

BFR30LT1, BFR31LT1

JFET Amplifiers

N-Channel

Features

- Pb-Free Package is Available

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|----------------------|----------|-------|------|
| Drain-Source Voltage | V_{DS} | 25 | Vdc |
| Gate-Source Voltage | V_{GS} | 25 | Vdc |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

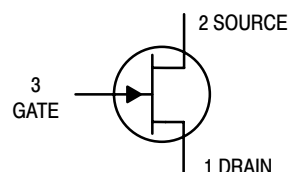
| Characteristic | Symbol | Max | Unit |
|---|-----------------|-------------|----------------------------|
| Total Device Dissipation (Note 1) $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 225 1.8 | mW mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 556 | $^\circ\text{C}/\text{W}$ |
| Total Device Dissipation Alumina Substrate, (Note 2) $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 300 2.4 | mW mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 417 | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

- Device mounted on FR4 glass epoxy printed circuit board using the recommended footprint.
- Alumina = 0.4 x 0.3 x 0.024 in 99.5% alumina.

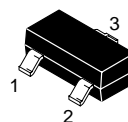


ON Semiconductor®

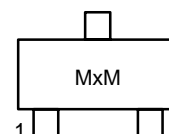
<http://onsemi.com>



MARKING DIAGRAM



SOT-23
CASE 318
STYLE 10



x = 1 or 2
M = Date Code

ORDERING INFORMATION

| Device | Package | Shipping† |
|-----------|---------------------|------------------|
| BFR30LT1 | SOT-23 | 3000/Tape & Reel |
| BFR30LT1G | SOT-23 (Pb-Free) | 3000/Tape & Reel |
| BFR31LT1 | SOT-23 | 3000/Tape & Reel |
| BFR31LT1G | SOT-23 (Pb-Free) | 3000/Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

BFR30LT1, BFR31LT1

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|--|----------------------|------|------|------|
| OFF CHARACTERISTICS | | | | |
| Gate Reverse Current (V _{GS} = 10 Vdc, V _{DS} = 0) | I _{GSS} | – | 0.2 | nAdc |
| Gate Source Cutoff Voltage (I _D = 0.5 nAdc, V _{DS} = 10 Vdc) | V _{GS(OFF)} | – | 5.0 | Vdc |
| Gate Source Voltage (I _D = 1.0 mAdc, V _{DS} = 10 Vdc) | BFR30 | –0.7 | –3.0 | Vdc |
| | BFR31 | – | –1.3 | |
| | BFR30 | – | –4.0 | |
| | BFR31 | – | –2.0 | |
| (I _D = 50 μAdc, V _{DS} = 10 Vdc) | BFR30 | – | – | |
| BFR31 | – | – | | |

ON CHARACTERISTICS

| | | | | |
|---|------------------|-----|-----|------|
| Zero-Gate-Voltage Drain Current (V _{DS} = 10 Vdc, V _{GS} = 0) | I _{DSS} | 4.0 | 10 | mAdc |
| | BFR30 | 1.0 | 5.0 | |
| | BFR31 | | | |

SMALL-SIGNAL CHARACTERISTICS

| | | | | |
|---|------------------|------|-----|-------|
| Forward Transconductance (I _D = 1.0 mAdc, V _{DS} = 10 Vdc, f = 1.0 kHz) | y _{fs} | 1.0 | 4.0 | mmhos |
| | BFR30 | 1.5 | 4.5 | |
| (I _D = 200 μAdc, V _{DS} = 10 Vdc, f = 1.0 kHz) | BFR30 | 0.5 | – | |
| | BFR31 | 0.75 | – | |
| Output Admittance (I _D = 1.0 mAdc, V _{DS} = 10 Vdc, f = 1.0 kHz) | y _{os} | 40 | 25 | μmhos |
| | BFR30 | 20 | 15 | |
| (I _D = 200 μAdc, V _{DS} = 10 Vdc) | | | | |
| Input Capacitance (I _D = 1.0 mAdc, V _{DS} = 10 Vdc, f = 1.0 MHz) | C _{iss} | – | 5.0 | pF |
| | | – | 4.0 | |
| (I _D = 200 μAdc, V _{DS} = 10 Vdc, f = 1.0 MHz) | | | | |
| Reverse Transfer Capacitance (I _D = 1.0 mAdc, V _{DS} = 10 Vdc, f = 1.0 MHz) | C _{rss} | – | 1.5 | pF |
| | | – | 1.5 | |
| (I _D = 200 μAdc, V _{DS} = 10 Vdc, f = 1.0 MHz) | | | | |

