433MHz remote control Product specification

Microtips (DongGuan) Inc.

Approval Sheet Form

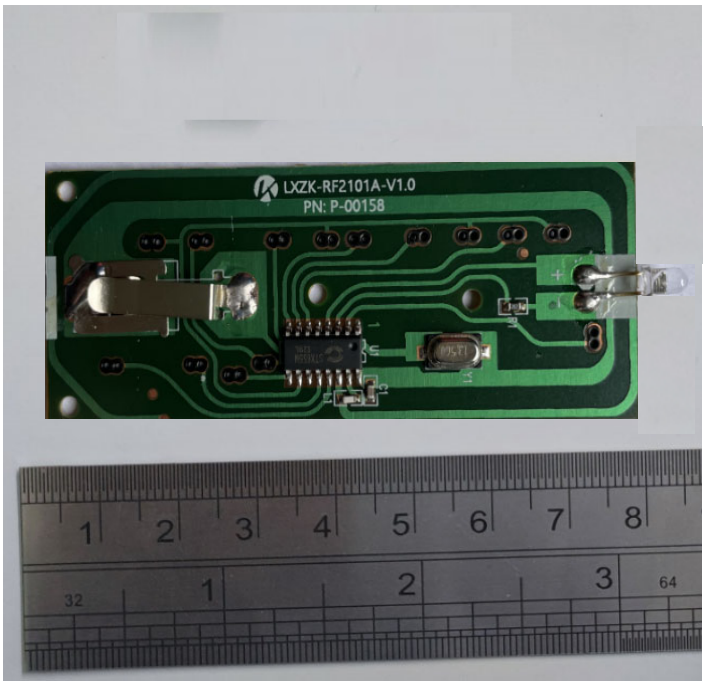
433MHz Antenna series
Comply with RoHS specification
PN: NS-021-RF01-002

characteristic

1. The size of the antenna is only 76.1x30.7 mm。
2. Low energy loss and high antenna efficiency。
3. It has high stability under the condition of temperature and humidity change.

application

1. Lora 915M 868M 490M 433MHz band antenna application
2. Sub-1g 915M 868M 490M 433MHz band antenna application



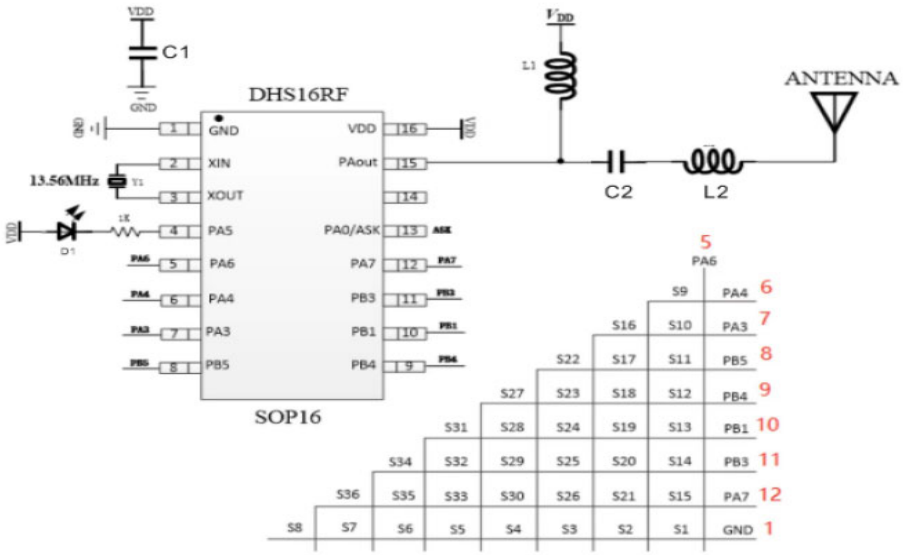
actual picture

electrical specification

CA-S01	Specification
工作频率范围 Working Frequency	400Mhz-960Mhz
初始频段(GHz)	433MHz
带宽 Band Width	>80MHz
阻抗 Impedance	50Ω
增益 Gain(dBi)	7.2
驻波比 VSWR	<2
工作温度 Operation Temperature	-40℃~+85℃
可承受功率 Power Capacity	W

