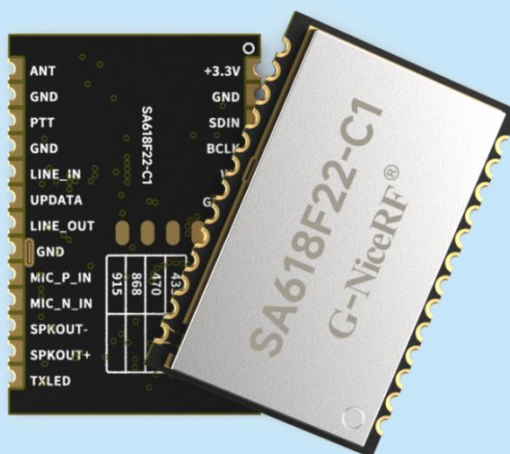


SA618F22-C1

Full-duplex digital and audio wireless transmission module

- 8 people can share high-quality calls
- I2S Digital audio+analog audio
- Mesh Network
- Multi-device concurrent transmission and reception
- Support OTA &Serial upgrade

Product Specification



Catalogue

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Note: Revision History

Revision	Date	Comment
V1.0	2024-9	First release

*Our company reserves the right to change, correct, enhance, or modify the products and this document at any time without prior notice. Users can obtain the latest relevant information before placing an order. The information in this notice supersedes and replaces the information in previous versions. NiceRF Wireless Technology CO.,LTD reserves all rights.

1. Description

SA618F22-C1 is an upgraded full-duplex wireless digital and audio all-in-one transmission module from our company, featuring shorter latency and supporting high-quality calls for up to 8 users simultaneously. Users can wirelessly transmit data via the serial port and transmit voice signals Microphone, Line in or I2S. The module is equipped with a high-speed microcontroller, echo cancellation circuitry, ESD protection, a high-performance RF chip, and an amplifier, utilizing wideband spread spectrum technology, resulting in low power consumption, long-range capabilities, and flexible frequency adjustment.

SA618F22-C1 supports multi-channel concurrent reception and relay in a Mesh network.

SA618F22-C1 enables full-duplex communication via the serial port and features wireless data transmission with Mesh networking capabilities. It supports over-the-air (OTA) upgrades or serial port upgrades, allowing users to easily set internal parameters and control its transmission functions through the serial port.

SA618F22-C1 is equipped with hardware and software watchdogs to prevent system crashes and includes reverse polarity protection, overcurrent, and overvoltage protection circuits, ensuring the device operates safely and stably in various environments.

SA618F22-C1 is manufactured and tested using strict lead-free processes, complying with RoHS and REACH standards, and is certified by CE and FCC.

