

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

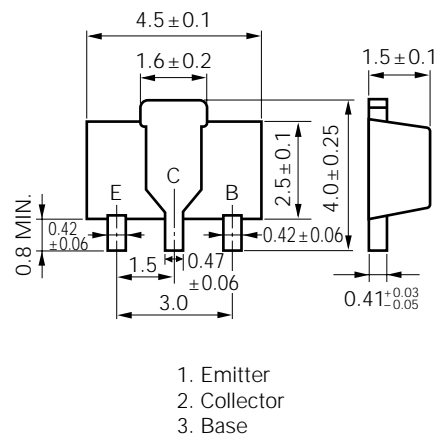
ABSOLUTE MAXIMUM RATINGS

| Maximum Voltages and Currents ($T_A = 25$ °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 | A |
| Collector Current (DC) | I_C | | 1 | A |
| Collector Current (Pulse)* | I_C | | 2 | A |
| Maximum Power Dissipation | | | | |
| Total Power Dissipation | | | | |
| at 25 °C Ambient Temperature** | P_T | 2.0 | | W |
| Maximum Temperatures | | | | |
| Junction Temperature | T_J | | 150 | °C |
| Storage Temperature Range | T_{stg} | -55 to +150 | | °C |

* $PW \leq 10$ ms, Duty Cycle ≤ 50 %

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

PACKAGE DIMENSIONS
in millimeters



ELECTRICAL CHARACTERISTICS ($T_A = 25$ °C)

