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January 2009

# 2SC5200/FJL4315

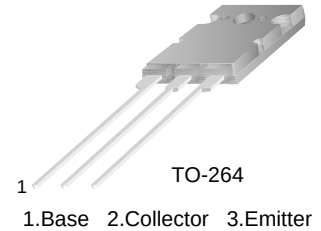
## NPN Epitaxial Silicon Transistor

### Applications

- High-Fidelity Audio Output Amplifier
- General Purpose Power Amplifier

### Features

- High Current Capability:  $I_C = 17A$ .
- High Power Dissipation : 150watts.
- High Frequency : 30MHz.
- High Voltage :  $V_{CEO}=250V$
- Wide S.O.A for reliable operation.
- Excellent Gain Linearity for low THD.
- Complement to 2SA1943/FJL4215.
- Thermal and electrical Spice models are available.
- Same transistor is also available in:
  - TO3P package, 2SC5242/FJA4313 : 130 watts
  - TO220 package, FJP5200 : 80 watts
  - TO220F package, FJPF5200 : 50 watts



### Absolute Maximum Ratings\* $T_a = 25^\circ C$ unless otherwise noted

| Symbol         | Parameter                                                                 | Ratings     | Units              |
|----------------|---------------------------------------------------------------------------|-------------|--------------------|
| $BV_{CBO}$     | Collector-Base Voltage                                                    | 250         | V                  |
| $BV_{CEO}$     | Collector-Emitter Voltage                                                 | 250         | V                  |
| $BV_{EBO}$     | Emitter-Base Voltage                                                      | 5           | V                  |
| $I_C$          | Collector Current(DC)                                                     | 17          | A                  |
| $I_B$          | Base Current                                                              | 1.5         | A                  |
| $P_D$          | Total Device Dissipation( $T_C=25^\circ C$ )<br>Derate above $25^\circ C$ | 150<br>1.04 | W<br>W/ $^\circ C$ |
| $T_J, T_{STG}$ | Junction and Storage Temperature                                          | - 50 ~ +150 | $^\circ C$         |

\* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

### Thermal Characteristics\* $T_a=25^\circ C$ unless otherwise noted

| Symbol          | Parameter                            | Max. | Units        |
|-----------------|--------------------------------------|------|--------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 0.83 | $^\circ C/W$ |

\* Device mounted on minimum pad size

### $h_{FE}$ Classification

| Classification | R        | O        |
|----------------|----------|----------|
| $h_{FE1}$      | 55 ~ 110 | 80 ~ 160 |

**Electrical Characteristics\***  $T_a=25^{\circ}\text{C}$  unless otherwise noted

| Symbol               | Parameter                            | Test Condition                        | Min. | Typ. | Max. | Units         |
|----------------------|--------------------------------------|---------------------------------------|------|------|------|---------------|
| $BV_{CBO}$           | Collector-Base Breakdown Voltage     | $I_C=5\text{mA}$ , $I_E=0$            | 250  |      |      | V             |
| $BV_{CEO}$           | Collector-Emitter Breakdown Voltage  | $I_C=10\text{mA}$ , $R_{BE}=\infty$   | 250  |      |      | V             |
| $BV_{EBO}$           | Emitter-Base Breakdown Voltage       | $I_E=5\text{mA}$ , $I_C=0$            | 5    |      |      | V             |
| $I_{CBO}$            | Collector Cut-off Current            | $V_{CB}=230\text{V}$ , $I_E=0$        |      |      | 5.0  | $\mu\text{A}$ |
| $I_{EBO}$            | Emitter Cut-off Current              | $V_{EB}=5\text{V}$ , $I_C=0$          |      |      | 5.0  | $\mu\text{A}$ |
| $h_{FE1}$            | DC Current Gain                      | $V_{CE}=5\text{V}$ , $I_C=1\text{A}$  | 55   |      | 160  |               |
| $h_{FE2}$            | DC Current Gain                      | $V_{CE}=5\text{V}$ , $I_C=7\text{A}$  | 35   | 60   |      |               |
| $V_{CE}(\text{sat})$ | Collector-Emitter Saturation Voltage | $I_C=8\text{A}$ , $I_B=0.8\text{A}$   |      | 0.4  | 3.0  | V             |
| $V_{BE}(\text{on})$  | Base-Emitter On Voltage              | $V_{CE}=5\text{V}$ , $I_C=7\text{A}$  |      | 1.0  | 1.5  | V             |
| $f_T$                | Current Gain Bandwidth Product       | $V_{CE}=5\text{V}$ , $I_C=1\text{A}$  |      | 30   |      | MHz           |
| $C_{ob}$             | Output Capacitance                   | $V_{CB}=10\text{V}$ , $f=1\text{MHz}$ |      | 200  |      | pF            |

