SSI2190

PROCIRCUIT™ 6-INTO-1 VOLTAGE CONTROLLED MIXER*

The SSI2190 is a six-into-one voltage controlled mixer in a compact 24-lead SSOP package, based on a new-generation Operational Transconductance Amplifier (OTA) developed by Sound Semiconductor. The high-compliance current output allows easy paralleling of multiple SSI2190s.

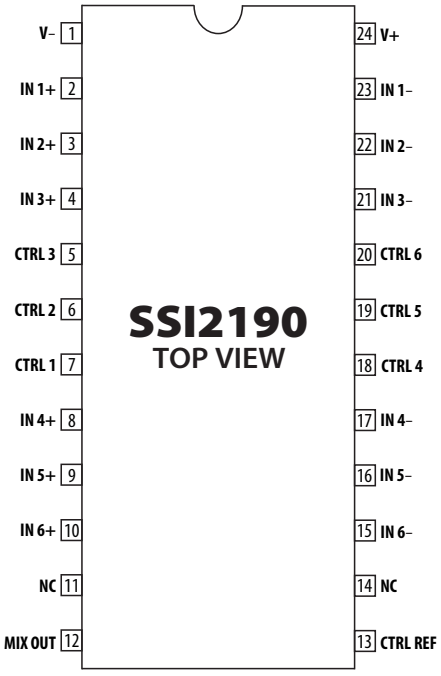
Each input channel has differential voltage inputs and a current-mode linear control input. Low distortion, low control feedthrough, full mute attenuation, and wide dynamic range round out the SSI2190s features.

The SSI2190 makes mixing of audio signals – as well as control voltages – a simple endeavor. Voltage controlled equalizers are easily designed. Differential inputs can be used for phase correction, and differential signal paths. As a generic audio building block, applications are only limited by one's imagination.

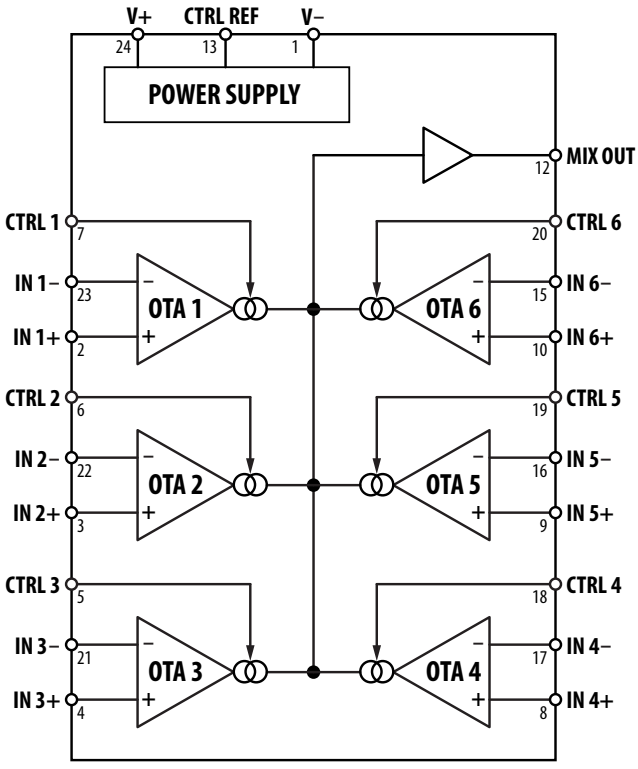
A wide supply voltage range (single or dual) allows use in a variety of audio gear from musical instruments and effects pedals to prosumer systems where large signal handling and headroom are desired.

FEATURES

- **Easy-to-Use Six Input into Single Output Audio Mixer**
- **Handles Input Signals up to $10V_{RMS}$**
- **Linear Control OTA's**
- **Very Low Noise: Typical –91dBu**
- **Low Distortion – Typical 0.025%**
- **Mute Attenuation of >100dB**
- **Low Control Feedthrough – Typical -60dB**
- **±4V to ±18V Operation**
- **Very Few External Components Required**



PIN CONNECTIONS
24-LEAD SSOP



FUNCTIONAL BLOCK DIAGRAM

*Patent Pending

The SSI2190 is available exclusively from Sound Semiconductor and its authorized resellers

