

# SIM300 hardware application note V1.06

Excelpoint System

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Warning: This document is only for your reference,  
and will be updated without your notice.

### 1. part number

SIM300: hot module in 2006,

maintain one year

1008-G60N-01R: 60pin socket, Entery, need order more, for it is easy to be soldered badly,

can not maintain

CC-OSMT/SMAK-100: antenna converter line,

can not maintain

SIM300 tool kit: tool kit,

maintain one year

including

SIM300EVB KIT PCB board,	1pcs
SIM300 module,	1pcs
power adaptor, 220V to 5V,2.5A,	1pcs
serial port line,	1pcs
earphone,	1pcs
car antenna line,	1pcs
antenna converter line,	1pcs

### application markets

Handhold set or smaller size application,  
Smart phone, PDA phone, mobile device,  
GSM phone, POS, PCMCIA card,  
Vehicle GPS GPRS, Power meter GPRS, medical GPRS,  
Industry control, etc

### 2. SIM300 highlights

900/1800/1900, SIM300,

850/900/1800/1900, SIM340, its lead-time is longer than SIM300,  
GPRS Class 10,

PWRKEY pin, not re-set pin

Sleep mode, TCP/IP,

Transparent mode, auto-baud rate( 1200~ 115200)

Lower voltage automatic shutdown,

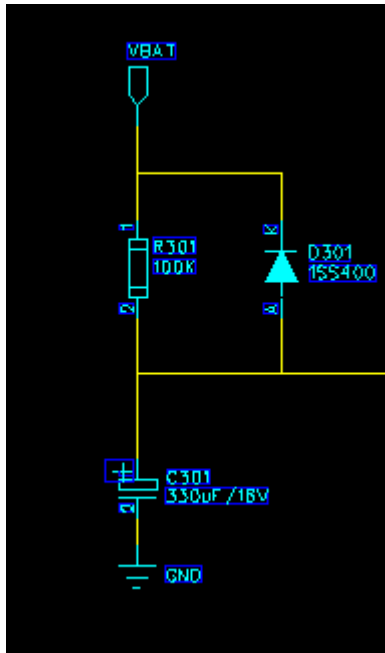
Support 6pin and 8pin SIM card,

### 3. turn on SIM300, turn it off, turn it off & turn it on when it is on

Way 1/3: by PWRKEY pin to turn on SIM300, L >1.5 seconds



Way 2/3: use this RC charger circuit to turn on SIM300, let D to dis-charger when turn off SIM300's power. It is not suggested if MCU exists.



Way 3/3: RTC( alarm mode), when alarm time expire, SIM300 will turn on, but if anything is not done within 90 seconds, SIM300 will turn off automatically.