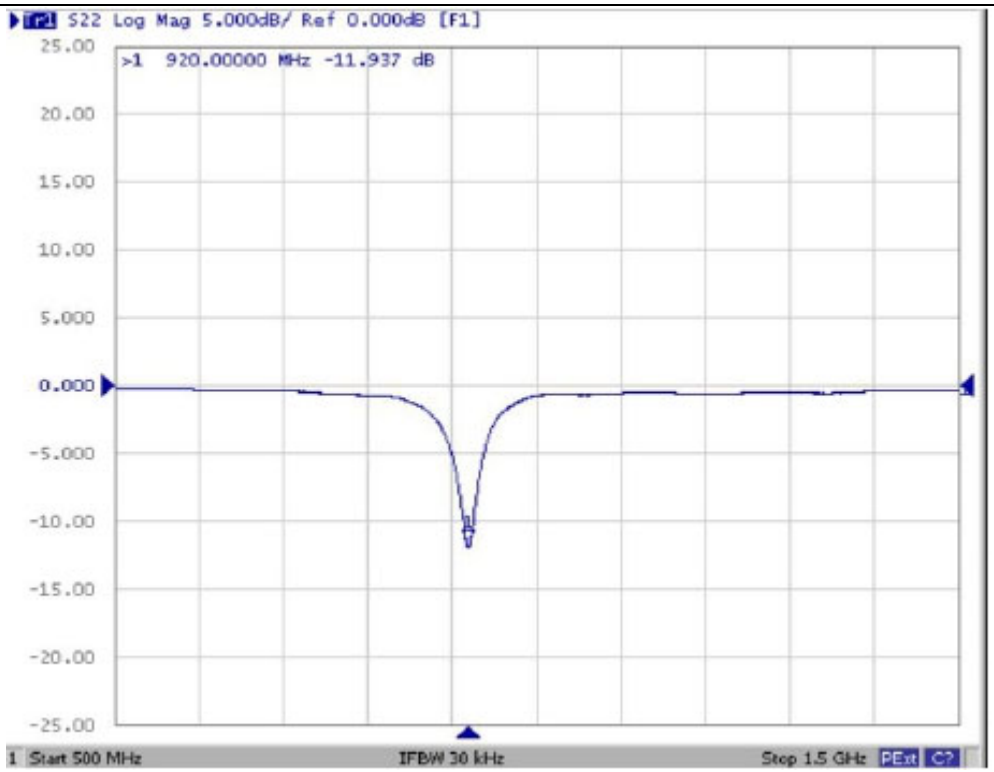
The working frequency of antenna needs to be realized by debugging impedance matching devices.

