

D2068

System Preamplifier for Single Cassette Back

General Description

The D2068 is system preamplifier IC for single deck radio-cassette tape player. This IC have built-in function for single cassette deck and mixing amp for KARAOKE and function switch for source selector.

D2068 is available in SOP24 package.



Features

- Built-in EQ Amp, REC Amp, Monitor Amp, Mic (Mixing) Amp
- Mic Amp is suitable for both inner mic and mixing mic
- Built-in source selector switch: RADIO-IN/TYPE-IN/AUX-IN
- Dual Channel
- 6-operation mode are available for INNER MIC set and MIXING MIC set.

<Inner MIC set > 1) Tape Play-Back 2) Line-In Play 3) Radio Play 4) Mic Recording Without Monitor 5) Line-In Recording and Play 6) Radio Recording and Play	<Mixing Mic Set > 1) Tape Play-Back with Mic Mixing 2) Line-In Play with Mic Mixing 3) Radio Play with Mic Mixing 4) Mic Recording With Monitor 5) Line-In Recording and Play with Mic Mixing 6) Radio Recording and Play with Mic Mixing
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- Operating Supply Voltage Range : $V_{cc(opr)}=4.0\sim 9.0V(T_a=25^{\circ}C)$

Package Information

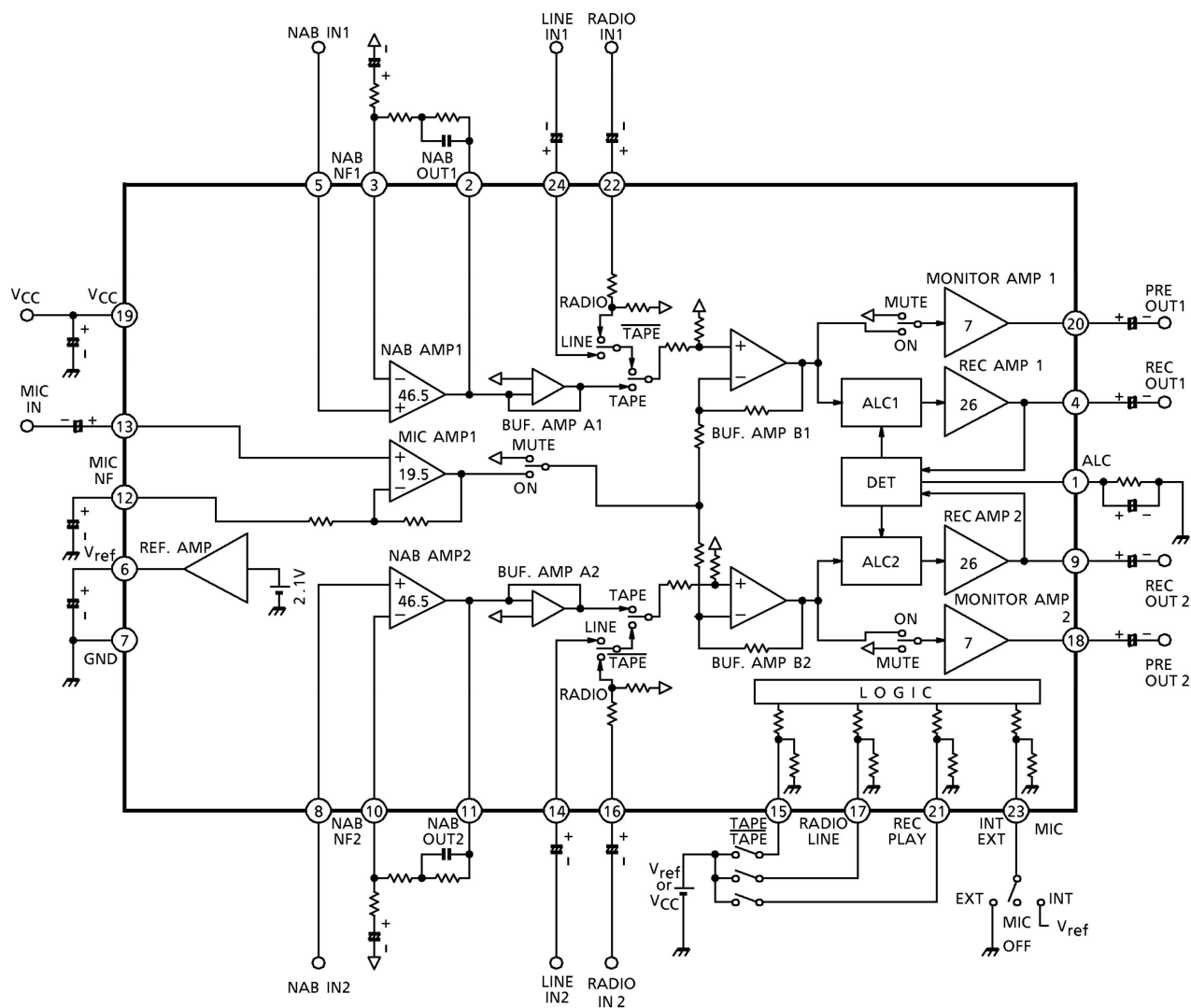
Part NO.	Package Description	Package Marking	Package Option
D2068	SOP24	CHMC SXXXX D2068	30/Tube 1800/Reel

CHMC:Trademark

D2068:Part NO.