2. Features

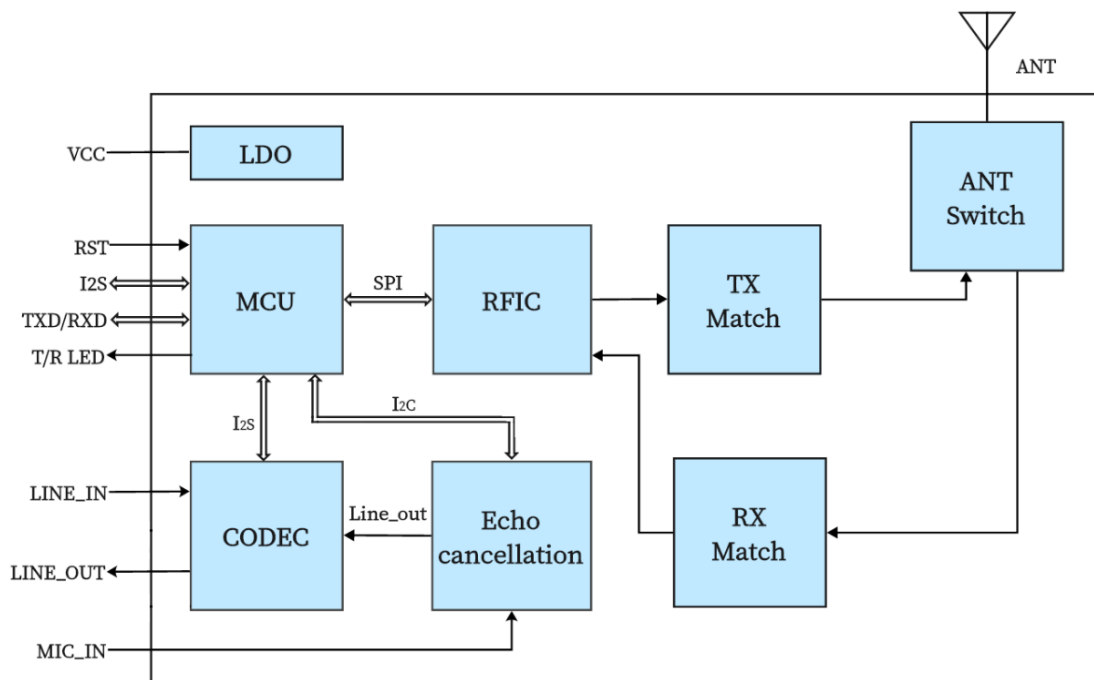
- | | |
|--|---|
| ■ Frequency Band UHF 824-830/902-928MHZ | ■ Supports 2 to 8 people in high-quality simultaneous calls |
| ■ Up to 8 devices transmit simultaneously
(Receive unlimited) | ■ Shorter call latency |
| ■ Echo cancellation function | ■ I2S Digital audio+analog audio |
| ■ VOX function | ■ Line In + Mic input |
| ■ High integration and compact size | ■ Full-duplex data transmission |
| ■ Low power consumption in sleep mode | ■ Mesh Network |
| ■ 1-3KM transmission distance in the open area | ■ Support OTA & Serial upgrade |
| | ■ High reception sensitivity: -117 dBm |

3. Applications

- | | |
|--------------------------------|-------------------------------|
| ■ Fire emergency communication | ■ Metro, Tunnel communication |
|--------------------------------|-------------------------------|

- Riding intercom system
- High-quality full duplex walkie talkie
- Conference telephone system
- Building community security system
- Security intercom system for special scenarios
- Earphone walkie talkie
- Special job assignment walkie talkie

4. Block Diagram



4. Electrical Characteristics

Parameters	Condition	Min.	Typ.	Max.	Unit
Power Supply		2.3	3.3	3.6	V
Working temperature		-30	25	70	°C
Current consumption					
Sleep current			12		uA
RX Current	@no voice output		50		mA
TX current(High power)	@22dBm Average		60		mA
RF Parameters					
Operating frequency	UHF	824		930	MHz
Transmit power	Default	0		22	dBm
Second Harmonic			-40		dBm
Bandwidth (BW)			500		KHz
Receiving sensitivity			-117		dBm
Audio parameters					
Modulation sensitivity			10	100	mV
Receive signal-to-noise ratio(SNR)			90		dB

Frequency response		60		3800	Hz
Voice output (line out)	Load 16 Ω			40	mW
Delay parameters	8channels	160	200	240	ms