\* Pulse Test: Pulse Width=20 $\mu\text{s}$ , Duty Cycle $\leq 2\%$ **Ordering Information**

| Part Number | Marking | Package | Packing Method | Remarks      |
|-------------|---------|---------|----------------|--------------|
| 2SC5200RTU  | C5200R  | TO-264  | TUBE           | hFE1 R grade |
| 2SC5200OTU  | C5200O  | TO-264  | TUBE           | hFE1 O grade |
| FJL4315RTU  | J4315R  | TO-264  | TUBE           | hFE1 R grade |
| FJL4315OTU  | J4315O  | TO-264  | TUBE           | hFE1 O grade |

## Typical Characteristics

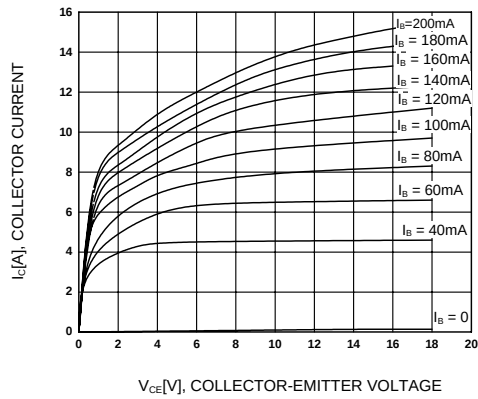


Figure 1. Static Characteristic

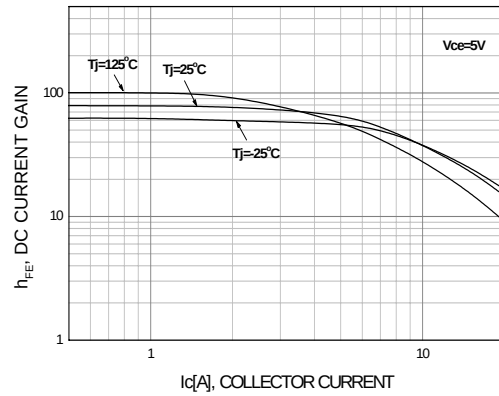


Figure 2. DC current Gain ( R grade )

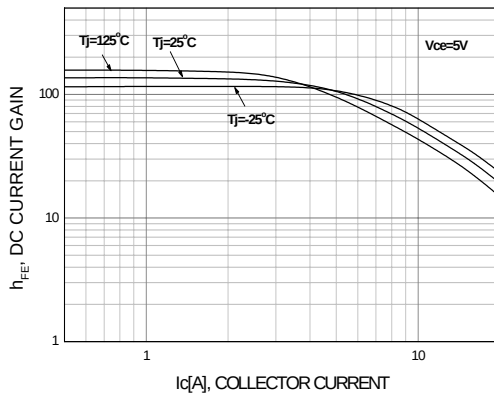


Figure 3. DC current Gain ( O grade )