SXXXX:Lot NO.

Functional Block Diagram



Pin Descriptions

Pin Number	Pin Name	Function Description	Equivalent Circuit
1	ALC	Automatic level control time constant terminal	
2/11	NAB OUT	Playback Amp output	
3/10	NAB NF	Playback Amp NF	
4/9	REC OUT	Recording Amp output	
5/8	NAB IN	Playback Amp input	

Pin Number	Pin Name	Function Description	Equivalent Circuit
6	Vref	Reference voltage	
7	GND	Ground	
12	MIC NF	MIC Amp NF	
16/22	RADIO IN	Radio input terminal	
18/20	PRE OUT	MONITOR Amp output	
13	MIC IN	MIC Amp input	

Pin Number	Pin Name	Function Description	Equivalent Circuit
14/24	LINE IN	Line input	
15	$\overline{TAPE} / TAPE$ SW	TAPE/EXTERNAL INPUT function SW	
17	LINE/RADIO SW	LINE/RADIO INPUT Function SW	
21	REC/PLAY SW	PLAYBACK/RECORDING Function SW	
23	INT/MIC OFF/EXT	INTERNAL MIC/MIC OFF /EXTERNAL MIC Function SW	

Absolute Maximum Ratings (T_{amb}=25℃)

Parameter Name	Symbol	Value	Unit
Supply Voltage	V _{cc}	9	V
Power Dissipation (SOP24)	P _D	700	mW
Operating Temperature	T _{opr}	-25 ~ +75	℃
Storage Temperature	T _{stg}	-55 ~ +155	℃

Electrical Characteristics

(Unless otherwise specified, $T_{amb}=25^{\circ}\text{C}$, $V_{cc}=5\text{V}$, $f=1\text{kHz}$, $BW=400\text{Hz}\sim 30\text{kHz}$)

Parameter Name	Test Conditions	Symbol	Min	Typ.	Max	Unit
Quiescent Current	REC Mode	I _{CCQ1}	6.0	10.0	16.0	mA
	PLAY Mode	I _{CCQ2}	4.0	7.5	13.0	mA
Reference Voltage		V _{REF}		2.1		V
Control Voltage Range						
$\overline{TAPE} / \overline{TAPE}$ SW (SW1:pin15)	$\overline{TAPE}$ Mode (open)	V _{TH1A}	0		0.2	V
	$\overline{TAPE}$ Mode	V _{TH1B}	1.3		V _{cc}	
RADIO/LINE SW (SW2:pin17)	Radio Mode (open)	V _{TH2A}	0		0.2	
	Line Mode	V _{TH2B}	1.3		V _{cc}	
REC/PLAY SW (SW3:pin21)	Play Mode (open)	V _{TH3A}	0		0.2	
	REC Mode	V _{TH3B}	1.3		V _{cc}	
MIC SW (SW4: pin23)	EXT MIC Mode (open)	V _{TH4A}	0		0.2	
	MIC Off Mode	V _{TH4B}		Open		
	INT MIC Mode	V _{TH4C}	1.6		V _{ref}	
RADIO Mode (Playback)						
Voltage Gain	V _{out} =-10dBV	G _{v1}	-4	-2	0	dB
Maximum Output Voltage	THD=1%	V _{om1}	0.8	1.2		V _{rms}
Output Noise Voltage	MIC off Mode, R _g =620Ω, DIN Audio	V _{no1}		-98	-90	dBV
Total Harmonic Distortion	V _{out} =-10dBV	THD ₁		0.2		%
Cross Talk	V _{out} =-10dBV	C.T. ₁		-60		dB
Ripple Rejection Ratio	MIC off Mode, V _{rip} =-20dBV,f=100Hz, BW=~30kHz	R.R. ₁		-52		dB

