eala Stereo Expander 2ch Pushbutton Interface EVR with eala Stereo Expander

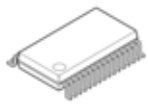
■ GENERAL DESCRIPTION

The **NJU7392** is a 2-channel electronic volume which include a Volume control, 2-in stereo input selector (with 1 x Differential input), eala Stereo Expander control (Stereo enhancement for narrow speakers), Bass boost control with ALC feature and a Stand-by function (Power-saving mode).

The **NJU7392** has also built-in push button interface for its volume, Bass Boost and eala Stereo Expander controls - making application possible without the use of micro-controller.

The **NJU7392** is suitable for low power application and also for application with narrow speaker such as mobile audio player and cradle speaker for mobile game.

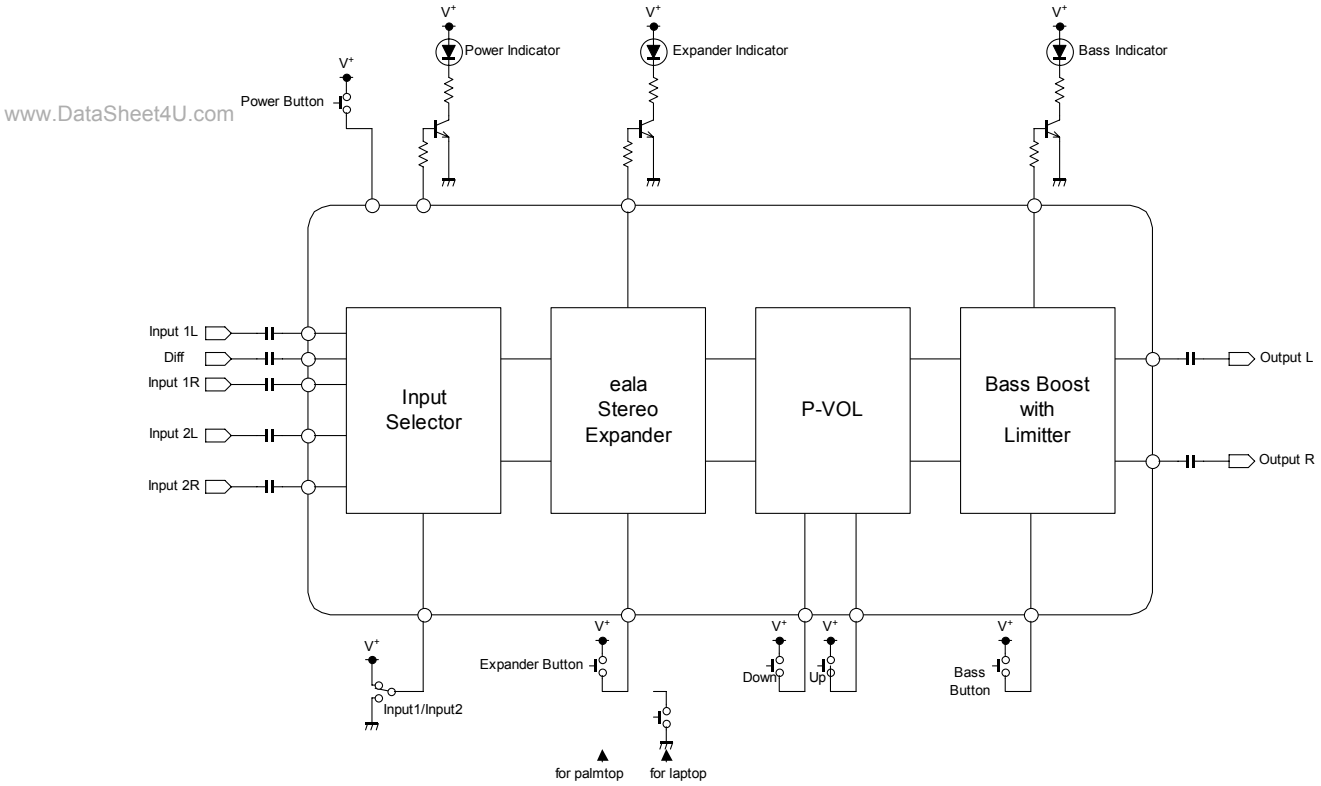
■ PACKAGE OUTLINE



■ FEATURES

- Operating Voltage +2.7 to +5.5V
- Low operating current 5mA typ. (Active mode)
  1μA typ. (stand-by mode)
- Low output noise 20μVrms typ. (eala Stereo Expander : ON)
- Input Selector 2ch (single-end / quasi-differential)
- Sound Space adjustment for narrow speaker
- Pushbutton interface EVR 0 to -68dB, MUTE
- Bass Boost with ALC
- CMOS Technology
- Package Outline SSOP32

■ BLOCK DIAGRAM



■ **ABSOLUTE MAXIMUM RATING** (Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Power Supply Voltage	V^+	+7	V
Power Dissipation	P_D	950*1)	mW
Maximum Input Voltage	V_{IMAX}	0 ~ V^+ *2)	V
Operating Temperature Range	Topr	-40 ~ +85	°C
Storage Temperature Range	Tstg	-40 ~ +125	°C

*1) EIA/JEDEC STANDARD Test board (76.2x114.3x1.6mm, 2layer, FR-4) mounting

*2) Don't apply the input voltage that exceeds supply voltage.

