



January 2009

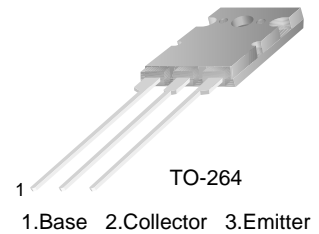
# 2SA1943/FJL4215 PNP Epitaxial Silicon Transistor

## 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 2SC5200/FJL4315.
- Full thermal and electrical Spice models are available.
- Same transistor is also available in:
  - TO3P package, 2SA1962/FJA4213 : 130 watts
  - TO220 package, FJP1943 : 80 watts
  - TO220F package, FJPF1943 : 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	-17	A
$I_B$	Base Current	-1.5	A
$P_D$	Total Device Dissipation( $T_C=25^\circ C$ ) Derate above $25^\circ C$	150 1.04	W 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	$V_{CB}=-10\text{V}, f=1\text{MHz}$		360		pF

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

Part Number	Marking	Package	Packing Method	Remarks
2SA1943RTU	A1943R	TO-264	TUBE	hFE1 R grade
2SA1943OTU	A1943O	TO-264	TUBE	hFE1 O grade
FJL4215RTU	J4215R	TO-264	TUBE	hFE1 R grade
FJL4215OTU	J4215O	TO-264	TUBE	hFE1 O grade

# Typical Characteristics

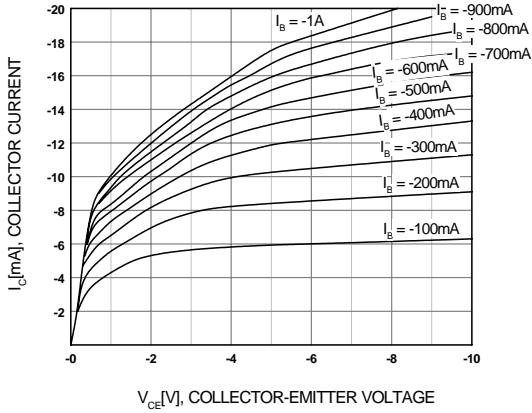


Figure 1. Static Characteristic

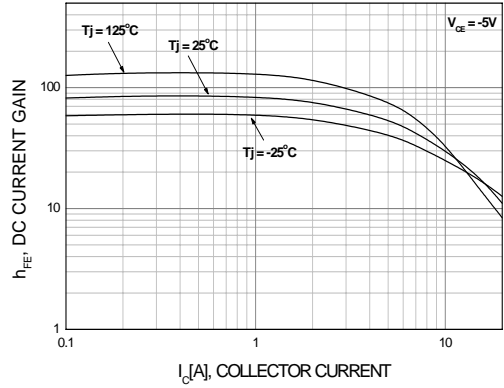


Figure 2. DC current Gain ( R Grade )

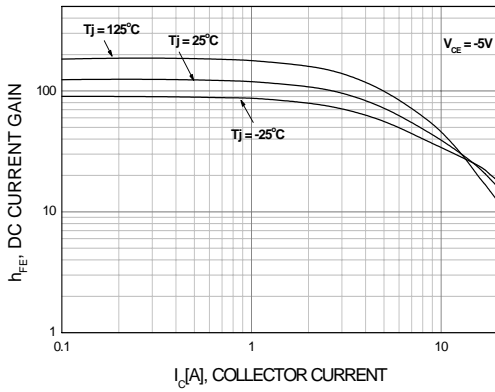


Figure 3. DC current Gain ( O Grade )

