

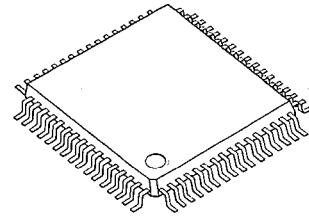
DOLBY PRO LOGIC SURROUND DECODER

■ GENERAL DESCRIPTION

The NJW1102A is a Dolby Pro Logic Surround Decoder including modified Dolby B-Type noise reduction circuit, input auto-balance controller, noise sequencer, adaptive matrix, center and surround channel level trimmers, serial data interface and others. All of internal status and the balance of surround speakers are controlled by serial data. It performs the complete Dolby Pro Logic Surround function and surround function, such as Hall, Matrix, Simulated and others combine with the digital delay NJU9702.

(Note) Dolby and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation, San Francisco, CA94103-4813, USA.
This device is available only to licensees of Dolby Lab.
Licensing and application information may be obtained from Dolby Lab.

■ PACKAGE OUTLINE



NJW1102AF1

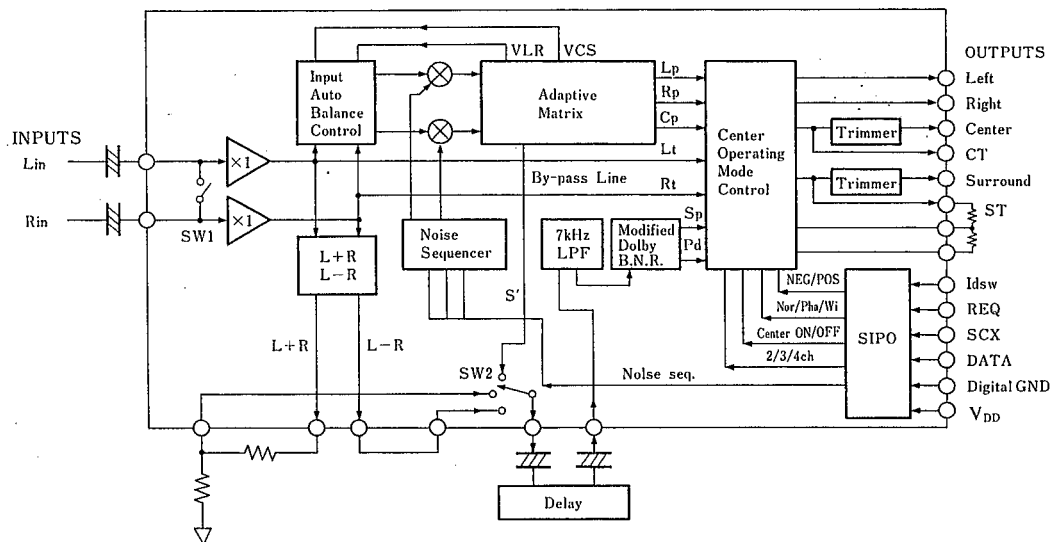
■ FEATURES

- Operating Voltage
Analog Block $V_{CC}=9-13$ or $\pm 5V$
Digital Block $V_{DD}=5V$
- Dolby Operating Level 300mVrms
- Center and Surround Channel Level Trimmers
-31 to +0dB/ 1dB step (0dB=Dolby Level)
- Internal Mode Control Switch
- Bi-CMOS Technology
- Package Outline TQFP64

■ FUNCTIONS

- Input Auto-Balance
- Noise Generator And Sequencer
- Adaptive Matrix
- Pro Logic Surround Mode Control : 4/3, Center ON/OFF, Normal/Phantom/Wideband
- 7kHz Low-pass Filter and Modified Dolby B Type Noise Reduction
- Center and Surround Channel Level Trimmer
- Other Surround Mode Control : S'Out Selector, Mixer And Mute Functions
- Serial Data Interface
- Optional Digital Outputs AUX1, AUX2

■ BLOCK DIAGRAM



NJW1102A

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-----------------------------|------------------|----------|------|
| Supply Voltage | V _{CC} | 13.0 | V |
| | V _{DD} | 6.5 | V |
| Power Dissipation | P _D | 700 | mW |
| Operating Temperature Range | T _{opr} | -20~+75 | °C |
| Storage Temperature Range | T _{stg} | -40~+125 | °C |

