



L8211

LINEAR INTEGRATED CIRCUIT

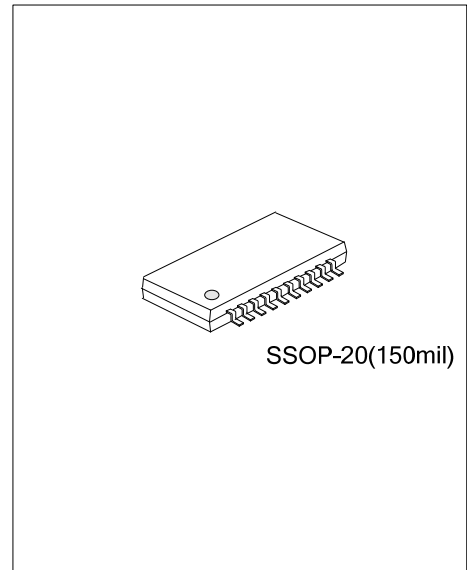
FET BIAS CONTROLLER WITH POLARIZATION SWITCH AND TONE DETECTION

DESCRIPTION

The UTC **L8211** is designed to bias the MOSFETs that are commonly used in LNBS that can implies minimum external components requires.

FEATURES

- * Three outputs that can drive up to 3 FETs.
- * Drain current adjustable by external resistor.
- * HB and LB switch for LNBS.
- * Band switching by 22kHz tone detection.

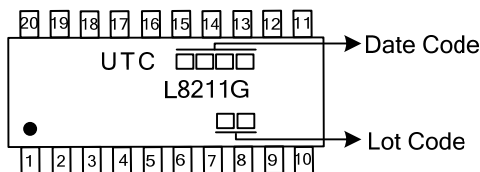


ORDERING INFORMATION

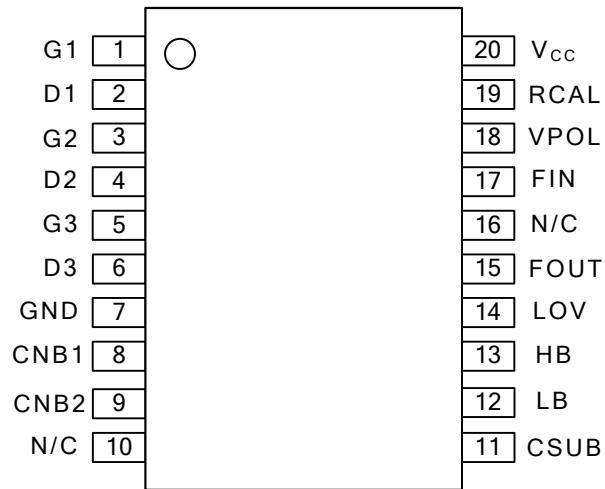
Ordering Number	Package	Packing
L8211G-R20-R	SSOP-20	Tape Reel
L8211G-R20-T	SSOP-20	Tube

<p>L8211G-R20-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel, T: Tube</p> <p>(2) R20: SSOP-20</p> <p>(3) G: Halogen Free and Lead Free</p>
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MARKING



■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	G1	To Gate of FET 1
2	D1	To Drain of FET 1
3	G2	To Gate of FET 2
4	D2	To Drain of FET 2
5	G3	To Gate of FET 3
6	D3	To Drain of FET 3
7	GND	Ground
8	CNB1	Connect 47nF capacitance to CNB2
9	CNB2	Connect 47nF capacitance to CNB1
10, 16	N/C	Nothing connect
11	CSUB	Connect an external 47nF cap to -3V
12	LB	Low band switch output
13	HB	High band switch output
14	LOV	LB and HB's switch
15	FOUT	Filter output
17	FIN	LNB input
18	VPOL	Control input switch
19	RCAL	Connect 33kohm to set Id1, Id2 and Id3 to 10mA
20	V _{CC}	Power supply

