

规格书编号

SPEC NO: HDM1575-B23 SP01

# 产品规格书

# SPECIFICATION

CUSTOMER 客户: \_\_\_\_\_  
PRODUCT 产品: FRONT-END MODULE  
MODEL NO 型号: HDM1575-B23  
MARKING 印字: HDM1575  
PREPARED 编制: \_\_\_\_\_ CHECKED 审核: \_\_\_\_\_  
APPROVED 批准: \_\_\_\_\_ D A T E 日期: 2019-9-25

客户确认 CUSTOMER RECEIVED:		
审核 CHECKED	批准 APPROVED	日期 DATE

无锡市好达电子有限公司  
Shoulder Electronics Limited



## 1. Features

- Low Noise Figure: 2.2dB;
- High power gain: 17dB typical @ 1.575 GHz
- Low current consumption: 6.9mA
- RF input/output impedance 50ohm
- Supply voltage: 1.5V-3.6V
- Operation frequency range: 1550MHz-1615MHz
- Small DFN (6-pin, 1.5mm x 1.0 mm) package
- High Out-Of-Band jammer rejection at Cellular/PCS/WLAN bands
- Fully-integrated module without any component at input/output side

## 2. Applications

- Smart phones, Feature Phones
- Tablet PCs
- Personal Navigation Devices
- Complete GPS/BDS chipset modules
- Theft protection(laptop, ATM)
- Smart watch and other mobile devices

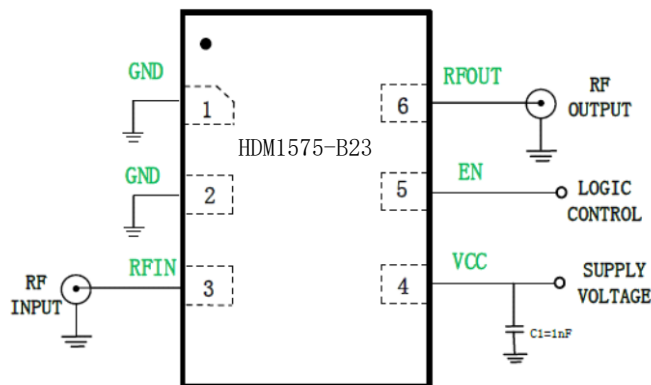
## 3. General Description

The HDM1575-B23 is a Front-End Module (FEM) with a fully integrated Low-Noise Amplifier and Pre-Filter for BDS/GPS/GNSS. The HDM1575-B23 requires no external capacitor/inductor, reduces assembly complexity and the PCB area, enabling a cost-effective solution.

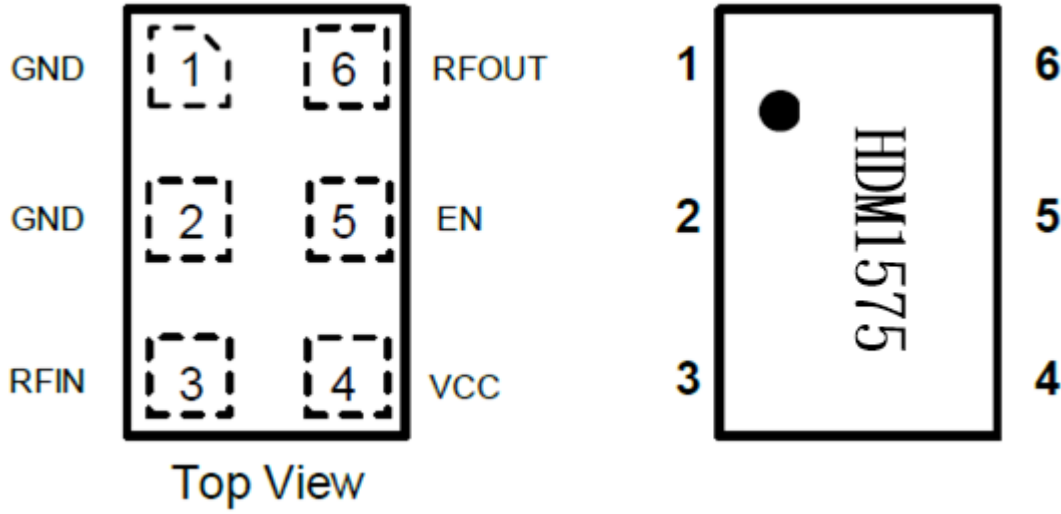
The HDM1575-B23 achieves low noise figure, high gain, excellent linearity and high Out-Of-Band rejection. All these feature make HDM1575-B23 an excellent choice for GNSS LNA as it improves sensitivity with low noise figure and high gain, provides better immunity against out-of-band jammer signals with high linearity, and reduces filtering requirement of preceding stage and hence reduces the overall cost of the GNSS receiver.

The HDM1575-B23 is provided in a compact 1.5mm x 1.0mm, 6-pin DFN package.

