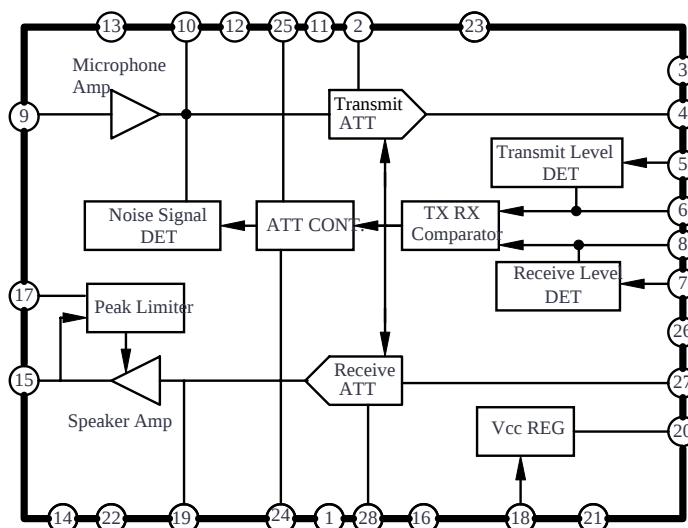


1. Overview

The HC34018 speakerphone integrated circuit incorporates the necessary amplifiers attenuators and control functions for a high quality hands-free speakerphone system. Included are microphone amplifier, audio power Amp for speaker, transmit and receive attenuator, a monitoring system for background noise level and an attenuation control system which responds to the relative transmit and receive level as well as background level. Also included are voltage regulator circuits both for internal and external circuit. A Chip Select pin allows the chip to be powered down when not in use. The CSC34018CP applications include speakerphone for household and business use, intercom system, automotive telephones and others. Its features are:

- All necessary level detection and attenuation control for hands-free telephone in one single chip
- Background level monitoring with long time constant
- Wide dynamic operating range with through signal compression
- On-chip supply and reference voltage regulation
- Typical 100mW output into 25 Ω load and peak level limiting to reduce distortion
- Chip Select pin for active/standby switch
- Linear volume control



2. 2 Pin Description

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	CON _{AA}	ATT Gain Control	15	OUT _P	Power Output
2	CON _{ATA}	Transmit ATT Gain Control	16	V ₊	Input DC Supply Voltage
3	IN _{TA}	Transmit ATT Input	17	AGC _P	Power AGC Control
4	OUT _{TA}	Transmit ATT Output	18	EN	Digital Chip Select Input
5	IN _{TD}	Transmit Level Detector Input	19	IN _P	Power Input
6	OUT _{TD}	Transmit Level Detector Output	20	REG	Regulation
7	IN _{RD}	Receive Level Detector Input	21	V _B	Bias Voltage
8	OUT _{RD}	Receive Level Detector Output	22	GND	Ground
9	IN _{MC}	Microphone Input	23	OUT _{CMP}	Comparator Output
10	OUT _{MC}	Microphone Output	24	CON _{VOL}	Volume Control
11	CMP _{NV}	Noise Level Compare	25	FIL _{AC}	ATT Control Filter
12	CMP _{TV}	Signal Level Compare	26	IUT _{RA}	Receive ATT Output
13	IN _{CMP}	Comparator Input	27	IN _{RA}	Receive ATT Input
14	GND _P	Power Ground	28	CON _{ARA}	Receive ATT Gain

3. Electrical Characteristics

3. 1 Absolute Maximum Ratings

Unless otherwise specified, T_{amb}= 25°C

Parameter	Symbol	Value	Unit
V ₊ Terminal Voltage	V ₊	12/-1.0	V
Chip Select Terminal Voltage	V _{EN}	12/-1.0	V
Speaker Power Ground Voltage	V ₁₄	3.0/-1.0	V
Volume Control Terminal Voltage	V _{CON}	V _{CC} /-1.0	V
Operating Temperature	T _{amb}	-20 ~ 70	°C
Storage Temperature	T _{stg}	-65 ~ 150	°C

