**N-Channel RF Amplifier**

This device is designed primarily for electronic switching applications such as low On Resistance analog switching. Sourced from Process 50.

### Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{DG}$</td>
<td>Drain-Gate Voltage</td>
<td>25</td>
<td>V</td>
</tr>
<tr>
<td>$V_{GS}$</td>
<td>Gate-Source Voltage</td>
<td>-25</td>
<td>V</td>
</tr>
<tr>
<td>$I_{GF}$</td>
<td>Forward Gate Current</td>
<td>10</td>
<td>mA</td>
</tr>
<tr>
<td>$T_{J,T_{stg}}$</td>
<td>Operating and Storage Junction Temperature Range</td>
<td>-55 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

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

**NOTES:**
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

### Thermal Characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Characteristic</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_{D}$</td>
<td>Total Device Dissipation</td>
<td>2N5484-5486</td>
<td>225 mW</td>
</tr>
<tr>
<td></td>
<td>Derate above 25°C</td>
<td>*MMBF5484-5486</td>
<td>350 mW</td>
</tr>
<tr>
<td>$R_{JC}$</td>
<td>Thermal Resistance, Junction to Case</td>
<td>125 °C/W</td>
<td></td>
</tr>
<tr>
<td>$R_{JA}$</td>
<td>Thermal Resistance, Junction to Ambient</td>
<td>357 °C/W</td>
<td></td>
</tr>
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</table>

* Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06.*
### Electrical Characteristics

TA = 25°C unless otherwise noted

#### OFF CHARACTERISTICS

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{(BR)GSS}$</td>
<td>Gate-Source Breakdown Voltage</td>
<td>$I_D = -1.0 , \mu A, , V_{DS} = 0$</td>
<td>-25</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>$I_{GSS}$</td>
<td>Gate Reverse Current</td>
<td>$V_{GS} = -20 , V, , V_{DS} = 0$</td>
<td>-1.0</td>
<td>-0.2</td>
<td></td>
<td>nA</td>
</tr>
<tr>
<td>$V_{GS(0ff)}$</td>
<td>Gate-Source Cutoff Voltage</td>
<td>$V_{DS} = 15 , V, , I_D = 10 , nA$</td>
<td>5484</td>
<td>5485</td>
<td>5486</td>
<td>V</td>
</tr>
</tbody>
</table>

#### ON CHARACTERISTICS

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{DSS}$</td>
<td>Zero-Gate Voltage Drain Current*</td>
<td>$V_{DS} = 15 , V, , V_{GS} = 0$</td>
<td>5484</td>
<td>5485</td>
<td>5486</td>
<td>mA</td>
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#### SMALL SIGNAL CHARACTERISTICS

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<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>$g_{fs}$</td>
<td>Forward Transfer Conductance</td>
<td>$V_{DS} = 15 , V, , V_{GS} = 0, , f = 1.0 , kHz$</td>
<td>3000</td>
<td>3500</td>
<td>4000</td>
<td>$\mu$hos</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6000</td>
<td>7000</td>
<td>8000</td>
<td>$\mu$hos</td>
</tr>
<tr>
<td>$R_{y(0)}$</td>
<td>Input Conductance</td>
<td>$V_{DS} = 15 , V, , V_{GS} = 0, , f = 100 , MHz$</td>
<td>100</td>
<td></td>
<td></td>
<td>$\mu$hos</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{DS} = 15 , V, , V_{GS} = 0, , f = 400 , MHz$</td>
<td>1000</td>
<td></td>
<td></td>
<td>$\mu$hos</td>
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<tr>
<td>$g_{os}$</td>
<td>Output Conductance</td>
<td>$V_{DS} = 15 , V, , V_{GS} = 0, , f = 1.0 , kHz$</td>
<td>50</td>
<td>60</td>
<td>75</td>
<td>$\mu$hos</td>
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<tr>
<td>$R_{y(os)}$</td>
<td>Output Conductance</td>
<td>$V_{DS} = 15 , V, , V_{GS} = 0, , f = 100 , MHz$</td>
<td>75</td>
<td></td>
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<td>$V_{DS} = 15 , V, , V_{GS} = 0, , f = 400 , MHz$</td>
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<td></td>
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<td>$\mu$hos</td>
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<td>$R_{y(0)}$</td>
<td>Forward Transconductance</td>
<td>$V_{DS} = 15 , V, , V_{GS} = 0, , f = 100 , MHz$</td>
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<td>3000</td>
<td>3500</td>
<td></td>
<td>$\mu$hos</td>
</tr>
<tr>
<td>$C_{iss}$</td>
<td>Input Capacitance</td>
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<td>5.0</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>$C_{rss}$</td>
<td>Reverse Transfer Capacitance</td>
<td>$V_{DS} = 15 , V, , V_{GS} = 0, , f = 1.0 , MHz$</td>
<td>1.0</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>$C_{oss}$</td>
<td>Output Capacitance</td>
<td>$V_{DS} = 15 , V, , V_{GS} = 0, , f = 1.0 , MHz$</td>
<td>2.0</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>NF</td>
<td>Noise Figure</td>
<td>$V_{DS} = 15 , V, , R_{G} = 1.0 , k\Omega, , f = 100 , MHz$</td>
<td>5484</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{DS} = 15 , V, , R_{G} = 1.0 , k\Omega, , f = 400 , MHz$</td>
<td>4.0</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{DS} = 15 , V, , R_{G} = 1.0 , k\Omega, , f = 100 , MHz$</td>
<td>3.0</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{DS} = 15 , V, , R_{G} = 1.0 , k\Omega, , f = 400 , MHz$</td>
<td>2.0</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
</tbody>
</table>

