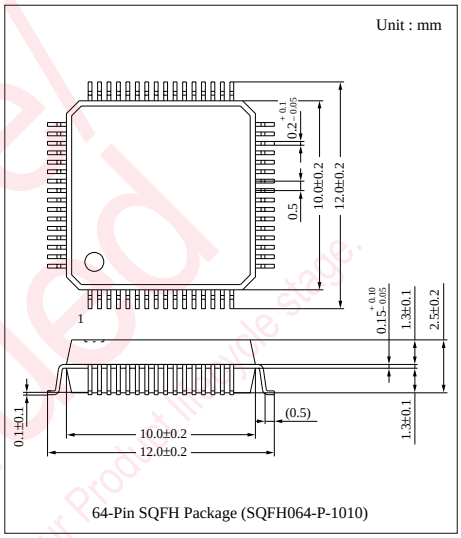
AN3988NFHP

Stereo Audio-Signal Processor IC for 8-mm Video Camera

■ Overview

The AN3988NFHP is a stereo audio signal processor IC for 8-mm video camera. It provides full audio signal processing functions for 8-mm video camera, making them less power consumption, and more compact by space saving of set.



64-Pin SQFH Package (SQFH064-P-1010)

■ Features

- Including full playback BPFs
- Low operating voltage (3 to 5V supply voltage)
- Low power consumption : 130mW for recording at V_{CC}=3.3V

■ Absolute Maximum Ratings

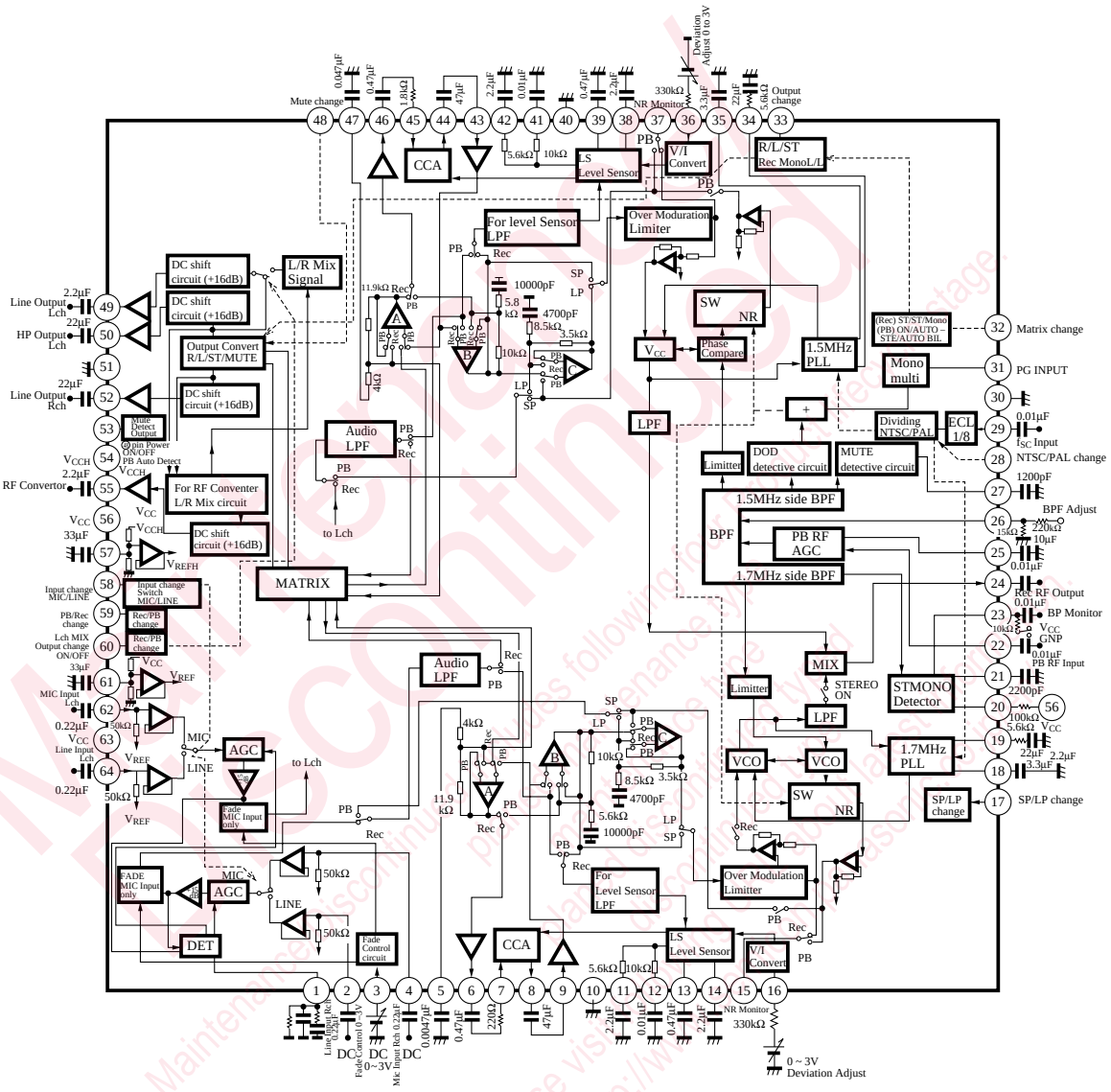
Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC1}	5.5V	V
	V_{CC2}	5.5V	V
Power dissipation Note 2)	P_D	331	mW
Operating ambient temperature Note 1)	T_{opr}	– 20 to + 70	˚C
Storage temperature Note 1)	T_{stg}	– 55 to +125	˚C

Note 1) Ta=25˚C except operating ambient temperature and storage temperature.
Note 2) Allowable power dissipation of the package at Ta=70˚C.