3. 2 Recommended Operating Conditions

Parameter	Symbol	Recommended Conditions	Value			Unit
			Min	Typ	Max	
V ₊ Terminal Voltage	V ₊		6.0		11	V
Chip Select Terminal Voltage	V _{EN}		0		11	V
Internal Regulation Current	I _{CC}		0		3.0	mA
Volume Control Terminal Voltage	V _{CON}		0.55		V _B	V
Receive ATT Input Signal Voltage	V _{IIRA}		0		250	mV
Microphone Amp Input Signal Voltage	V _{IMC}		0		5.0	mV
Speaker Power Ground Voltage	V ₁₄		-10		10	mV

3.3 Electrical Characteristics

Unless otherwise specified, $T_{amb} = 25^{\circ}\text{C}$, add supply voltage on pin 22, $V_+ = 7.5\text{V}$, $V_{EN} = 0.7\text{V}$.

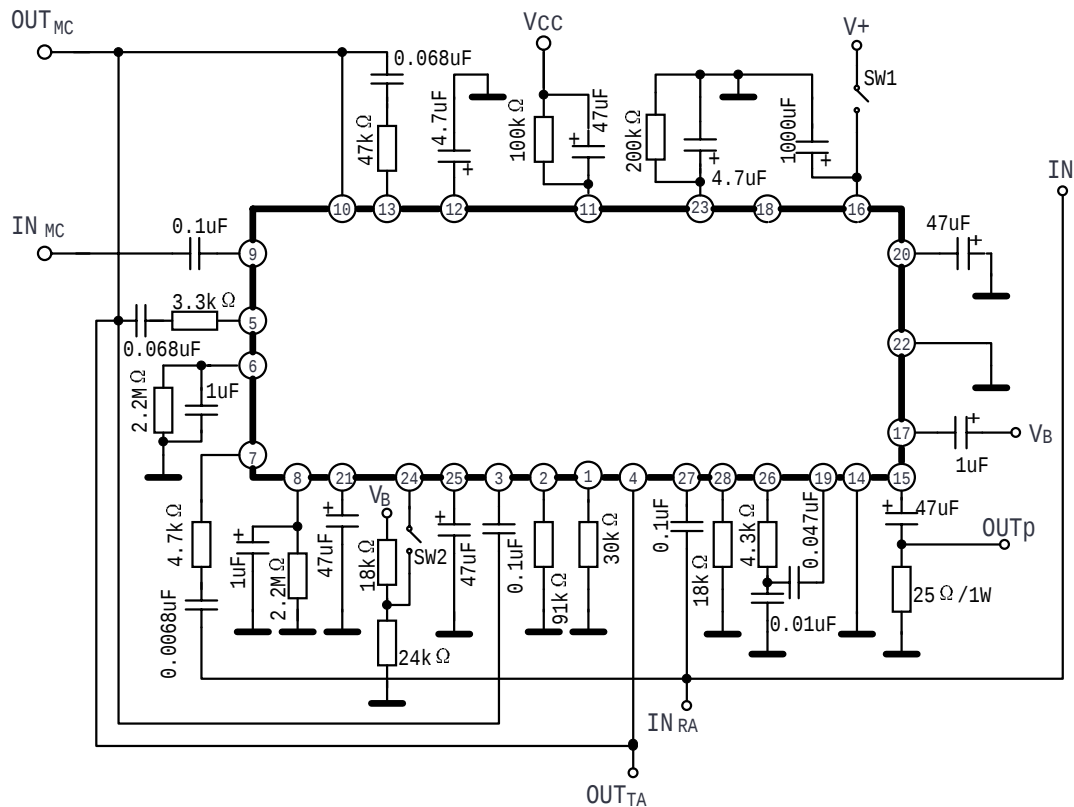
Receiving Mode: $V_8 = 5\text{V}$; Transmitting Mode: $V_6 = 5\text{V}$, $V_{11} = 0\text{V}$;

