BFR30LT1, BFR31LT1

JFET Amplifiers

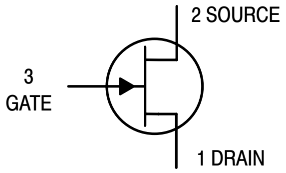
N−Channel

ON Semiconductor®

http://onsemi.com

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

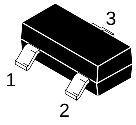
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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

THERMAL CHARACTERISTICS

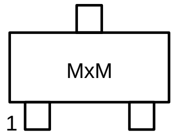
Characteristic	Symbol	Max	Unit
Total Device Dissipation (Note 1) T_A = 25°C Derate above 25°C	P_D	 225 1.8	 mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate, (Note 2) T_A = 25°C Derate above 25°C	P_D	300 2.4	mW mW/°C
Thermal Resistance,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

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

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.

February, 2005 − Rev. 4

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)	BFR30	$V_{GS(OFF)}$	−	5.0	Vdc
		BFR31		−	2.5	
Gate Source Voltage	(I_D = 1.0 mAdc, V_{DS} = 10 Vdc)	BFR30	V_{GS}	−0.7	−3.0	Vdc
		BFR31		−	−1.3	
	(I_D = 50 μAdc, V_{DS} = 10 Vdc)	BFR30		−	−4.0	
		BFR31		−	−2.0	
ON CHARACTERISTICS						
Zero−Gate−Voltage Drain Current	(V_{DS} = 10 Vdc, V_{GS} = 0)	BFR30	I_{DSS}	4.0	10	mAdc
		BFR31		1.0	5.0	
SMALL−SIGNAL CHARACTERISTICS						
Forward Transconductance			$\lvert y_{fs} \rvert$			mmhos
	(I_D = 1.0 mAdc, V_{DS} = 10 Vdc, f = 1.0 kHz)	BFR30		1.0	4.0	
		BFR31		1.5	4.5	
	(I_D = 200 μAdc, V_{DS} = 10 Vdc, f = 1.0 kHz)	BFR30		0.5	−	
		BFR31		0.75	−	
Output Admittance			$\lvert y_{os} \rvert$			μmhos
	(I_D = 1.0 mAdc, V_{DS} = 10 Vdc, f = 1.0 kHz)	BFR30		40	25	
	(I_D = 200 μAdc, V_{DS} = 10 Vdc)	BFR31		20	15	
Input Capacitance	(I_D = 1.0 mAdc, V_{DS} = 10 Vdc, f = 1.0 MHz)		C_{iss}	−	5.0	pF
	(I_D = 200 μAdc, V_{DS} = 10 Vdc, f = 1.0 MHz)			−	4.0	
Reverse Transfer Capacitance	(I_D = 1.0 mAdc, V_{DS} = 10 Vdc, f = 1.0 MHz)		C_{rss}	−	1.5	pF
	(I_D = 200 μAdc, V_{DS} = 10 Vdc, f = 1.0 MHz)			−	1.5	