■ Recommended Operating Range (Ta=25˚C)

Parameter	Symbol	Range
Operating supply voltage range	V_{CC1}	3.0V to 5.0V
	V_{CC2}	4.5V to 5.0V

■ Block Diagram



■ Electrical Characteristics (V_{CC1} = 4.75V, V_{CC2} = 4.75V, Ta = 25±2˚C)

Parameter	Symbol	Condition	min	typ	max	Unit
Circuit current on recording mode 1	I_{63R}	V_{CC1}= 4.75V Rec in no signal	29	37	45	mA
Circuit current on recording mode 2	I_{54R}	V_{CC1}= 4.75V Rec in no signal	5	7	9	mA
Circuit current on PB mode 1	I_{63P}	V_{CC1}= 4.75V PB in no signal	27	34	41	mA
Circuit current on PB mode 2	I_{54P}	V_{CC1}4.75V PB in no signal	37	47	57	mA
Microphone AGC reference output level	V_{OALL} V_{OALR}	Vin= –38dBs f= 400Hz	– 8	– 7	– 6	dBs
Microphone AGC reference output level R/L	B_{AC1}	V_{OALR}/V_{OALL} difference	– 0.55	0	+ 0.55	dBs
Microphone AGC reference output level output distortion ratio	T_{HALL1} T_{HALR1}	Vin= –38dBs, 1kHz up to THD 10th	—	0.02	0.1	%
Microphone AGC ON output level 1 (RE + 4dB)	V_{OALL1} V_{OALR1}	Vin= –34dBs f= 400Hz	– 5.0	– 3.0	– 1.0	dBs
Microphone AGC ON output level 2 (REF + 20dB)	V_{OALL2} V_{OALR2}	Vin= –18dBs f= 400Hz	– 5.0	– 2.0	+1.0	dBs
Microphone AGC ON output level 3 (REF + 36dB)	V_{OALL3} V_{OALR3}	Vin= –2dBs f= 400Hz	– 3.0	0.0	+3.0	dBs
Microphone AGC ON output level difference 1 (+20dB/+ 4dB)	R_{VOL12} R_{VOR12}	V_{OALL2}/V_{OALL1} V_{OALR2}/V_{OALR1}	– 0.5	1.0	—	dB
Microphone AGC ON output level difference 1 (+36dB/+ 20dB)	R_{VOL23} R_{VOR23}	V_{OALL3}/V_{OALL2} V_{OALR3}/V_{OALR2}	– 0.5	2.0	—	dB
Microphone AGC ON output distortion ratio (REF + 36dB)	T_{HALL3} T_{HALR3}	Vin= –2dBs, 1kHz up to THD 10th	—	0.35	1.0	%
Fade maximum attenuation output	V_{FALL} V_{FALR}	Vin= –38dBs, 1kHz A curve filter	—	– 74	– 69	dBs
E-E system monitor frequency characteristics 1	V_{OLFL1} V_{OLFR1}	Vin= –38dBs 20kHz/400Hz ratio	– 1	0	+1	dB
E-E system monitor frequency characteristics 2	V_{OLFL2} V_{OLFR2}	Vin= –38dBs 50kHz/400Hz ratio	—	—	– 5	dB
Microphone AGC output noise voltage	V_{NALL} V_{NALR}	No input, A curve filter	—	– 73	– 71	dBs
Line reference output level	V_{OLLL} V_{OLLR}	Vin= –38dBs f= 400Hz	– 8	– 7	– 6	dBs
Line reference output R/L difference	B_{LL1}	Vin= –38dBs V_{OLLR}/V_{OLLL} ratio	– 0.55	0	+ 0.55	dB
Line reference output distortion ratio (THD)	T_{HLLLL1} T_{HLLLR1}	Vin= –38dBs, 1kHz up to THD 10th	—	0.02	0.1	%
Line output noise voltage	V_{NLLL} V_{NLLR}	No input, A curve filter	—	– 73	– 71	dBs
Crosstalk between microphone and line, or between inputs	V_{CTINL} V_{CTINR}	Vin= –28dBs, 1kHz A curve filter	—	– 68	– 66	dBs
E-E system channel crosstalk	V_{CTLRL} V_{CTLRR}	Vin= –28dBs, 1kHz A curve filter	—	– 69	– 67	dBs
Line max. output level	V_{OLML} V_{OLMR}	f=1kHz, 47kΩ when load THD=1%	0.5	2.0	—	dBs
Head-phone reference output level	V_{HC8L} V_{HC8R}	Vin= – 38dBs, 400Hz 120 + 8Ω load, 8Ω end	– 33	– 31	– 29	dBs
Head-phone reference output level R/L difference	B_{HC8}	Vin= – 38dBs, 400Hz 120 + 8Ω load, 8Ω end	– 1	0	+1	dB
Head-phone reference output level output distortion ratio	T_{HHC8L} T_{HHC8R}	Vin= – 38dBs, 1kHz 120 + 8Ω load, 8Ω end	—	0.03	0.5	%
Head-phone output noise voltage	V_{NHCOL} V_{NHCOR}	No input, A curve filter	—	– 97	– 93	dBs

Note) Unless otherwise specified, a 30-kHz LPF is used, and level is measured at 400Hz except that distortion or cross-talk is mea sured at 1kHz.