Parameter Name	Test Conditions		Symbol	Min	Typ.	Max	Unit
RADIO Mode (REC)							
Voltage Gain	Vout=-10dBV		Gv2	16.5	19.0	21.5	dB
Output Noise Voltage	MIC off Mode, Rg=620Ω, DIN Audio		Vno2		-77	-68	dBV
Total Harmonic Distortion	Vin=-6dBV, ALC=ON		THD2		0.3		%
Cross Talk	Vout=-10dBV		C.T.2		-57		dB
Ripple Rejection Ratio	MIC off Mode, Vrip=-20dBV, f=100Hz, BW=~30kHz		R.R.2		-40		dB
ALC Level	Vin=-16dBV	Dual Channel input	ALC ₂₁	-4	-2	1	dBV
	Vin=4dBV		ALC ₂₂	-4	-1	2	
LINE Mode (Playback)							
Voltage Gain	Vout=-10dBV		Gv3	5	7	9	dB
Maximum Output Voltage	THD=1%		Vom3	0.8	1.2		Vrms
Output Noise Voltage	MIC off Mode, Rg=620Ω, DIN Audio		Vno3		-98	-90	dBV
Total Harmonic Distortion	Vout=-10dBV		THD3		0.2		%
Cross Talk	Vout=-10dBV		C.T.3		-60		dB
Ripple Rejection Ratio	MIC off Mode, Vrip=-20dBV,f=100Hz, BW=~30kHz		R.R.3		-52		dB
LINE Mode (REC)							
Voltage Gain	Vout=-10dBV		Gv4	25.5	28.0	30.5	dB
Output Noise Voltage	MIC off Mode, Rg=620Ω, DIN Audio		Vno4		-77	-68	dBV
Total Harmonic Distortion	Vin=-16dBV, ALC=ON		THD4		0.3		%
Cross Talk	Vout=-10dBV		C.T.4		-56		dB
Ripple Rejection Ratio	MIC off Mode, Vrip=-20dBV, f=100Hz, BW=~30kHz		R.R.4		-37		dB
ALC Level	Vin=-26dBV	Dual Channel input	ALC ₄₁	-4	-2	1	dBV
	Vin=-6dBV		ALC ₄₂	-4	-1	2	

Parameter Name	Test Conditions		Symbol	Min	Typ.	Max	Unit
TAPE Mode							
Open Loop Voltage Gain	Vout=-10dBV		Gvo5		97		dB
Closed Loop Voltage Gain	Vout=-10dBV		Gv5	41.5	43.5	45.5	dB
Maximum output Voltage	THD=1%		Vom5	0.8	1.2		Vrms
Output Noise Voltage	MIC off Mode, Rg=620Ω, DIN Audio		Vno5		-73	-65	dBV
Total Harmonic Distortion	Vin=-6dBV, ALC=ON		THD5		0.2		%
Cross Talk	Vout=-10dBV		C.T.5		-57		dB
Ripple Rejection Ratio	MIC off Mode, Vrip=-20dBV, f=100Hz, BW=~30kHz		R.R.5		-33		dB
MIC Mode (Playback)							
Voltage Gain	Vout=-10dBV		Gv6	27	29	31	dB
Maximum Output Voltage	THD=1%		Vom6	0.8	1.2		Vrms
Output Noise Voltage	EXT. MIC Mode, Rg=620Ω, DIN Audio		Vno6		-87	-79	dBV
Total Harmonic Distortion	Vout=-10dBV		THD6		0.24		%
Ripple Rejection Ratio	MIC off Mode, Vrip=-20dBV, f=100Hz, BW=~30kHz		R.R.6		-52		dB
MIC Mode (REC)							
Voltage Gain	Vout=-10dBV		Gv7	46.5	49.5	52.5	dB
Maximum Output Voltage	THD=1%, ALC=OFF		Vom7	0.8	1.2		Vrms
Output Noise Voltage	INT. MIC/EXT. MIC Mode, Rg=620Ω, DIN Audio		Vno7		-70	-61	dBV
Total Harmonic Distortion	Vin=-36dBV, ALC=ON		THD7		0.3		%
Ripple Rejection Ratio	INT. MIC/EXT. MIC Mode, Vrip=-20dBV, f=100Hz, BW=~30kHz		R.R.7		-47		dB
ALC Level	Vin=-46dBV	Dual Channel input	ALC ₇₁	-4	-2	1	dBV
	Vin=-26dBV		ALC ₇₂	-4	-1	2	

DC Voltage at Each Terminal (V_{cc}=5V, V_{in}=0, T_a=25°C)

Terminal No.	1	2	3	4	5	6	7	8	9	10	11	12
DC Voltage (V)	1.0(REC)	2.1	2.1	2.1	2.1	2.1	0 (GND)	2.1	2.1	2.1	2.1	2.1
	0.1(Play)											
Terminal No.	13	14	15	16	17	18	19	20	21	22	23	24
DC Voltage (V)	2.1	2.1	0 (open)	2.1	0 (open)	2.1	5.0 (V _{cc})	2.1	0 (open)	2.1	0 (open)	2.1

Switch Mode Explanation (L:GND, O:OPEN, H:V_{cc}, W.O=WITHOUT)