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.6 ~ +12	V
Supply Current	I_{CC}	100	mA
Input Voltage	V_{IN}	25 Continuous	V
Drain Current (per FET)(set by R_{CAL})	I_D	0 ~ 15	mA
Power Dissipation($T_A=25^\circ\text{C}$)	P_D	600	mW
Operating Temperature	T_{OPR}	-40~+70	$^\circ\text{C}$
Storage Temperature	T_{STG}	-50~+85	$^\circ\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS

($T_A=25^\circ\text{C}$, $V_{CC}=5\text{V}$, $I_D=10\text{mA}$, $R_{CAL}=33\text{K}\Omega$, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		5		10	V
Supply Current	I_{CC}	I_{D1} to $I_{D3}=0$		6	15	mA
		$I_{D1}=0$, I_{D2} to $I_{D3}=10\text{mA}$, $V_{POL}=14\text{V}$		25	35	mA
		$I_{D2}=0$, I_{D1} to $I_{D3}=10\text{mA}$, $V_{POL}=15.5\text{V}$		25	35	mA
		I_{D1} to $I_{D3}=0$, $I_{LB}=10\text{mA}$		16	25	mA
		I_{D1} to $I_{D3}=0$, $I_{HB}=10\text{mA}$		16	25	mA
Substrate Voltage	V_{SUB}	(Internally generated) $I_{SUB}=0$	-3.5	-3	-2.5	V
		$I_{SUB} = -200\mu\text{A}$			-2.4	V
Output Noise	Gate Voltage	E_{NG}	$C_G=4.7\text{nF}$, $C_D=10\text{nF}$		0.005	Vpkpk
	Drain Voltage	E_{ND}	$C_G=4.7\text{nF}$, $C_D=10\text{nF}$		0.02	Vpkpk
Oscillator Freq	f_o		200	350	800	kHz

■ GATE CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT		
Output Current Range	I_{GO}		-30		2000	μA		
Output Voltage Gate 1	Off	V_{G1O}	$I_{D1}=0\text{mA}$, $V_{POL}=14\text{V}$, $I_{GO1}=0\mu\text{A}$		-0.05	0	0.05	V
	Low	V_{G1L}	$I_{D1}=12\text{mA}$, $V_{POL}=15.5\text{V}$, $I_{GO1}=-10\mu\text{A}$		-2.7	-2.4	-2	V
	High	V_{G1H}	$I_{D1}=8\text{mA}$, $V_{POL}=15.5\text{V}$, $I_{GO1}=0\mu\text{A}$		0.4	0.75	1.0	V
Output Voltage Gate 2	Off	V_{G2O}	$I_{D2}=0\text{mA}$, $V_{POL}=15.5\text{V}$, $I_{GO2}=0\mu\text{A}$		-0.05	0	0.05	V
	Low	V_{G2L}	$I_{D2}=12\text{mA}$, $V_{POL}=14\text{V}$, $I_{GO2}=-10\mu\text{A}$		-2.7	-2.4	-2	V
	High	V_{G2H}	$I_{D2}=8\text{mA}$, $V_{POL}=14\text{V}$, $I_{GO2}=0\mu\text{A}$		0.4	0.75	1.0	V
Output Voltage Gate 3	Low	V_{G3L}	$I_{D3}=12\text{mA}$, $I_{GO3}=-10\mu\text{A}$		-3.5	-2.9	-2	V
	High	V_{G3H}	$I_{D3}=8\text{mA}$, $I_{GO3}=0\mu\text{A}$		0.4	0.75	1.0	V