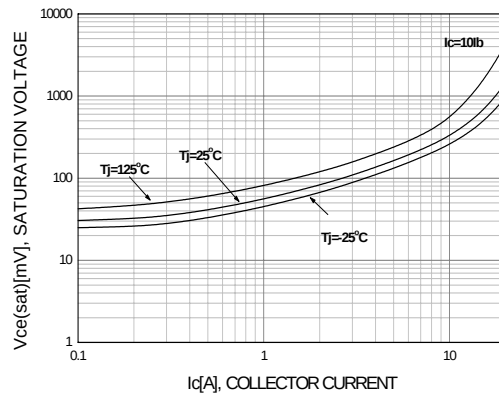


Figure 4. Collector-Emitter Saturation Voltage

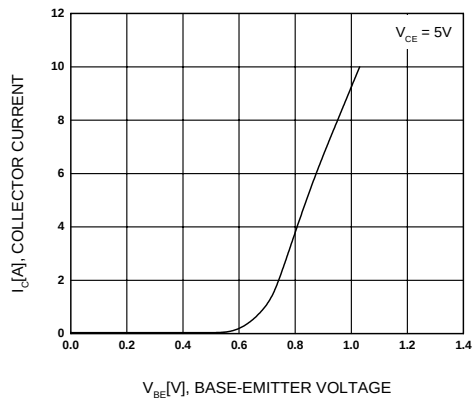


Figure 5. Base-Emitter On Voltage

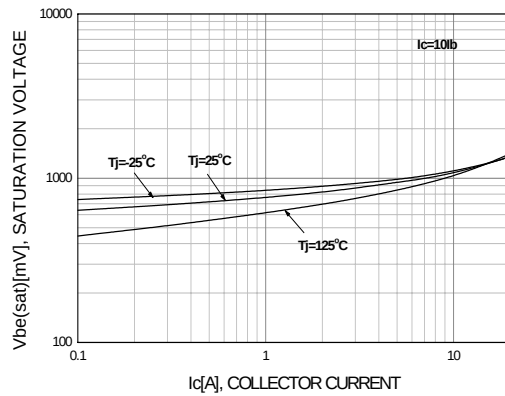


Figure 6. Base-Emitter Saturation Voltage

## Typical Characteristics

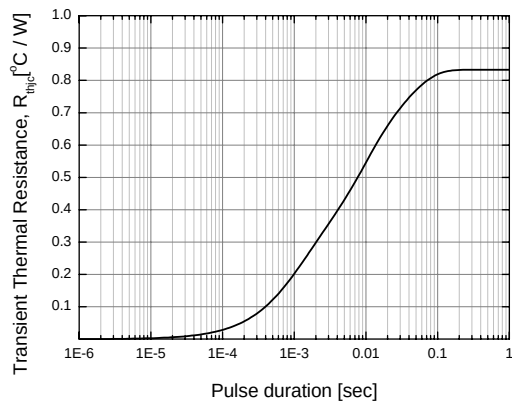


