AN7367K

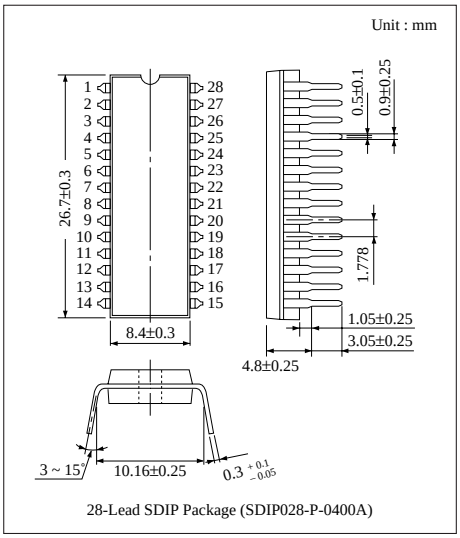
dbx II Noise Reduction IC for Cassette Deck

■ Overview

The AN7367K is an integrated circuit available for stereo operation on a single chip developed for dbx II type noise reduction, which can also use for U.S. sound multiplex TV. And it is designed for easy use of reference signal level, supply voltage and logic input level.

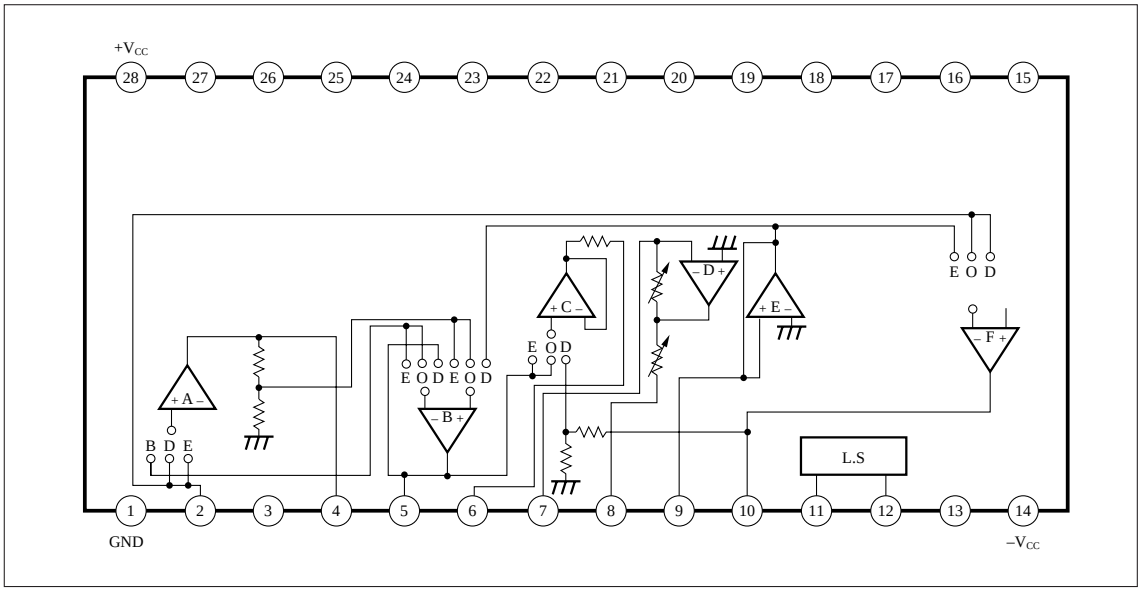
■ Features

- Dynamic range : 110dB
- 2-channel
- Reference input-output signal level : 90mV
- 2 power supply type (+, –)



28-Lead SDIP Package (SDIP028-P-0400A)

■ Block Diagram



■ Absolute Maximum Ratings (Ta=25˚C)

Parameter	Symbol	Rating	Unit
Supply Voltage	V_{CC}	±7.2	V
Supply Current	I_{CC}	30	mA
Power Dissipation (Ta=75˚C)	P_D	450	mW
Operating Ambient Temperature	T_{opr}	–20 ~ + 75	˚C
Storage Temperature	T_{stg}	–55 ~ + 150	˚C

■ Recommended Operating Range (Ta=25˚C)