*Pulse Test: Pulse Width ≤ 300 ms, Duty Cycle ≤ 2%
Typical Characteristics

Transfer Characteristics

Channel Resistance vs Temperature

Transconductance Characteristics

Common Drain-Source Characteristics

Output Conductance vs Drain Current

Transconductance Parameter Interactions

N-Channel RF Amplifier (continued)
N-Channel RF Amplifier
(continued)

Typical Characteristics (continued)

Transconductance vs Drain Current

Noise Voltage vs Frequency

Capacitance vs Voltage

Noise Figure Frequency

Power Dissipation vs. Ambient Temperature
Common Source Characteristics

### Input Admittance

- \( V_{ds} = 15V \)
- \( V_{ds} = 0 \)
- \( V_{gs} \) (CS)

\[ Y_{in} = \text{INPUT ADMITTANCE} \] (mmhos)

\[ f \rightarrow \text{FREQUENCY (MHz)} \]

### Output Admittance

- \( V_{ds} = 15V \)
- \( V_{ds} = 0 \)
- \( V_{gs} \) (CS)

\[ Y_{out} = \text{OUTPUT CONDUCTANCE} \] (mmhos)

\[ f \rightarrow \text{FREQUENCY (MHz)} \]

### Forward Transadmittance

- \( V_{ds} = 15V \)
- \( V_{ds} = 0 \)
- \( V_{gs} \) (CS)

\[ Y_{fs} = \text{FORWARD TRANSFER} \] (mmhos)

\[ f \rightarrow \text{FREQUENCY (MHz)} \]

### Reverse Transadmittance

- \( V_{ds} = 15V \)
- \( V_{ds} = 0 \)
- \( V_{gs} \) (CS)

\[ Y_{rs} = \text{REVERSE TRANSFER} \] (mmhos)

\[ f \rightarrow \text{FREQUENCY (MHz)} \]
Common Gate Characteristics

Input Admittance

Yin = INPUT ADMITTANCE (mmhos)

Vds = 15V
Vgs = 0
(CG)

f -- FREQUENCY (MHz)

Output Admittance

Yout = OUTPUT CONDUCTANCE (mmhos)

Vds = 15V
Vgs = 0
(CG)

f -- FREQUENCY (MHz)

Forward Transadmittance

Yf = FORWARD TRANSFER (mmhos)

Vds = 15V
Vgs = 0
(CG)

f -- FREQUENCY (MHz)

Reverse Transadmittance

Yr = REVERSE TRANSFER (mmhos)

Vds = 15V
Vgs = 0
(CG)

f -- FREQUENCY (MHz)
TO-92 Tape and Reel Data

TO-92 Packaging
Configuration: Figure 1.0

TO-92 Tape and Reel Data

TAPE and REEL OPTION
See Fig 2.0 for various Reeling Styles

AMMO PACK OPTION
See Fig 3.0 for 2 Ammo Pack Options

BULK OPTION
See Bulk Packing Information

( TO-92 ) BULK PACKING INFORMATION

<table>
<thead>
<tr>
<th>EOL CODE</th>
<th>DESCRIPTION</th>
<th>LEADCLIP</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>J18Z</td>
<td>TO-18 OPTION STD</td>
<td>NO-LEADCLIP</td>
<td>2.0 K / BOX</td>
</tr>
<tr>
<td>J55Z</td>
<td>TO-5 OPTION STD</td>
<td>NO-LEADCLIP</td>
<td>1.5 K / BOX</td>
</tr>
<tr>
<td>NO EOL</td>
<td>TO-92 STANDARD STRAIGHT FOR: PKG 92, 94 (NON PROELECTRON SERIES), 95</td>
<td>NO-LEADCLIP</td>
<td>2.0 K / BOX</td>
</tr>
<tr>
<td>LA2Z</td>
<td>TO-92 STANDARD STRAIGHT FOR: PKG 92, 94 (PROELECTRON SERIES BCXXX, BFXXX, BSRXXX, 97, 98)</td>
<td>NO-LEADCLIP</td>
<td>2.0 K / BOX</td>
</tr>
</tbody>
</table>