AT+CALARM // set alarm time

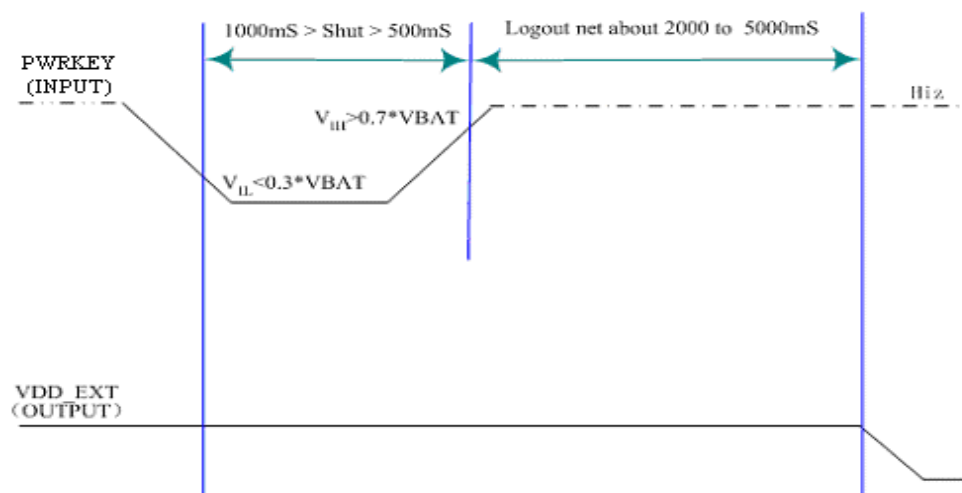
AT+CCLK // set current time

AT+CFUN //start or shut protocol stack

Note: if AT+CFUN=0, and set alarm time, if SIM300 works, but SIM300 will not search network automatically, you need use AT+CFUN=1,0 // SIM100 should be 1,1 if its firmware support CFUN

### SIM300 is on, turn it off

Way 1/5:  $1S > L > 0.5$  second, then SIM300 need about 2~ 5 seconds for logout network, then SIM300 is turned off.



Way 2/5: use AT+CPOWD=1, SIM300 is turned off.

Note: you can re-start SIM300 by CPOWD, then let PWRKEY pin low for above 1.5 seconds. But is CPOWD is software way turning off.

Way 3/5: Under-voltage, SIM300 is auto shutdown,

Warning if VBAT is bellow 3.5V,

Auto-shutdown if VBAT is bellow 3.4V

Way 4/5: Over-temperature, SIM300 is auto shutdown.

Warning: +CMTE: 1 if  $>85^{\circ}\text{C}$ ,

+CMTE: -1 if  $<-35^{\circ}\text{C}$ ,

Auto-shutdown +CMTE: 2 if  $>90^{\circ}\text{C}$ ,

+CMTE: -2 if  $<-40^{\circ}\text{C}$ ,

Way 5/5: if AT command is not valid, you need turn off SIM300's power supply: let MCU not enable MIC29302's enable pin.

Note: it is backup, and very strongly suggestion for no-person application.

when SIM300 is on, turn off & turn on

Turn off:  $1\text{S} > L > 0.5\text{ second}$ ,

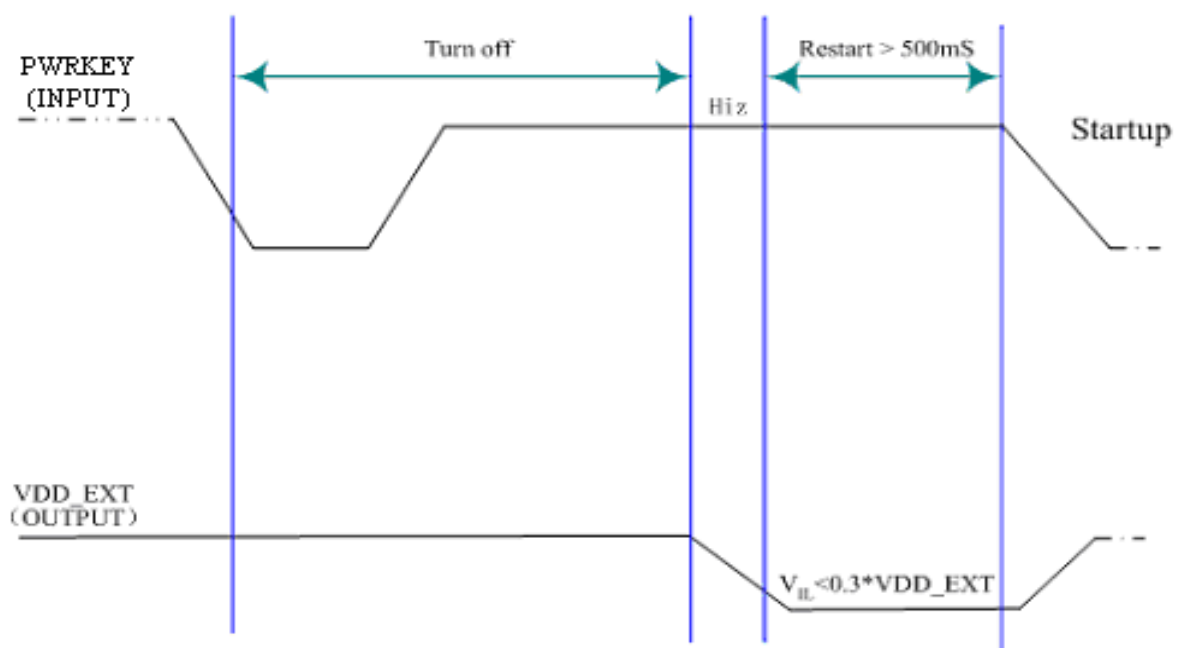
Hiz: about 2~ 5 seconds for logout network,