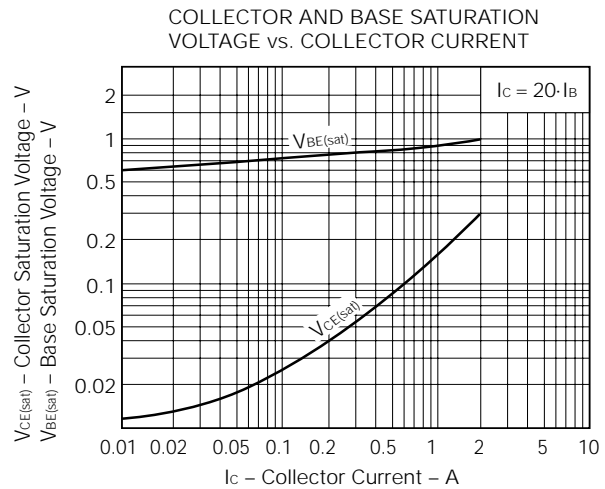
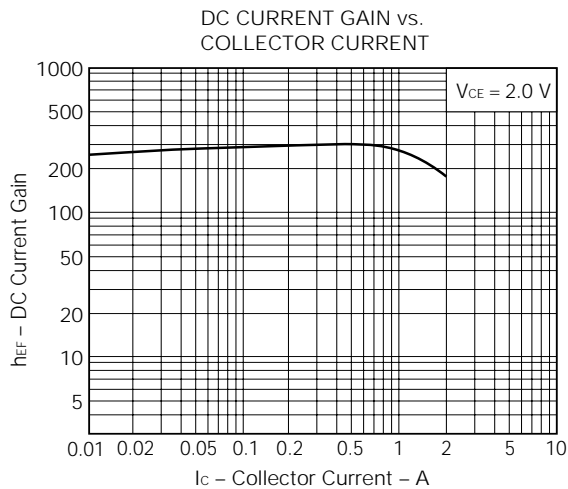
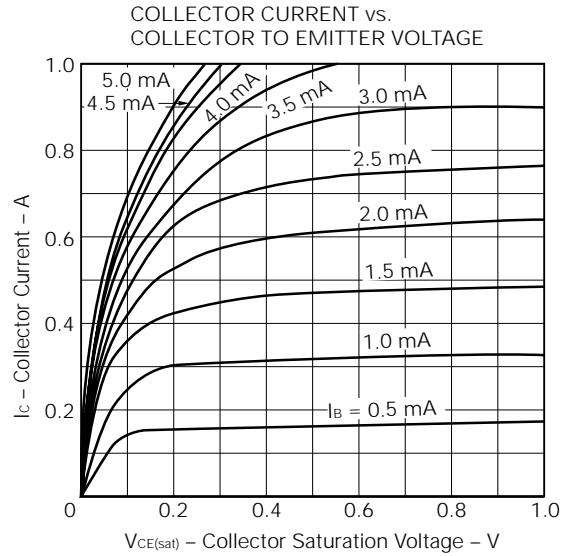
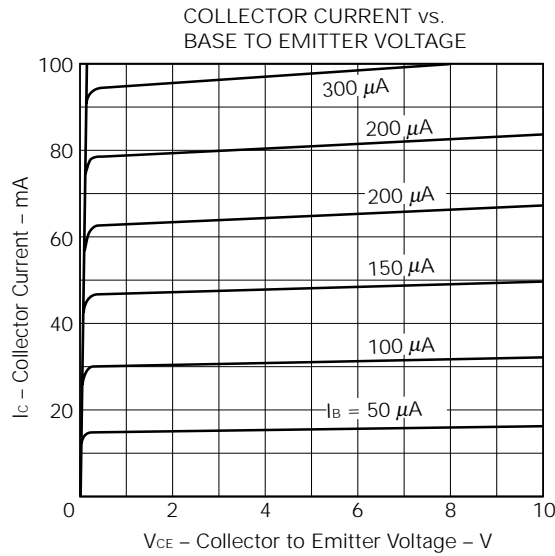
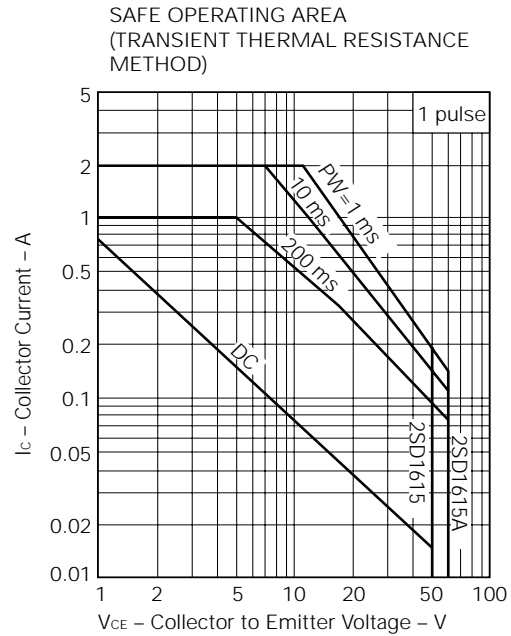
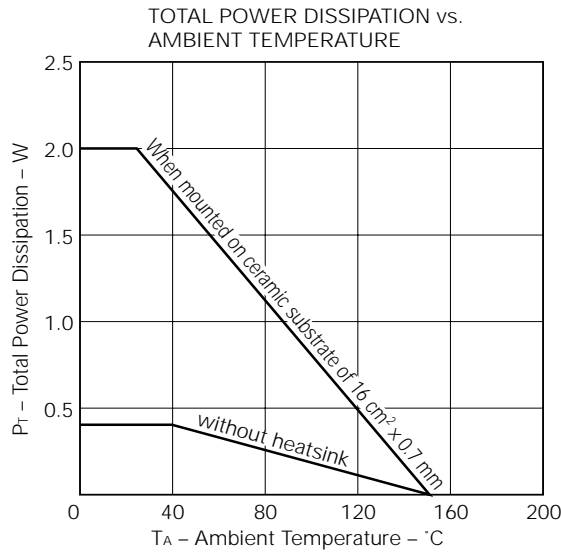
| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS | |
|------------------------------|---------------------|------|------|------|------|--|----------------------------------|
| Collector Cutoff Current | I_{CBO} | | | 100 | nA | 2SD1615 | $V_{CB} = 60$ V, $I_E = 0$ |
| | | | | 100 | nA | 2SD1615A | $V_{CB} = 120$ V, $I_E = 0$ |
| Emitter Cutoff Current | I_{EBO} | | | 100 | nA | $V_{EB} = 6.0$ V, $I_C = 0$ | |
| DC Current Gain | h_{FE1}^{***} | 135 | 290 | 600 | | 2SD1615 | $V_{CE} = 2.0$ V, $I_C = 100$ mA |
| | | 135 | | 400 | | 2SD1615A | |
| DC Current Gain | h_{FE2}^{***} | 81 | 270 | | | $V_{CE} = 2.0$ V, $I_C = 1.0$ A | |
| Collector Saturation Voltage | $V_{CE(sat)}^{***}$ | | 0.15 | 0.3 | V | $I_C = 1.0$ A, $I_B = 50$ mA | |
| Base Saturation Voltage | $V_{BE(sat)}^{***}$ | | 0.9 | 1.2 | V | $I_C = 1.0$ A, $I_B = 50$ mA | |
| Base to Emitter Voltage | V_{BE}^{***} | 600 | | 700 | mV | $V_{CE} = 2.0$ V, $I_C = 50$ mA | |
| Gain Bandwidth Product | f_T | 80 | 160 | | MHz | $V_{CE} = 2.0$ V, $I_E = -100$ mA | |
| Output Capacitance | C_{ob} | | 19 | | pF | $V_{CB} = 10$ V, $I_E = 0$, $f = 1.0$ MHz | |