Figure 7. Power Derating

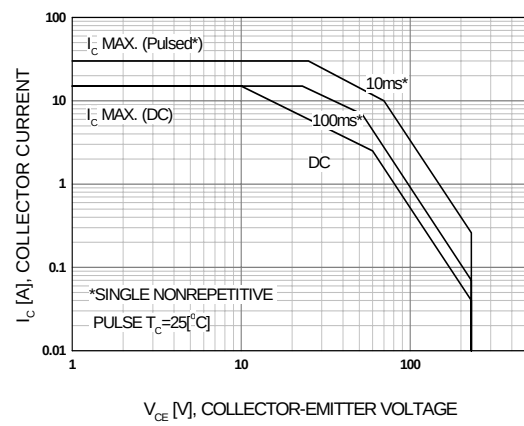


Figure 8. Safe Operating Area

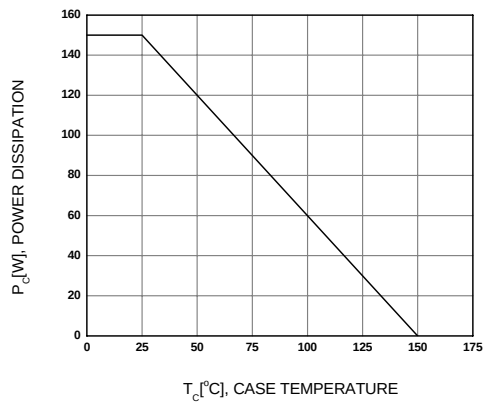
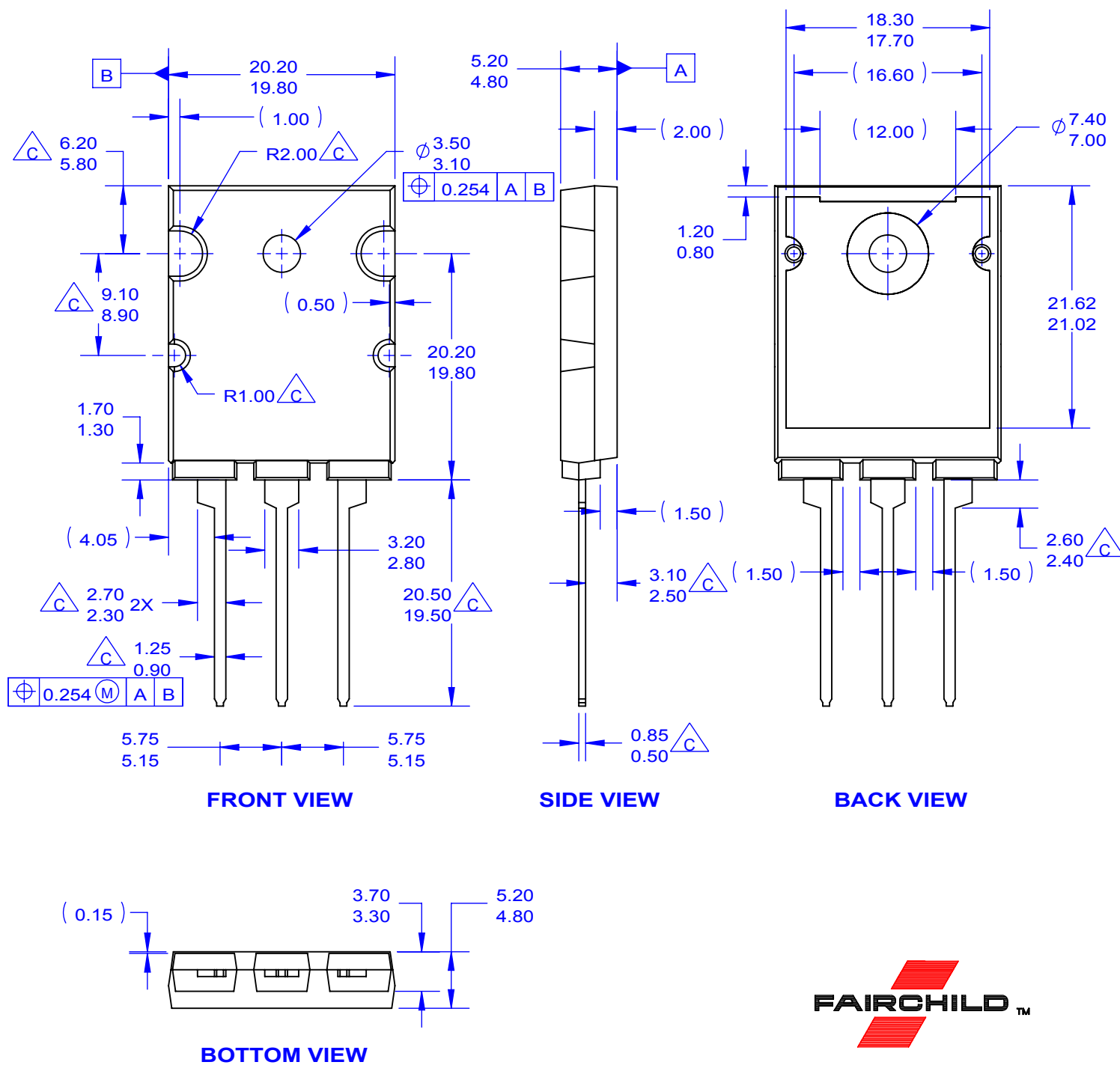


Figure 9. Power Derating



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