Parameter	Symbol	Range
Operating Supply Voltage Range	V_{CC}	± 5V ~ ±7V

■ Electrical Characteristics (V_{CC}= ± 6V, Ta=25˚C)

Parameter	Symbol	Condition	min.	typ.	max.	Unit
Encode Output Voltage	V_{OE}	V_{in} = 1kHz, 90mV (Reference Level)	67.5	85	107	mV
Encode Linearity –1 *1	L_{E-1}	V_{in} = 1kHz, 900mV (Encode)	8	10	12	dB
Encode Linearity –2 *1	L_{E-2}	V_{in} = 1kHz, 0.9mV (Encode)	– 22	– 20	– 18	dB
Decode Output Voltage	V_{OD}	V_{in} = 1kHz, 90mV (Reference Level)	67.5	85	107	mV
Decode Linearity –1 *2	L_{D-1}	V_{in} = 1kHz, 285mV (Decode)	17	20	23	dB
Decode Linearity –2 *2	L_{D-2}	V_{in} = 1kHz, 9mV (Decode)	– 43	– 40	– 37	dB
Encode Max. Output Voltage	V_{OME}	THD = 3%, f = 1kHz	300	—	—	mV
Decode Max. Output Voltage	V_{OMD}	THD = 3%, f = 1kHz	1100	—	—	mV
Encode Total Harmonic Distortion	THD_E	At Encode, 400Hz ~ 30kHz, f = 1kHz, 90mV	—	0.35	0.45	%
Decode Total Harmonic Distortion	THD_D	At Decode, 400Hz ~ 30kHz, f = 1kHz, 90mV	—	0.1	0.3	%
Encode Noise Output Voltage	V_{NOE}	Input short, DIN/AUDIO	—	– 62	– 58	dBV
Decode Noise Output Voltage	V_{NOD}	Input short, DIN/AUDIO	—	– 96	– 92	dBV
Encode Output Defference between Channels	CD_E	V_{in} = 1kHz, 90mV	– 1.3	0	1.3	dB
Decode Output Difference between Channels	CD_D	V_{in} = 1kHz, 90mV	– 2	0	2	dB
Encode Crosstalk between Channels	CT_E	At Encode *3, V_{in} = 1kHz, 900mV	—	– 52	– 45	dBV
Decode Crosstalk between Channels	CT_D	At Decode, V_{in} = 1kHz, 90mV	—	– 91	– 85	dBV
Monitor Output Voltage	V_{OM}	At Encode, V_{in} = 1kHz, 90mV	75	90	107	mV
Monitor Output Voltage Output Difference Between Channels	CD_M	At Encode, V_{in} = 1kHz, 90mV	– 1.5	0	1.5	dB
Monitor Output Noise Output Voltage	V_{NOM}	Encode input, Short DIN/AUDIO	—	– 110	– 106	dBV
Monitor Output Total Harmonic Distortion	THD_M	At Encode, V_{in} = 1kHz, 90mV	—	0.01	0.1	%
dbx OFF Line Output Voltage	V_{LOFF}	V_{in} = 1kHz, 180mV	151	180	214	mV
dbx OFF Rec. Output Voltage	V_{ROFF}	V_{in} = 1kHz, 180mV	151	180	214	mV
dbx OFF line Output Total Harmonic Distortion	THD_{LOFF}	V_{in} = 1kHz, 180mV	—	0.01	0.1	%
dbx OFF Rec Output Total Harmonic Distortion	THD_{ROFF}	V_{in} = 1kHz, 180mV	—	0.01	0.1	%
dbx OFF Line Output Noise Output Voltage	V_{NLOFF}	Input Short, DIN/AUDIO	—	– 110	– 104	dBV
dbx OFF Rec. Output Noise Output Voltage	V_{NROFF}	Input Short, DIN/AUDIO	—	– 110	104	dBV
dbx OFF Line Output Output Difference between Channels	CD_{LOFF}	V_{in} = 1kHz, 180mV	– 1.5	0	1.5	dB
dbx OFF Rec. Output Output Difference between Channels	CD_{ROFF}	V_{in} = 1kHz, 180mV	– 1.5	0	1.5	dB
Input Impedance	Z_{IN}	V_{in} = 1kHz, 90mV	500	—	—	kΩ
Total Circuit Current	I_{tot}	Input Short at Encode	—	12	16	mA