FUNCTION			SWITCH MODE COMBINATION				INPUT	INPUT RESISTANCE R _g	OUTPUT AMPLIFIER
			SW ₄	SW ₃	SW ₂	SW ₁			
RADIO Mode	Play-back	(*) W.O V _{no} , R.R.	L/O	O/H	H	O	RADIO	—	MONITOR
		V _{no11}	O	O/H	H	O	—	RADIO	MONITOR
		V _{no12}	L	O/H	H	O	—	RADIO / MIC	MONITOR
		R.R.11	O	O/H	H	O	—	RADIO	MONITOR
		R.R.12	L	O/H	H	O	—	RADIO / MIC	MONITOR
	REC	(*) W.O V _{no} , R.R.	L/O	H	H	O	RADIO	—	REC
		V _{no21}	O	H	H	O	—	RADIO	REC
		V _{no22}	L	H	H	O	—	RADIO / MIC	REC
		R.R.21	O	H	H	O	—	RADIO	REC
		R.R.22	L	H	H	O	—	RADIO / MIC	REC
LINE Mode	Play-back	(*) W.O V _{no} , R.R.	L/O	O/H	O	O	LINE	—	MONITOR
		V _{no31}	O	O/H	O	O	—	LINE	MONITOR
		V _{no32}	L	O/H	O	O	—	LINE / MIC	MONITOR
		R.R.31	O	O/H	O	O	—	LINE	MONITOR
		R.R.32	L	O/H	O	O	—	LINE / MIC	MONITOR
	REC	(*) W.O V _{no} , R.R.	L/O	H	O	O	LINE	—	REC
		V _{no41}	O	H	O	O	—	LINE	REC
		V _{no42}	L	H	O	O	—	LINE / MIC	REC
		R.R.41	O	H	O	O	—	LINE	REC
		R.R.42	L	H	O	O	—	LINE / MIC	REC
TAPE Mode		(*) W.O V _{no} , R.R.	L/O	O	O/H	H	TAPE	—	MONITOR
		V _{no51}	O	O	O/H	H	—	TAPE	MONITOR
		V _{no52}	L	O	O/H	H	—	TAPE / MIC	MONITOR
		R.R.51	O	O	O/H	H	—	TAPE	MONITOR
		R.R.52	L	O	O/H	H	—	TAPE / MIC	MONITOR
MIC Mode	Play-back	(*) W.O V _{no} , R.R.	L	H	O/H	H	MIC	—	MONITOR
		V _{no6}	L	H	O/H	H	—	MIC	MONITOR
		R.R.61	O	H	O/H	H	—	MIC	MONITOR
		R.R.62	L	H	O/H	H	—	MIC	MONITOR
	REC	(*) W.O V _{no} , R.R.	L/O	H	O/H	H	MIC	—	REC
		V _{no7}	L/O	H	O/H	H	—	MIC	REC
		R.R.7	L/O	H	O/H	H	—	MIC	REC

Operation Mode by External Switch (1/2)

SW Position	MIC Mode	G: EXT MIC O: MIC OFF H: INT MIC	Vref Internal MIC mode								GND External MIC mode							
	REC/ PLAY	SW3(21) O: PLAY H: REC	Open Play back mode				Vcc Recording mode				Open Play back mode				Vcc Recording mode			
	Source Select	SW2(15) O: TYPE H: TYPE	Vcc		Open		Vcc		Open		Vcc		Open		Vcc		Open	
		SW1(17) O: LINE H: RADIO	Vcc	Open	Vcc	Open	Vcc	Open	Vcc	Open	Vcc	Open	Vcc	Open	Vcc	Open	Vcc	Open
Operation Mode	Input/Source		Tape		Line	Radio	MIC		Line	Radio	Tape + MIC		Line + MIC	Radio + MIC	MIC		Line + MIC	Radio + MIC
	Monitor OUT		O		O	O			O	O	O		O	O	O		O	O
	REC OUT						O		O	O					O		O	O
Internal Operation	NAB AMP		ON		ON		OFF		OFF		ON		ON		OFF		OFF	
	BUFFER AMP A		OFF		OFF		ON		ON		OFF		OFF		ON		ON	
	LINE/RADIO SW		Line	Radio	Line	Radio	Line	Radio	Line	Radio	Line	Radio	Line	Radio	Line	Radio	Line	Radio
	TAPE/TAPE SW		Tape		Tape		Tape		Tape		Tape		Tape		Tape		Tape	
	MIC AMP		MUTE		MUTE		ON		MUTE		ON		ON		ON		ON	
	BUFFER AMP B		ON		ON		ON		ON		ON		ON		ON		ON	
	REC AMP		OFF		OFF		ON		ON		OFF		OFF		ON		ON	
	ALC CIRCUIT		ON		ON		ON		ON		ON		ON		ON		ON	
	ALC DISCHARGE		ON		ON		OFF		OFF		ON		ON		OFF		OFF	
	MONITOR AMP		ON		ON		MUTE		ON		ON		ON		ON		ON	