■ DRAIN CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Current	I_D		8	10	12	mA
Current Change	With V_{CC}	ΔI_{DV}	$V_{CC}=5 \sim 10\text{V}$		0.5	%/V
	With T_J	ΔI_{DT}	$T_J = -40 \sim +70^\circ\text{C}$		0.05	%/ $^\circ\text{C}$
Drain 1 Voltage: High	V_{D1}	$I_{D1}=10\text{mA}$, $V_{POL}=15.5\text{V}$	1.8	2	2.2	V
Drain 2 Voltage: High	V_{D2}	$I_{D2}=10\text{mA}$, $V_{POL}=14\text{V}$	1.8	2	2.2	V
Drain 3 Voltage: High	V_{D3}	$I_{D3}=10\text{mA}$	1.8	2	2.2	V
Voltage Change	With V_{CC}	ΔV_{DV}	$V_{CC} = 5 \sim 10\text{V}$		0.5	%/V
	With T_J	ΔV_{DT}	$T_J = -40 \sim +70^\circ\text{C}$		50	ppm
Leakage Current	Drain 1	I_{LEAK1}	$V_{D1}=0.5\text{V}$, $V_{POL}=14\text{V}$		10	μA
	Drain 2	I_{LEAK2}	$V_{D2}=0.5\text{V}$, $V_{POL}=15.5\text{V}$		10	μA

■ TONE DETECTION CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Filter Amplifier						
Input Bias Current	I_B	$R_{F1}=150k\Omega$	0.02	0.07	0.25	μA
Output Voltage	V_{OUT}	$R_{F1}=150k\Omega$	1.75	1.95	2.05	V
Output Current	I_{OUT}	$V_{OUT}=1.96V, V_{FIN}=2.1V$	400	520	650	μA
Voltage Gain	G_V	$f=22kHz, V_{IN}=1mV$		46		dB
Rejection Frequency	f_R	$V_{(AC)IN}=1V$ p/p sq.w	1.0	7.5		kHz
V Threshold	F_{VT}		100		350	mV p/p
Output Stage						
Lov Volt.Range	V_{LOV}	$I_L=50mA$ (LB or HB)	-0.5		$V_{CC}-1.8$	V
Lov Bias Current	I_{LOV}	$V_{LOV}=0V$	0.02	0.15	1	μA
LB Output Low	V_{LBL}	$V_{LOV}=0V, I_L=-10\mu A$ Enable	-3.5	-2.75	-2.5	V
		$V_{LOV}=3V, I_L=0mA$ Enable	-0.01	0	0.01	V
LB Output High	V_{LBH}	$V_{LOV}=0V, I_L=10mA$ Disable	-0.025	0	0.025	V
		$V_{LOV}=3V, I_L=50mA$ Disable	2.9	3	3.1	V
HB Output Low	V_{HBL}	$V_{LOV}=0V, I_L=-10\mu A$ Disable	-3.5	-2.75	-2.5	V
		$V_{LOV}=3V, I_L=0mA$ Disable	-0.01	0	0.01	V
HB Output High	V_{HBH}	$V_{LOV}=0V, I_L=10mA$ Enable	-0.025	0	0.025	V
		$V_{LOV}=3V, I_L=50mA$ Enable	2.9	3	3.1	V

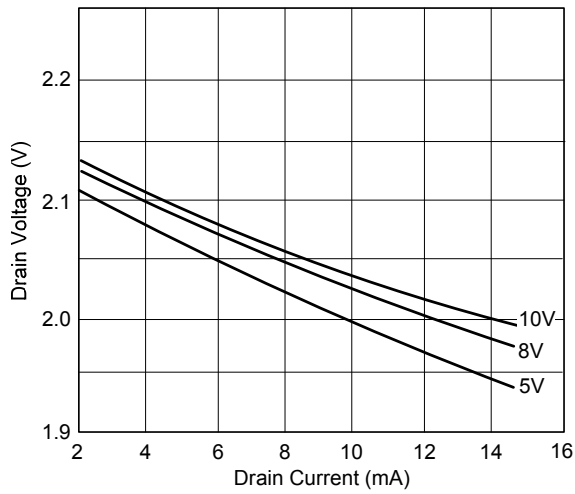
Note: Noise voltage measurement would be ignored in production.