Lot: CBVK741B019
NSID: PN2222N
D/C1: D9842
SPEC REV: B2
SPEC:         QTY: 10000
QA REV:       FAIRCHILD SEMICONDUCTOR CORPORATION
HTB: B

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March 2001, Rev. B1
TO-92 Tape and Reel Data, continued

TO-92 Reeling Style
Configuration: Figure 2.0

Machine Option “A” (H)
Style “A”, D26Z, D70Z (s/h)
FIRST WIRE OFF IS EMITTER
ADHESIVE TAPE IS ON THE TOP SIDE
FLAT OF TRANSISTOR IS ON BOTTOM

Machine Option “E” (J)
Style “E”, D27Z, D71Z (s/h)
FIRST WIRE OFF IS COLLECTOR
ADHESIVE TAPE IS ON BOTTOM SIDE
FLAT OF TRANSISTOR IS ON TOP

TO-92 Radial Ammo Packaging
Configuration: Figure 3.0

ORDER STYLE
D74Z (M)
FIRST WIRE OFF IS EMITTER
ADHESIVE TAPE IS ON BOTTOM SIDE
FLAT OF TRANSISTOR IS ON BOTTOM

ORDER STYLE
D75Z (P)
FIRST WIRE OFF IS COLLECTOR ON PKG. 92
ADHESIVE TAPE IS ON BOTTOM SIDE
FLAT OF TRANSISTOR IS ON TOP

September 1999, Rev. B
TO-92 Tape and Reel Data, continued

TO-92 Tape and Reel Taping
Dimension Configuration: Figure 4.0

User Direction of Feed

TO-92 Reel
Configuration: Figure 5.0

Note: All dimensions are in inches.

July 1999, Rev. A
TO-92 Package Dimensions

TO-92 (FS PKG Code 92, 94, 96)

Scale 1:1 on letter size paper
Dimensions shown below are in:
inches [millimeters]

Part Weight per unit (gram): 0.1977

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SOT-23 Tape and Reel Data

SOT-23 Packaging
Configuration: Figure 10

Packaging Description:
SOT-23 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polywater film, adhesive layer, sealant, and antistatic sprayed agent. These nested parts in standard option are shipped with 3,000 units per 7" or 177cm diameter reel. The reels are dark blue in color and made of polystyrene plastic (antistatic coated). Other option comes in 10,000 units per 13" or 330cm diameter reel. This and some other options are described in the Packaging Information table.

These full reels are individually labeled and placed inside a standard intermediate case of recyclable corrugated brown paper with a Fairchild logo printing. One pizza box contains eight reels maximum. And these intermediate boxes are placed inside a labeled shipping box which comes in different sizes depending on the number of parts shipped.

<table>
<thead>
<tr>
<th>SOT-23 Packaging/Information</th>
<th>Standard</th>
<th>D87Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packaging/Option</td>
<td>TNR</td>
<td>TNR</td>
</tr>
<tr>
<td>Qty per Reel/Tube/Bag</td>
<td>3,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Reel Diameter (in)</td>
<td>7&quot;</td>
<td>13&quot;</td>
</tr>
<tr>
<td>Box Dimension (mm)</td>
<td>187x107x183</td>
<td>343x343x64</td>
</tr>
<tr>
<td>Max qty per Box</td>
<td>24,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Weight per unit (gm)</td>
<td>0.0082</td>
<td>0.0082</td>
</tr>
<tr>
<td>Weight per Reel (kg)</td>
<td>0.1175</td>
<td>0.4006</td>
</tr>
<tr>
<td>Note/Comments</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOT-23 Unit Orientation

343mm x 342mm x 64mm
Intermediate Box for L87Z Option

187mm x 107mm x 183mm
Intermediate Box for Standard Option

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September 1999, Rev. C
SOT-23 Tape and Reel Data, continued