Operation Mode by External Switch (2/2)

SW Position	MIC Mode	G: EXT MIC O: MIC OFF H: INT MIC	Open MIC mode							
	REC/PLAY	SW3(21) O: PLAY H: REC	Open Play back mode				Vcc Recording mode			
	Source Select	SW2(15) O: TYPE H: TYPE	Vcc		Open		Vcc		Open	
		SW1(17) O: LINE H: RADIO	Vcc	Open	Vcc	Open	Vcc	Open	Vcc	Open
Operation Mode	Input/Source		Tape		Line	Radio	MIC		Line	Radio
	Monitor OUT		O		O	O			O	O
	REC OUT						O		O	O
Internal Operation	NAB AMP		ON		ON		OFF		OFF	
	BUFFER AMP A		OFF		OFF		ON		ON	
	LINE/RADIO SW		Line	Radio	Line	Radio	Line	Radio	Line	Radio
	TAPE/TAPE SW		Tape		Tape		Tape		Tape	
	MIC AMP		MUTE		MUTE		MUTE		MUTE	
	BUFFER AMP B		ON		ON		ON		ON	
	REC AMP		OFF		OFF		ON		ON	
	ALC CIRCUIT		ON		ON		ON		ON	
	ALC DISCHARGE		ON		ON		OFF		OFF	
	MONITOR AMP		ON		ON		ON		ON	

Level Diagram

(1) TAPE IN $\Rightarrow$ MONITOR OUT (52dB at 315Hz)

TAPE IN	$\Rightarrow$	NAB AMP	$\Rightarrow$	BUF. AMP	$\Rightarrow$	MONI. AMP	$\Rightarrow$	MONI. OUT
G_V	:	45dB (315Hz)		0dB		7dB		
LEVEL	:	0.154mV _{rms} (- 74dBm)		0.027V _{rms} (- 29dBm)		0.027V _{rms} (- 29dBm)		0.062V _{rms} (- 22dBm)

(2) RADIO IN $\Rightarrow$ MONITOR OUT (- 2dB)

RADIO IN	$\Rightarrow$	ATT.	$\Rightarrow$	BUF. AMP	$\Rightarrow$	MONI. AMP	$\Rightarrow$	MONI. OUT
G_V	:	- 9dB		0dB		7dB		
LEVEL	:	0.078V _{rms} (- 20dBm)		0.027V _{rms} (- 29dBm)		0.027V _{rms} (- 29dBm)		0.062V _{rms} (- 22dBm)

(3) RADIO IN $\Rightarrow$ REC OUT (17dB)

RADIO IN	$\Rightarrow$	ATT.	$\Rightarrow$	ALC	$\Rightarrow$	REC AMP	$\Rightarrow$	REC OUT
G_V	:	- 9dB				26dB		
LEVEL	:	0.069V _{rms} (- 21dBm)		0.025V _{rms} (- 30dBm)		0.025V _{rms} (- 30dBm)		0.489V _{rms} (- 4dBm)

(4) LINE IN $\Rightarrow$ MONITOR OUT (7dB)

LINE IN	$\Rightarrow$	BUF. AMP	$\Rightarrow$	MONI. AMP	$\Rightarrow$	MONI. OUT
G_V	:	0dB		7dB		
LEVEL	:	0.027V _{rms} (- 29dBm)		0.027V _{rms} (- 29dBm)		0.062V _{rms} (- 22dBm)

(5) LINE IN $\Rightarrow$ REC OUT (26dB)

LINE IN	$\Rightarrow$	BUF. AMP	$\Rightarrow$	ALC	$\Rightarrow$	REC AMP	$\Rightarrow$	REC OUT
G_V	:	0dB				26dB		
LEVEL	:	0.025V _{rms} (- 30dBm)		0.025V _{rms} (- 30dBm)		0.025V _{rms} (- 30dBm)		0.489V _{rms} (- 4dBm)