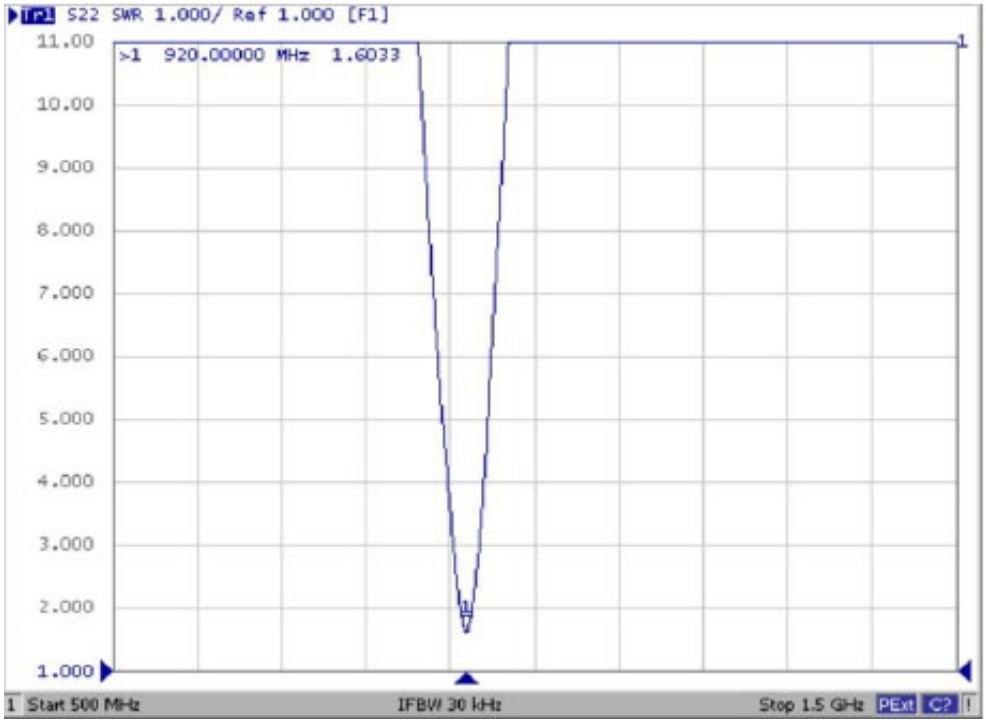
Antenna pad and trace design



433Mhz Matching device value	C2	15pF
	L2	68nH
	L1	270nH

Antenna test on test board (slab thickness 1.0mm)