Restart:  $>500\text{mS}$ ,

Startup:  $L > 1.5\text{ seconds}$

Note: need time discharger Capacitors, suggest 5 seconds or more.

Total: L for 1S, H for 5S+500mS+5S,  $L > 1.5\text{S}$ , turn on SIM300.



#### 4. Power saving

Way 1/2: Minimum functionality mode

AT+CFUN=0(or 4, is not used usually for 4),

Wakeup from power saving: AT+CFUN=1,0 //SIM100S is 1,1

Way 2/2: Sleep mode( slow clocking mode), 2.5mA in sleep mode

AT+CSCLK=1, DTR=H(igh),

Wakeup from sleep mode:

DTR=L,

Or receive a SMS, DTR: Low 200mS, then High

Or incoming call, DTR: Low 50mS, then High

RTC alarm expire

#### 5. Power supply, its SCH & PCB layout,

(1). For handset application, using Li-Ion battery, Please serial link a MOSFET serial to module's power, let MCU turn this MOSFET on or off for your convenience & system reliability.

And MCU detects battery voltage is about 3.4V, turns this MOSFET off to protect module.

And use parallel link 470uF capacitor(s) to ground near module's power input, if battery's current is not enough, capacitor(s) can offer current to match module's 2A peak current when module start to work.

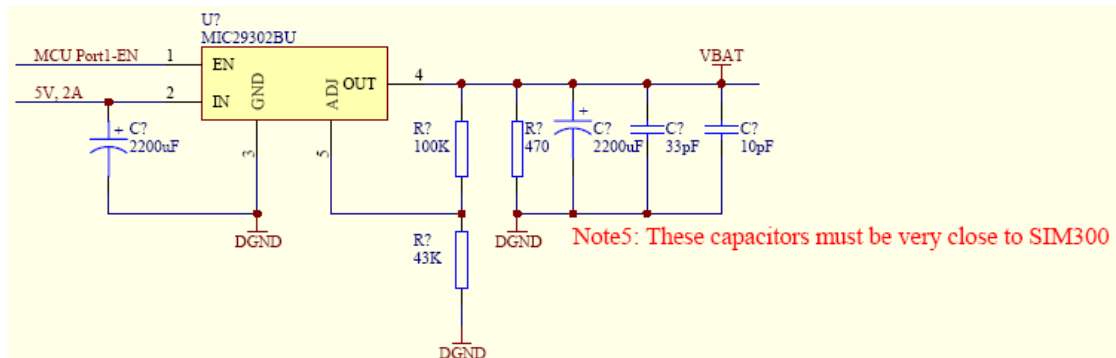
Please layout Power supply and ground lines as wide as possible, suggest: layout naked-copper over module's power pins and ground pins, then trace wide lines, like 50~ 200mill lines to power & ground lines of MIC29302, because, 8mil can only pass 500mA or lower current.

If your power supply and ground for module's are from the other layer(s) of PCB board, you need use hole(s) to connect these lines with module's soldering layer. Please use several holes, not one or two, because one or two holes only pass 500mA or lower current.

Please do not turn on and off of this MOSFET so rapidly, suggest 5 minutes or longer.