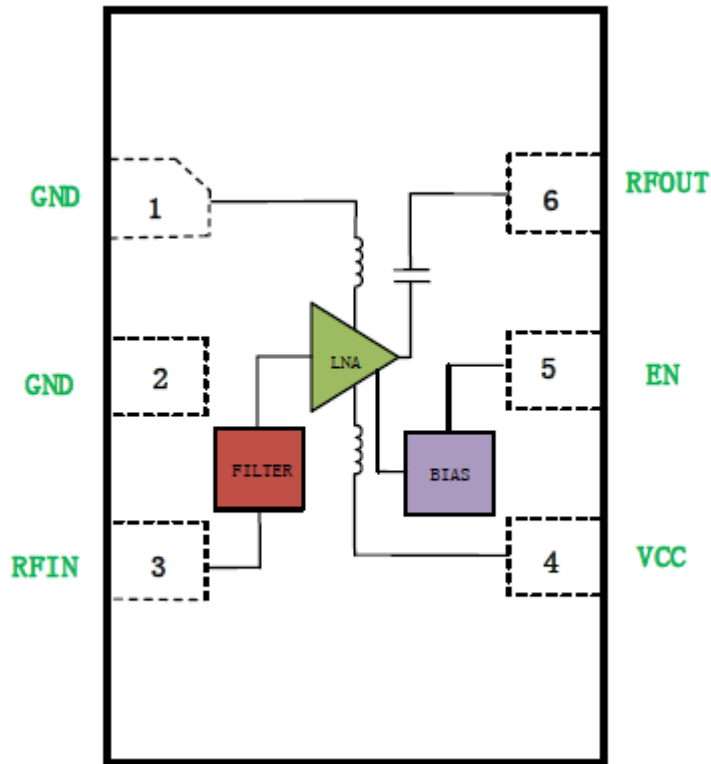
## 4. Typical Application Circuit



**5. Pin configuration and top marking**



**6. Functional Block Diagram**



## 7. Maximum Rating

Items	Rating
Supply Voltage	-0.3V ~ 4.2V
EN pin voltage	-0.3V ~ 4.2V
Supply maximum current	30 mA
RFIN input power Pin	-20 dBm
Maximum Junction temperature	125°C
Storage temperature	-65 ~ +150°C
Operating temperature	-40 ~ +85°C
Lead Temperature (Soldering 10 Seconds)	260°C
ESD	HBM:250V

## 8. Electronic Characteristics

TA=25°C, VCC=1.8V, EN=1.8V, Rs=Ro=50ohm, Frequency=1575.42 MHz

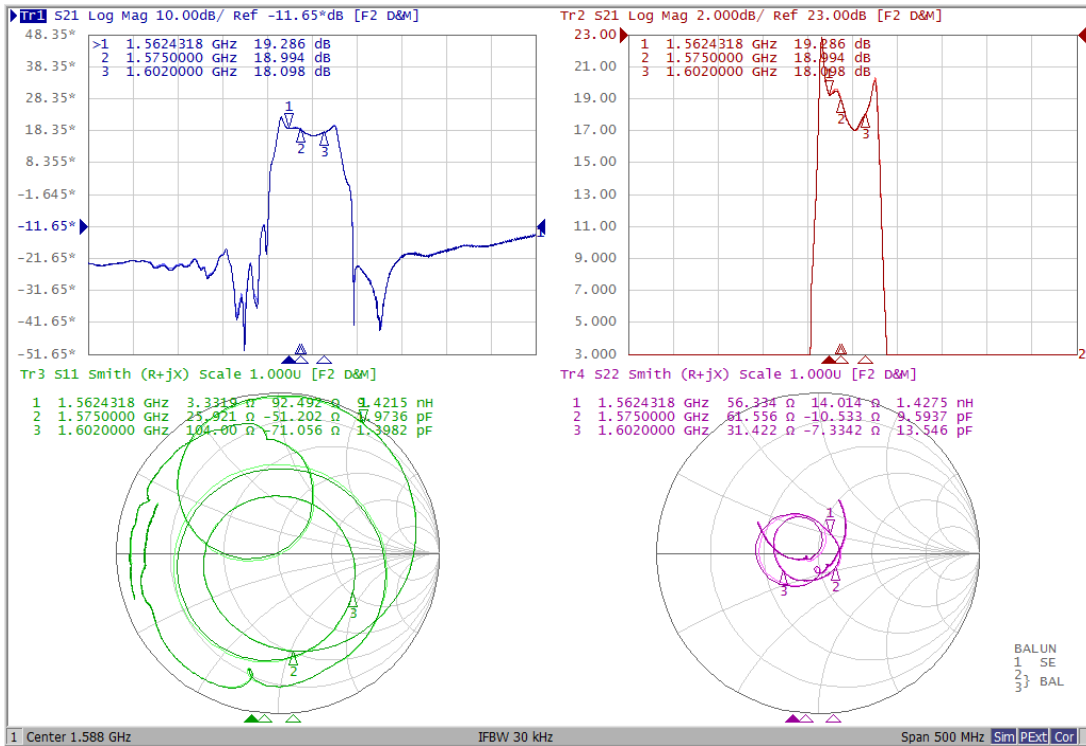
Parameter	Test Condition	Min.	Typ.	Max.	Unit.
<b>DC Electrical Characteristics</b>					
Supply Voltage		1.5	1.8	3.6	V
Shut-down Current	EN=Low	-	0.1	1	μ A
Static Current	EN=2.8V	-	6.7	-	mA
Digital Input Logic High		1	-	-	V
Digital Input Logic Low		-	-	0.45	V
<b>AC Electrical Characteristics</b>					
Power Gain		-	15.5	-	dB
Noise Figure	Input / Output 50ohm	-	2.2	-	dB
Input Return Loss	Input / Output 50ohm	-	-10	-	dB
Output Return Loss	Input / Output 50ohm	-	-30	-	dB
Stability Factor	Input / Output 50ohm	1.0		-	
In-Band 1dB-compression point	Input / Output 50ohm	-	-9.2	-	dBm
Out of band Input 3 <sup>rd</sup> order intercept point	f1=1712.7MHz f2=1850MHz Pin=20dBm	-	-0.8	-	dBm
	f1=1712.7MHz f2=1850MHz Pin=30dBm	-	-0.5	-	dBm
Out of band Input 2 <sup>nd</sup> order intercept point		-	6.2	-	dBm
<b>Frequency Response Characteristics</b>					
Power Gain Ripple	f=1575.42±0.1MHz	-	0.1	-	dB
Attenuation	f=DC~1GHz	30	45	-	dBc
	f=2.4~3GHz	36	45	-	dBc