■ POLARITY SWITCH CHARACTERISTICS

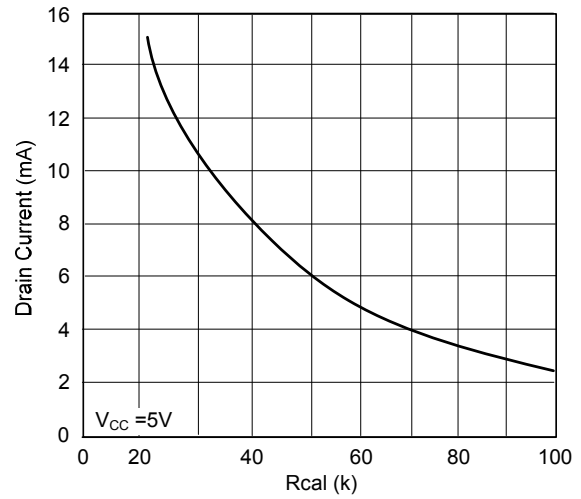
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Current	I_{POL}	$V_{POL}=25V$ (Applied via $R_{POL}=10k\Omega$)	10	20	40	μA
Threshold Voltage	V_{TPOL}	$V_{POL}=25V$ (Applied via $R_{POL}=10k\Omega$)	14	14.75	15.5	V
Switching Speed	T_{SPOL}	$V_{POL}=25V$ (Applied via $R_{POL}=10k\Omega$)			100	ms