■ Electrical Characteristics (cont.) (V_{CC1} = 4.75V, V_{CC2} = 4.75V, Ta = 25±2˚C)

Parameter	Symbol	Condition	min	typ	max	Unit
Head-phone maximum output voltage	V_{MHH8L} V_{MHH8R}	f=1kHz, at load of THD=1% at 120 + 8Ω load pin	–1.0	+1.0	—	dBs
Line mute attenuation output	V_{MLML} V_{MLMR}	Vin= –28dBs, 1kHz A curve filter	—	– 86	– 80	dBs
Deviation adjustment range	DEV36 DEV16	Adjust Pin16 and Pin36 through resistor, so as Rec FM deviation to be 60±0.2kHz for 1.5 MHz side, and 30±0.1kHz for 1.7MHz side, (thereafter,the adjusted voltage maintained) R=330kΩ.	0.1	—	2.9	V
NR encode reference output level distortion factor (THD)	T_{HORLL} T_{HORLR}	Vin= –38dBs, 1kHz Line In, *TEST mode	—	0.2	0.5	%
NR encode linearity	V_{ORLL} V_{ORLR}	Vin= –38dBs/ –78dBs, 400Hz Line In, TEST mode	–22.5	–21.5	–20.5	dB
NR encode frequency characteristics SP mode	V_{FSRLL} V_{FSRLR}	Vin= – 48dBs, TEST mode Ratio of f=10kHz/400Hz	3.6	4.8	6.0	dB
NR encode frequency characteristics LP mode	V_{FPRLL} V_{FPRLR}	Vin= –48dBs, TEST mode Ratio of f=10kHz, LP/SP	2.2	2.7	3.2	dB
Encode stereo separation in-phase	V_{BSRLR}	Vin= –38dBs, 400Hz Ratio of DEV 16/DEV 36 STEREO	—	–25	–17.5	dB
Encode stereo separation anti-phase	V_{BSRLL}	Vin= –38dBs, 400Hz Ratio of DEV 16/DEV 36 STEREO	—	–25	–17.5	dBs
Encode output noise voltage	V_{NRRL} V_{NRRR}	No input, A curve filter	—	–56	–53	dBs
Encode channel crosstalk	S_{ERL} S_{ERR}	Vin= –28dBs, 1kHz A curve filter	—	–56	–53	dBs
VCO (NTSC mode) oscillation frequency 1.5MHz	F_{ONTL}	fsc=3.579545 (MHz) Vfsc=200mV_{P-P}	1.499	1.500	1.501	MHz
VCO (NTSC mode) oscillation frequency 1.7MHz	F_{ONTR}	fsc=3.579545 (MHz) Vfsc= 200mV_{P-P}	1.699	1.700	1.701	MHz
VCO (PAL mode) oscillation frequency 1.5MHz	F_{OPAL}	fsc= 4.433619 (MHz) Vfsc= 200mV_{P-P}	1.499	1.500	1.501	MHz
VCO (PAL mode) oscillation frequency 1.7MHz	F_{OPAR}	fsc= 4.433619 (MHz) Vfsc= 200mV_{P-P}	1.699	1.700	1.701	MHz
VCO output level Lch (1.5MHz)	V_{VCOL}	Carrier level measurement of 1.5MHz	198	220	245	mV_{P-P}
VCO output level Rch (1.7MHz)	V_{VCOR}	Carrier level measurement of 1.7MHz	157	175	194	mV_{P-P}
FM (VCO) output L/R mix ratio	V_{COMIX}	Ratio of stereo, NTSC mode 1.5MHz/1.7MHz	1.5	2.0	2.5	dB
FM (VCO) output 2nd harmonics distortion 1.5MHz	V_{VCOL2}	Load above 10kΩ, regard fundamental wave as 0dB	—	– 42	– 35	dB
FM (VCO) output 2nd harmonics distortion 1.7MHz	V_{VCOR2}	Load above 10kΩ, regard fundamental wave as 0dB	—	– 42	– 35	dB
FM (VCO) output 3rd harmonics distortion 1.5MHz	V_{VCOL3}	Load above 10kΩ, regard fundamental wave as 0dB	—	– 50	– 40	dB
FM (VCO) output 3rd harmonics distortion 1.7MHz	V_{VCOR3}	Load above 10kΩ, regard fundamental wave as 0dB	—	– 50	– 40	dB

* Pin20 is at 0V in the MONO mode.

Note) Unless otherwise specified, a 30-kHz LPF is used, and level is measured at 400Hz except that distortion or cross-talk is measured at 1kHz.