(2). For traffic GPS etc system, input is 12V, please use LM2576 to get 5V, then use MIC29302 to get 4.2V for module's power.

And let your [MCU\\_Port1\\_EN pin control MIC29302's Enable pin](#) automatically to add system stability, pay attention, not turn no and off frequently as above.



And use parallel link [two 2200uF or two 1100uF capacitors](#) at the input and output of MIC29302, output of 2200uF capacitor close to module's power.

And add [470 Ohm resistor](#), if output of MIC29302 is empty load, it can work well for this 470 Ohm resistor load.

And let MIC29302 output 4.2V, link a [3pin switch](#) to module's power pins. It will be a backup for power off module if PWRKEY is not under control.

And you can use this 3pin switch for updating firmware for after service, etc.

(3). SIM300 is a analog, digital and RF signals, high integration, very small size module, it interfaces a whole area of digital ground of iron shell to you. This iron shell is for [EMC, large ground interface and heat scattering](#) for our application.

So, suggest you [layout naked-copper, and add more holes](#) to your top side of PCB board, position is under our SIM300 iron shell, total system will be more stable, and module can work well under very hot environment.

Although SIM300's DIP-60pin socket, this is some space from SIM300 and PCB board.

Note: SIM100S32-E PCB board picture for your reference.

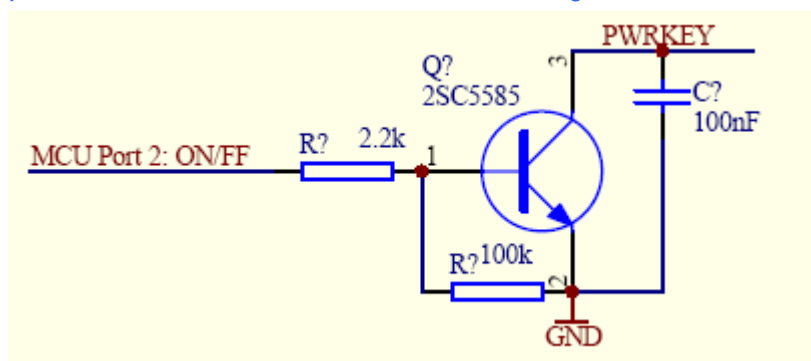


Top side of PCB board



Bottom side of PCB board

PWRKEY of SIM300's pin34 must be connected by MCU Port2\_ON/OFF pin. MCU turn on and off SIM300 by 07 IC to control this pin.



## 6. two serial ports

main one for MCU or computer communication

its baud rate is 1200~ 115200, and when SIM300 is turned on, module will auto-baud rate search, then get now baud rate within 8 seconds, and without RDY. And you can AT+IPR?

AT+IPR=9600;&W to save 9600 or other, then if you re-start SIM300, it will not search baud rate later, and get RDY, etc.

Input is  $(0 \sim 0.3 \times V_{EXT}) \sim (0.7 \times V_{EXT} \sim V_{EXT} + 0.3V)$

All following pins are 2.8V voltage level.

If you not need this function, please no connect these pins.

**TXD**: transmit data, output, pull-up 100k to VEXT inside.

**RXD**: receive data, input, not pull-up and pull-down inside.

**RI**: ring indicator, output

standby: high

receive SMS: Low 200mS, then High

calling: Low 50mS, then High,

**DTR**: data terminal ready,

Sleep mode: MCU use AT+CSCLK=1, then DTR=H, go to sleep,

Go to normal mode from sleep: DTR=L.

Transparent mode to AT command mode by DTR=L.

**DCD**: data carrier detection, output

Default is H(igh),

TCP/ UDP connecting well, DCD=L when transparent mode

Windows PPP dialing well, DCD=L

**RTS**: request to send, input, pull down inside,

SIM300's default mode is hardware follow control, no need it.

You can use RTS for large data transferring or receiving.