■ ELECTRICAL CHARACTERISTICS

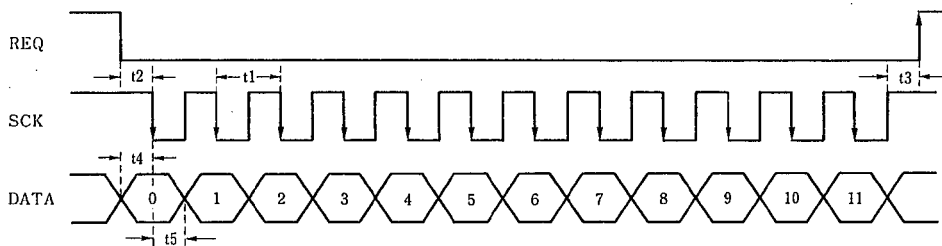
(Ta=25°C, V_{CC}=10V, V_{DD}=5V, 0dB reference is 300mVrms/1kHz at C-OUT with C ch trimmer being 0dB, unless otherwise specified.)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|--|------------------|-------------------------------------|--------------------|-------|--------------------|------|
| Overall | | | | | | |
| Operating Voltage | V _{CC} | | 9 | 10 | 13 | V |
| | V _{DD} | | 4.5 | 5.0 | 6.5 | V |
| Operating Current | I _{CC} | No Signal | | 35 | 45 | mA |
| | I _{DD} | No Signal | | 0.6 | 1.5 | mA |
| Reference Voltage | V _{ref} | No Signal | 3.6 | 4.0 | 4.4 | V |
| Threshold Voltage | V _{thh} | Digital Input High Level | 0.7V _{DD} | | V _{DD} | V |
| | V _{thl} | Digital Input Low Level | 0.0 | | 0.3V _{DD} | V |
| Input Auto Balance | | | | | | |
| Capture Range | CPR | | | ±5 | | dB |
| Error Correction | CER | | | ±4 | | dB |
| Adaptive Matrix | | | | | | |
| Output Level Accuracy Relative to C ch | ΔVol | L, R, S' ch out | -0.5 | 0.0 | 0.5 | dB |
| Matrix Rejection Relative | MR | L, R, C, S' ch out | 25 | 40 | | dB |
| Headroom | HRAM | V _{CC} =9V at THD=1% | 15 | 17 | | dB |
| Total Harmonic Distortion | THDAM | L, R, C, S' ch out at 4ch mode | | 0.050 | 0.200 | % |
| | | L, R ch out at 2ch mode | | 0.002 | 0.050 | % |
| Signal to Noise Ratio | SNAM | Rg=0, weighted:CCIR/ARM at 4ch mode | 75 | 80 | | dB |
| | | L, R ch out at 2ch mode | 93 | 100 | | dB |
| Noise Sequencer | | | | | | |
| Output Noise Level | V _{no} | | -15 | -12.5 | -10.0 | dB |
| Output Noise Level | ΔV _{no} | L, R, S' ch out | -0.5 | 0.0 | 0.5 | dB |
| Output Noise Level Accuracy Relative to C ch | | | | | | |

4

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|--------|---|------|-------|-------|------|
| Modified Noise B Type Noise Reduction | | | | | | |
| (0dBd reference is input level at NR-IN when S out is adjusted to 0dB (300mVrms/100Hz) with S ch trimmer level being 0dB) | | | | | | |
| Voltage Gain | VGNR | Vin=0dBd, f=100Hz | | 9.0 | | dB |
| Decode Response 1 | DEC1 | Vin=0dBd, f=1.0kHz | -1.6 | -0.1 | 1.4 | dB |
| Decode Response 2 | DEC2 | Vin=-15dBd, f=1.4kHz | -3.0 | -1.5 | 0.0 | dB |
| Decode Response 3 | DEC3 | Vin=-20dBd, f=1.4kHz | -4.9 | -3.4 | -1.9 | dB |
| Decode Response 4 | DEC4 | Vin=-40dBd, f=5.0kHz | -6.8 | -5.3 | 3.8 | dB |
| Total Harmonic Distortion | THDNR | Vin=0dBd, f=1kHz | | 0.070 | 0.300 | % |
| Headroom | HRNR | Vin=9V at THD=1% | 15 | 17 | | dB |
| Signal to Noise | SNNR | Rg=0, weighted : CCIR/ARM | 73 | 78 | | dB |
| Other Surround | | | | | | |
| Total Harmonic Distortion | THDOS | Vin=0dBd, f=1kHz L+R, L-R Output | | 0.050 | 0.200 | % |
| Headroom | HROS | Vcc=9V at THD=1% L+R, L-R Output | 15 | 17 | | dB |
| Signal to Noise | SNOS | Rg=0, weighted : CCIR/ARM L+R, L-R Output | 75 | 80 | | dB |
| Adder Gain | AG | | | 0 | | dB |
| C.S Channel Trimmer | | | | | | |
| Full Scale | FS | Digital Input= -31dB | -34 | -31 | -28 | dB |
| Non Linearity (Note 1) | NL | Digital Input=-1, -2, -4, -8, -16dB | -0.5 | 0.0 | 0.5 | dB |
| Optional Digital Output (AUX1, AUX2) | | | | | | |
| Low Level Voltage | VOL | Sink Current=0.8mA, V _{DD} =5V | | 0.6 | 1.0 | V |
| High Level Voltage | VOH | Source Current=0.5mA, V _{DD} =5V | 3.5 | 4.0 | | V |
| Control Timing | | | | | | |
| SCK Clock Width | t1 | SCK | 50 | | | μS |
| REQ Set-up Time | t2 | REQ-SCK | 25 | | | μS |
| REQ Hold Time | t3 | REQ-SCK | 25 | | | μS |
| Data Set-up Time | t4 | SCK-DATA | 25 | | | μS |
| Data Hold Time | t5 | SCK-DATA | 25 | | | μS |

(Note 1) $NL = A \cdot B / D - C$
 A : Measured gain value in full scale
 B : Digital input value
 C : Measured gain value of digital input
 D : Full scale value
 (Note 2) Control Timing



NJW1102A

MEMO

[CAUTION]

The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.