■ Electrical Characteristics (cont.) (V_{CC1} = 4.75V, V_{CC2} = 4.75V, Ta = 25±2˚C)

Parameter	Symbol	Condition	min	typ	max	Unit
Reference FM modulation distortion factor Lch, Rch	T_{HDFML} T_{HDFMR}	Vin= –38dBs, 400Hz Line In, mono mode, SP	—	0.2	0.4	%
BRF adjustment voltage f=1.625MHz	B_{PFADJ}	At f=1.625MHz, Vin=15m V_{P-P}, change Pin23 through 10kΩ to V_{CC} or to GND, and adjust Pin26 to make level equal.	0.1	—	4.65	V
BPF MAIN 1.5MHz monitor level	B_{FM150}	Vin=15.0mV_{P-P} f=1.50MHz SP mode	90	130	170	mV_{P-P}
BPF MAIN frequency characteristics 0.80MHz/1.50MHz	B_{FM080}	Vin=15.0mV_{P-P} f= 0.80MHz	—	–50	– 43	dB
BPF MAIN 1.40MHz/1.50MHz	B_{FM140}	Vin=15.0mV_{P-P} f=1.40MHz	–7.0	– 3.5	0	dB
BPF MAIN 1.60MHz/1.50MHz	B_{FM160}	Vin=15.0mV_{P-P} f=1.60MHz	–7.0	–3.5	0	dB
BPF MAIN 1.65MHz/1.50MHz	B_{FM165}	Vin=15.0mV_{P-P} f=1.65MHz	—	–15	–7	dB
BPF MAIN 2.50MHz/1.50MHz	B_{FM250}	Vin=15.0mV_{P-P} f=2.50MHz	—	–50	– 43	dB
BPF SUB 1.7MHz monitor level	B_{FS170}	Vin=12mV_{P-P} f=1.70MHz SP mode	70	115	160	mV_{P-P}
BPF frequency characteristics 1.50MHz/1.70MHz	B_{FS150}	Vin=12mV_{P-P} f=1.50MHz	—	–35	– 22.5	dB
BPF frequency characteristics 1.60MHz/1.70MHz	B_{FS160}	Vin=12mV_{P-P} f=1.60MHz	—	–15	– 9.0	dB
BPF frequency characteristics 1.65MHz/1.70MHz	B_{FS165}	Vin=12mV_{P-P} f=1.65MHz	–7.0	–3.5	0	dB
BPF frequency characteristics 1.75MHz/1.70MHz	B_{FS175}	Vin=12mV_{P-P} f=1.75MHz	–7.0	–3.5	0	dB
BPF frequency characteristics 1.90MHz/1.70MHz	B_{FS190}	Vin=12mV_{P-P} f=1.90MHz	—	– 50	– 25	dB
LP/SP BPF input output gain difference	G_{BLPSP}	Vin=15.0mV_{P-P} f=1.5MHz LP/SP	1.0	2.0	3.0	dB
fsc input level range	V_{fsc}	Guarnteed fsc level range of F_{ONTL}, F_{ONTR}, F_{OPAL} and F_{OPAR}	100	200	1000	mV_{P-P}
PB FM demodulation output voltage BIL mode Lch (equal to self-PB level)	V_{BILPL}	VcL=15mV_{P-P}, 1.5MHz DEV= 60kHz, fm=1kHz VcR=12mV_{P-P}, 1.7MHz DEV= 30kHz, fm=1kHz	– 9.0	–7.0	– 5.0	dBs
PB FM demodulation output voltage BIL mode Rch (equal to self-PB level)	V_{BILPR}		– 9.0	–7.0	– 50	dBs
PB FM demodulation output distortion factor BIL mode Lch	T_{HBLPL}	VcL=15mV_{P-P}, 1.5MHz DEV= 60kHz, fm=1kHz VcR=12mV_{P-P}, 1.7MHz DEV= 30kHz, fm=1kHz	—	0.2	0.5	%
PB FM demodulation output distortion factor BIL mode Rch	T_{HBLPR}		—	0.2	0.5	%
PB FM demodulation output voltage 1 STE mode Lch	V_{SLP1L}	VcL=15mV_{P-P}, 1.5MHz DEV= 60kHz, fm=1kHz VcR=12mV_{P-P}, 1.7MHz DEV= 0kHz	– 9.0	– 7.0	– 5.0	dBs
PB FM demodulation output voltage 1 STE mode Rch	V_{SLP1R}		– 9.0	– 7.0	– 5.0	dBs
PB FM demodulation output voltage 2 STE mode Lch	V_{SLP2L}	VcL=15mV_{P-P}, 1.5MHz DEV= 0kHz VcR=12mV_{P-P}, 1.7MHz DEV= 30kHz, fm=1kHz	– 9.0	– 7.0	– 5.0	dBs
PB FM demodulation output voltage 2 STE mode Rch	V_{SLP2R}		– 9.0	– 7.0	– 5.0	dBs
PB FM demodulation output noise BIL mode L,R	V_{NLPL} V_{NLPR}	VcL=15mV_{P-P}, 1.5MHz VcR=12mV_{P-P}, 1.7MHz	—	– 81	– 76	dBs
Self Rec. PB R/L level difference	B_{BRP}	V_{BILPR}/V_{BILPL}	–1.5	0	+1.5	dB

Note) Unless otherwise specified, a 30-kHz LPF is used, and level is measured at 400Hz except that distortion or cross-talk is meas ured at 1kHz.