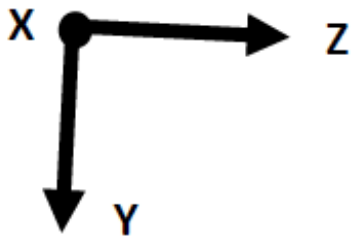
Antenna S11 characteristics


Antenna VSWR characteristics


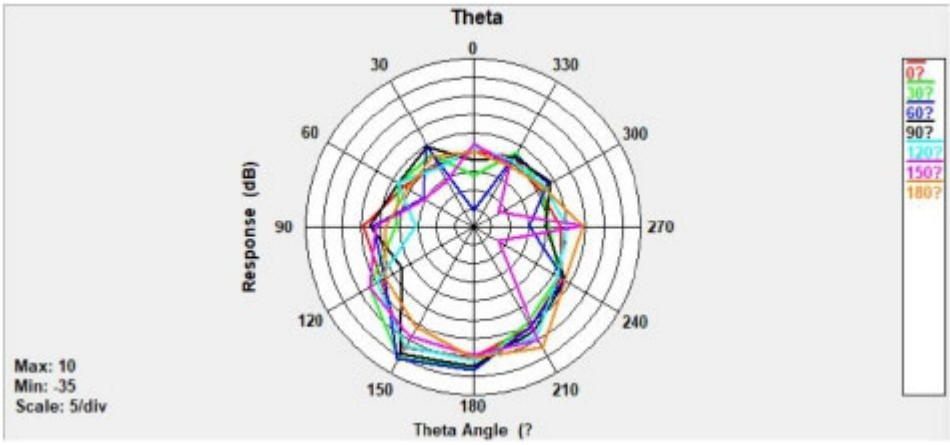
Efficiency and radiation maps

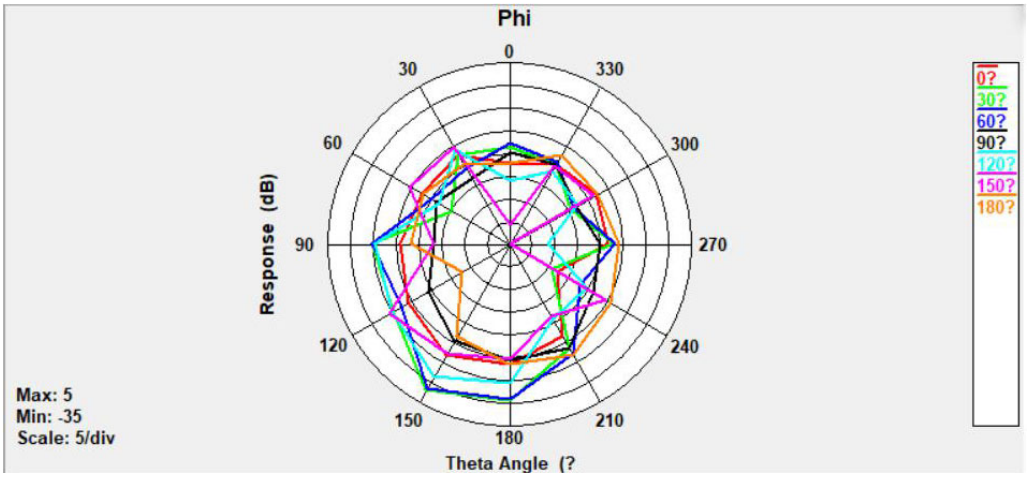
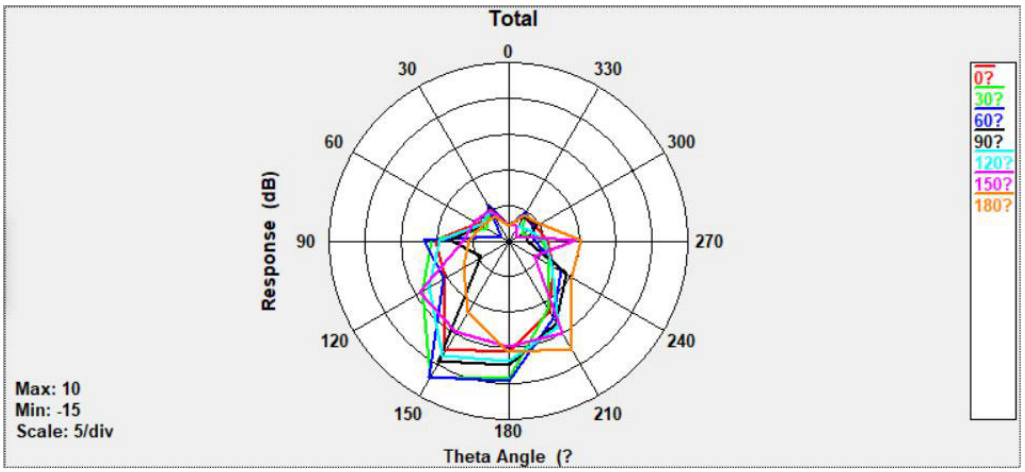
Efficiency, radiation pattern, gain and other performance are based on the test plate design of NS-021-RF01-002 antenna specification characteristics test data are。

Based on the test PCB board size and the test direction shown in the figure below. The following data were tested in ETS 3D microwave darkroom.



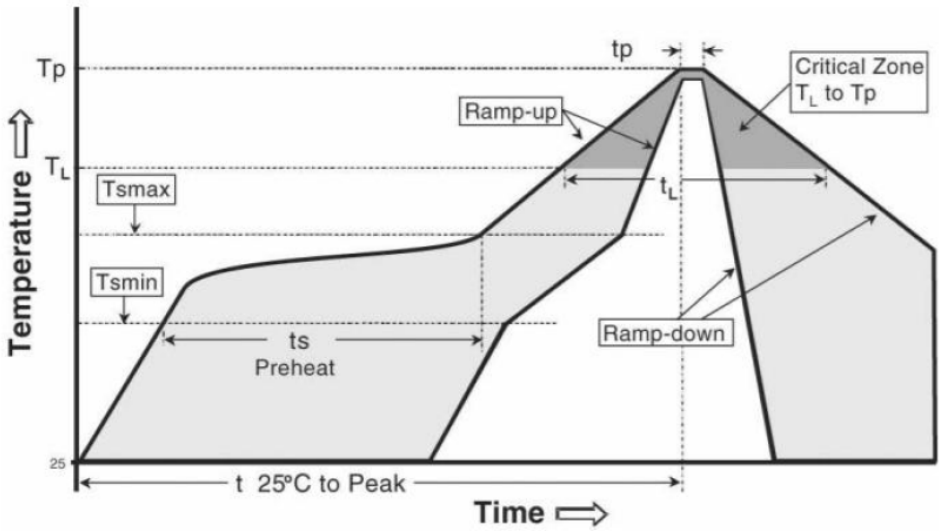
Gain and efficiency	**bandwidth 423-443mhz**
Peak Gain	**7.2dBi**
Average Gain across the band	**5.6dBi**
Gain Range across the band	**2.2dBi~7.2dBi**
Peak Efficiency	**39.5%**
Average Efficiency across the band	**28.7%**
Efficiency Range across the band	**12.3%~39.5%**

Theta @920 MHz	

Phi @920 MHz	
Total @920 MHz	

Welding condition

Typical welding specifications for reliable and nondestructive welding are shown below