TYPICAL CHARACTERISTICS

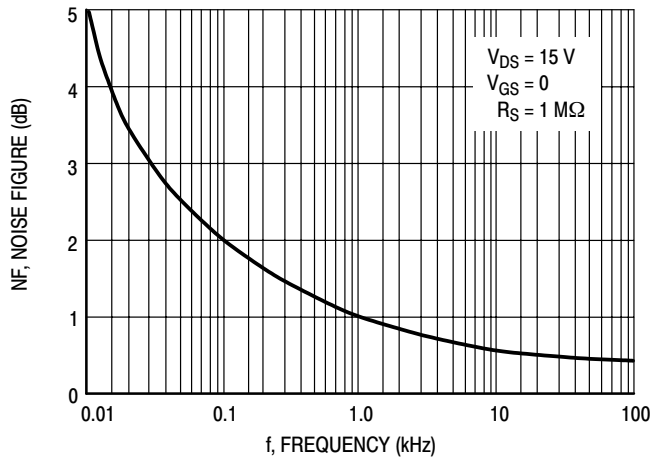


Figure 1. Noise Figure versus Frequency

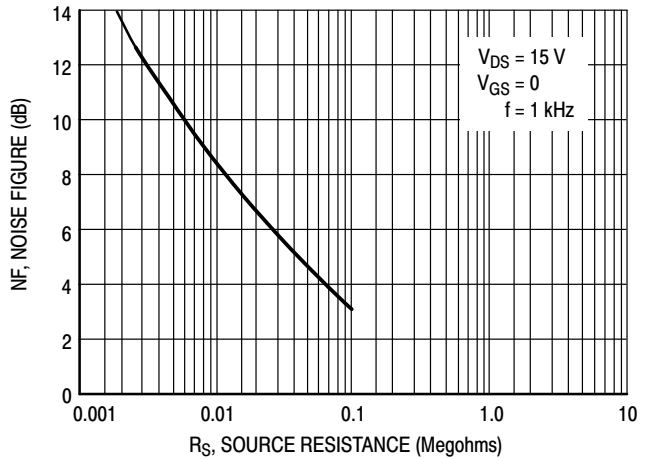


Figure 2. Noise Figure versus Source Resistance

BFR30LT1, BFR31LT1

TYPICAL CHARACTERISTICS

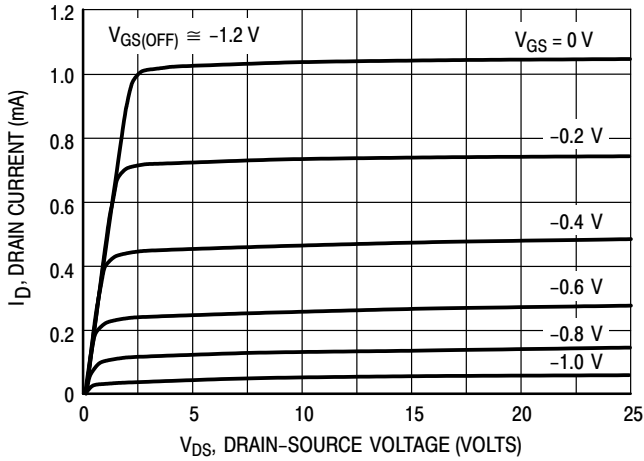


Figure 3. Typical Drain Characteristics

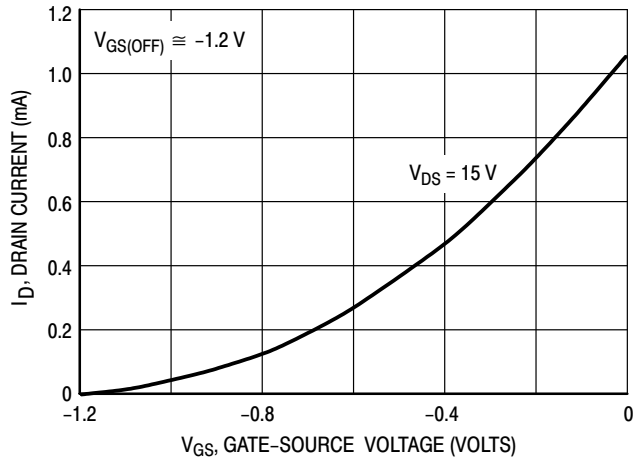


Figure 4. Common Source Transfer Characteristics

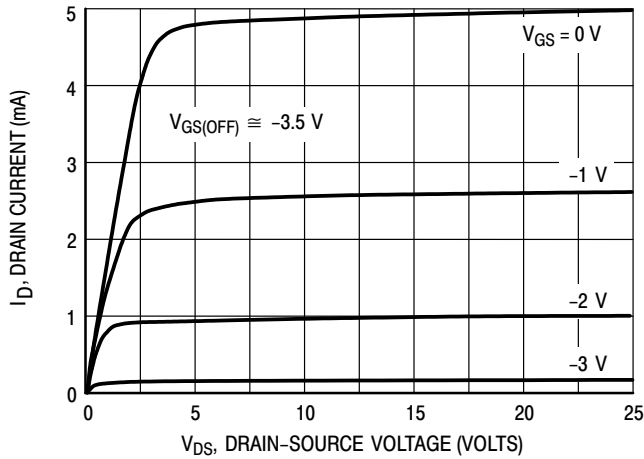


Figure 5. Typical Drain Characteristics