■ Electrical Characteristics (cont.) (V_{CC1} = 4.75V, V_{CC2} = 4.75V, Ta = 25±2˚C)

Parameter	Symbol	Condition	min	typ	max	Unit
Stereo mode self recording & playback channel separation positive phase	S_{SRPR}	Vin= –38dBs, 400Hz Lch line input, Lch ratio	—	–30	–23.5	dB
Stereo mode self recording & playback channel separation negative phase	S_{SRPL}	Vin= –38dBs, 400Hz Rch line input, Rch ratio	—	–30	–23.5	dB
Dropout detection ON level	DODON	BPF monitor voltage of 1.5MHz Set 130mV_{P-P} at 0dB, f=1.5MHz, SP mode	–18	–14	–11	dB
Dropout detection OFF level hysteresis width	DODOFF	BPF monitor voltage of 1.5MHz 130mV_{P-P} = 0dB f=1.5MHz, SP mode Ratio to DODON	0.5	4.5	6.5	dB
Start delay time at Mute ON	T_{MTON}	Delay time of after carrierlack to MUTE begining	260	340	430	µs
Mute holding time at Mute release	T_{MTOFF}	MUTE hold time when MUTE relesed	113	133	153	ms
Monaural automatic detection ON level	AMOON	BPF monitor voltage of 1.7MHz 130mV_{P-P} = 0dB f=1.7MHz, SP mode	–11.5	–9	–7.5	dB
Monaural automatic detection OFF level hysteresis width	AMOOFF	BPF monitor voltage of 1.7MHz 130mV_{PP-P} = 0dB f=1.7MHz, SP mode, Ratio to AMOON	1.0	3.0	5.0	dB
Monaural holding time at monaural release	T_{MNOFF}	Monaural holding time at monaural release	113	133	153	ms
Input change-over holding voltage microphone input	V_{58MIC}		2.0	—	V_{CC1}	V
Input change-over holding voltage line input	V_{58LIN}		0	—	1.0	V
SP/LP change-over holding voltage SP mode	V_{17SP}		2.0	—	V_{CC1}	V
SP/LP change-over holding voltage LP mode	V_{17LP}		0	—	1.0	V
NTSC/PAL change-over holding voltage NTSC	V_{28NT}		2.0	—	V_{CC1}	V
NTSC/PAL change-over holding voltage PAL	V_{28PA}		0	—	1.0	V
Line mute change-over holding voltage ON	V_{48MO}		2.0	—	V_{CC1}	V
Line mute change-over holding voltage OFF	V_{48MF}		0	—	1.0	V
PB/Rec change-over holding voltage PB	V_{59PB}		2.0	—	V_{CC1}	V
PB/Rec change-over holding voltage Rec	V_{59RE}		0	—	1.0	V
Output change-over holding voltage SUB/SUB (R/R)	V_{33RR}		2.3	—	V_{CC1}	V
Output change-over holding voltage MAIN/SUB (L/L)	V_{33LL}		1.3	—	1.7	V
Output change-over holding voltage MAIN/SUB (STEREO)	V_{33ST}		0	—	0.7	V
Recording system matrix holding voltage (stereo)	V_{32ST}		2.3	—	V_{CC1}	V
Recording system matrix holding voltage (monaural)	V_{32MO}		0	—	1.3	V
PB system matrix holding voltage forced ON	V_{32ON}		2.3	—	V_{CC1}	V
PB system matrix holding voltage forced STEREO-AUTO	V_{32AT}		1.3	—	1.7	V
PB system matrix holding voltage forced BIL-AUTO	V_{32OF}		0	—	0.7	V
Line Lch output MIX switch ON	V_{60MXO}		2.3	—	V_{CC1}	V

Note) Unless otherwise specified, a 30-kHz LPF is used, and level is measured at 400Hz except that distortion or cross-talk is measu red at 1kHz.

■ Electrical Characteristics (cont.) (V_{CC1} = 4.75V, V_{CC2} = 4.75V, Ta = 25±2˚C)

Parameter	Symbol	Condition	min	typ	max	Unit
Line Lch output MIX switch OFF	V_{60MXF}		0	—	0.7	V
Output change-over terminal voltage	V_{33}		1.31	—	1.69	V
PB system matrix terminal voltage	V_{32}		1.31	—	1.69	V
Fade control non-attenuating holding voltage	V_{FANOL} V_{FANOR}	Measure control voltage range of ineffective fading.	0	—	0.6	V
E-E system MUTE change-over output stage difference	V_{DCROL} V_{DCROR}	Line output DC level difference in recording at MUTE ON/OFF	– 200	—	+200	mV_{P-P}
LP emphasis frequency characteristics 2kHz (LP/SP)	V_{DCPOL} V_{DCPOR}	Line output DC level difference in playback at MUTE ON/OFF	–100	—	+100	mV_{P-P}
PB system output stage difference at MUTE change-over	V_{FPRLL2} V_{FPRLR2}	TEST mode f=2kHz, ratio to LP/SP	1.0	1.4	1.8	dB
Audio limiter level Lch, when recording	V_{ALIML}	Measure maximum deviation with Vin= –2dBs, f=10kHz	84	100	116	kHz
Audio limiter level Rch, when recording	V_{ALIMR}	Measure maximum deviation with Vin= –2dBs, f=10kHz	42	50	58	kHz
MUTE automatic detection ON level	AMUTON	BPF monitor voltage at 1.5MHz Set 130mV_{P-P} at 0dB, fc=1.5MHz SP mode	–12	–9	–7	dB
MUTE automatic detection OFF hysteresis width	AMUTOFF	BPF monitor voltage at 1.5MHz Set 130mV_{P-P} at 0dB, fc=1.5MHz Ratio of SP mode to AMUTON	1	3	5	dB

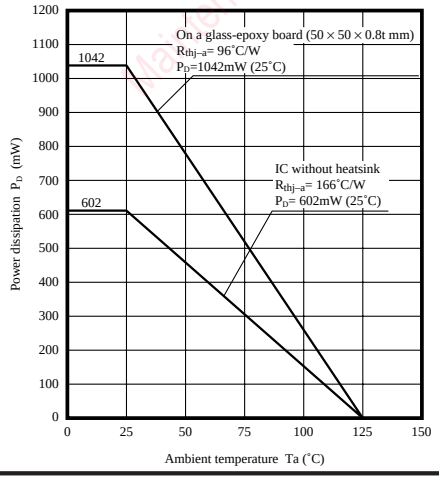
Note) Unless otherwise specified, a 30-kHz LPF is used, and level is measured at 400Hz except that distortion or cross-talk is measu red at 1kHz.