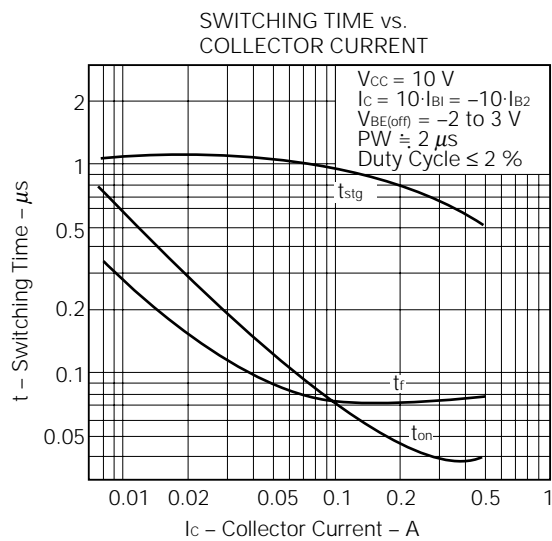
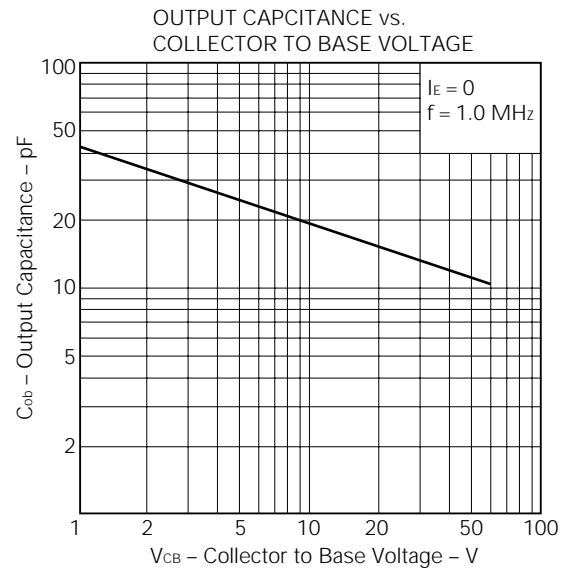
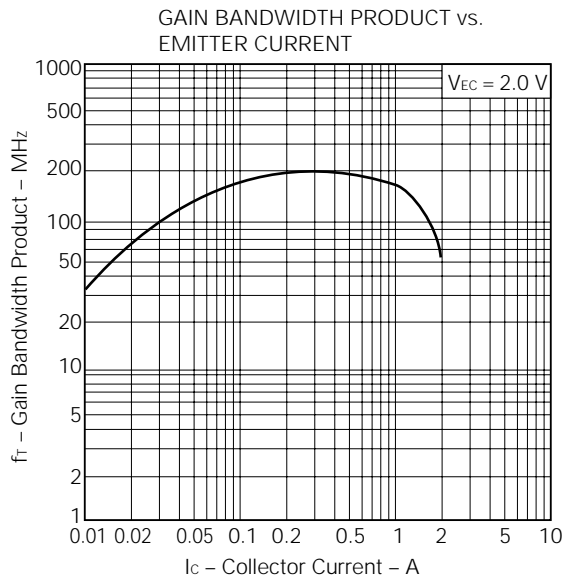
*** Pulsed: $PW \leq 350$ μ s, Duty Cycle ≤ 2 %

h_{FE} Classification

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

TYPICAL CHARACTERISTICS (T_A = 25 °C)





REFERENCE

| Document Name | Document No. |
|--|--------------|
| NEC semiconductor device reliability/quality control system. | TEI-1202 |
| Quality grade on NEC semiconductor devices. | IEI-1209 |
| Semiconductor device mounting technology manual. | IEI-1207 |
| Semiconductor device package manual. | IEI-1213 |
| Guide to quality assurance for semiconductor devices. | MEI-1202 |
| Semiconductor selection guide. | MF-1134 |

[MEMO]

No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Corporation. NEC Corporation assumes no responsibility for any errors which may appear in this document.

NEC Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a device described herein or any other liability arising from use of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Corporation or others.

While NEC Corporation has been making continuous effort to enhance the reliability of its semiconductor devices, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC semiconductor device, customer must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features.

NEC devices are classified into the following three quality grades:

"Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.

Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

The quality grade of NEC devices in "Standard" unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact NEC Sales Representative in advance.

Anti-radioactive design is not implemented in this product.