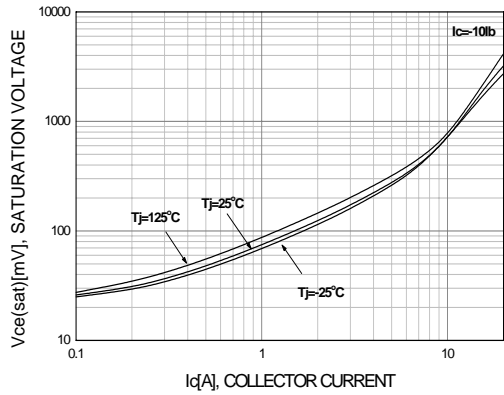


Figure 4. Collector-Emitter Saturation Voltage

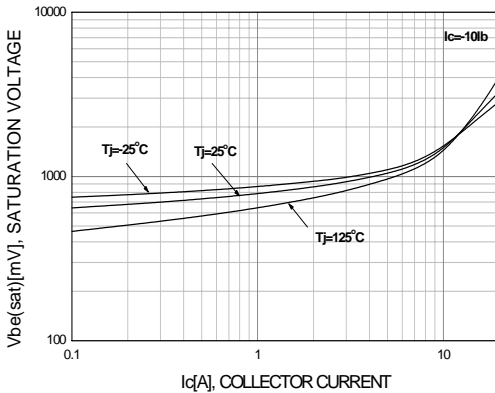


Figure 5. Base-Emitter Saturation Voltage

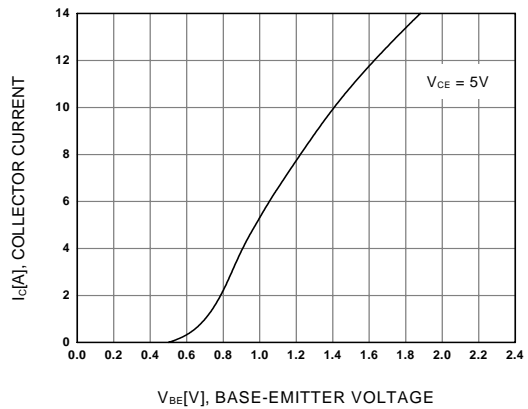


Figure 6. Base-Emitter On Voltage

# Typical Characteristics

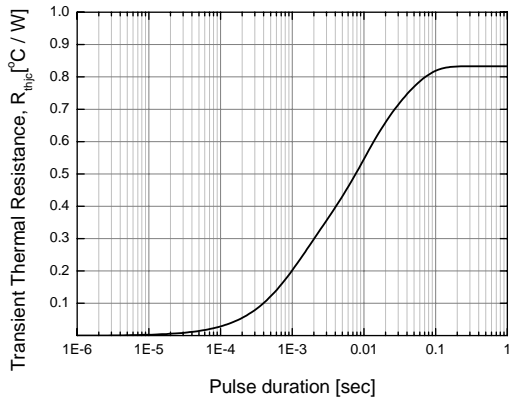


Figure 7. Thermal Resistance

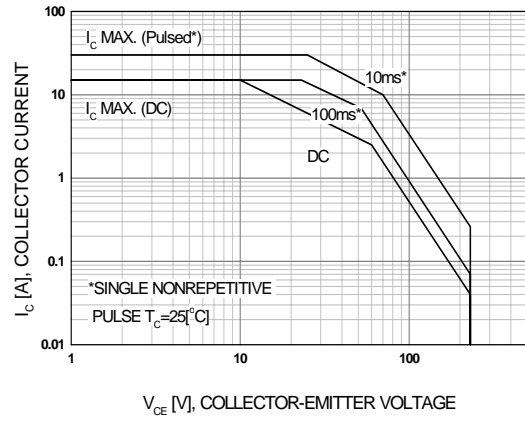


Figure 8. Safe Operating Area

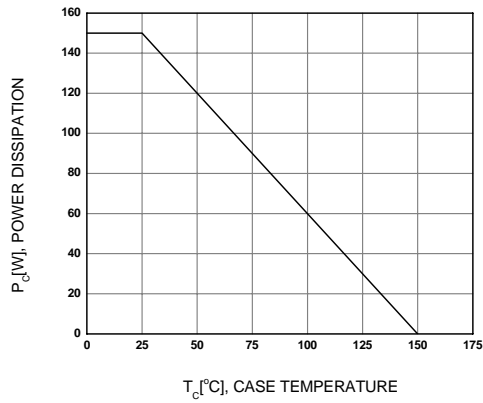
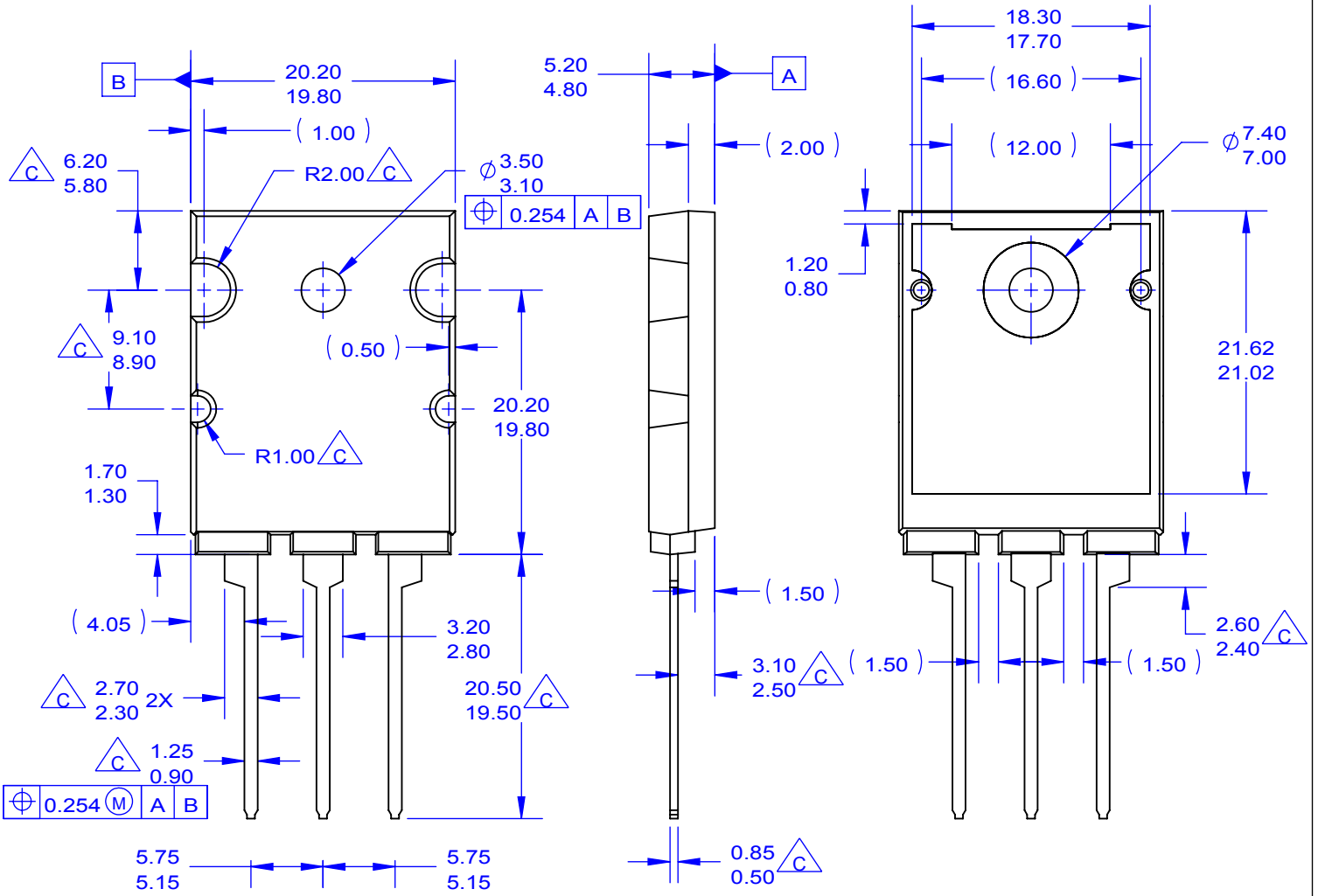


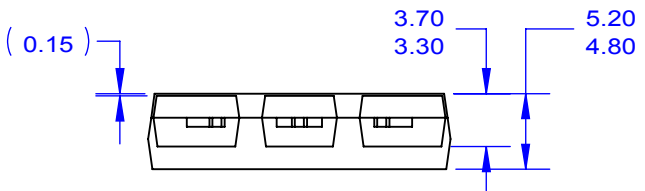
Figure 9. Power Derating



**FRONT VIEW**

**SIDE VIEW**

**BACK VIEW**



**BOTTOM VIEW**



**NOTES:**

- A. PACKAGE REFERENCE: JEDEC TO264 VARIATION AA.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- $\triangle C$  OUT OF JEDEC STANDARD VALUE.
- D. DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994.
- E. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- F. THIS PACKAGE IS INTENDED ONLY FOR "FS PKG CODE AR"
- G. DRAWING FILE NAME: TO264A03REV2

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
Phone: 81-3-5817-1050

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)  
**Order Literature:** <http://www.onsemi.com/orderlit>  
For additional information, please contact your local  
Sales Representative