5. Typical Applications:

■ Headset Walkie-talkie



Headset Walkie-talkie



Cycling with Travel Buddies



High-altitude Work



Shipboard Communication

■ Handheld radio

High-end
Full-duplex Walkie-talkie

Property Security



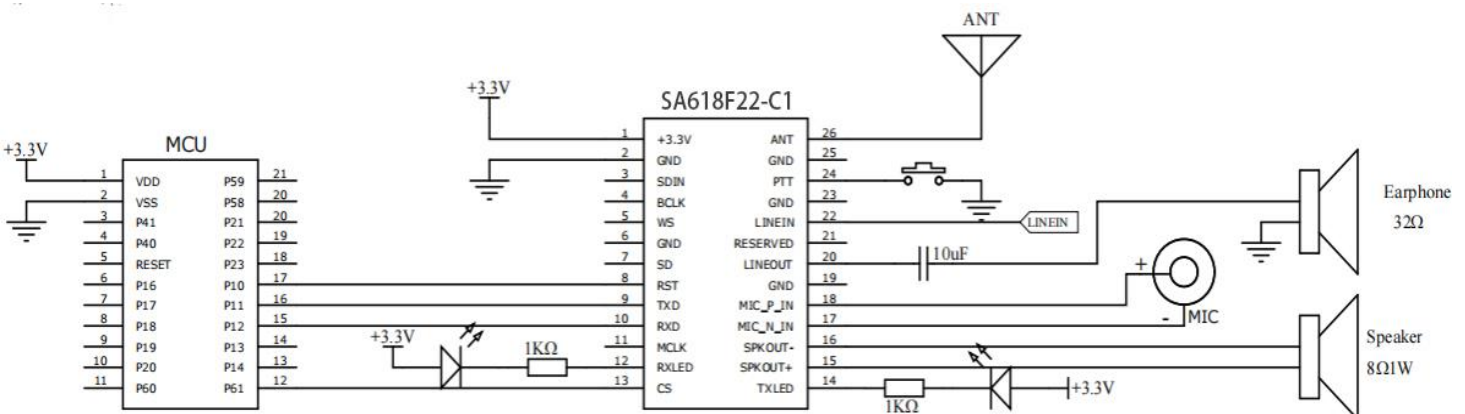
Subway Communication



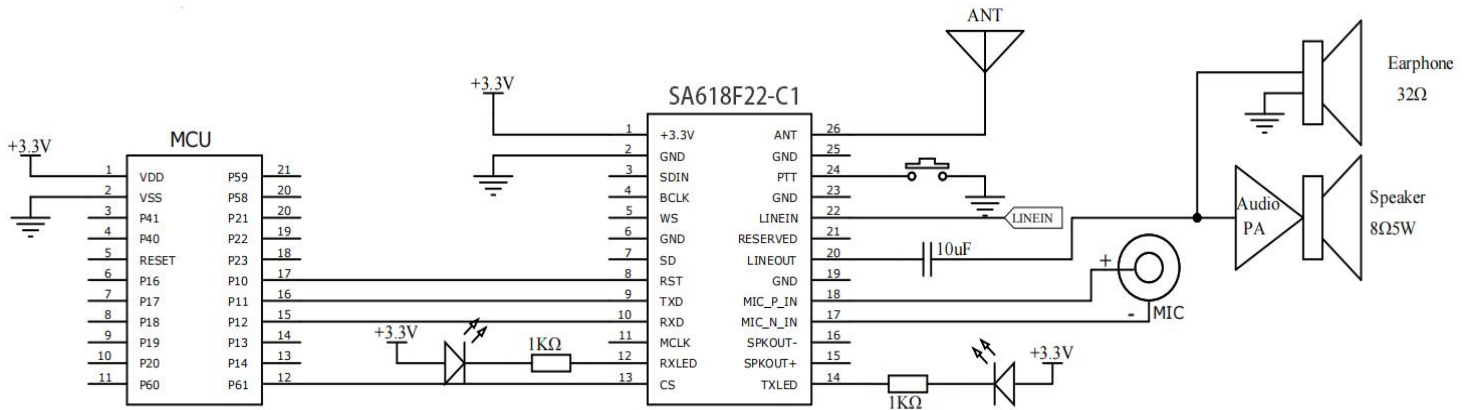
Emergency Rescue

6. Typical application circuit

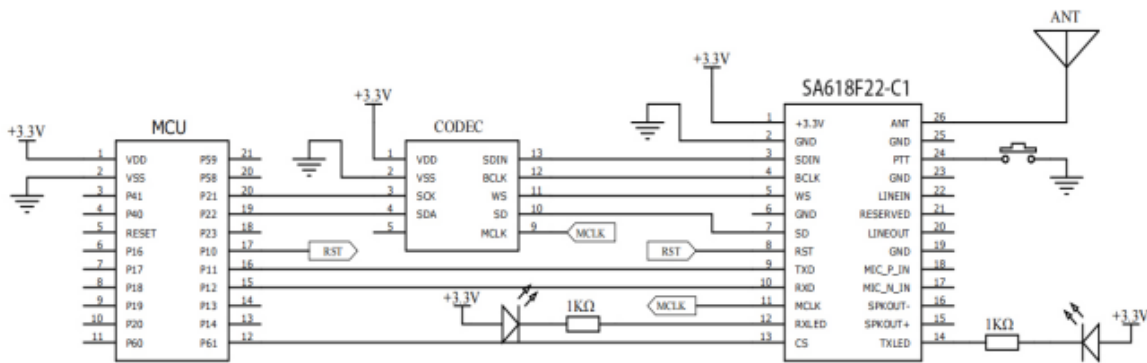
■ Analog input and analog output application circuit (built-in audio amplifier)