If RTS is L, MCU can send data to SIM300's buffer, about 10kbytes,

If RTS is H, not suggest to send data to SIM300, maybe these data will be lost.

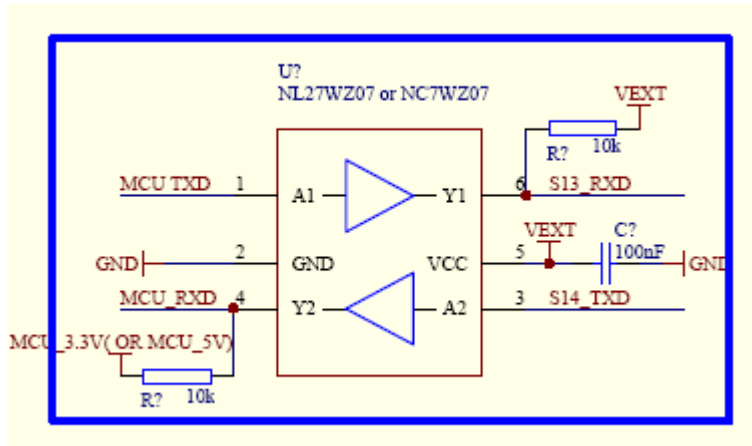
**CTS**: clear to send, output, default is L.

CTS: L, means there is some space for SIM300's buffer for sending data.

CTS: H, not suggest to send data to this buffer, as RTS above.



(1). For SIM300 IO voltage level is 2.8V, if MCU I/O pin is 3.3V or 5V etc, please use [NL27WZ07](#) (ON-Semi), [NC7WZ07](#) (Fairchild) or [74HC07](#) (ST), etc with module's serial pins, **or 06 serial for inverter.**



If MCU is reset, its IO port output is high impedance, or high level, 07 serial is recommendation.

If MCU is reset, its IO port output is high impedance, or low level, 06 serial is for your choice.

(2). Suggest link module's [TXD](#), [RXD](#), [VDD\\_EXT\(3.0V\)](#), [MCU\\_Port1\\_EN](#), [MCU Port2\\_ON/OFF](#), ground 6-pins as a [SIP6 socket](#) to the side of your PCB board. Details from SCH in pdf files.

And let [PWRKEY](#) pin is linked by a 2-pins jumper. And links this SIP6 socket to [MAX3221CAE](#) or [SP3238](#) or [MAX3238](#), and to RS232 female socket, this can be on your board, or it is on a small board, that links computer serial port.

And let MIC29302 output 4.2V, links a [3pin switch](#) to module's power pins. When download, we can use it to turn on and off module, if PWRKEY is not convenient to be controlled.

Target: TXD and RXD switch to this SIP6 socket, you can [learn, test module](#), or revise module's setup for mass production, but not interface with MCU.

For after service, you can links your system with computer to check If module works well, if not well, [update firmware](#), then to check if it works well. It is so convenient. But, NEED [SIP6 & 3pin Switch](#).

[debug one for SIMCom testing](#)

DBGTX: link to test,

DBGRX: link to test,

AT+UART

Suggest link module's DBGTX, DBGRX, 3.0V, and ground as a 4 pins

SIP4 socket to the side of your PCB board, and that socket links a [SP3238](#) same as main serial port. It will be very convenient to SIMCom test on your PCB board.

## 7. Voice circuits & its layout

Please layout lines of voice to the bottom side of PCB board when you trace your lines by holes directly from 60pin socket.

Please use 45 degree lines, not 90 degree lines.

