

AN6166NK

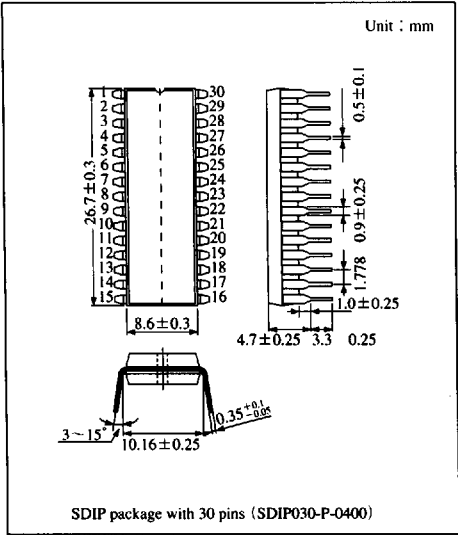
Cordless Telephone Speech Network IC

Overview

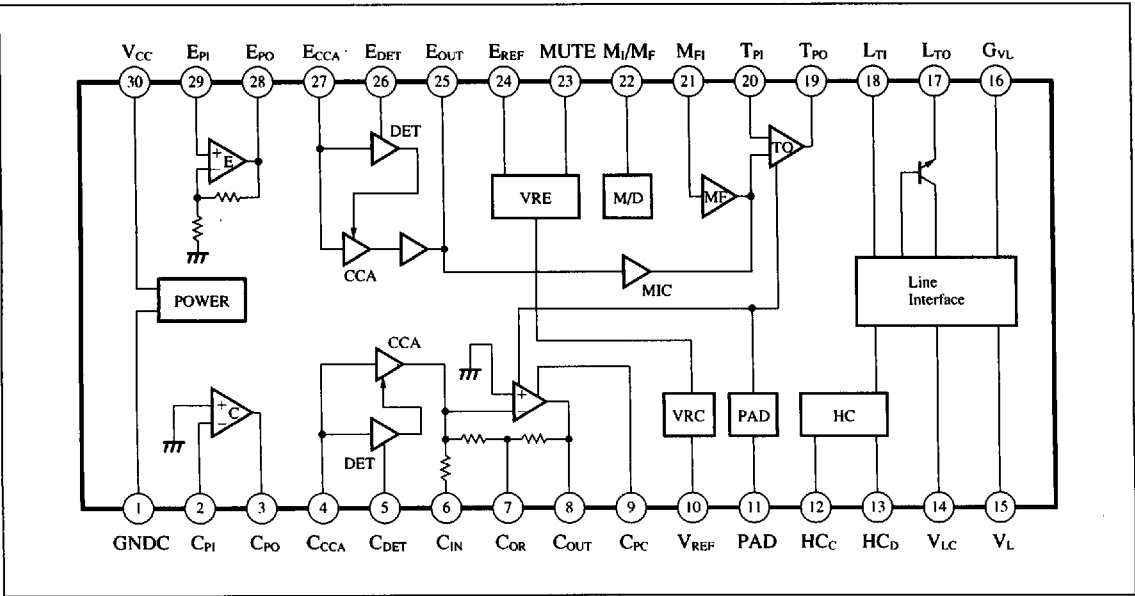
The AN6166NK is a speech network IC for the base set of a cordless telephone. It incorporates a line interface (speech network), a compander circuit, and an automatic hold-reset circuit. With a minimal number of external components, it can perform all the functions of the base set of a cordless telephone.

Features

- The compressor/expander circuit incorporates preamplifiers to make level and frequency adjustments easier.
- Incorporates a MUTE function to make the compander circuit independent of the speech network.
- The speech network consumes minimal current, operates on low voltage, and supports telephone branching.
- Incorporates an MF amplifier, an automatic-pad circuit, and an automatic hold-reset circuit, making the required number of external components minimal.



Block Diagram



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■ Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Rating	Unit
Supply voltage (1)	V_{CC}	7.5	V
Supply voltage (2)	V_L	10	V
Supply current	I_L	150	mA
Power dissipation ($T_a = 75^\circ\text{C}$)	P_D	1,070	mW
Operating ambient temperature	T_{opr}	-20 to +75	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

■ Recommended Operating Range ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Range
Operating supply voltage range (1)	V_{CC}	2.5 to 4.5V
Operating supply voltage range (2)	V_L	1 to 8V
Operating supply current	I_L	3 to 120mA

■ Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Condition	min	typ	max	Unit
Compressor						
Preamplifier voltage gain	G_{PC}	$R_A/R_B = 51\text{k}\Omega/5.1\text{k}\Omega$, $V_{in} = -40\text{dBV}$	19	20	21	dB
Preamplifier output voltage	V_{PC}	$R_A/R_B = 51\text{k}\Omega/5.1\text{k}\Omega$, $\text{THD} = 5\%$, $R_L = 1\text{k}\Omega$	-10	-7	—	dBV
Reference output	V_{ORC}	$V_{IRC} = -20\text{dBV}$ (Ref. output)	-13	-11	-9	dBV
Δ Gain (1)	ΔC_1	$V_{in} = V_{IRC} - 20\text{dB}$, $\Delta C_1 = V_{ORC} - V_{OC1}$	-11	-10	-9	dB
Δ Gain (2)	ΔC_2	$V_{in} = V_{IRC} - 40\text{dB}$, $\Delta C_2 = V_{ORC} - V_{OC2}$	-22	-20	-19	dB
Distortion	THD_C	$V_{in} = -20\text{dBV}$	—	0.5	1	%
Maximum output voltage	V_{OCM}	$\text{THD} = 5\%$, $R_L = 1\text{k}\Omega$	-10	-7	—	dBV
Output noise voltage	V_{NOC}	$R_g = 2\text{k}\Omega$, with a CCITT filter	—	-60	55	dBV
Receiver automatic PAD	ΔP_C	$V_{in} = -20\text{dBV}$, $I_L = 20$ to 100mA	-3.5	-2	-1	dB
Expander						
Preamplifier voltage gain	G_{PE}	$V_{in} = -20\text{dBV}$	10	12	14	dB
Preamplifier output voltage	V_{PE}	$\text{THD} = 5\%$, $R_L = 1\text{k}\Omega$	-10	-7	—	dBV
Reference output	V_{ORE}	$V_{IRE} = -20\text{dBV}$ (Ref. output)	-32	-29	-26	dBV
Δ Gain (1)	ΔE_1	$V_{in} = V_{IRE} - 10\text{dB}$, $\Delta E_1 = V_{ORE} - V_{OE1}$	-21	-20	-19	dB
Δ Gain (2)	ΔE_2	$V_{in} = V_{IRE} - 20\text{dB}$, $\Delta E_2 = V_{ORE} - V_{OE2}$	-41.5	-40	-38.5	dB
Distortion	THD_E	$V_{in} = -20\text{dBV}$	—	0.5	1	%
Maximum output voltage	V_{OFM}	$\text{THD} = 5\%$, $R_L = 1\text{k}\Omega$	-10	-7	—	dBV
Output noise voltage	V_{NOE}	$R_g = 2\text{k}\Omega$, with a CCITT filter	—	-95	-90	dBV
Speech network						
Line voltage (1)	V_{L1}	$I_L = 20\text{mA}$	2.5	3.5	4	V
Line voltage (2)	V_{L2}	$I_L = 100\text{mA}$	6.5	8	9.5	V
MIC amp. voltage gain	G_{MIC}	$V_{in} (\text{Pin } 25) = -30\text{dBV}$, MUTE-ON	22	24	26	dB
MIC amp. distortion	THD_M	$V_{in} (\text{Pin } 25) = -30\text{dBV}$, MUTE-ON	—	0.5	2	%
MIC amp. automatic PAD	ΔP_M	$V_{in} (\text{Pin } 25) = -30\text{dBV}$, $I_L = 20$ to 100mA	-6	-4.5	-3	dBV

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■ Electrical Characteristics (Cont.) (Ta=25℃)

Parameter	Symbol	Condition	min	typ	max	Unit
Speech network (Cont.)						
MIC amp. max output voltage	V _{OM}	THD=5%	3	—	—	dBV
MIC amp. output noise voltage	V _{NOM}	MIC input pin=OPEN, MUTE ON	—	−60	−55	dBV
DTMF amp. voltage gain	G _{MF}	V _{in} (Pin②1) = −40dBV, MI/MF ON	36	38	40	dB
DTMF amp. gain	THD _{MF}	V _{in} (Pin②1) = −40dBV, MI/MF ON	—	0.2	1.5	%
DTMF amp. automatic PAD	ΔP _{MF}	V _{in} (Pin②1) = −40dBV, I _L = 20 to 100mA	−6	−4.5	−3	dB
DTMF amp. max output voltage	V _{OMF}	THD=5%	3	—	—	dBV
Power supply						
Current consumption	I _{CC}	V _{CC} = 3V, no signal	2	3	6	mA
Sink current at the hold-reset pin	I _{HC}	20 hold-reset signal ON	0.5	—	—	mA

■ Pin Descriptions

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	GNDC	Compander GND	16	G _{VL}	Line GND
2	C _{PI}	COMP preamp. input	17	L _{TO}	Line transmission
3	C _{PO}	COMP preamp. output	18	L _{TI}	Line transmission signal input
4	C _{CCA}	COMP-CCA input	19	T _{PO}	Speech preamp. output
5	C _{DET}	COMP detection	20	T _{PI}	Speech preamp. input
6	C _{IN}	COMP signal input	21	M _{FI}	DTMF signal input
7	C _{OR}	COMP output V _{REF}	22	M _I /M _F	MIC/DTMF switching
8	C _{OUT}	COMP output	23	MUTE	Compander MUTE
9	C _{PC}	COMP phase adjustment	24	E _{REF}	EXP-V _{REF}
10	V _{REF}	COMP-V _{REF}	25	E _{OUT}	EXP output
11	PAD	PAD adjustment	26	E _{DET}	EXP detection
12	H _{CC}	Hold adjustment	27	E _{CCA}	EXP-CCA input
13	H _{CO}	Hold-reset signal output	28	E _{PO}	EXP preamp. output
14	V _{LC}	Line regulated power supply	29	E _{PI}	EXP preamp. input (+)
15	V _L	Line power supply	30	V _{CC}	Supply voltage



■ Application Circuit