■ Pin Descriptions

Pin No.	Pin name	Pin No.	Pin name
1	Input AGC detection	33	Output switching control
2	Line input (R channel)	34	PLL loop filter (L channel)
3	Fade control	35	PLL smoothing capacitor (L channel)
4	Mic. input (R channel)	36	Deviation control (L channel)
5	To an FM emphasis capacitor (R channel)	37	NR monitor (L channel)
6	NR input amp. (R channel)	38	LS recovery capacitor (L channel)
7	CCA input 1 (R channel)	39	LS hold capacitor (L channel)
8	CCA output 1 (R channel)	40	GND
9	CCA input 2 (R channel)	41	LS weighting capacitor (2L)
10	GND	42	LS weighting capacitor (1L)
11	LS weighting capacitor (1R)	43	CCA input 2 (L channel)
12	LS weighting capacitor (2R)	44	CCA output 1 (L channel)
13	LS hold capacitor (R channel)	45	CCA input 1 (L channel)
14	LS recovery capacitor (R channel)	46	NR input amp. (L channel)
15	NR monitor (R channel)	47	To an FM emphasis capacitor (L channel)
16	Deviation control (R channel)	48	Mute control
17	SP/LP switching	49	Line output (L channel)
18	PLL smoothing capacitor (R channel)	50	Headphone output (L channel)
19	PLL loop filter	51	GND
20	Mono mode discrimination	52	Line/headphone output (R channel)
21	STEREO/MONO discrimination and detection	53	Mute discrimination output
22	Playback RF input	54	V_{CCH}
23	BPF monitor	55	RF converter output
24	Recording FM output	56	VCC
25	BPF AGC detection	57	1/2 V_{CCH} (V_{REFH})
26	BPF control	58	Input switching
27	Mute detection	59	PB/rec switching
28	PAL/NTSC switching	60	Line L channel MIX output switching
29	fsc input	61	1/2 V_{CC} (V_{REF})
30	GND	62	Mic input (L channel)
31	PG pulse input	63	V_{CC}
32	Matrix switching	64	Line input (L channel)

■ Reference

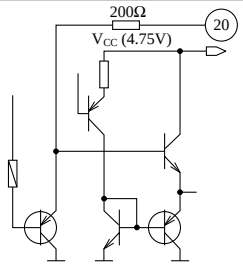
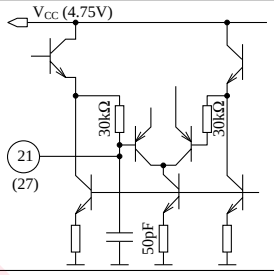
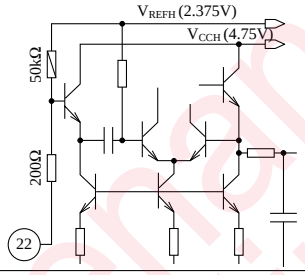
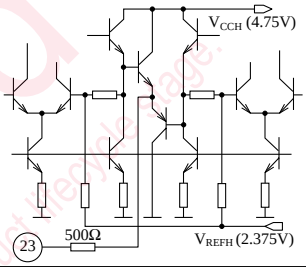
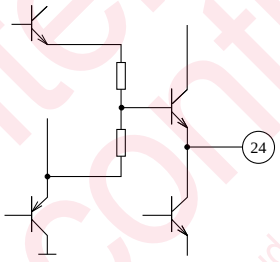
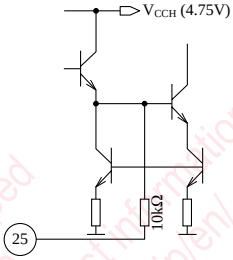
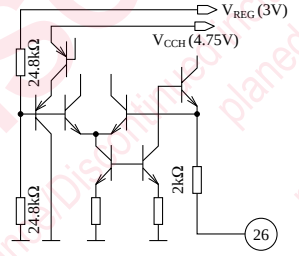
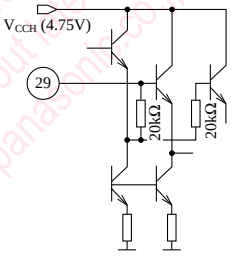
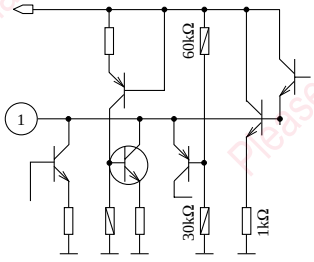
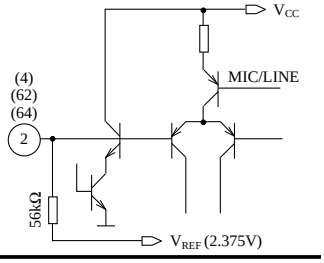
P_D–Ta