SOT-23 Embossed Carrier Tape
Configuration: Figure 3.0

Dimensions are in millimeter

<table>
<thead>
<tr>
<th>Pkg type</th>
<th>A0</th>
<th>B0</th>
<th>W</th>
<th>D0</th>
<th>D1</th>
<th>E1</th>
<th>E2</th>
<th>F</th>
<th>P1</th>
<th>P0</th>
<th>K0</th>
<th>T</th>
<th>Wc</th>
<th>Tc</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOT-23</td>
<td>3.15</td>
<td>2.77</td>
<td>8.0</td>
<td>1.55</td>
<td>1.26</td>
<td>1.75</td>
<td>6.35</td>
<td>3.50</td>
<td>4.0</td>
<td>4.0</td>
<td>1.35</td>
<td>0.06</td>
<td>3.2</td>
<td>0.06</td>
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</tbody>
</table>

Notes: A0, B0, and K0 dimensions are determined with respect to the EIA/Jedec RS-481 rotational and lateral movement requirements (see sketches A, B, and C).

20 deg maximum component rotation

Sketch A (Side or Front Sectional View)
Component Rotation

Sketch B (Top View)
Component Rotation

Sketch C (Top View)
Component lateral movement

W1 Measured at Hub

7” Diameter Option

13” Diameter Option

W2 max Measured at Hub

Dimensions are in inches and millimeters

<table>
<thead>
<tr>
<th>Tape Size</th>
<th>Reel Option</th>
<th>Dim A</th>
<th>Dim B</th>
<th>Dim C</th>
<th>Dim D</th>
<th>Dim N</th>
<th>Dim W1</th>
<th>Dim W2</th>
<th>Dim W3 (LSL-USL)</th>
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</thead>
<tbody>
<tr>
<td>8mm</td>
<td>7” Dia</td>
<td>0.059</td>
<td>0.059</td>
<td>0.059</td>
<td>0.311</td>
<td>0.008</td>
<td>0.311</td>
<td>0.008</td>
<td>0.311 – 0.429</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.008</td>
<td>0.008</td>
<td>7.9 – 10.9</td>
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<tr>
<td>8mm</td>
<td>13” Dia</td>
<td>0.059</td>
<td>0.059</td>
<td>0.059</td>
<td>0.331</td>
<td>0.008</td>
<td>0.331</td>
<td>0.008</td>
<td>0.331 – 0.429</td>
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<td></td>
<td></td>
<td></td>
<td>0.008</td>
<td>0.008</td>
<td>7.9 – 10.9</td>
</tr>
</tbody>
</table>

User Direction of Feed

SOT-23 Reel Configuration: Figure 4.0

September 1999, Rev. C
SOT-23 Package Dimensions

SOT-23 (FS PKG Code 49)

Scale 1:1 on letter size paper
Dimensions shown below are in:
inches [millimeters]
Part Weight per unit (gram): 0.0082

NOTE: UNLESS OTHERWISE SPECIFIED
1. STANDARD LEAD FINISH: 150 MICROINCHES / 3.81 MICROMETERS
   MINIMUM TIN / LEAD (SOLDER) ON ALLOY 42
2. REFERENCE JEDEC REGISTRATION TO-236, VARIATION A3, ISSUE G, DATED JUL 1993
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<tr>
<td>ACEx™</td>
<td>FAST™</td>
<td>PowerTrench®</td>
<td>SyncFET™</td>
</tr>
<tr>
<td>Bottomless™</td>
<td>GlobalOptoisolator™</td>
<td>QFET™</td>
<td>TinyLogic™</td>
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<td>CoolFET™</td>
<td>GTO™</td>
<td>QS™</td>
<td>UHC™</td>
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<td>QT Optoelectronics™</td>
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<td>DOME™</td>
<td>ISOPLANAR™</td>
<td>Quiet Series™</td>
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<tr>
<td>E²CMOS™</td>
<td>MICROWIRE™</td>
<td>SILENT SWITCHER®</td>
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<td>EnSigna™</td>
<td>OPTOLOGIC™</td>
<td>SMART START™</td>
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<td>FACT™</td>
<td>OPTOPLANAR™</td>
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<td>FACT Quiet Series™</td>
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<td>FAST®</td>
<td>POP™</td>
<td>SuperSOT™-8</td>
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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

<table>
<thead>
<tr>
<th>Datasheet Identification</th>
<th>Product Status</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advance Information</td>
<td>Formative or In Design</td>
<td>This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.</td>
</tr>
<tr>
<td>Preliminary</td>
<td>First Production</td>
<td>This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.</td>
</tr>
<tr>
<td>No Identification Needed</td>
<td>Full Production</td>
<td>This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.</td>
</tr>
<tr>
<td>Obsolete</td>
<td>Not In Production</td>
<td>This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.</td>
</tr>
</tbody>
</table>