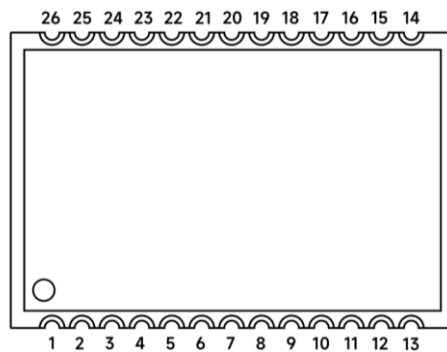
■ Analog input and analog output application circuit (external audio amplifier)



■ IIS input and output application circuit



7. Pin definition

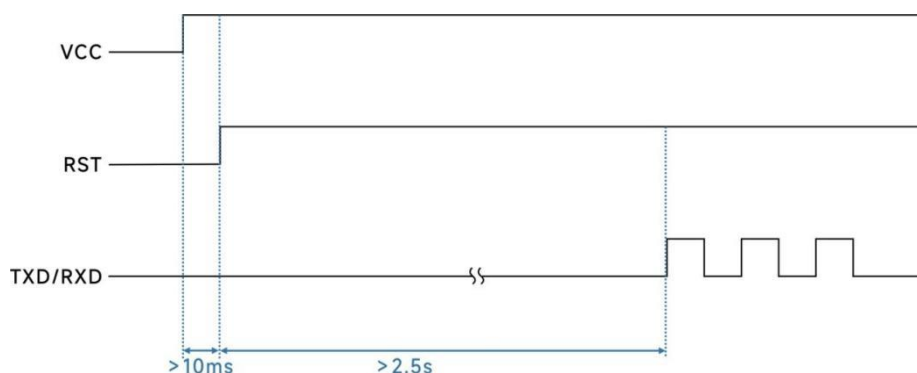


Pin NO.	Pin name	I/O	Description
1	+3.3V		Connect to power positive (2.3-3.6V)
2,6,19,23,25	GND		Connect to power negative
3	SDIN	I	External I2S (0-3.3V)
4	BCLK	O	External I2S (0-3.3V)
5	WS	O	External I2S (0-3.3V)
7	SD	O	External I2S (0-3.3V)
8	RST	I	Module reset pin, pull low for more than 5 ms to reset the module
9	TXD	O	Module serial port transmit pin

10	RXD	I	Module serial port receive pin
11	MCLK	O	External I2S (0-3.3V)
12	RXLED	O	Receiving indicator, connected with external led, turn on by low level output when data or voice received, (suggest 1K ohm resistor for current limitation)
13	CS	I	The module's sleep pin, high level for operation and low level for sleep, with an internal pull-up, defaulting to high level.
14	TXLED	O	Transmitting indicator, connected with external led, turn on by low level output when data or voice is transmitting, (suggest 1K ohm resistor for current limitation)
15	SPKOUT+	O	External connect 8Ω 2W speaker
16	SPKOUT-	O	External connect 8Ω 2W speaker
17	MIC_N_IN	I	Negative electrode of external microphone
18	MIC_P_IN	I	Positive electrode of external microphone
20	LINE_OUT	O	Connected with 16 Ω earphones
21	Reserved		Module test pin, user should leave it unconnected
22	LINE_IN	I	Line in ,maximum 1VRMS
24	PTT	I	Press to talk, pull down to enter transmission mode, pull high or leave open to enter receive mode, pull-up internally,
26	ANT		Connected with 50ohm Antenna