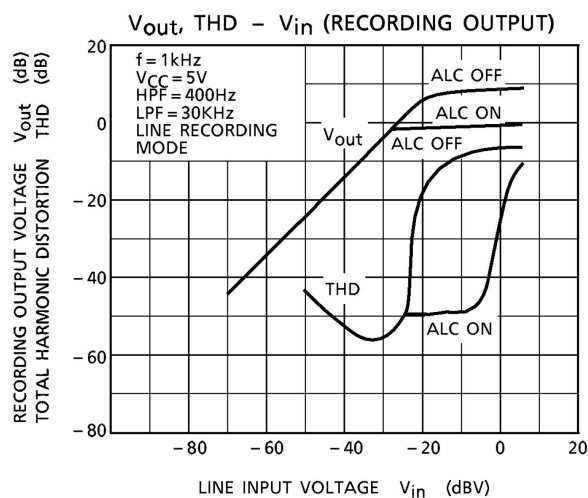
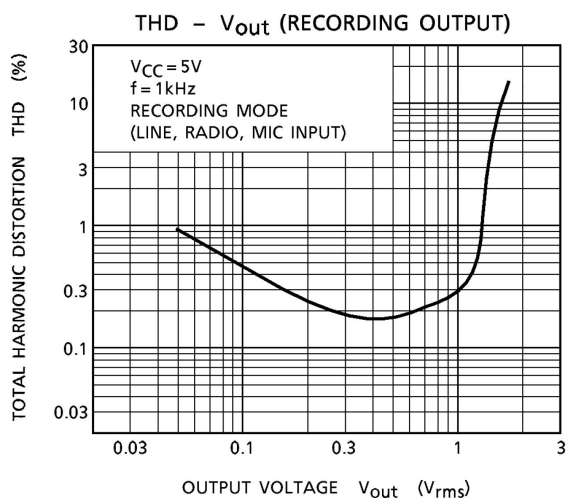
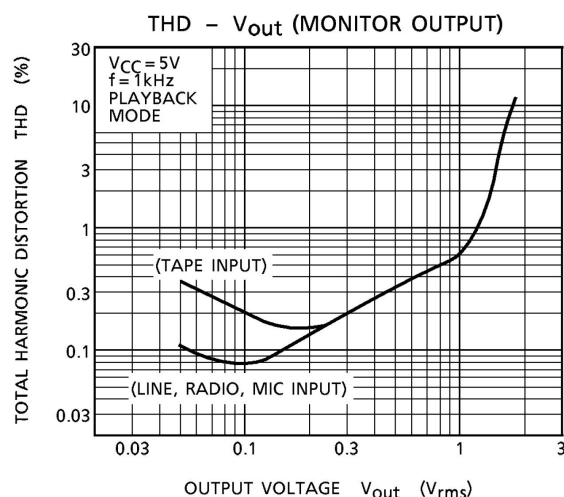
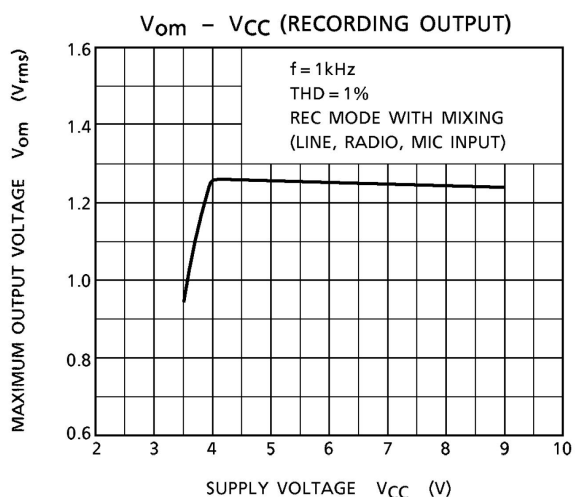
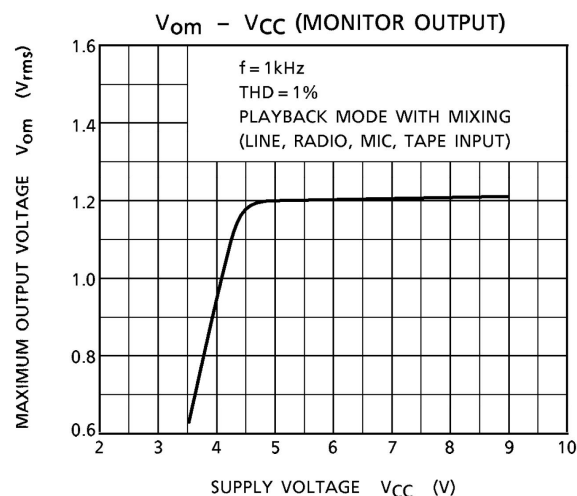
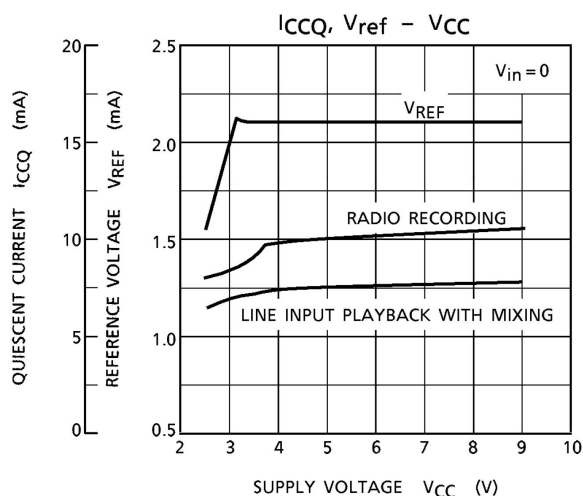
(6) MIC IN $\Rightarrow$ MONITOR OUT (26.5dB)