TA=25°C, VCC=2.8V, EN=2.8V, Rs=Ro=50ohm, Frequency=1575.42 MHz

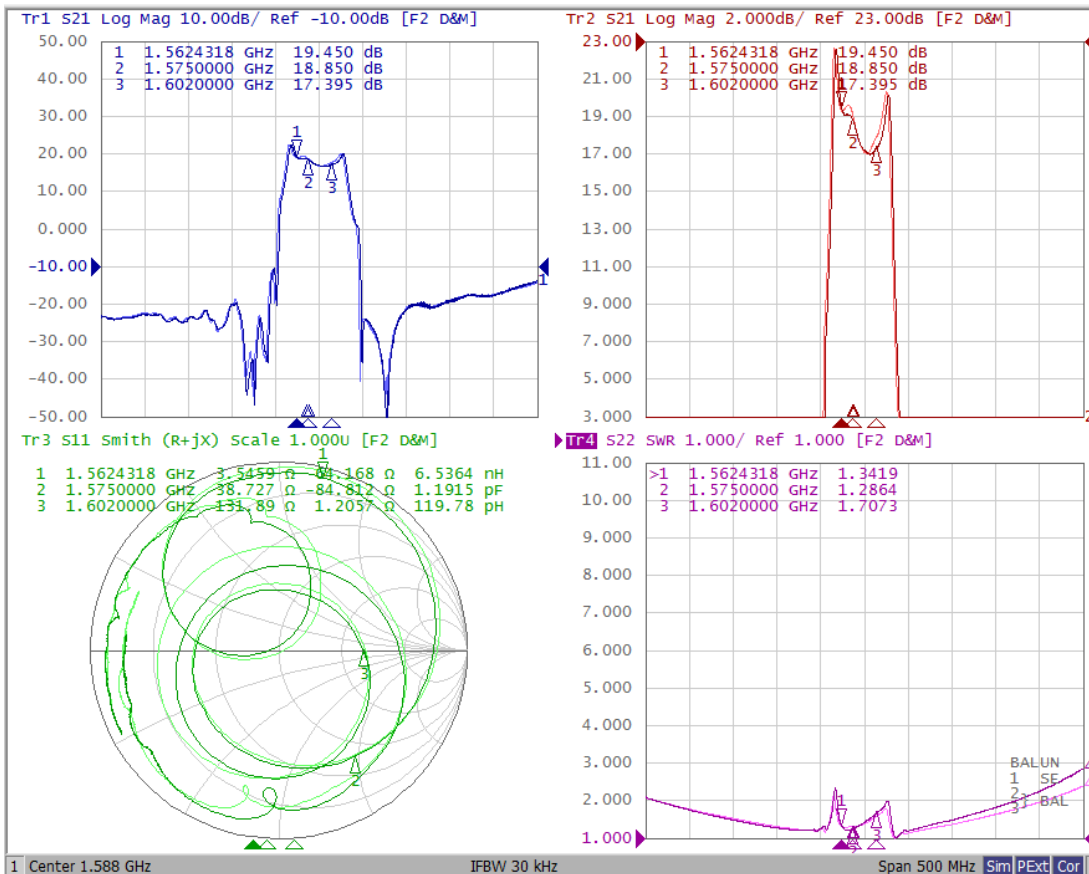
Parameter	Test Condition	Min.	Typ.	Max.	Unit.
<b>DC Electrical Characteristics</b>					
Supply Voltage		1.5	2.8	3.6	V
Shut-down Current	EN=Low	-	0.1	1	μ A
Static Current	EN=2.8V	-	8.8	-	mA
Digital Input Logic High		1	-	-	V
Digital Input Logic Low		-	-	0.45	V
<b>AC Electrical Characteristics</b>					
Power Gain		-	16	-	dB
Noise Figure	Input / Output 50ohm	-	2.2	-	dB
Input Return Loss	Input / Output 50ohm	-	-10	-	dB
Output Return Loss	Input / Output 50ohm	-	-25	-	dB
Stability Factor	Input / Output 50ohm	1.0		-	
In-Band 1dB-compression point	Input / Output 50ohm	-	-7	-	dBm
Out of band Input 3 <sup>rd</sup> order intercept point	f1=1712.7MHz f2=1850MHz Pin=20dBm	-	0.2	-	dBm
	f1=1712.7MHz f2=1850MHz Pin=30dBm	-	0.7	-	dBm
Out of band Input 2 <sup>nd</sup> order intercept point		-	8.5	-	dBm
<b>Frequency Response Characteristics</b>					
Power Gain Ripple	f=1575.42±0.1MHz	-	0.1	-	dB
Attenuation	f=DC~1GHz	30	45	-	dBc
	f=2.4~3GHz	38	45	-	dBc