TYPICAL CHARACTERISTICS

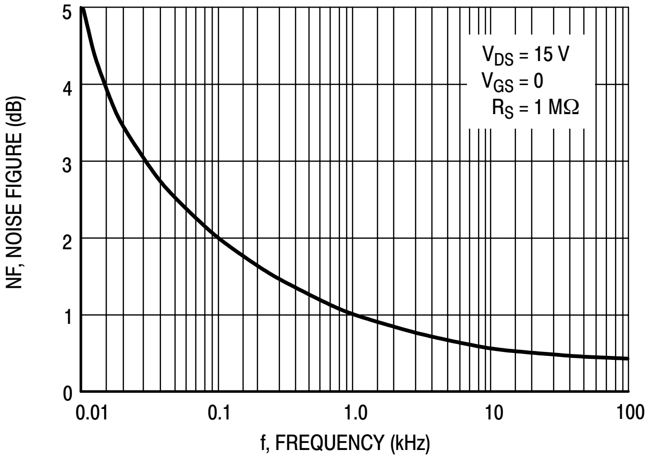


Figure 1. Noise Figure versus Frequency

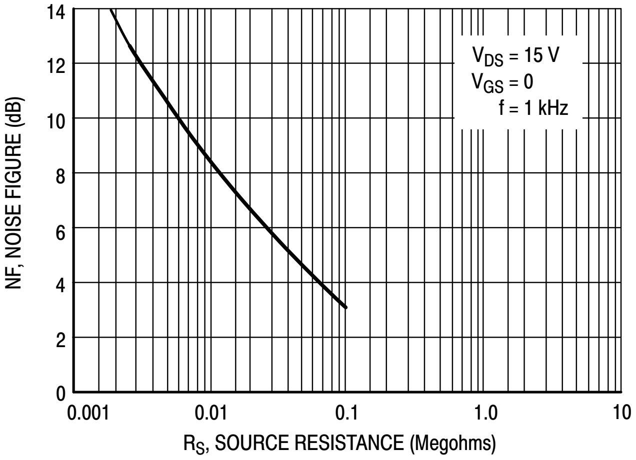


Figure 2. Noise Figure versus Source Resistance

TYPICAL CHARACTERISTICS

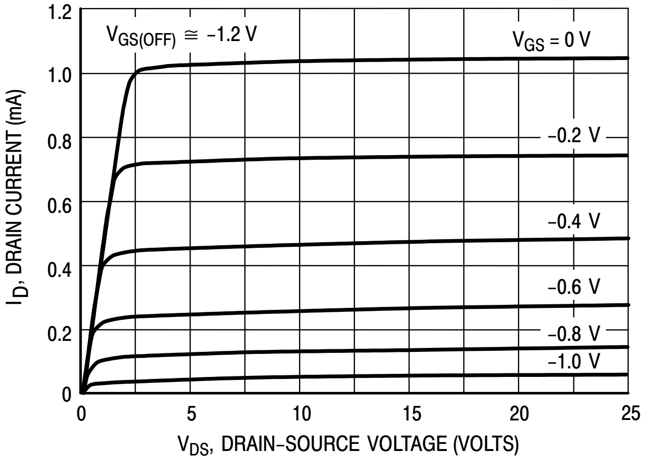


Figure 3. Typical Drain Characteristics

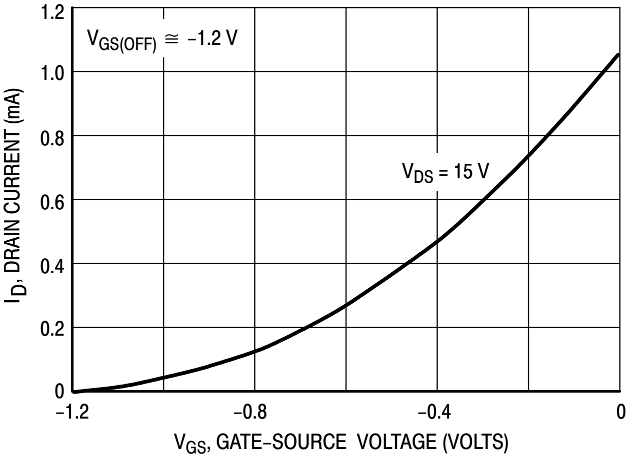


Figure 4. Common Source Transfer Characteristics

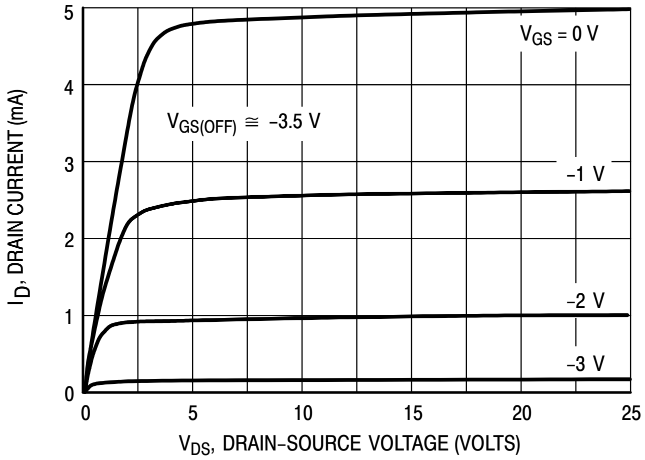


Figure 5. Typical Drain Characteristics

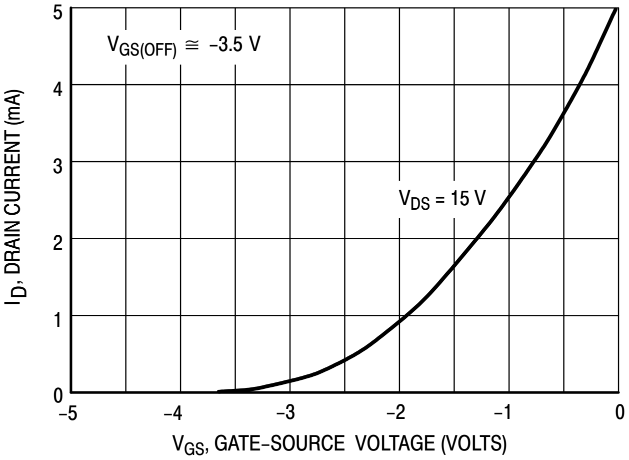


Figure 6. Common Source Transfer Characteristics

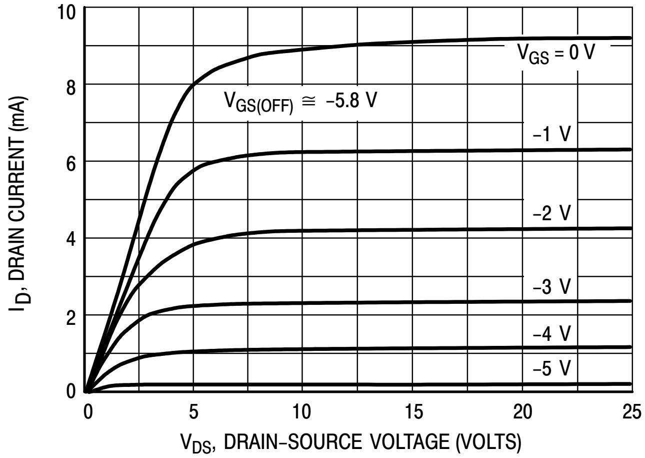


Figure 7. Typical Drain Characteristics

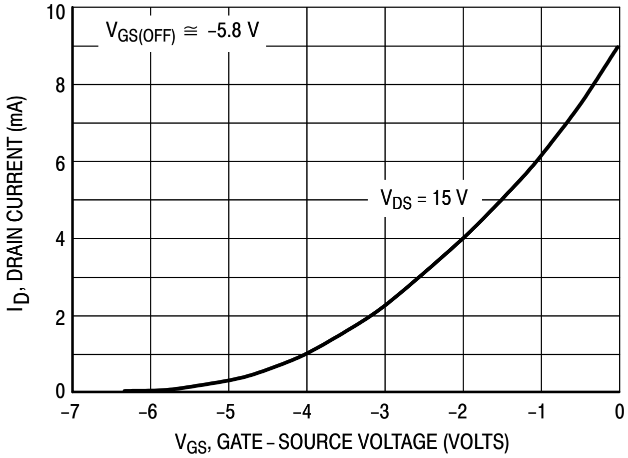
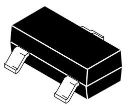


Figure 8. Common Source Transfer Characteristics

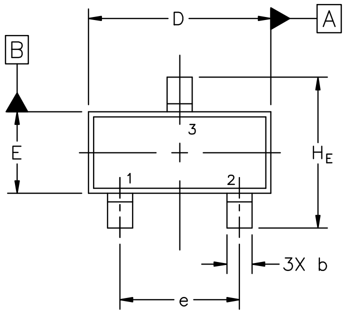
Note: Graphical data is presented for dc conditions. Tabular data is given for pulsed conditions (Pulse Width = 630 ms, Duty Cycle = 10%). Under dc conditions, self heating in higher I_{DSS} units reduces I_{DSS}.