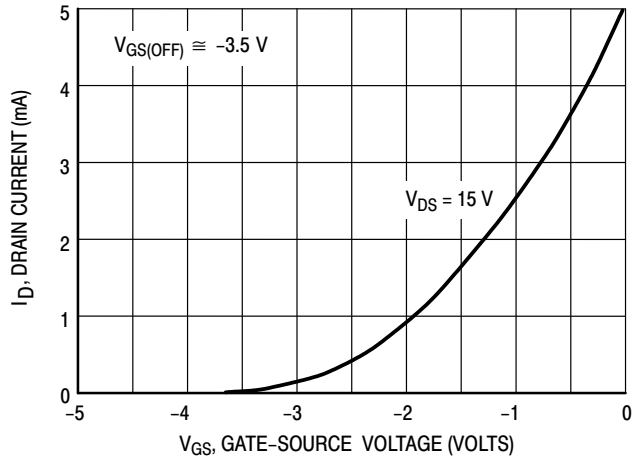


Figure 6. Common Source Transfer Characteristics

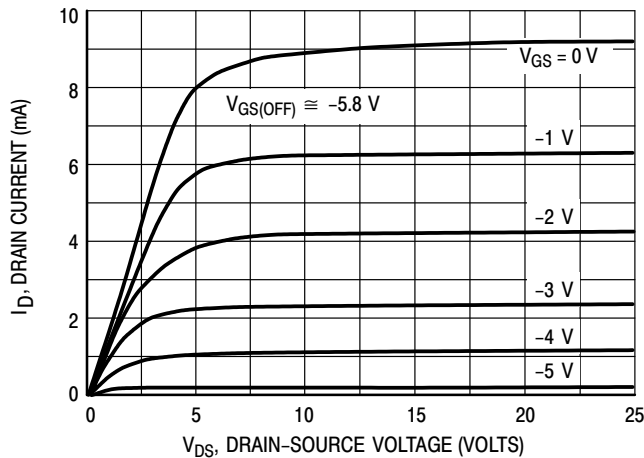


Figure 7. Typical Drain Characteristics

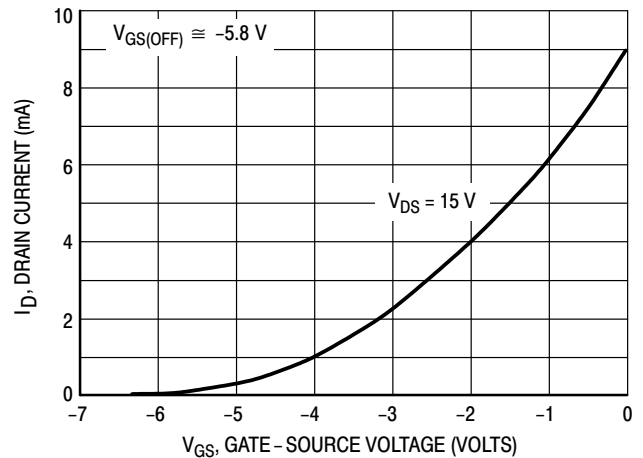


Figure 8. Common Source Transfer Characteristics

Note: Graphical data is presented for dc conditions. Tabular data is given for pulsed conditions (Pulse Width = 630 ms, Duty Cycle = 10%). Under dc conditions, self heating in higher I_{DSS} units reduces I_{DSS} .

MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



SOT-23 (TO-236)
CASE 318
ISSUE AT

DATE 01 MAR 2023

SCALE 4:1



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

| DIM | MILLIMETERS | | | INCHES | | |
|----------------|-------------|------|------|--------|-------|-------|
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | 0.89 | 1.00 | 1.11 | 0.035 | 0.039 | 0.044 |
| A1 | 0.01 | 0.06 | 0.10 | 0.000 | 0.002 | 0.004 |
| b | 0.37 | 0.44 | 0.50 | 0.015 | 0.017 | 0.020 |
| c | 0.08 | 0.14 | 0.20 | 0.003 | 0.006 | 0.008 |
| D | 2.80 | 2.90 | 3.04 | 0.110 | 0.114 | 0.120 |
| E | 1.20 | 1.30 | 1.40 | 0.047 | 0.051 | 0.055 |
| e | 1.78 | 1.90 | 2.04 | 0.070 | 0.075 | 0.080 |
| L | 0.30 | 0.43 | 0.55 | 0.012 | 0.017 | 0.022 |
| L1 | 0.35 | 0.54 | 0.69 | 0.014 | 0.021 | 0.027 |
| H _E | 2.10 | 2.40 | 2.64 | 0.083 | 0.094 | 0.104 |
| T | 0° | --- | 10° | 0° | --- | 10° |

GENERIC MARKING DIAGRAM*



- XXX = Specific Device Code
- M = Date Code
- = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.



RECOMMENDED MOUNTING FOOTPRINT

* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

STYLES ON PAGE 2

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MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS



SOT-23 (TO-236)
CASE 318
ISSUE AT

DATE 01 MAR 2023

- | | | | | | |
|---|---|---|---|---|---|
| STYLE 1 THRU 5: CANCELLED | STYLE 6: PIN 1. BASE 2. EMITTER 3. COLLECTOR | STYLE 7: PIN 1. EMITTER 2. BASE 3. COLLECTOR | STYLE 8: PIN 1. ANODE 2. NO CONNECTION 3. CATHODE | | |
| STYLE 9: PIN 1. ANODE 2. ANODE 3. CATHODE | STYLE 10: PIN 1. DRAIN 2. SOURCE 3. GATE | STYLE 11: PIN 1. ANODE 2. CATHODE 3. CATHODE-ANODE | STYLE 12: PIN 1. CATHODE 2. CATHODE 3. ANODE | STYLE 13: PIN 1. SOURCE 2. DRAIN 3. GATE | STYLE 14: PIN 1. CATHODE 2. GATE 3. ANODE |
| STYLE 15: PIN 1. GATE 2. CATHODE 3. ANODE | STYLE 16: PIN 1. ANODE 2. CATHODE 3. CATHODE | STYLE 17: PIN 1. NO CONNECTION 2. ANODE 3. CATHODE | STYLE 18: PIN 1. NO CONNECTION 2. CATHODE 3. ANODE | STYLE 19: PIN 1. CATHODE 2. ANODE 3. CATHODE-ANODE | STYLE 20: PIN 1. CATHODE 2. ANODE 3. GATE |
| STYLE 21: PIN 1. GATE 2. SOURCE 3. DRAIN | STYLE 22: PIN 1. RETURN 2. OUTPUT 3. INPUT | STYLE 23: PIN 1. ANODE 2. ANODE 3. CATHODE | STYLE 24: PIN 1. GATE 2. DRAIN 3. SOURCE | STYLE 25: PIN 1. ANODE 2. CATHODE 3. GATE | STYLE 26: PIN 1. CATHODE 2. ANODE 3. NO CONNECTION |
| STYLE 27: PIN 1. CATHODE 2. CATHODE 3. CATHODE | STYLE 28: PIN 1. ANODE 2. ANODE 3. ANODE | | | | |

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