Standby Mode: $V_6 = 5\text{V}$, $V_{11} = 5\text{V}$

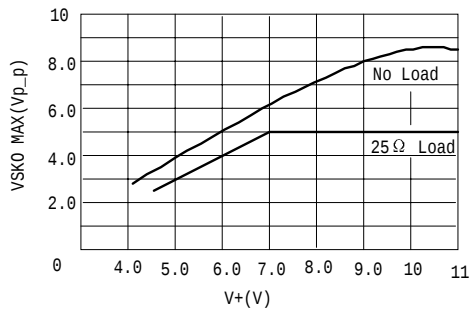
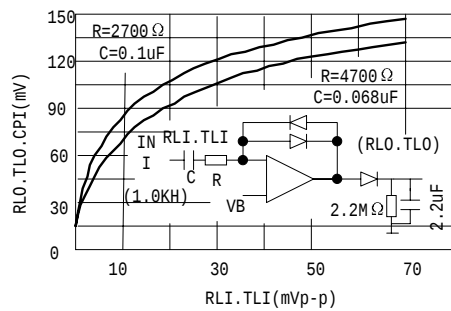
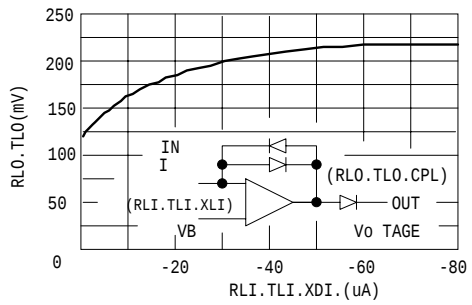
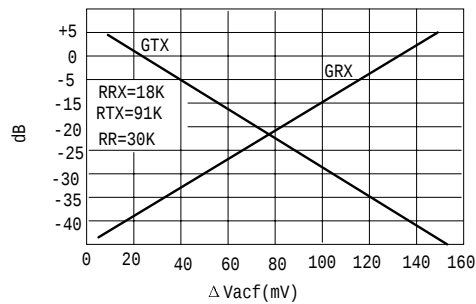
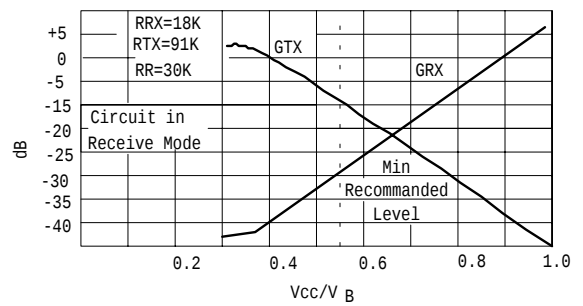
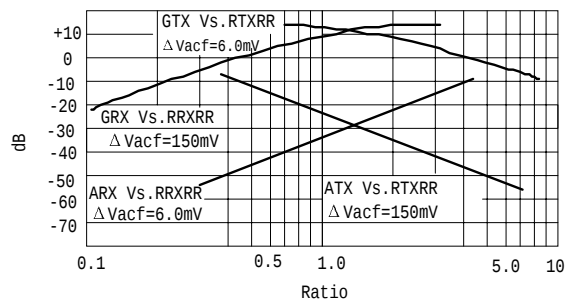
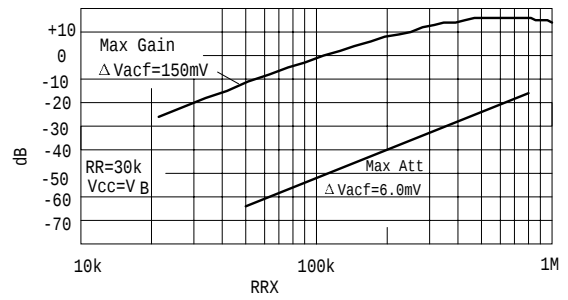
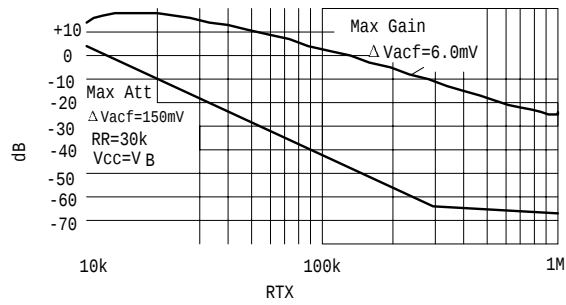
Parameter	Symbol	Test Conditions	Value			Unit
			Min	Typ	Max	
Supply Voltage						
Supply Current	I _{V+}	V ₊ =11V, V ₁₈ =0.7V			9.0	mA
		V ₊ =11V, V ₁₈ =1.6V			800	uA
V _{CC} Voltage	V _{CC}	V ₊ =7.5V	4.9	5.4	5.9	V
Line Regulation	△V _{CCLIN}	6.5V<V ₊ <11V		65	150	mV
Output Resistance	R _{O(VCC)}	I _{CC} =3.0mA		6.0	20	Ω
Dropout Voltage	V _{sat}	V ₊ =5.0V		80	300	mV
V _B Voltage	V _B	V ₊ =7.5V	2.5	2.9	3.3	V
Output Resistance	R _{O(VB)}	V _B , I _B =1.7ma		250		Ω
Receive Attenuators						
ATT Gain	A _{RA}	Receive, f=1.0kHz V ₂₄ =V _B , V ₂₇ =250mV	2.0	6.0	10	dB
Range	△A _{RA}	Receive to Transmit	40	44	48	dB
Idle Mode	A _{RAI}	Receive, f=1.0kHz V ₂₄ =V _B , V ₂₇ =250mV	-20	-16	-12	dB
Receive Output Voltage	V _{RAO}	Receive	1.8	2.3	3.2	V