PO Box 1587, Arroyo Grande, CA 93421 USA, www.soundsemiconductor.com

Rev. 1.5, October 2024

SPECIFICATIONS (V_S = ±15V, V_{IN} = 0.775V_{RMS}, f = 1kHz, V_C = 5V, $V_{CTRLREF}$ = GND, T_A = 25°C; using Figure 1 circuit)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
POWER SUPPLY						
Supply Voltage Range	V_S		±4		±18	V
Supply Current - Positive	I_{SY+}	V_{IN} = GND; All channels active		+11.4	+12.5	mA
Supply Current - Negative	I_{SY-}	V_{IN} = GND; All channels active		–12.1	–13.0	mA
Power Supply Rejection Ratio	PSRR	V_{IN} = GND		64		dB
CONTROL PORTS						
Control Current Range	I_{CTRL}	At CTRL pins, mute to full on	0		100	µA
Transconductance	g_m	V_{IN} = ±1V; After 60 seconds	7500	8100	8700	µS
Channel to Channel g_m Matching				±0.1		dB
Control Feedthrough*		V_{IN} = GND; V_C = 5V_{P-P} Sine		-60		dB
Maximum Attention†		V_C = 0V; V_{IN} = +20dBu Sine; See Figure 2 Test Circuit		100		dB
SIGNAL INPUTS						
Maximum Input Voltage		At IN+ and IN– pins	V– +2V		V+ –2V	V
Maximum Differential Input Voltage		Between any IN+/IN– pair			±1	V
Input Resistance				12		kΩ
Input Bias Current	I_B	V_{IN} = GND		2.0		µA
Input Offset Current	I_{OS}	V_{IN} = GND		40		nA
Common Mode Rejection	CMRR	V_{IN} = GND		73		dB
SIGNAL OUTPUT						
Output Compliance		See Figure 2 Test Circuit	V– +1V		V+ –1V	V
Output Offset Current		V_{IN} = GND		±1.2	±5.5	µA
Max Recommended Output Current		THD = 1%			800	µA
PERFORMANCE						
Output Noise		V_{IN} = GND; See Figure 2		–91		dBu
Headroom	HR	@1% THD; See Figure 2		+22		dBu
Total Harmonic Distortion	THD	See Figure 2		0.025		%
Channel Separation		Any channel to another‡		88		dB
Slew Rate	SR			130		µA/µs

*see "Control Feedthrough" for a detailed discusson
†see "Control Reference" section for further information
‡Driven channel V_{IN} = 10V_{RMS} and V_C = 0V, measured channel V_{IN} = GND and V_C = 5V

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	±20V
Maximum Control Current	500µA
Maximum Differential Input Voltage	±4V
Storage Temperature Range	-65°C to +150°C
Operating Temperature Range	-40°C to +85°C
Lead Temperature (Soldering, 10 sec)	260°C

ORDERING INFORMATION

Part Number	Package Type/Container	Quantity
SSI2190SS-TU	24-Lead SSOP* - Tube	58
SSI2190SS-RT	24-Lead SSOP* - Tape and Reel	4000

*SSI Package ID "**PSSL24**", compliant with JEDEC MO-137-AE
Mechanical drawing available at www.soundsemiconductor.com

PIN DESCRIPTIONS ("x" refers to one of the six channels)

Pin(s)	Name	Description
1	V–	Negative supply. Recommend 100nF local decoupling capacitor placed as close to package as possible with a low inductance trace to ground.
2, 3, 4, 8, 9, 10	IN x+	Non-Inverting voltage signal input
5, 6, 7, 18, 19, 20	CTRL x	Control current input referenced to CTRL REF
11, 14	NC	Leave these pins unconnected
12	MIX OUT	High-compliance current output
13	CTRL REF	Common reference for the control inputs. In a bipolar power supply system connect to control ground; if single supply to a pseudo ground. See Control Reference for more information about use of this pin.
15, 16, 17, 21, 22, 23	IN x–	Inverting voltage signal input. Differential input should not exceed ±100mV.
24	V+	Positive supply. Recommend 100nF local decoupling capacitor placed as close to package as possible with a low inductance trace to ground.

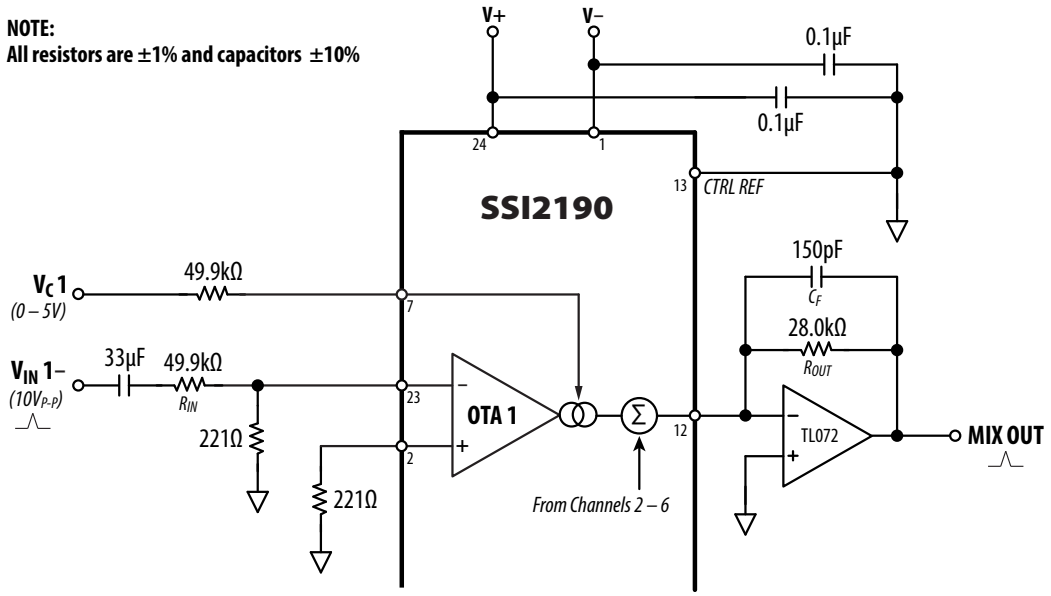


Figure 1: Typical Application Circuit

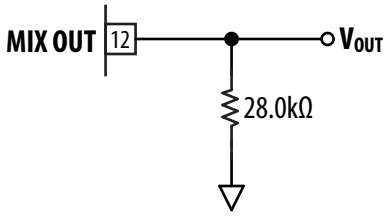


Figure 2: Test Circuit