### 9. Frequency Response

TA=25°C, VCC=2.8V, EN=2.8V, Rs=Ro=50ohm

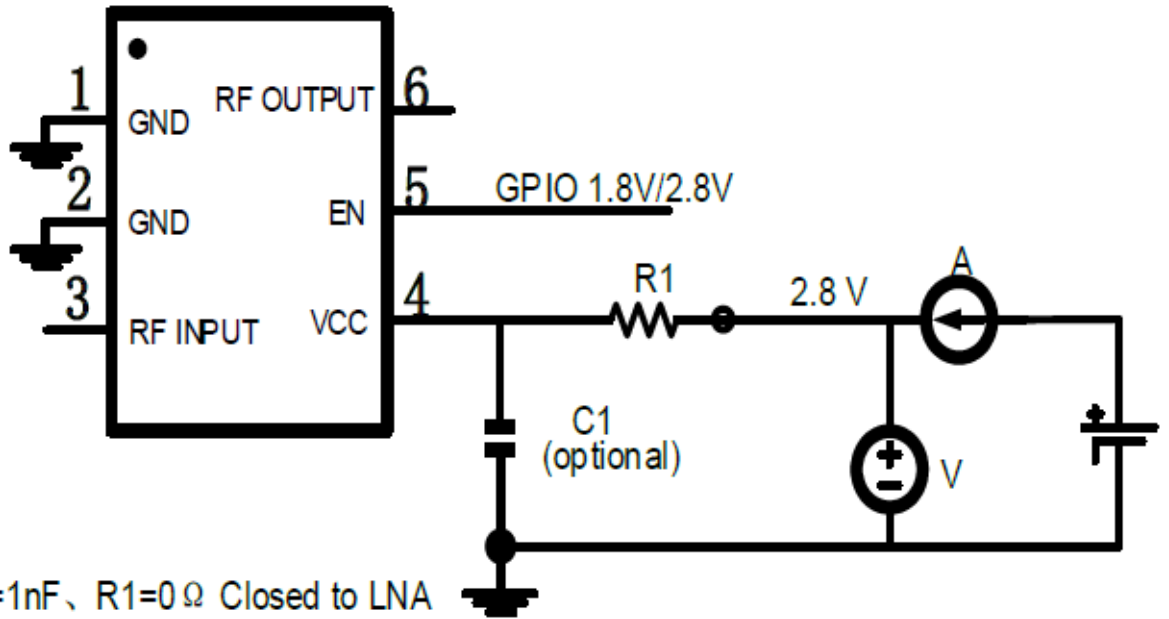


TA=25°C, VCC=1.8V, EN=1.8V, Rs=Ro=50ohm

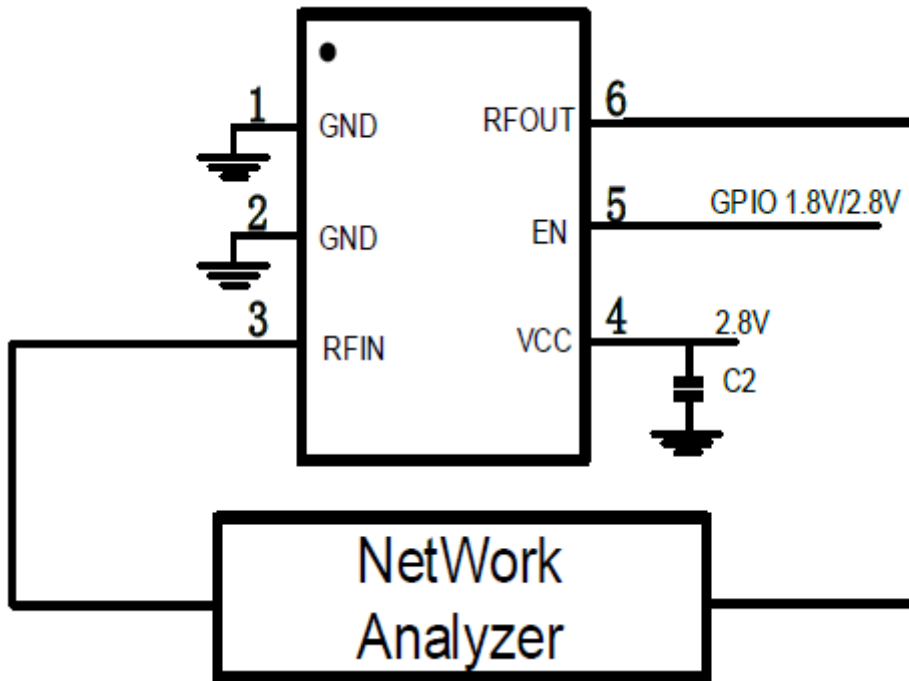


### 10. Test Circuit

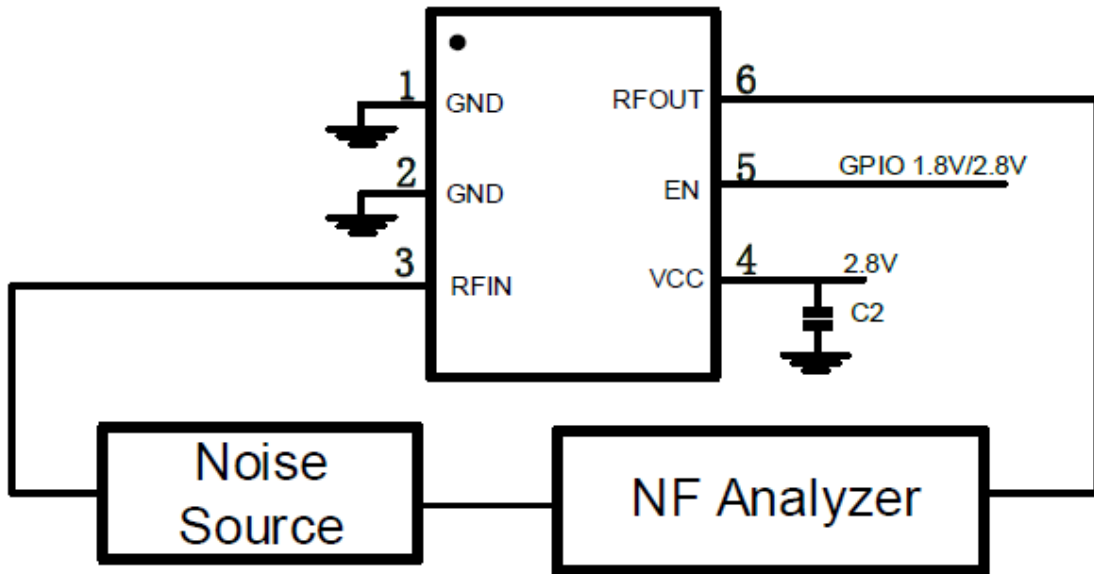
