

LOW VOLTAGE COMPANDER

DESCRIPTION

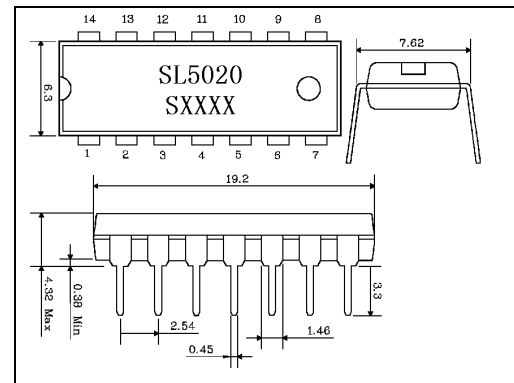
The SL5020 contains two variable gain circuits configured for compressing and expanding the dynamic range of an audio signal. One circuit is configured as an expander, while the other circuit can be configured as a compressor or expander. Each circuit has a full wave rectifier to provide average value information to a variable gain cell located in either the input stage or the feedback path.

An internal temperature stable bandgap reference provides the necessary precision voltages and currents required. It contains also compressor and expander mute circuit.

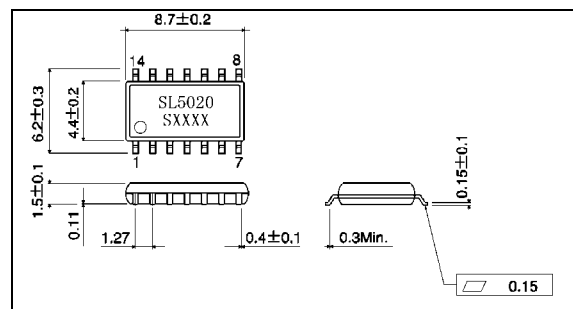
FEATURE

- Low voltage operation $V_{opr} = 1.8 \sim 5.0V$
- Decreasing external component
- Built in compressor and expander mute circuit
- Unity gain level set a $100mV_{rms}$
- Response time adjustable