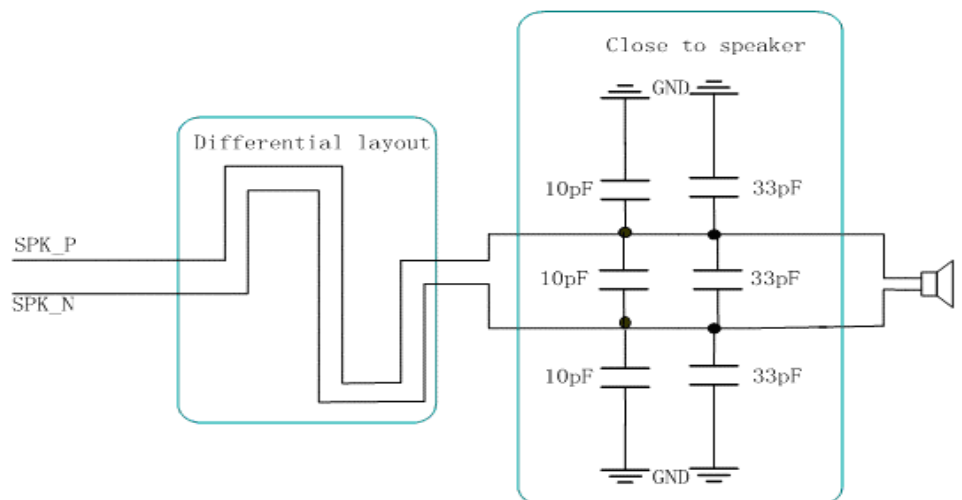
Please trace them as short as possible, and for differential lines, need parallel trace to enhance common mode restrain rate is better, And let large area analog ground to protect these voice lines.

For module side, let filter capacitors near module, for speaker or earphone, let other filter capacitors near it also.

Target is for lower noise, high quality voice.