8. Reset Timing Diagram

➤ Power-on Reset Timing Diagram



➤ Reset time chart from working mode



9. Communication protocol

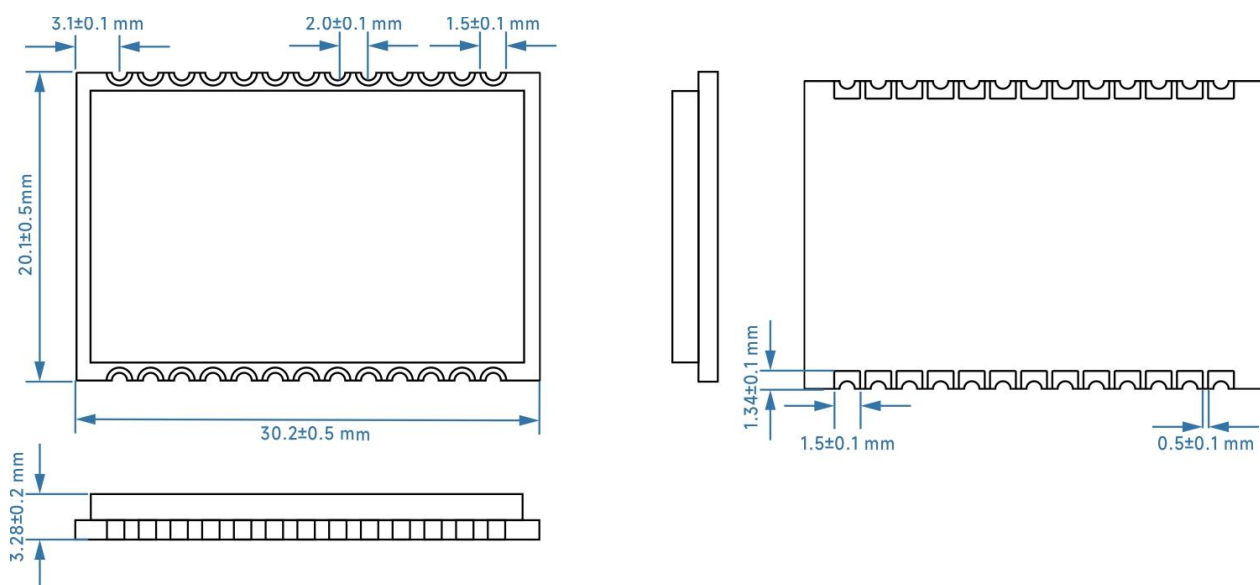
The wireless audio module can be configured or controlled by serial command :

The format is : 115200, 8, N, 1 Baud rate : 115200 Parity checking: none

All commands start with '0xAA 0xFA', Ended with '0x0d 0x0a'

*Details please refer to “ SA618F22-C1 communication protocol”.