Outline Drawing

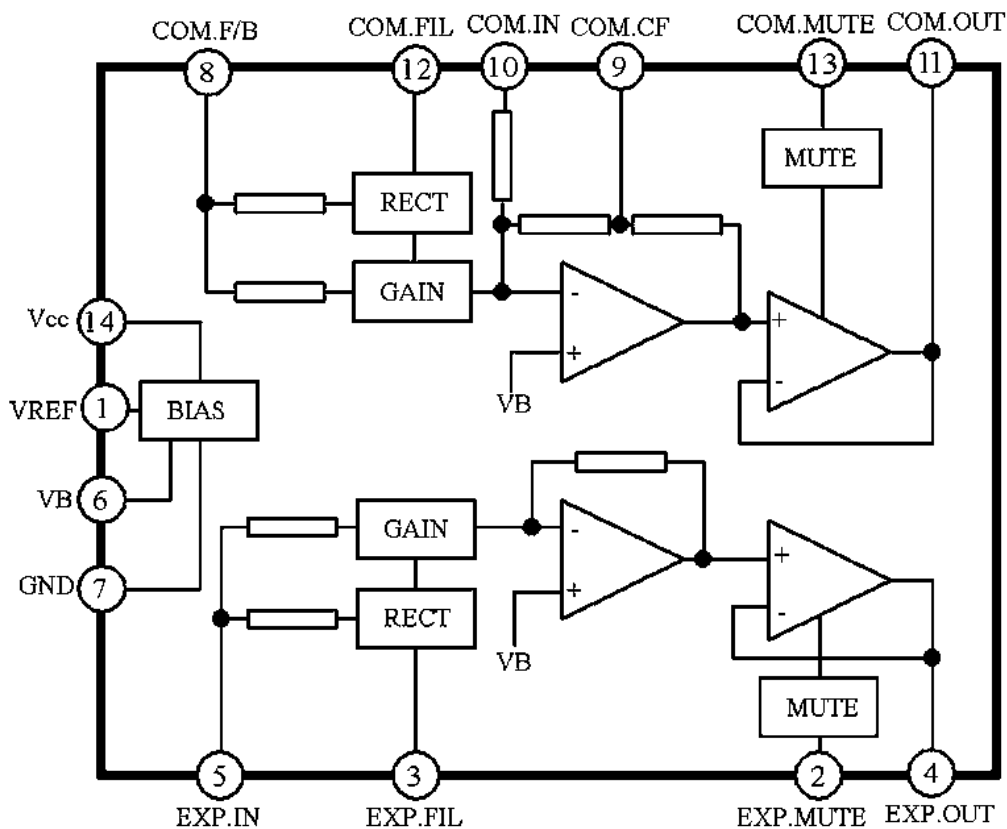


DIP14



SOP14

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Value	Unit
Maximum Supply Voltage	V _{cc}	10	V
Power Dissipation	P _D	410	mW
Storage Temperature Range	T _{stg}	-55~150	°C

OPERATING CONDITIONS

- Operating Supply Voltage : 1.8 ~ 5.0 V
- Operating Temperature Range : -20 ~ 70°C
- Input frequency Range : 100Hz ~ 20kHz
- Input Voltage : Compressor Input = 600mV_{rms}
(V_{cc}=3V) Expander Input = 260mV_{rms}

PIN VOLTAGE and DESCRIPTION

Pin NO	Symbol	Voltage	Description
1	V _{REF}	1.3	Bandgap Voltage
2	EXP.MUTE	1.4	Expander mute adjust
3	EXP.FILTER	0~0.6	Expander Filter. Connect to an external capacitor to filter the full wave rectifier's output. This capacitor affects attack & delay times, as well as low frequency accuracy.
4	EXP.OUTPUT	1.5	Output of the expander amplifier.
5	EXP.INPUT	1.5	Expander input. Nominally signal range is 3.16mVrms to 260mVrms. Must be capacitor coupled to the signal source
6	V _B	2.2	An internal reference voltage. This is an AC ground, and must be well filtered to obtain high power supply rejection and low crosstalk.
7	GND	GND	Ground
8	COM.FEEDBACK	1.5	Input to the compressor Variable gain stage and rectifier.
9	COM.CF	1.5	Normally, this is connected to the compressor's output through filtered DC feedback path.
10	COM.INPUT	1.5	Compressor input, Normally, Signal range is 100μVrms to 1.0Vrms. Must be capacitor coupled to the signal source.
11	COM.OUTPUT	1.5	Output of the compressor amplifier.
12	COM.FILTER	0~0.6	Compressor filter. Connect to an external capacitor to filter the full wave rectifier's output. This capacitor affects attack & decay times, and low frequency accuracy
13	COM.MUTE	1.4	Compressor mute adjust.
14	V _{cc}	3	Power supply pin. Connect to power supply providing between 1.8 and 5.0V.

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified: Ta=25°C, Vcc=3V, f=1kHz)