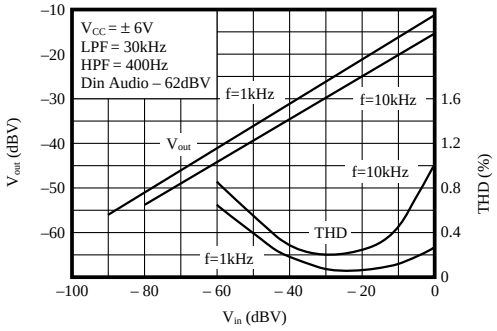
*1 Level Ratio to V_{OE}
*2 Level Ratio to V_{OD}
*3 Measure output leak by short of measuring channel input and input to reverse channel.

■ Electrical Characteristics (Cont.) (V_{CC}= ± 6V, Ta=25˚C)

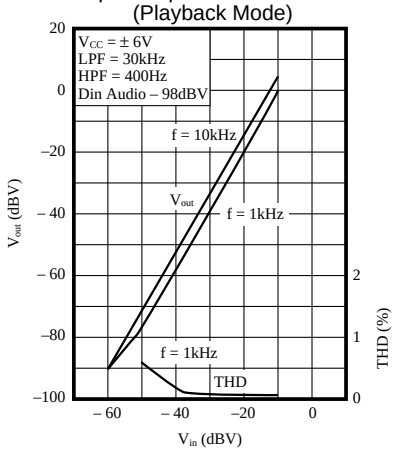
Parameter	Symbol	Condition	min.	typ.	max.	Unit
dbx ON/OFF Control dbx ON	V_{15ON}	Satisfy specifications of the preceding page V_{OE} ~ V_{NLOFF}	3.2	—	6	V
dbx ON/OFF Control dbxOFF	V_{15OFF}	Satisfy specifications of the preceding page V_{OE} ~ V_{NLOFF}	$-V_{EE}$ + 0.4V	—	1.8	V
Encode/Decode Control Encode	V_{16EN}	Satisfy specifications of the preceding page V_{OE} ~ V_{NLOFF}	3.2	—	6	V
Encode/Decode Control Decode	V_{16DE}	Satisfy specifications of the preceding page V_{OE} ~ V_{NLOFF}	$-V_{EE}$ + 0.4V	—	1.8	V
dbx ON/OFF Control “L” Overflow Current	I_{15L}	V_{15}=1.8V	–2.1	—	– 0.2	µA
Encode/Decode Control “L” Overflow Current	I_{16L}	V_{16}=1.8V	–2.1	—	– 0.2	µA
Pulse Noise at Encode	V_{NPE}	Input Short, Time : a second, number : one	—	—	13	mV_{P-P}

■ Characteristics Curve

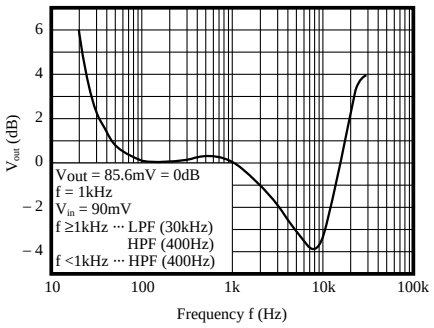
Input/Output Characteristics (Rec. Mode)



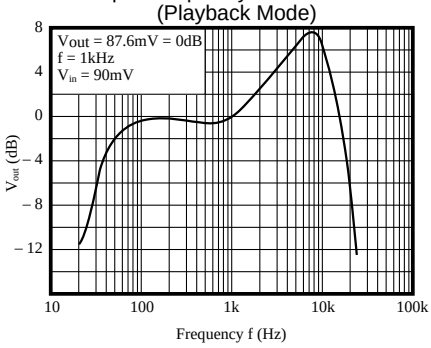
Input/Output Characteristics (Playback Mode)



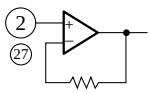
Output Frequency Characteristics (Rec. Mode)