Test DC Characteristics (Current & Power)



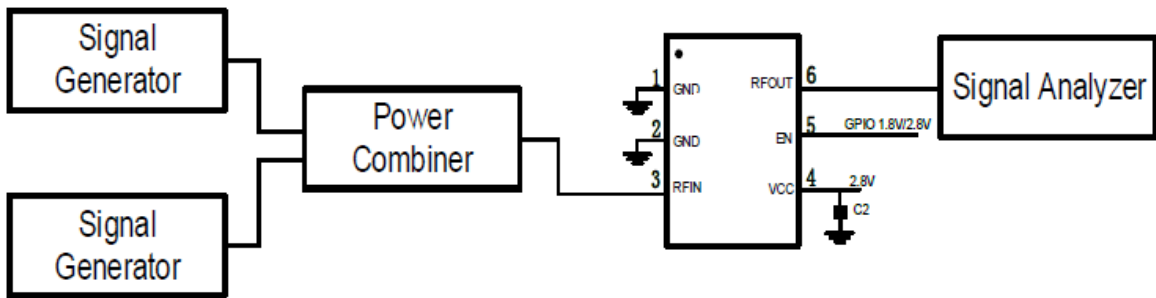
Test S-parameter



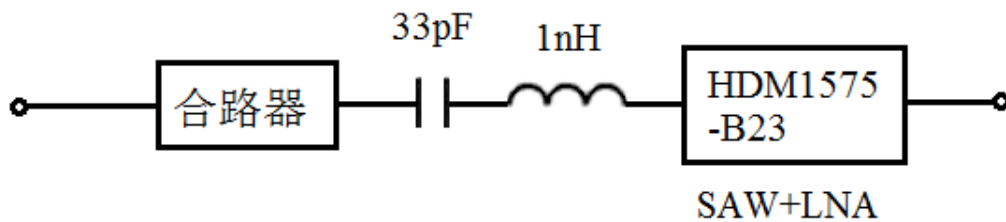
Test Noise-Figure



Test IIP3



Recommended circuit for FAE



## 11. Application Information

Choice of components

Take Figure 1 for example:

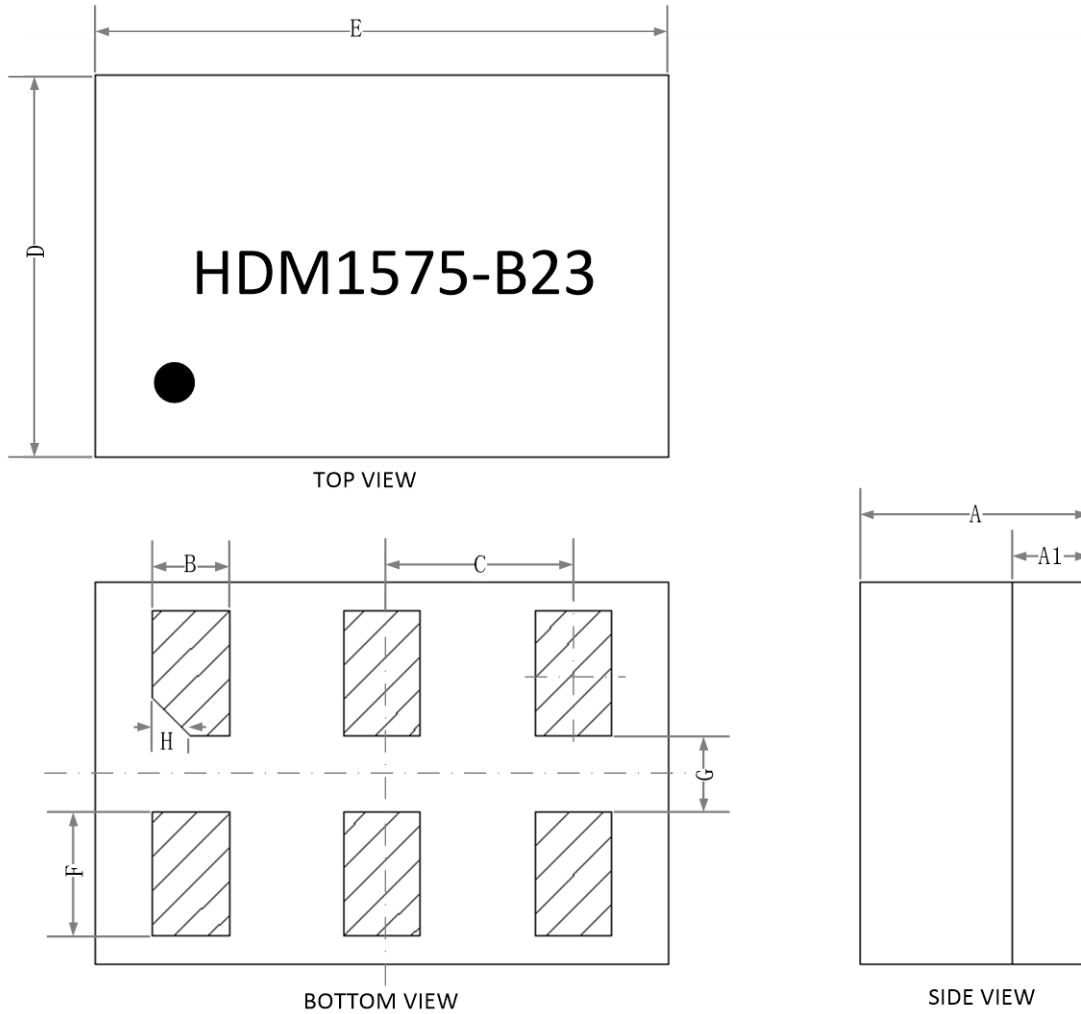
The HDM1575-B23 includes an internal switch to turn off the entire chip: apply logic high to EN to turn on, and a logic low to shut down.

The output of HDM1575-B23 is internally matched to 50 ohm and a DC blocking capacitor is integrated on-chip, thus no external component is required at the output.

The HDM1575-B23 should be placed close to the GPS antenna. Use 50-ohm microstrip lines to connect RF INPUT and RF OUTPUT. Bypass capacitor should be located close to the device.

For long Vcc lines, it may be necessary to add more decoupling capacitors. Proper grounding of the GND pins is very important.