Delta OUT _{RA}	△V _{RAO}	Receive to Transmit			100	mV
OUT _{RA} Sink Current	A _{RAOL}	Receive	75			uA
OUT _{RA} Source Current	I _{RAOH}	Receive	1.0		3.0	mA
Input Resistance	R _{RAOH}	Receive	3.5	5.0	8.0	k Ω
Volume Control	V _{CON}	Receive 0.6V _B <V ₂₄ <V _B	24.5		32.5	dB
Transmit Attenuators						
ATT Gain	A _{TA}	Transmit f=1.0kHz, V ₃ =250mV	4.0	6.0	8.0	dB
Range	△A _{TA}	Transmit to Receive	40	44	48	dB
Idle Mode	A _{TAI}	Standby f=1.0kHz, V ₃ =250mV	-16.5	-13	-8.5	dB
Transmit Output Voltage	V _{OTA}	Transmit	1.8	2.3	3.2	V
Delta OUT _{RA}	△V _{RAO}	Transmit to Receive			100	mV
OUT _{RA} Sink Current	A _{TAOL}	Transmit	75			uA
OUT _{RA} Source Current	I _{TAOH}	Transmit	1.0		3.0	mA
Input Resistance	R _{TAI}		3.5	5.0	8.0	k Ω
FIL _{AC} Terminal Voltage	△V _{ACF}	Receive		150		mV
		Transmit		6.0		mV
		Standby		75		mV
Power Amplifier for Speaker						
Gain	A _p	V ₁₉ =20mV	33	34	35	dB
Input Resistance	R _{IP}		15	22	37	k Ω
Output Voltage	V _{OP}	V ₁₉ with capacitor to GND	2.4	3.0	3.6	V
Output High Level	V _{POH}	V ₁₉ =0.1V, V ₁₅ =-100mA	5.5			V
Output Low Level	V _{POL}	V ₁₉ = -0.1V, V ₁₅ =100mA			600	mV