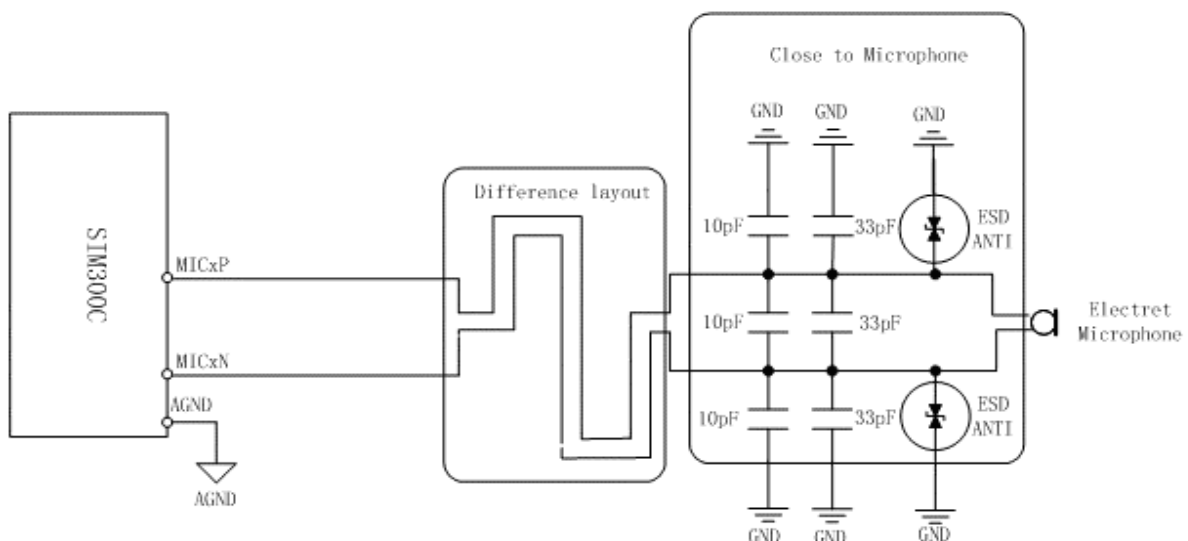


### Speaker



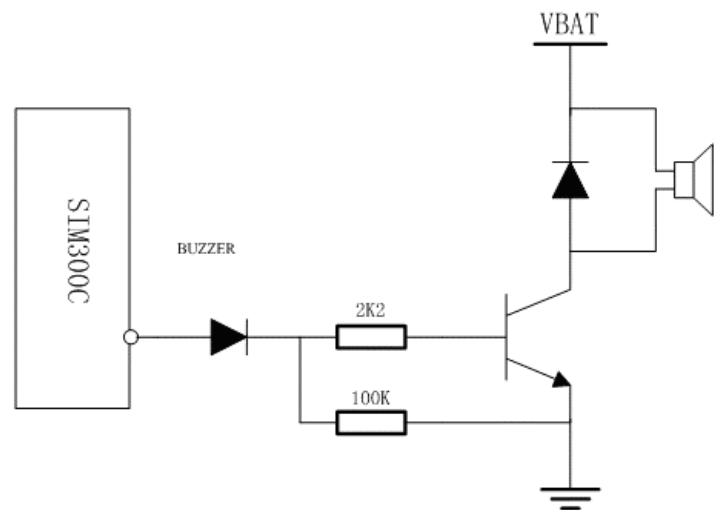
### Microphone

VANA is inside SIM300, output need ESD diodes



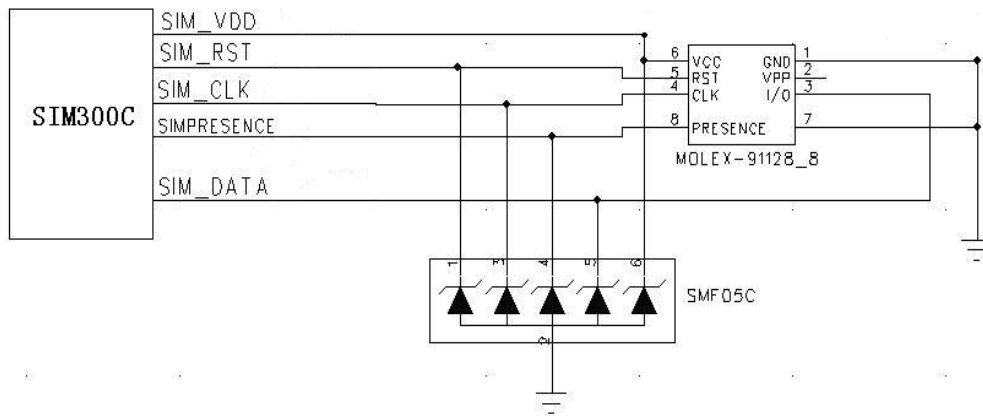
## Buzzer

AT+CRSL, volume of buzzer



## 8. Support 6pin and 8pin SIM card

SIM\_DATA pin's pull up is inside



9. **SIM card:** 1.8V, 3V, not support others, like 5V SIM card,  
ESD diode: ST ESDA6V1W5, [www.st.com](http://www.st.com),  
or, ON SEMI SMF05C, [www.onsemi.com](http://www.onsemi.com),  
support 6pin or 8pin SIM card  
6pin SIM card: Amphenol C707 10M006 0492, it is popular.  
[www.amphenol.com](http://www.amphenol.com)  
8pin SIM card: Molex 91128, [www.molex.com](http://www.molex.com), it is special.  
SIM application toolkit

Need AT+CSDT to set SIM\_Presence pin for 8 pin SIM card.

## 10. performance

Frequency

SIM300: E-GSM900Mhz/ DCS1800Mhz/ PCS1900Mhz

Or

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SIM340: GSM850Mhz/EGSM900Mhz/DCS1800Mhz/ PCS1900Mhz

#### GSM

Phase2/2+

- Class 4( 2W@ 900Mhz),
- Class 1( 1W@ 1800/1900Mhz),

#### SMS

Point-to-point MO and MT

SMS cell broadcast

Text and PDU mode

CSD up to 14.4kbps

FAX: Group 3, class1

USSD

#### GPRS

GPRS multi-slot, Class 10,  
max 85.6kbps( downlink),  
max 42.8kbps( uplink)