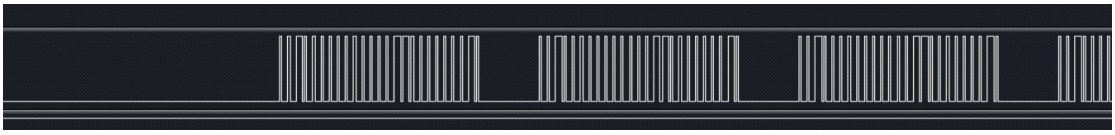
Remote control product specifications

number	State the items		Gauge lattice
0	Main engine size		85.7*39.7*7.MM shell: black
1	Product implementation standard		GB/T 14960-1994
2	Product storage environment	Ambient temperature	-20℃～45℃
3		Relative humidity	45%～75% RH
4		Atmospheric pressure	86～106Kpa
5		Ambient illumination(for use)	unlimited
6	Product use environment	Ambient temperature	-25℃～45℃
7		Relative humidity	45%～75% RH
8		Atmospheric pressure	86～106Kpa
9		Ambient illumination(for use)	unlimited
10	Product composition specification (Standard specification, te Don't ask for exclusions)	Key material	PET bulge
11		Plastic material	ABS Raw material
12		Key contact mode	PET printing carbon oil(carbon film contacts)
13		Circuit board material	94HB- 0.8mm Carbon oil filling hole
14		PCB Model number	NS-021-RF01
15		Packing method	Self-adhesive bag
16		IC Encapsulation mode	SOP16:OTP firmware
17		Remote emission source	wireless 433
18		Remote transmitter code table	See attached code table
19		Remote coding specification	Subject to sample
20		Product appearance design	See attached drawing
21		Type of battery used	Lithium-manganese dioxide battery
22		Battery specification	CR2025*1
23	Product inspection standard (unless special instructions, Tamb=25°C)	Rated operating voltage	DC 3V
24		Operating voltage range	DC 2.5V-4.2V
25		Operating current range	≤20mA
26		Standby current	≤10uA
27		Operating frequency and modulation mode	433.92KHz ±0.8% ASK
28		Transmitting distance	≥35m
29		Directional emission Angle	360° No blind spot
30		Transmitted power	10dBm
31		Undervoltage emission distance	≥15m
32		Key free height	0.5-1mm
33		Key force	250～350g
34		Key load life	≥1 Ten thousand times
35		Free drop test	76cm (Hard floor) /100cm(Wooden floor)
36		Number of free drops	6 times (once per side)
37		Vibration test (30min)	Scanning cycles: 5 Frequency range: 30 ~ 55 ~ 30HZ Three-dimensional direction; 1.5mm displacement range: 0.15mm
38		High temperature storage test	45℃ (2h)
39		Low temperature storage test	-25℃(2h)
40		Constant wet temperature test	40℃ relative humidity 93%(48h)

Communication protocol

Annex 1

Code data (format) description



The encoding contains 24 bits, BYTE0+BYTE1+BYTE2+ end bit:

0:0.4msH + 1.2msL

1:1.2msH + 0.4msL

End bit: 0.4msH + 12msL

BYTE0, BYTE1 is the address code;

The high position is sent in front, and at least 5 frames are sent by a single press;

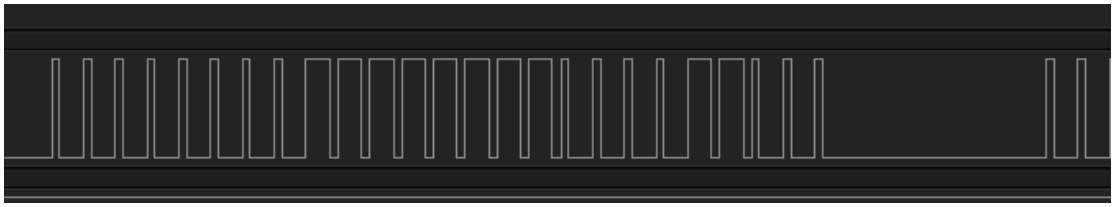
The address code can be set to a fixed address code, FFFF, or other address value.

Can also be set to be a scroll code, each remote control address code is different. Scrolling code can achieve one-to-one function, that is, a remote control

Device, which controls only one receiving device.

BYTE2 is the key code value. Each key has a fixed code value.