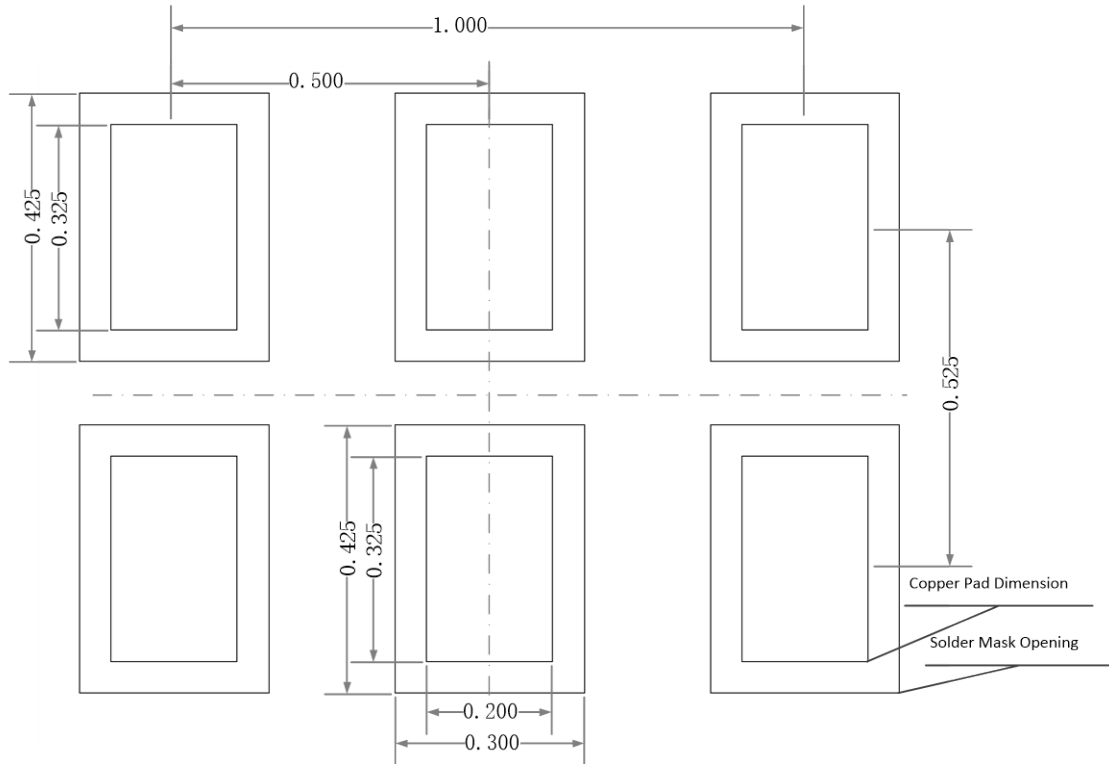
**12. Package Information**



**COMMON DIMENSIONS**  
(UNITS OF MEASURE=MILLMETER)

SYMBOL	MIN	NOM	MAX
A	0.500		0.600
A1	0.160	0.190	0.220
B	0.150	0.200	0.250
C	0.400	0.500	0.600
D	0.900	1.000	1.100
E	1.400	1.500	1.600
F	0.275	0.325	0.375
G	0.150	0.200	0.250
H	0.100REF		

**Land Pattern**



Dimension are all in millimeters

**13. Packing**

13.1 Dimensions

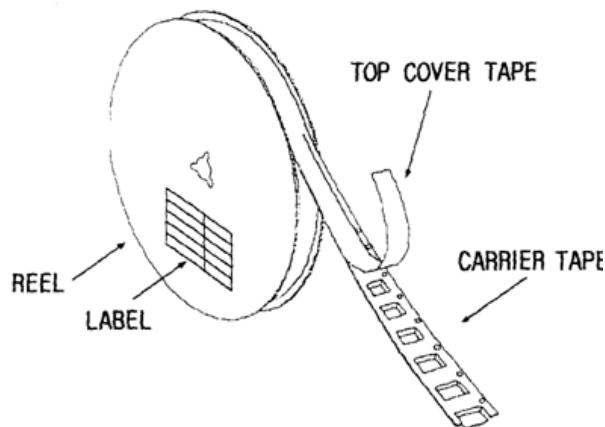
- (1) Carrier Tape: Figure 1
- (2) Reel: Figure 2
- (3) The product shall be packed properly not to be damaged during transportation and storage.

13.2 Reeling Quantity

10000 pcs/reel  $\phi$  257.5mm

13.3 Taping Structure

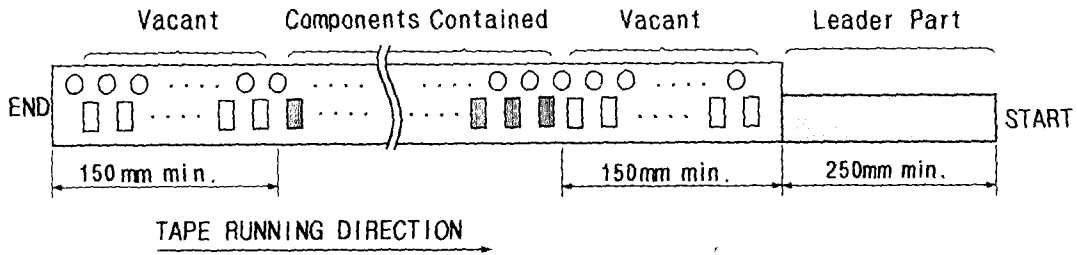
- (1) The tape shall be wound around the reel in the direction shown below.



(2) Label

Device Name	
Marking	
User Product Name	
Quantity	
Lot No.	

(3) Leader part and vacant position specifications.