10. Mechanism Dimension(Unit:mm)

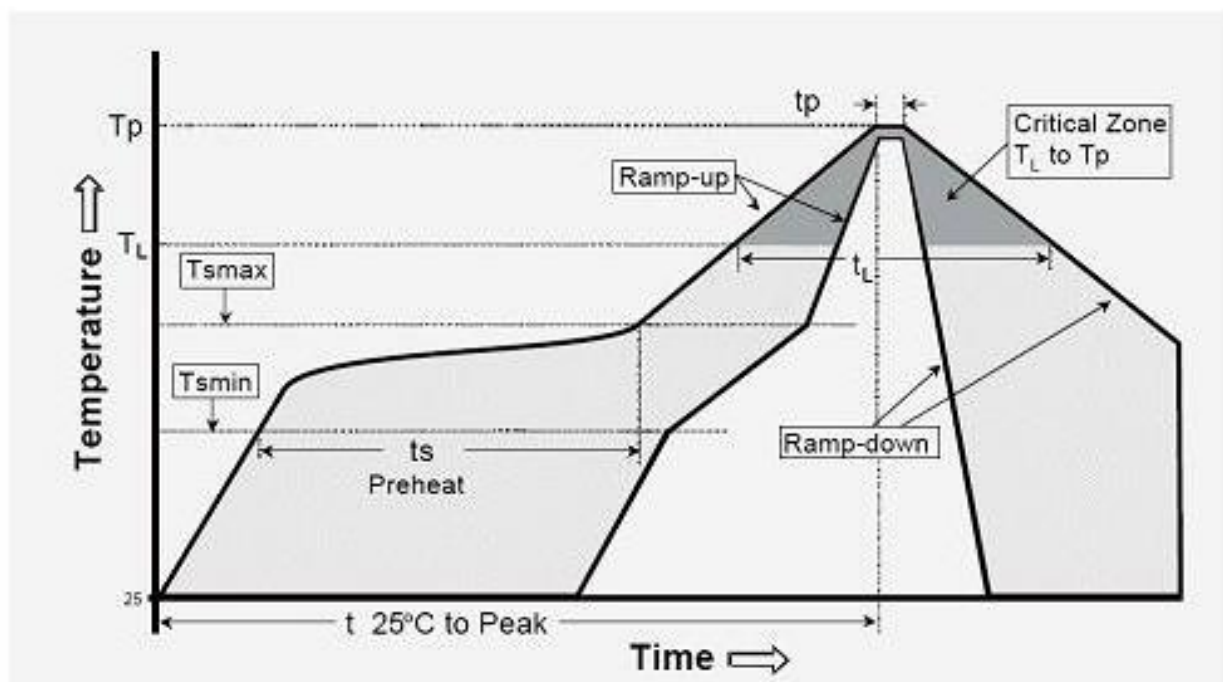


11. Product order information

Product Number	Description
SA618F22-C1-U	Working frequency range 410~490MHz
SA618F22-C1-XXX	Other customized working frequency bands: 150~960 MHz

Appendix :SMD Reflow Chart

Below reflow profile is recommended for SMT technology:



IPC/JEDEC J-STD-020B the condition for lead-free reflow soldering	big size components (thickness $\geq 2.5\text{mm}$)
The ramp-up rate (Tl to Tp)	3°C/s (max.)
preheat temperature	
– Temperature minimum (Tsmin)	150°C
– Temperature maximum (Tsmax)	200°C
– preheat time (ts)	60~180s
Average ramp-up rate(Tsmax to Tp)	3°C/s (Max.)
– Liquidous temperature(Tl)	217°C
– Time at liquidous(tL)	60~150 second
peak temperature(Tp)	245+/-5°C

12. Statements

FCC:

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or changes to this equipment. Such modifications or changes could void the user's authority to operate the equipment.

RF exposure information: To maintain compliance with FCC RF exposure requirements, use the product that maintain a 20cm separation distance between the user's body and the host.

MPE limit for RF exposure at prediction frequency is 0.606mW/cm² for 909.125MHz. The MPE for 909.125MHz is 0.006mW/cm². It satisfy RF exposure compliance.

CE:

This product can be used across EU member states.

EU Regulatory Conformance

Hereby, NiceRF Wireless Technology LTD. Corporation declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

For the declaration of conformity, visit the Web site <http://www.nicerf.com> certification.



This device is intended only for OEM integrators under the following conditions:

1. The antenna must be installed such that 20 cm is maintained between the antenna and users.
2. The transmitter module may not be co-located with any other transmitter or antenna. As long as the two conditions above are met, additional transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required for the installed module.

Important Note:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Federal Communications Commission of the U.S. Government (FCC) and the Canadian Government authorizations are no longer considered valid and the FCC ID and IC ID cannot be used on the final product. In these circumstances, the OEM integrator shall be responsible for re-evaluating the end-product (including the transmitter) and obtaining a separate FCC and IC authorization in the U.S. and Canada.

OEM Integrators - End Product Labeling Considerations:

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains, FCC ID: 2AD66-SA618F22-C1. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

OEM Integrators - End Product Manual Provided to the End User:

The OEM integrator shall not provide information to the end user regarding how to install or remove this RF module in end product user manual. The end user manual must include all required regulatory information and warnings as outlined in this document.