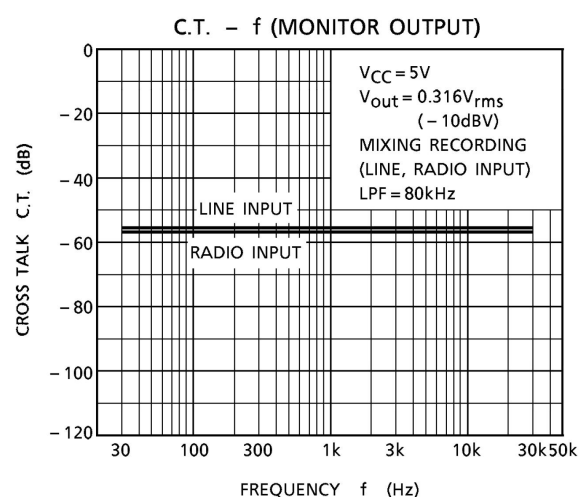
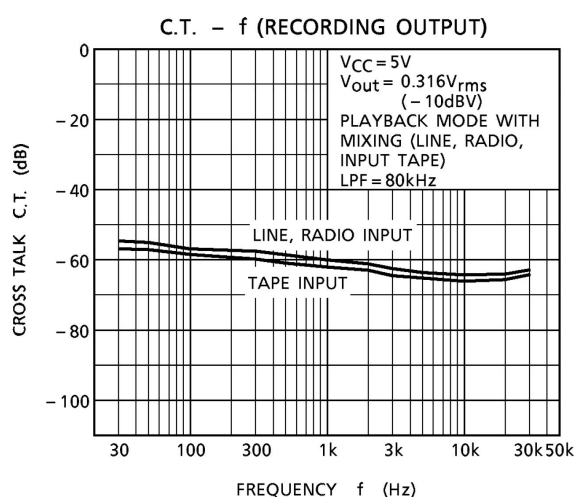
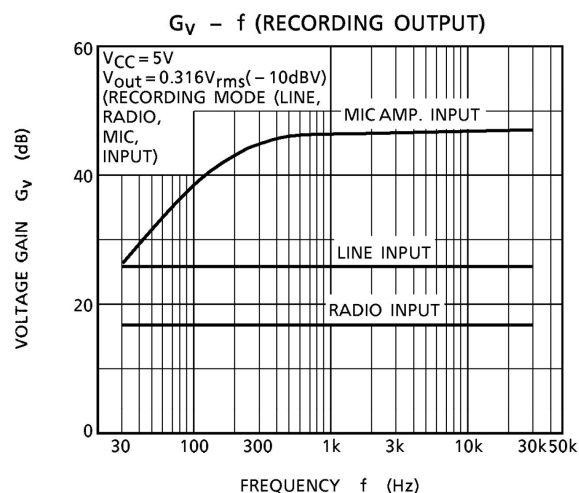
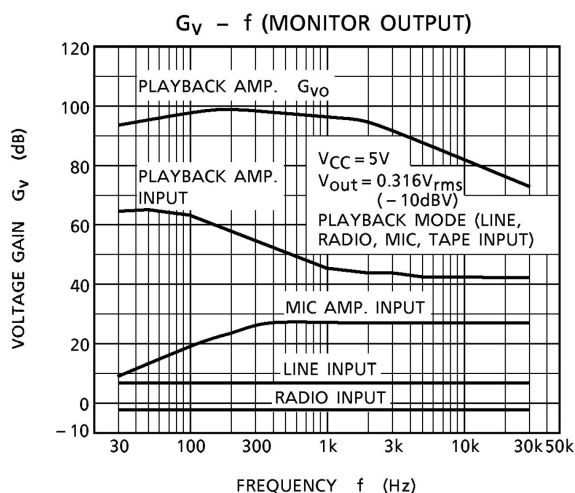
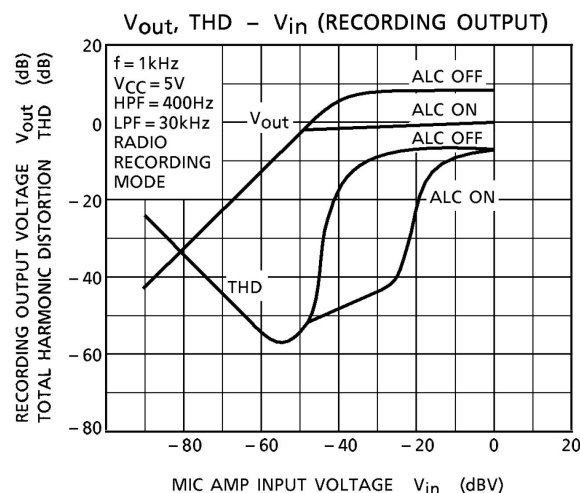
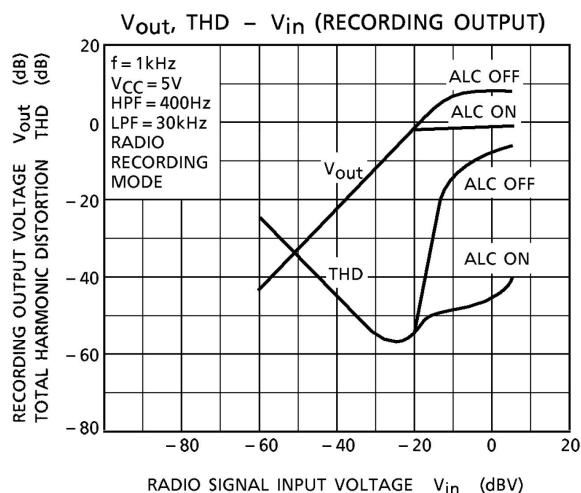
MIC IN	$\Rightarrow$	MIC AMP	$\Rightarrow$	BUF. AMP	$\Rightarrow$	MONI. AMP	$\Rightarrow$	MONI. OUT
G_V	:	19.5dB		0dB		7dB		
LEVEL	:	2.913mV _{rms} (- 48.5dBm)		0.027V _{rms} (- 29dBm)		0.027V _{rms} (- 29dBm)		0.062V _{rms} (- 22dBm)