GPRS mobile station class B,

Plat form: 10.0

PPP

TCP/IP

#### Interface

SIM card: 3V, 1.8V

board-to-board 60pin connector

two pins space: 1.27mm

Two analog audio interfaces

Keypad interface

RTC backup

AT commands via main serial interface

Dual serial interface

Antenna connector, using this converter line [CC-OSMT/SMAK-100](#)

And Antenna pad

#### Approvals

FTA

Local Type Approval

CE

Weight: 12g for SIM300

## 11 . dimensions

excluding 60pin Entry socket

40±0.15x 33±0.15x 2.85±0.3 mm,

including 60pin Entry socket

40±0.15x 33±0.15x 3.3±0.3 mm

## 12. temperature range

Operation temperature

-20° C ~ 55° C for normal operation,

-25° C ~ -20° C, 55° C ~ 70° C for restricted operation

-40° C ~ 90° C module will be shut down automatically soon

storage temperature

-40° C ~ 80° C

## 13. power supply

3.4V ~ 4.0( typical) ~ 4.5V,

<3.4V, switch off module automatically

voltage wave: max 350mV

peak current: 2A, about 577uS( keep 1 burst)

sleep mode, power saving: about 2.5mA

## 14. VDD\_EXT( VEXT)

output: 2.85V ~ 3.0V( typical) ~ 3.15V, 60mA,

when module is working, VEXT outputs 3.0V.

It is module's inside LDO's output

## 15. RTC-- real time clock

1.2V ~ 1.8V(typical) ~ 2.0V, 20uA, PIN15 of SIM300

8.2k resistance is integrated in SIM300

only need coin-cell battery,

like re-charger Li-Ion Maxell: TC614, Seiko: TS621

or super-capacitor, Seiko: XC621,

or Panasonic: EECEM0E204A(6.8mm diameter, 0.2F ~ 0.3F)

Note: strongly suggest not use 3V battery for RTC pin

## 16. SIM\_VDD

1.8V or 2.8V by software detecting,

if SIM card finishing communicating with base station, this SIM\_VDD is not available.

#### 17. PWRKEY pin

Input is  $0.3 * VBAT \sim 0.7 * VBAT$

Please take care of this Pin34 application, it is very important.

It is input of module, MCU can control module's on and off by it.

For business phone application, you can use our auto-power on , then working circuit.

For business phone, GPRS data transfer etc applications with MCU, whatever MCU IO voltage level, like 3.0V, 3.3V or 5V, please serial links a [NL27WZ07](#)(ON-Semi) or OC gate between PWRKEY and MCU IO port, or choose 06 serial.

And please link a [2pin jump to this PWRKEY and ground, when download, short this jump as our request](#). For normal working, let this jump off.

#### 18. ADC0, input: 0~ 2.4V

AT+CADC

#### 19. antenna interface

50 Ohm

Antenna pad, solder directly, fewer 10 seconds: 260° C

GSM900< 1dB, DCS1800/PCS1900< 1.5dB

Antenna connector, Murata MM9329-2700, customer need buy antenna converter line: CC-OSMT/SMAK-100

GSM: 0.5dBi,

DCS: 1dBi,

Pattern: omni-directional antenna

#### 20. Serial LCD

LCD or GPIO

#### 21. GPIO

PIN32(GPIO5), PIN36(GPIO8), not support

#### 22. LED

off: not working

64mS on/ 800mS off: not find network

64mS on/ 3S off: find network

64mS on/ 300mS off: GPRS data

### 23. SIM300 Tool kit user guide

main serial port,

#### How to work:

S1 to OFF, S2 to ON,

Insert SIM card, antenna,

Turn tool kit's power on,

press PWRKEY for 2 second or more, module will work.

#### How to turn off module:

when module works, if press PWRKEY for 1 second, module turn off

#### How to download module firmware:

S1 to ON, S2 to ON,

start

debug serial port,

SIMCom can get logo by tool kit