Parameter	Symbol	Test Conditions	Value			Unit
			Min	Typ	Max	
Speaker Amplifier						
Amp Gain	A _{MC}	V ₉ =10mV, f=1.0kHz	32.5	34	35	dB
Input Resistance	R _{IMC}		6.5	10	16	k Ω
LOGAMPS						
Receive Leakage Current	I _{LKORD}	V ₈ =V _B -1.0V			2.0	uA
Transmit Leakage Current	I _{LKOTD}	V ₆ =V _B -1.0V			2.0	uA
Transmit to Receive Threshold	I _{TH}	Ratio of I _{TLI} to I _{RLI} at 20 uA	0.8		1.2	
Transmit Detector						
Comparator Output Voltage	V _{CCMP}	Idle		0		V
		Transmit		4.0		
CP2 Current Source	I _{CP2}		5.0	10	13	uA
Distortion						
Transmit Distortion	D _{RA}	IN _R to OUT _P V ₂₇ =10mVrms,1kHz			1.5	%
Receive Distortion	D _{TA}	IN _{MC} to OUT _{TA} V ₉ =5.0mVrms,1kHz			2.0	%

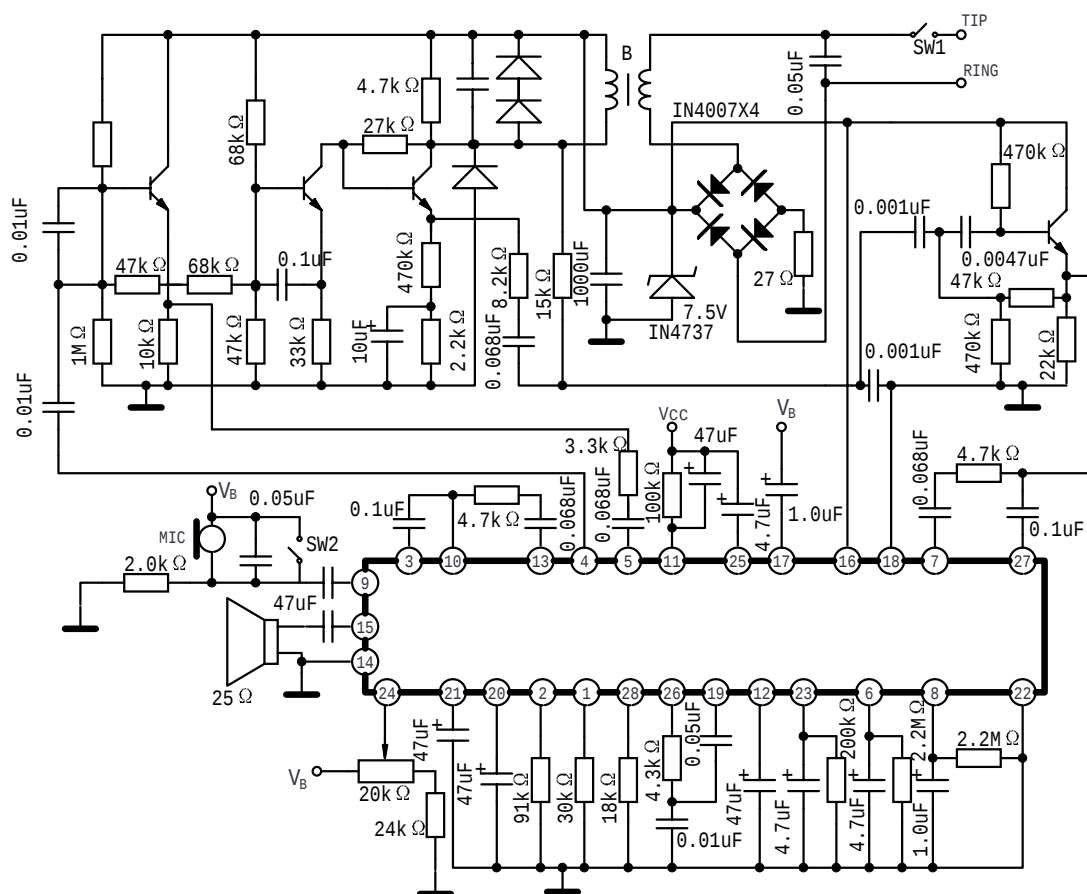
4. Test Circuit



5. Characteristics Curve



6. Application Circuit



7. Package Dimensions