As shown in the figure below the key value is 0C and the address code is 00,FF



Note:

1. **Code value is hexadecimal, address code is different for each remote control, can realize a remote control of a device, do not interfere with each other.**
2. **If a remote control is not required for a receiving function, the receiving program can be made not to compare the address code, only compare the key code.**

Receiving and decoding programming instructions

When the remote control does not send 433MHz signal, the wireless receiving chip signal pin (DATA) is irregular clutter, which is normal. When the remote control starts to send 433MHz signal, the receiving signal pin will appear regular waveform. Generally, the receiving program detects the signal of 12ms per frame code interval, and the decoding program enters and starts decoding. When writing the decoding program, it should be noted that the actual high level time is shorter than the theoretical value, and the high level time of each remote control will be somewhat different, so we set the high level time range as large as possible

When programming 0 for 0:0.4ms +1.2ms, the pulse width range of 0.4 should be enlarged as much as possible, and the range of 0.4 should be between 0.2 and 0.6

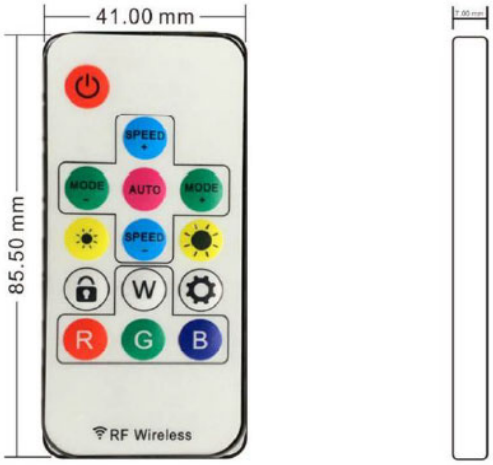
When 1:1.2ms +0.4ms is programmed for 1, the pulse width range of 1.2 should be enlarged as much as possible. The range of 1.2 is between 0.8 and 1.4

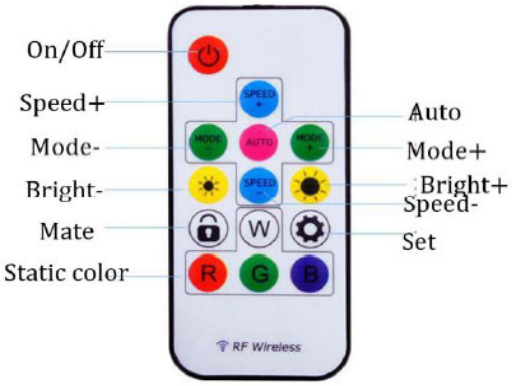
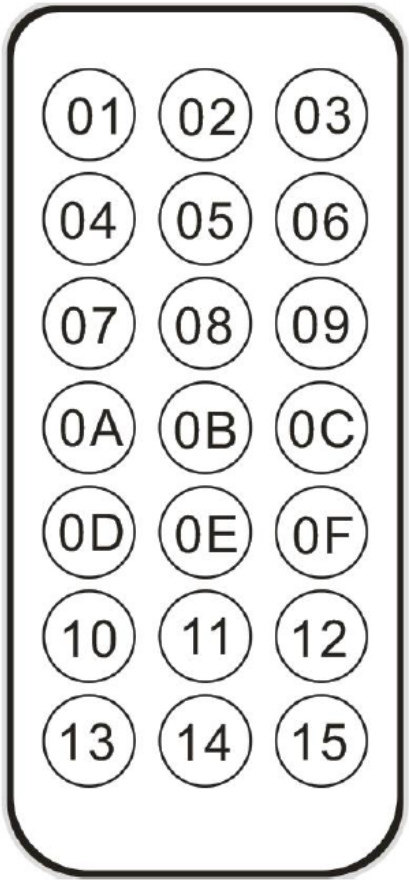
The receiving and decoding takes the receiving 12ms interval time as the starting signal, and the 12ms interval time is regular. When receiving and decoding, the interval range is set between 8ms and 15ms to filter out some interference signals from external devices.

Note: The pulse width in the protocol is the standard length. The actual mass-produced products will have slightly longer pulse width due to the discreteness of MCU timing sequence Deviation, programming attention to software tolerance, tolerance range as far as possible.

Remote control picture and code table

Remote control picture





Code value of the remote control: roll