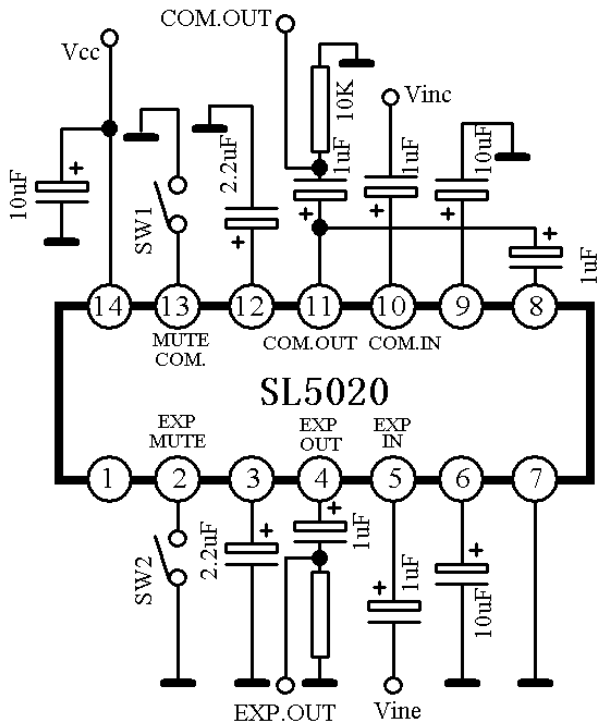
Characteristics	Symbol	Test conditions	Min	Typ	Max	Unit
Supply current	Icc	No Signal		3.1		mA
Compressor Section						
0dB Gain	Gc0	Vinc=100mVrms, 0dB	-1.5	0	1.5	dB
Gain Error (Note 1)	Gc1	Vinc=316mVrms, 10dB	-1	0	1	dB
	Gc2	Vinc=10mVrms, -20dB	-1	0	1	dB
	Gc3	Vinc=1mVrms, -40dB	-1	0	1	dB
	Gc4	Vinc=100μVrms, -60dB	-1	0	1	dB
Distortion	THDc	Vinc=100mVrms, f=1kHz		0.3	1.5	%
Noise Output	Vnoc	Rg=600Ω		0.8	5	mVrms
Ripple Rejection Ratio	RRc	Vcc=3V(DC), 1kHz, 100mVrms		-25	-18	dB
Crosstalk(C→E)	CTc	Vinc=100mVrms, Exp Output		-72	-50	dB
Muting Attenuation	Attc	Vinc=100mVrms, Vpin13=GND		-65	-50	dB
Input Impedance	Rinc	PIN 10		20		kΩ
Expander Section						
0dB Gain	Ge0	Vine=100mVrms, 0dB	-1.5	0	1.5	dB
Gain Error (Note 1)	Ge1	Vine=178mVrms, 5dB	-1	0	1	dB
	Ge2	Vine=31.6mVrms, -10dB	-1	0	1	dB
	Ge3	Vine=10mVrms, -20dB	-1	0	1	dB
	Ge4	Vine=3.16mVrms, -30dB	-1	0	1	dB
Distortion	THDe	Vine=100mVrms, f=1kHz		0.4	1.5	%
Noise Output	Vnoe	Rg=600Ω		0.06	5.0	mVrms
Ripple Rejection Ratio	RRe	Vcc=3V(DC), 1kHz, 100mVrms		-58	-38	dB
Crosstalk(E→C)	CTe	Vine=100mVrms, Com Output		-34	-24	dB
Muting Attenuation	Atte	Vine=316mVrms, Vpin2=GND		-70	-50	dB
Input Impedance	Rine	PIN 4		4.3		kΩ

(Note 1) Gain Error= (V_{OUT}-20dBV)-V_{IN}×K

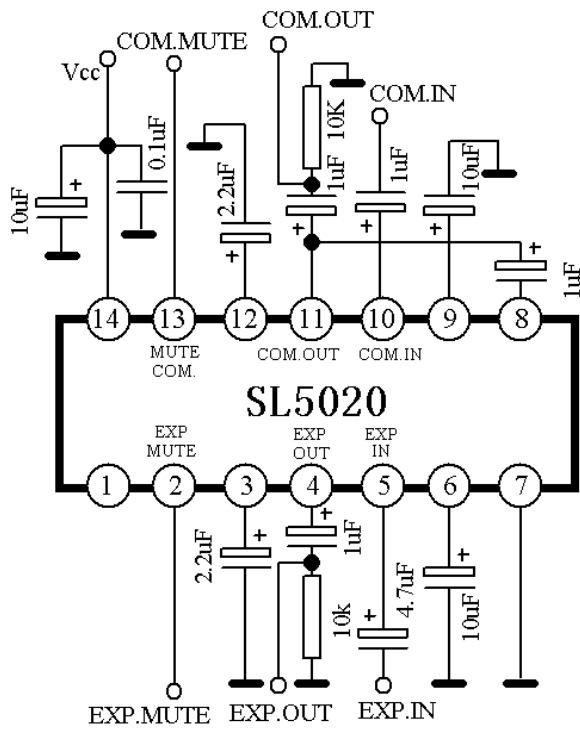
K: Compressor=0.5

Expander=2

TEST CIRCUIT



APPLICATION CIRCUIT



CHARACTERISTIC CURVES