■ **ELECTRICAL RECOMMENDED OPERATING CONDITION** (Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V^+	-	2.7	3.3	5.5	V

■ **ELECTRICAL CHARACTERISTICS**

●**DC CHARACTERISTICS** (Ta=25°C, V^+=3.3V, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I_{DD1}	No Signal, Active	-	5.0	8.0	mA
	I_{DD2}	No Signal, Standby	-	0.1	1.0	μA
Reference Voltage	V_{REF}	No signal	1.5	1.65	1.8	V

●**AC CHARACTERISTICS**

(Ta=25°C, V^+=3.3V, V_{IN}=500mVrms, f=1kHz, Expander: OFF, Treble:0dB, Bass Boost: OFF, VOL:0dB, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	IN L	IN R	OUT	MIN.	TYP.	MAX.	UNIT
Maximum Input Voltage 1	V_{IM1}	THD=1% BW=400Hz-30kHz	V_{IN} -	- V_{IN}	L R	550	580	-	mVrms
Maximum Input Voltage 2	V_{IM2}	Expander: Palmtop THD=1%, BW=400Hz-30kHz	V_{IN} 0	0 V_{IN}	L R	550	580	-	mVrms
Maximum Input Voltage 3	V_{IM3}	Expander: Palmtop Bass: ON, f=1kHz THD=1%, BW=400Hz-30kHz	V_{IN} V_{IN}	V_{IN} V_{IN}	L R	550	580	-	mVrms
Output Noise Voltage 1	V_{NO1}	Rg=0Ω, A-weighted	0 0	0 0	L R	-	-100 (10)	-94 (20)	dBV (μVrms)
Output Noise Voltage 2	V_{NO2}	Rg=0Ω, A-weighted VOL=-68dB	0 0	0 0	L R	-	-100 (10)	-94 (20)	dBV (μVrms)
Output Noise Voltage 3	V_{NO3}	Expander: Palmtop Rg=0Ω, A-weighted	0 0	0 0	L R	-	-90 (32)	-80 (100)	dBV (μVrms)
Output Noise Voltage 4	V_{NO4}	Expander: Palmtop Bass: ON, Rg=0Ω, A-weighted	0 0	0 0	L R	-	-90 (32)	-80 (100)	dBV (μVrms)
Total Harmonic Distortion 1	THD+N_1	BW=400Hz-30kHz	V_{IN} -	- V_{IN}	L R	-	0.05	0.1	%
Total Harmonic Distortion 2	THD+N_3	Expander: Palmtop BW=400Hz-30kHz	V_{IN} 0	0 V_{IN}	L R	-	0.1	0.5	%
Total Harmonic Distortion 3	THD+N_3	Expander: Palmtop Bass: ON BW=400Hz-30kHz	V_{IN} 0	0 V_{IN}	L R	-	0.1	0.5	%

PARAMETER	SYMBOL	TEST CONDITION	IN		OUT	MIN.	TYP.	MAX.	UNIT
			L	R					
Bypass Gain	G_{VBYP}	Treble=0dB	V_{IN}	-	L	-1.0	0.0	1.0	dB
			-	V_{IN}	R				
Treble Gain	G_{VTRE}	f=10kHz	V_{IN}	-	L	2.0	3.0	4.0	dB
			-	V_{IN}	R				
Expander Gain 1	G_{VEXP1}	Expander: Laptop f=10kHz	V_{IN}	V_{IN}	L	1.7	3.7	5.7	dB
			V_{IN}	V_{IN}	R				
Expander Gain 2	G_{VEXP2}	Expander: Palmtop f=10kHz	V_{IN}	V_{IN}	L	3.0	5.0	7.0	dB
			V_{IN}	V_{IN}	R				
Expander Gain 3	G_{VEXP3}	Expander: Laptop	V_{IN}	0	L	2.1	4.1	6.1	dB
			0	V_{IN}	R				
Expander Gain 4	G_{VEXP4}	Expander: Palmtop	V_{IN}	0	L	3.3	5.3	7.3	dB
			0	V_{IN}	R				
Bass Gain	G_{VBASS}	Bass: ON V_{IN}=100mVrms f=100Hz	V_{IN}	V_{IN}	L	4.0	6.0	8.0	dB
			V_{IN}	V_{IN}	R				
Maximum Attenuate level	GV_{VOL-68}	VOL=-68dB BW=400Hz-30kHz	V_{IN}	-	L	-70	-68	-66	dB
			-	V_{IN}	R				
Mute Level	Mute	VOL=Mute BW=400Hz-30kHz	V_{IN}	-	L	-	-90	-86	dB
			-	V_{IN}	R				
Channel Balance	G_{CB}		V_{IN}	-	L	-1.0	0.0	1.0	dB
			-	V_{IN}	R				
Bass Limit Level	V_{LIM}	Bass: ON V_{IN}=0.7Vrms f=100Hz	V_{IN}	V_{IN}	L	0.75	1.0	1.25	Vrms
			V_{IN}	V_{IN}	R				
Cross Talk	CT	Selected Input: No Signal, Rg=0Ω BW=400Hz-30kHz	V_{IN}	-	L	70	80	-	dB
			-	V_{IN}	R				
Channel Separation	CS	Rg=0Ω BW=400Hz-30kHz	0	V_{IN}	L	70	80	-	dB
			V_{IN}	0	R				

● **Indicator Output Block** (Ta=25°C, V^+=3.3V, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
High Input Voltage	V_{OH}	I_{SOURCE}=1mA (pin 17, pin 18, pin 19)	V^+*0.8	-	V^+	V
Low Input Voltage	V_{OL}	I_{SINK}=1mA (pin 17, pin 18, pin 19)	0	-	V^+*0.2	V