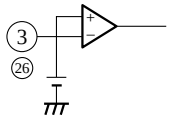
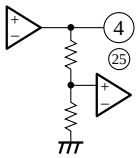
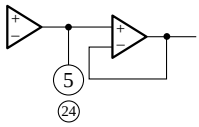
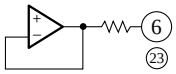
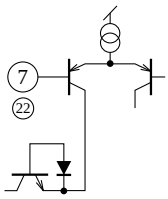
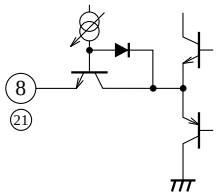
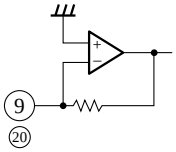
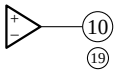
Output Frequency Characteristics (Playback Mode)



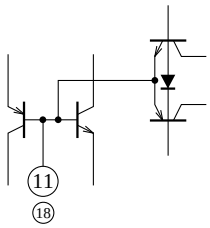
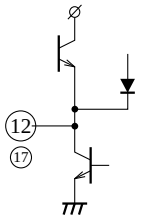
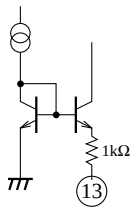
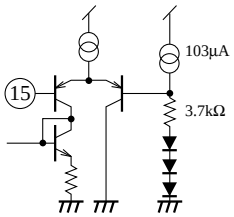
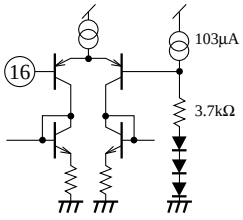
■ Pin Description

Pin No.	Pin Name	Typ. Waveform	Description	Equivalent Circuit
2 · 27	Recording Signal Input	0V	Pin for inputting signal	

■ Pin Description (Cont.)

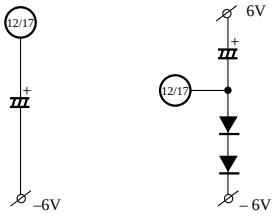
Pin No.	Pin Name	Typ. Waveform	Description	Equivalent Circuit
3 · 26	Emphasis		Emphasis amp. – side input pin	
4 · 25	Line Amp. Output	0V	Line amp. output pin	
5 · 24	Emphasis Amp. Output	0V	Emphasis amp. output pin	
6 · 23	Buffer Output	0V	Buffer output pin	
7 · 22	CCA Input	0V	CCA input pin	
8 · 21	CCA Output	0V	CCA output pin	
9 · 20	CCA Amp. Input	0V	CCA amp. input pin	
10 · 19	Rec. Out Output	0V	Rec. out output pin	

■ Pin Description (Cont.)

Pin No.	Pin Name	Typ. Waveform	Description	Equivalent Circuit
11 · 18	Level Sensor Input	–5.2V	Level sensor input pin	
12 · 17	Timing Capacitor	–5.3V	Level sensor smoothing pin	
13	Timing Current Adjusting Pin	———	Adjust the timing current by external variable resistance.	
15	dbx ON/OFF Switching	———	High– dbx ON Low– dbx OFF	
16	Encode/ Decode Switching	———	High – Encode Low– Decode	
1	GND	———	———	———
14	(–) Power Supply	———	———	———
28	(+) Power Supply	———	———	———

■ Precautions on Use

1) For the emphasis, RMS filter, and waiting C, R, use those resistors and capacitors which satisfy the following error ranges. (R ; ±2%, C ; ±5%)
2) For the timing capacitor, use a suitable one whose error is within ±5% and whose tan δ is small enough. The selected timing capacitor must also has excellent temperature characteristics.
3) Adjust the timing adjustment pin so that the level on both 1kΩ ends becomes 18.4mV.
4) If shortening of the power ON rise time is necessary, connect the timing capacitor as shown in the sketch below.



Note) Remember to make the power impedance low enough.

5) Encode THD
The product specification is based on the data confirmed by use of a band-pass filter (400Hz ~ 30kHz).
The distortion rate in the secondary to quintic higher harmonics measured by a spectrum analyzer is about 0.16%.
6) When users use the AN7367K, contract should be made between the dbx Technology Licensing. dbx license and trademark should be contacted with the following.

the U.S.A. : dbx Technology Licensing
433 California Street. Third Floor
San Francisco, California 94104
Tel : 415-765-2801
Fax : 415-765-2141
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Fax : 03-3374-5191

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