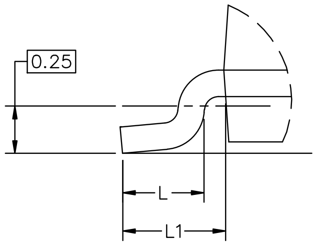
SCALE 4:1

SOT−23 (TO−236) 2.90x1.30x1.00 1.90P
CASE 318
ISSUE AU

DATE 14 AUG 2024

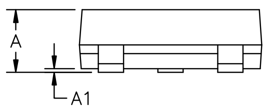


TOP VIEW

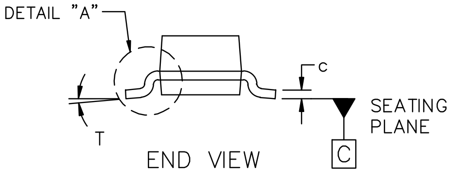


DETAIL "A"
Scale 3:1

DIM	MILLIMETERS MIN	MILLIMETERS NOM	MILLIMETERS MAX
A	0.89	1.00	1.11
A1	0.01	0.06	0.10
b	0.37	0.44	0.50
c	0.08	0.14	0.20
D	2.80	2.90	3.04
E	1.20	1.30	1.40
e	1.78	1.90	2.04
L	0.30	0.43	0.55
L1	0.35	0.54	0.69
HE	2.10	2.40	2.64
T	0°	---	10°



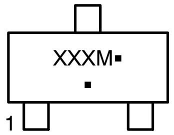
SIDE VIEW



END VIEW

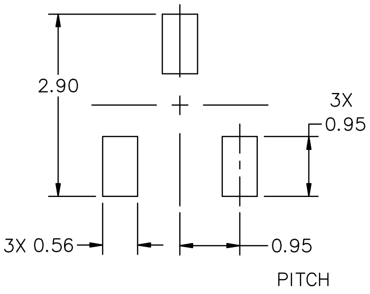
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

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 onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

STYLES ON PAGE 2

SOT−23 (TO−236) 2.90x1.30x1.00 1.90P
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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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