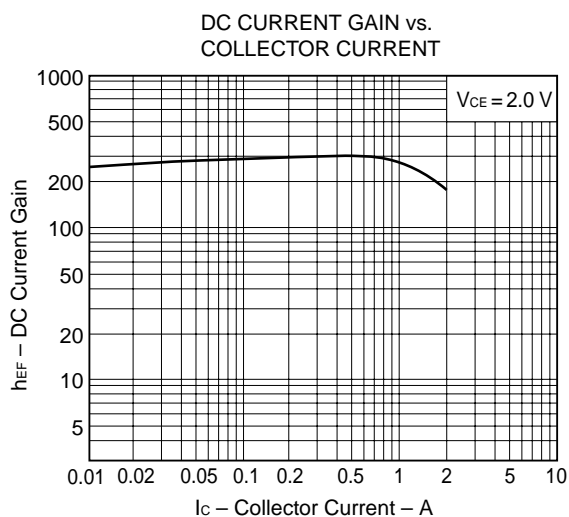
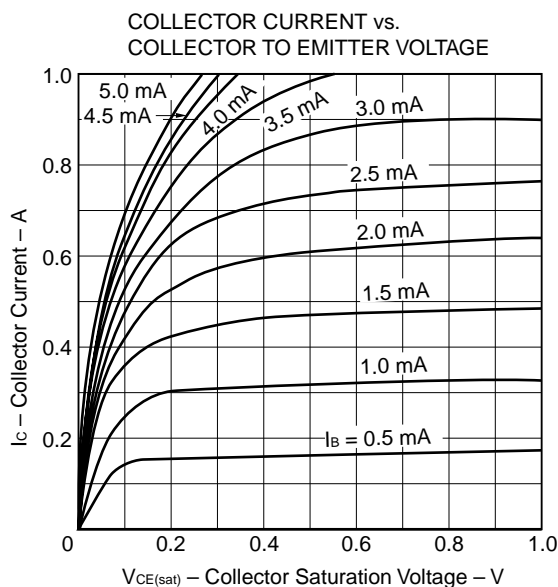
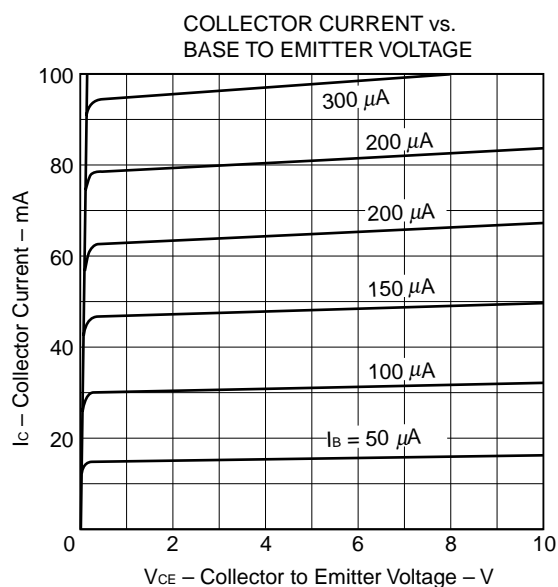
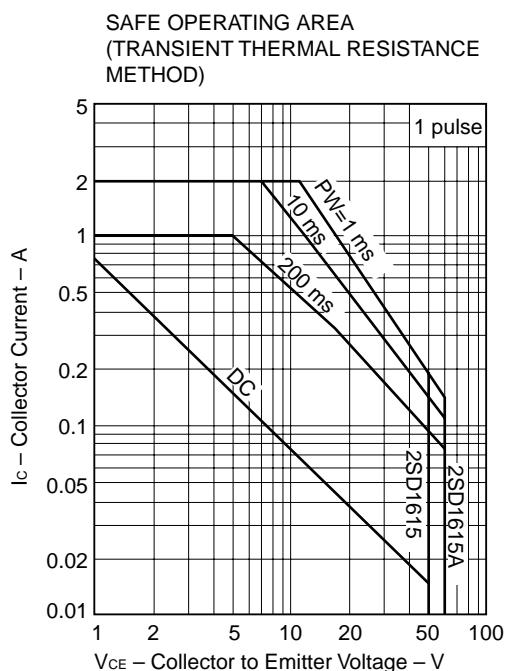
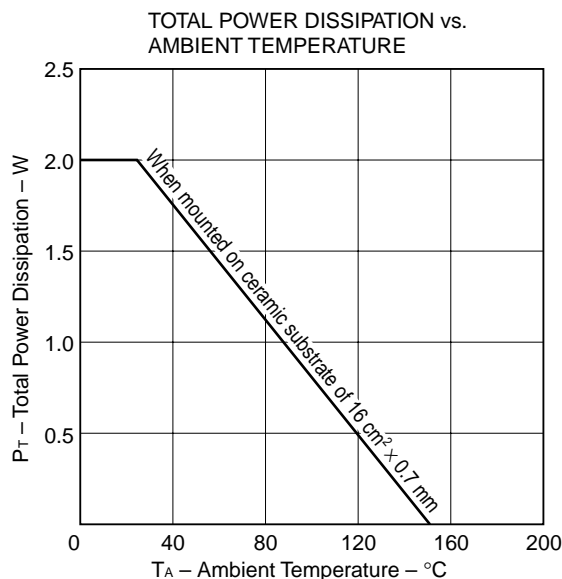
| CHARACTERISTIC               | SYMBOL                   | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS   |  |
|------------------------------|--------------------------|------|------|------|------|---|--|
| Collector Cutoff Current     | I <sub>CBO</sub>         |      |      | 100  | nA   | 2SD1615   | V <sub>CB</sub> = 60 V, I <sub>E</sub> = 0       |
|                              |                          |      |      | 100  | nA   | 2SD1615A  | V <sub>CB</sub> = 120 V, I <sub>E</sub> = 0      |
| Emitter Cutoff Current       | I <sub>EBO</sub>         |      |      | 100  | nA   | V <sub>EB</sub> = 6.0 V, I <sub>C</sub> = 0             |  |
| DC Current Gain              | h <sub>FE1</sub> ***     | 135  | 290  | 600  |      | 2SC1615   | V <sub>CE</sub> = 2.0 V, I <sub>C</sub> = 100 mA |
|                              |                          | 135  |      | 400  |      | 2SD1615A  |  |
| DC Current Gain              | h <sub>FE2</sub> ***     | 81   | 270  |      |      | V <sub>CE</sub> = 2.0 V, I <sub>C</sub> = 1.0 A         |  |
| Collector Saturation Voltage | V <sub>CE(sat)</sub> *** |      | 0.15 | 0.3  | V    | I <sub>C</sub> = 1.0 A, I <sub>B</sub> = 50 mA          |  |
| Base Saturation Voltage      | V <sub>BE(sat)</sub> *** |      | 0.9  | 1.2  | V    | I <sub>C</sub> = 1.0 A, I <sub>B</sub> = 50 mA          |  |
| Base to Emitter Voltage      | V <sub>BE</sub> ***      | 600  |      | 700  | mV   | V <sub>CE</sub> = 2.0 V, I <sub>C</sub> = 50 mA         |  |
| Gain Bandwidth Product       | f <sub>T</sub>           | 80   | 160  |      | MHz  | V <sub>CE</sub> = 2.0 V, I <sub>E</sub> = −100 mA       |  |
| Output Capacitance           | C <sub>ob</sub>          |      | 19   |      | pF   | V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0, f = 1.0 MHz |  |