(Usage notes)

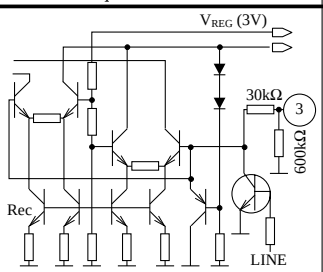
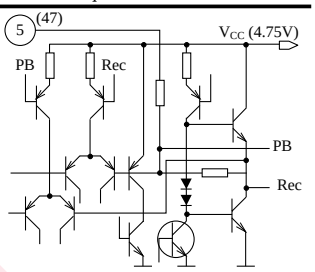
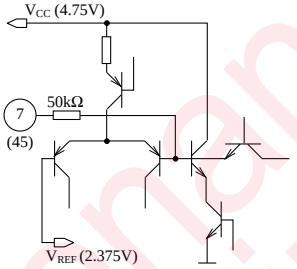
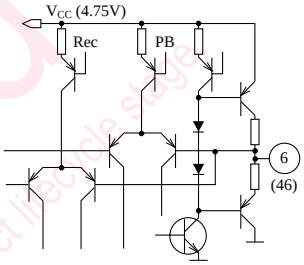
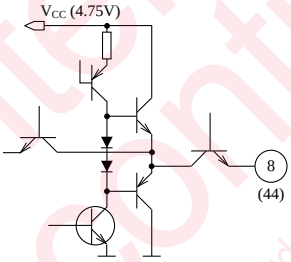
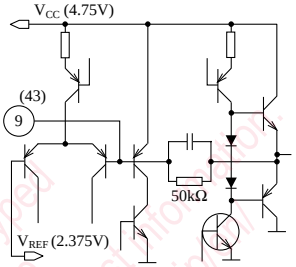
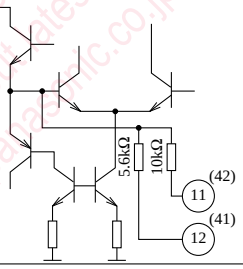
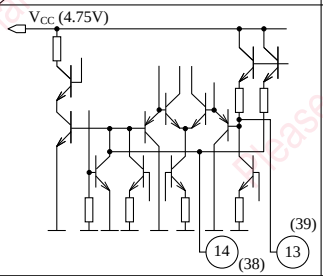
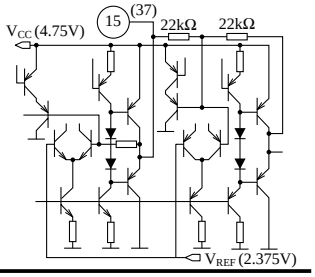
1. To reduce temperature dependency of BPF frequency characteristics, it is recommended that the resistor and the variable resistor at Pin26 should be metal film type and thermet variable resistor.
2. To reduce distortion at low frequencies, capacitances between Pins8 and 9, and between Pins43 and 44 should be increased, (for example, to 220µF).
3. The surge breakdown level for Pins38, 39, and 53 is 160 to 200 V (with a capacitance of 200pF). Ensure that the voltage at these pins does not exceed the level.

■ Pin Descriptions

Pin No.	Waveform · Voltage	Equivalent circuit	Pin No.	Waveform · Voltage	Equivalent circuit
20	Mono/stereo discrimination Pull-up by an external 100kΩ resistor 0V for stereo and 4.75V for mono mode		21 27	Mono mode discrimination and detection	
22	Playback RF input 2.375V		23	BPF monitor Connected to VCCH/GND through an external 10kΩ resistor.	
24	Rec FM output 2.8V		25	RF AGC	
26	BPF fo adjustment 1.5V		29	fsc input 200mV$_{P-P}$	
1	Mic line input AGC detection		2 4 62 64	Line input Mic input – 38dBs 2.375V	

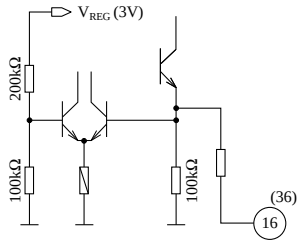
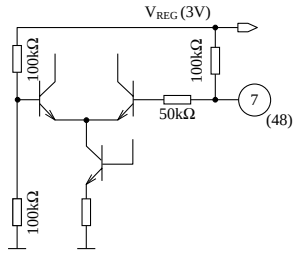
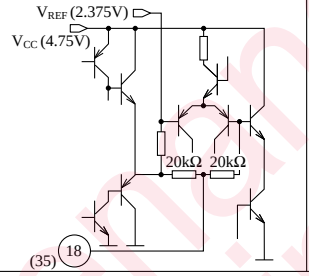
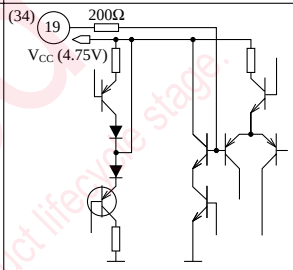
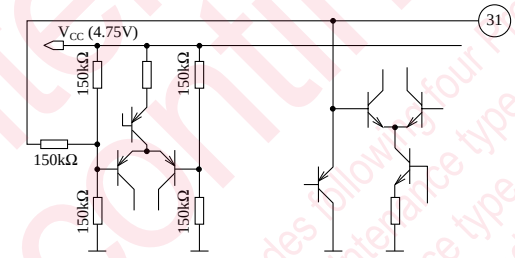
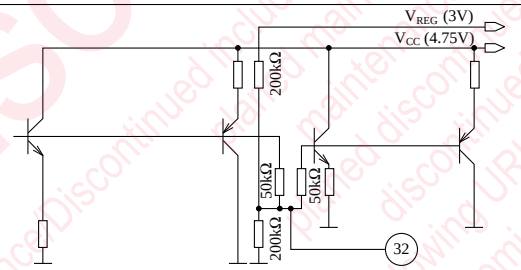
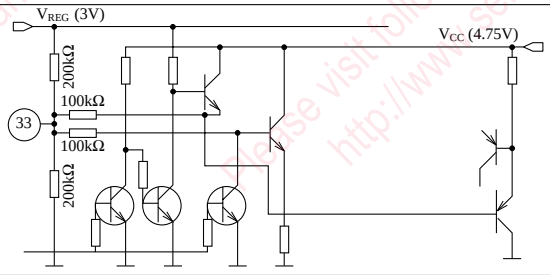
Note) The value in the above characteristics is not a guaranteed value, but reference one on design.