(7) MIC IN $\Rightarrow$ REC OUT (45.5dB)

MIC IN	$\Rightarrow$	MIC AMP	$\Rightarrow$	BUF. AMP	$\Rightarrow$	ALC	$\Rightarrow$	REC AMP	$\Rightarrow$	REC OUT
G_V	:	19.5dB		0dB				26dB		
LEVEL	:	2.596mV _{rms} (- 49.5dBm)		0.025V _{rms} (- 30dBm)		0.025V _{rms} (- 30dBm)		0.025V _{rms} (- 30dBm)		0.489V _{rms} (- 4dBm)

Characteristic Curves

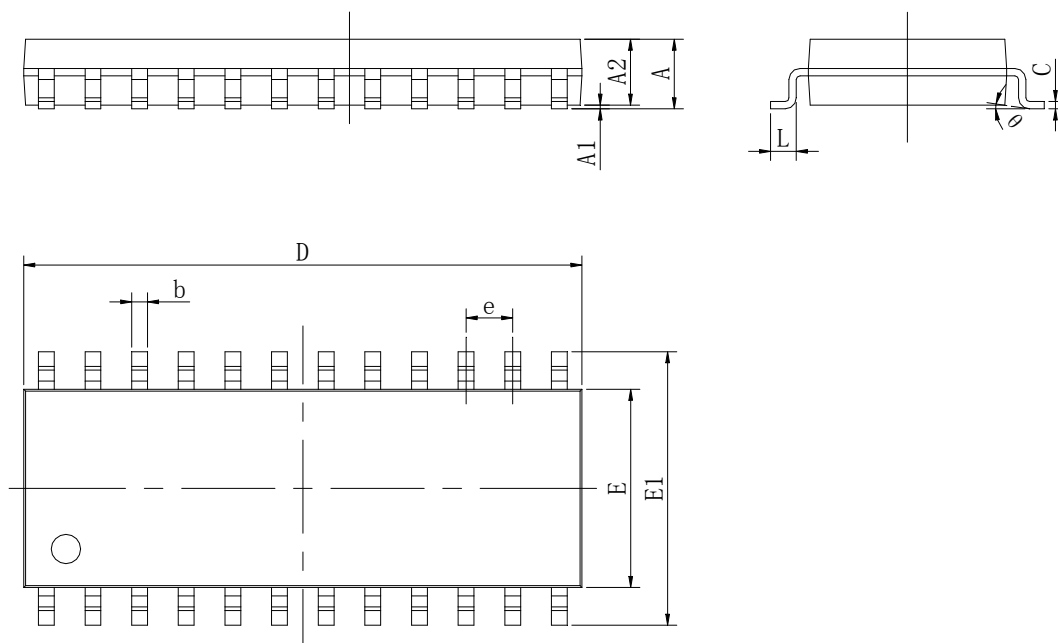




Outline Dimensions

SOP24:

Unit: mm



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.350	2.650	0.093	0.104
A1	0.100	0.300	0.004	0.012
A2	2.100	2.500	0.083	0.098
b	0.330	0.510	0.013	0.020
c	0.204	0.330	0.008	0.013
D	15.200	15.600	0.598	0.614
E	7.400	7.600	0.291	0.299
E1	10.210	10.610	0.402	0.418
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Statements

- Silicore Technology reserves the right to make changes without further notice to any products or specifications herein. Before customers place an order, customers need to confirm whether datasheet obtained is the latest version, and to verify the integrity of the relevant information.
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