TYPICAL CHARACTERISTICS

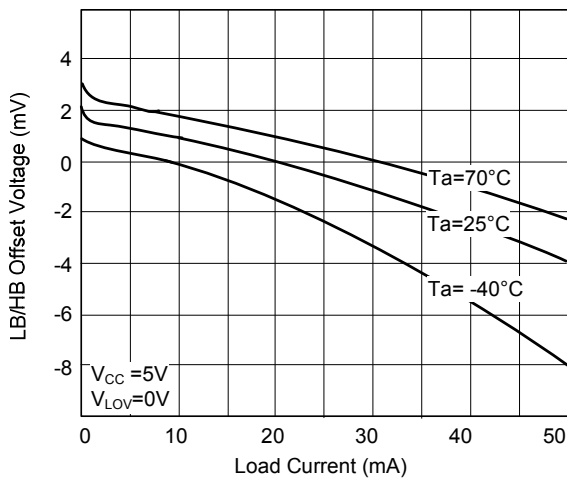
JFET Drain Voltage vs Drain Current



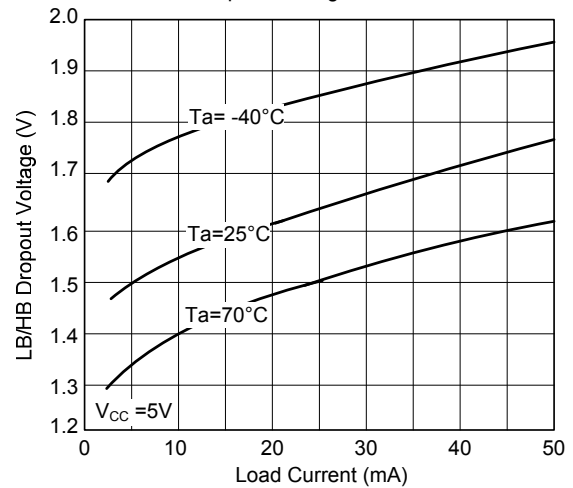
JFET Drain Current vs Rcal



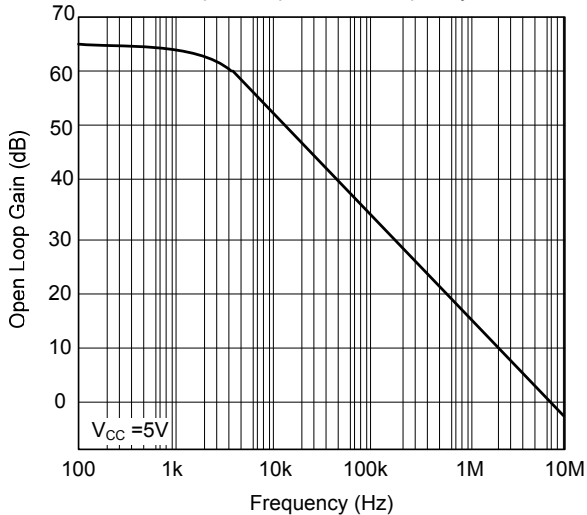
LB/HB Offset Voltage vs Load Current



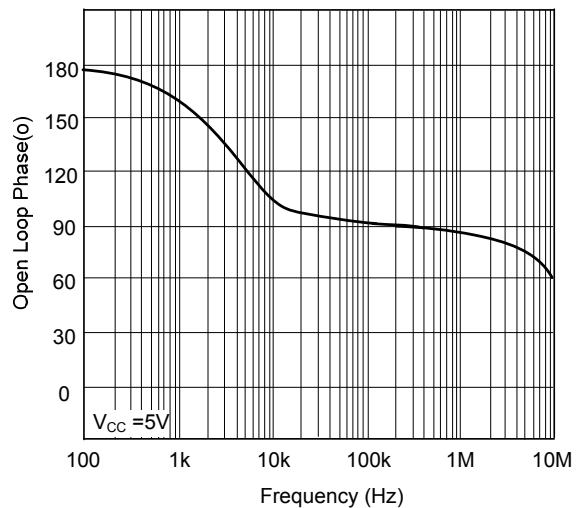
LB/HB Dropout Voltage vs Load Current



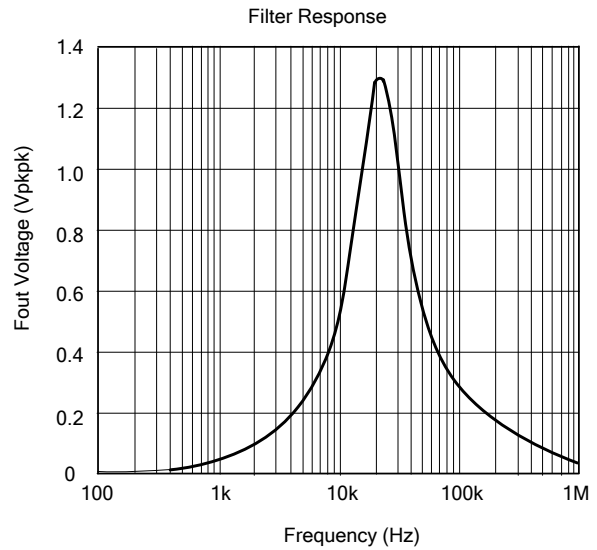
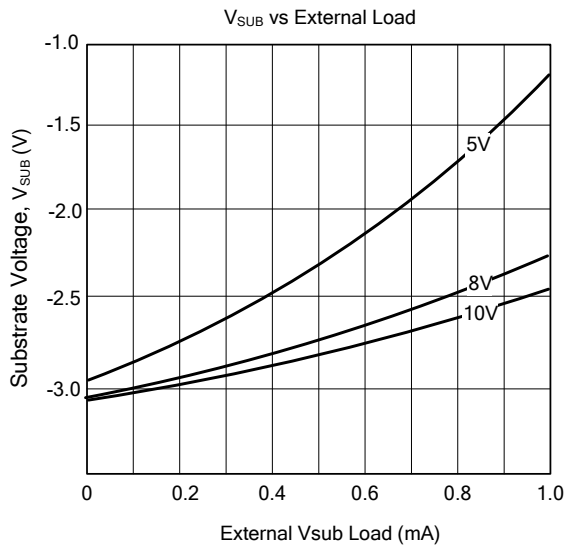
Open Loop Gain vs Frequency



Open Loop Phase vs Frequency



■ TYPICAL CHARACTERISTICS(Cont.)



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