■ Pin Descriptions(cont.)

Pin No.	Waveform · Voltage	Equivalent circuit	Pin No.	Waveform · Voltage	Equivalent circuit
3	Fade control input DC 0 to 3V		5 47	FM emphasis 2.375V	
7 45	– 23dBs 2.375V		6 46	– 23dBs 2.375V	
8 44	2.375V		9 43	2.375V	
10 30 40 51	GND		11 12 41 42	LS weighting 2.375V	
13 14 38 39	LS weighting 2.375V		15 37	NR monitor – 23dBs 2.375V	

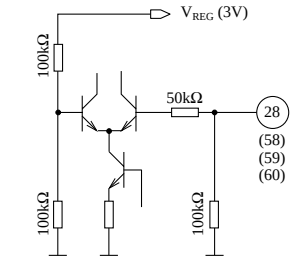
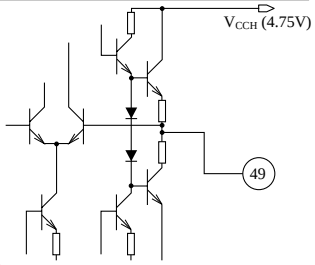
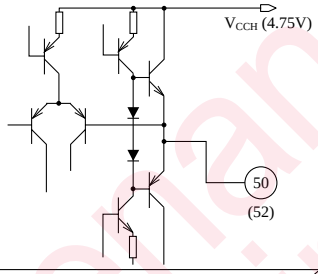
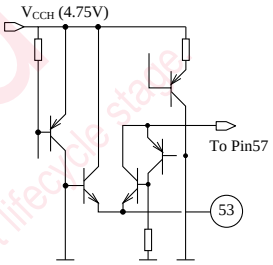
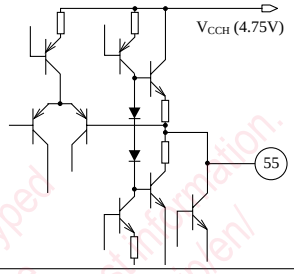
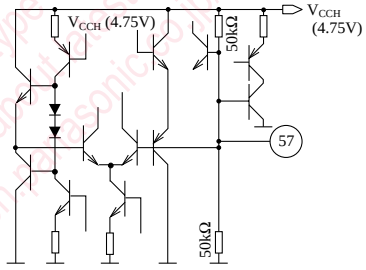
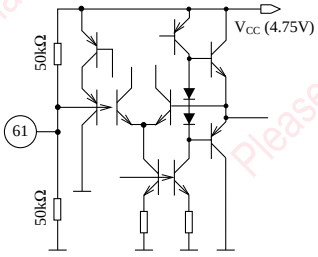
Note) The value in the above characteristics is not a guaranteed value, but reference one on design.

■ Pin Descriptions (cont.)

Pin No.	Waveform · Voltage	Equivalent circuit	Pin No.	Waveform · Voltage	Equivalent circuit
16 36	DEV control input 0 to 3V		17 48	SP/LP switching MUTE switching 3.0V	
18 35	 2.375V		19 34	 2.375V	
31	PG input 30Hz 2.375V				
32	Matrix switching 1.5V				
33	Output switching 1.5V				

Note) The value in the above characteristics is not a guaranteed value, but reference one on design.

■ Pin Descriptions(cont.)

Pin No.	Waveform · Voltage	Equivalent circuit	Pin No.	Waveform · Voltage	Equivalent circuit
28 58 59 60	PAL/NTSC switching Rec/PB input switching L channel Mix switch 0V		49	LINE L channel output –7dBs 2.375V	
50 52	HP output L channel LINE/HP R channel output –7dBs 2.375V		53	MUTE discrimination output	
54	V_{CCH} 4.75V		55	RF converter output –7dBs 2.375V	
56 63	V_{CC} 4.75V		57	V_{REFH} 2.375V	
61	V_{REF} 2.375V				

Note) The value in the above characteristics is not a guaranteed value, but reference one on design.

Request for your special attention and precautions in using the technical information and semiconductors described in this book

(1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.

(2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products, and no license is granted under any intellectual property right or other right owned by our company or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information described in this book.

(3) The products described in this book are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
- Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
- Any applications other than the standard applications intended.

(4) The products and product specifications described in this book are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.

(5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.

(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.