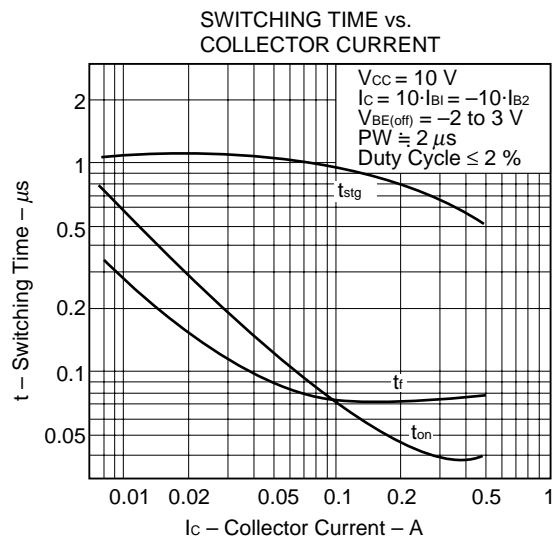
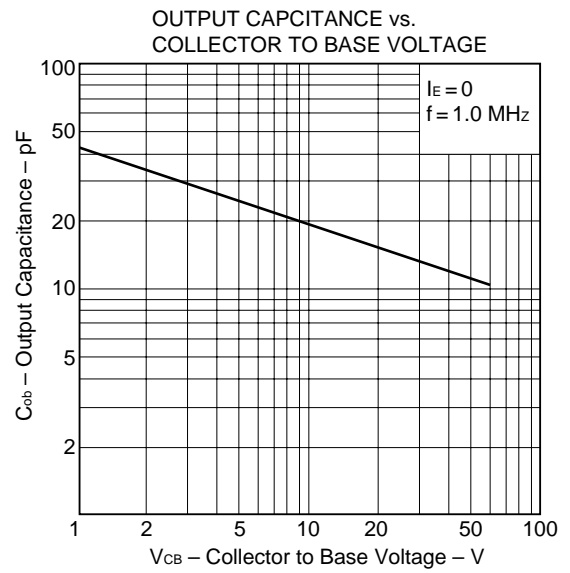
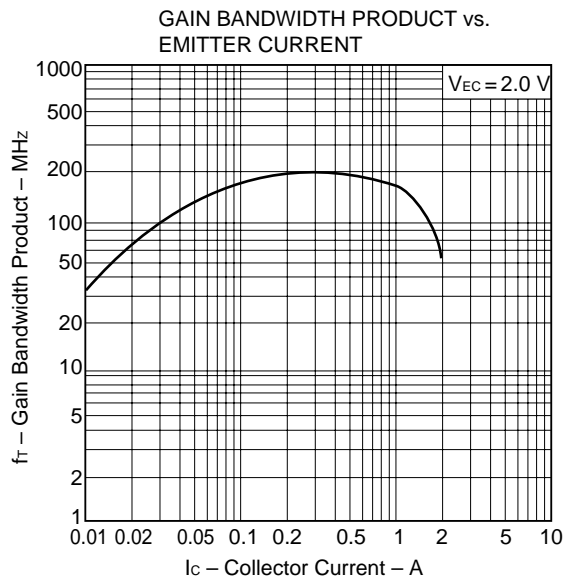
\*\*\* Pulsed:  $PW \leq 350\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2\%$

#### $h_{FE}$ Classification

| MARKING  | 2SD1615  | GM         | GL         | GK         |
|----------|----------|------------|------------|------------|
|          | 2SD1615A | GQ         | GP         |            |
| $h_{FE}$ |          | 135 to 270 | 200 to 400 | 300 to 600 |

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



[MEMO]

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