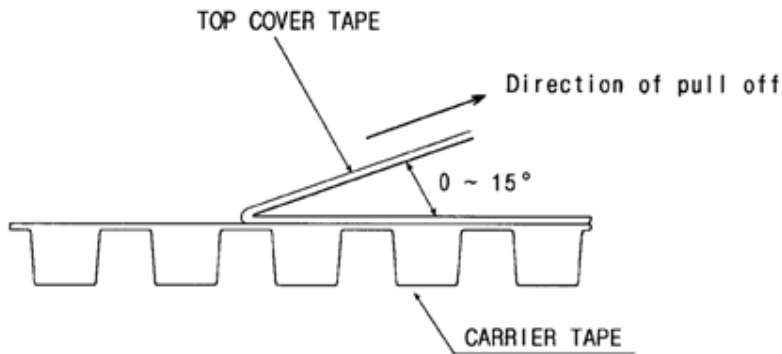


**6. TAPE SPECIFICATIONS**

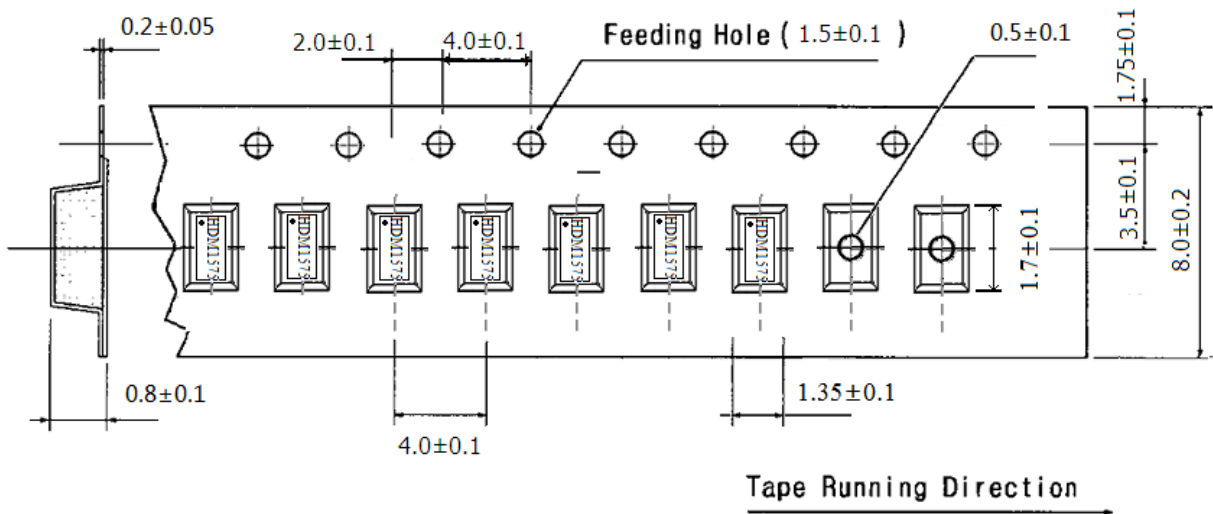
6.1 Tensile Strength of Carrier Tape: 4.4N/mm width

6.2 Top Cover Tape Adhesion (See the below figure)

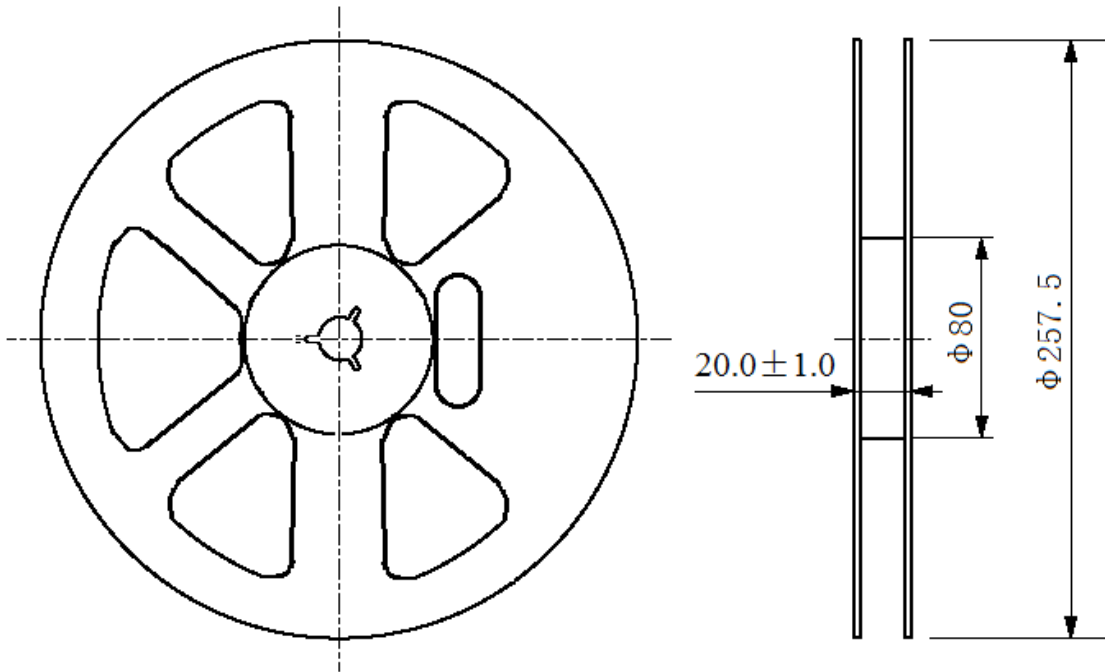
- (1) pull off angle: 0~15°
- (2) speed: 300mm/min.
- (3) force: 20~70g



**[Figure 1] Carrier Tape Dimensions**



[Figure 2] 10000 pcs/reel  $\phi$  257.5mm



$\phi$  257.5 Reel Dimension

(in mm)