K-Band
Doppler Sensor Module

RF Frequency: 24.075 to 24.175 GHz

Model No. NJR4265RTF3

Specifications
Rev.01　May 2, 2017

Caution

1. NJRC strives to produce reliable and high quality microwave components. NJRC's microwave components are intended for specific applications and require proper maintenance and handling. To enhance the performance and service of NJRC's microwave components, the devices, machinery or equipment into which they are integrated should undergo preventative maintenance and inspection at regularly scheduled intervals. Failure to properly maintain equipment and machinery incorporating these products can result in catastrophic system failures.

2. To ensure the highest levels of reliability, NJRC products must always be properly handled. The introduction of external contaminants (e.g. dust, oil or cosmetics) can result in failures of microwave components.

3. NJRC offers a variety of microwave components intended for particular applications. It is important that you select the proper component for your intended application. You may contact NJRC's sales office or sales representatives, if you are uncertain about the products listed in the catalog and the specification sheets.

4. Special care is required in designing devices, machinery or equipment, which demand high levels of reliability. This is particularly important when designing critical components or systems whose foreseeable failure can result in situations that could adversely affect health or safety. In designing such critical devices, equipment or machinery, careful consideration should be given to, amongst other things, their safety design, fail-safe design, back-up and redundancy systems, and diffusion design.

5. The products listed in the catalog and specification sheets may not be appropriate for use in certain equipment where reliability is critical or where the products may be subjected to extreme conditions. You should consult our sales office or sales representatives before using the products in any of the following types of equipment.

- ✓ Aerospace Equipment
- ✓ Equipment Used in the Deep Sea
- ✓ Power Generator Control Equipment (nuclear, steam, hydraulic)
- ✓ Life Maintenance Medical Equipment
- ✓ Fire Alarm/Intruder Detector
- ✓ Vehicle Control Equipment (automobile, airplane, railroad, ship, etc.)
- ✓ Various Safety Equipment

6. NJRC's products have been designed and tested to function within controlled environmental conditions. Do not use products under conditions that deviate from methods or applications specify in the catalog and specification sheets. Failure to employ NJRC's products in the proper applications can lead to deterioration, destruction or failure of the products. NJRC shall not be responsible for any bodily injury, fires or accidents, property damage or any consequential damages resulting from the misuse or misapplication of its products. PRODUCTS ARE SOLD WITHOUT WARRANTY OF ANY OF KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

7. The product specifications and descriptions listed in the catalog and specification sheets are subject to change at any time, without notice.

FCC Statement

Responsible party:
New Japan Radio Co., Ltd.
1-1, Fukuoka 2-chome Fujimino city Saitama Japan
+81-49-278-1271 Fax: +81-49-278-1247

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.
(2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE:
Changes or modifications to this module not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ✓ Reorient or relocate the receiving antenna.
- ✓ Increase the separation between the equipment and receiver.
- ✓ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ✓ Consult the dealer or an experienced radio/TV technician for help.

Caution:
When this module is installed in a host product, this module shall be connected directly to a PCB of the host product. No cable shall be used in order to extend connections between this module and this PCB.

WARNING:
The FCC regulations provide that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Manual and Product Labeling information To The End User:
The end user manual shall include all required regulatory information/warning as show in this manual.
And when this module is installed in the host product, you must include a "Contains FCC ID: 2ACUJR4265RT " in the label of the host product.

This equipment complies with radio frequency exposure limits set forth by the FCC for an uncontrolled environment.
This device must not be co-located or operating in conjunction with any other antenna or transmitter.

This module is a radio transmitter module for embedded purpose. Please understand the functions and features of this module, and evaluate as the final product with this module properly.
Especially, EMC evaluation (i.e. FCC part 15 subpart b) and related application must be performed as the final product with this module.

ISED Statement

Note:
This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference; and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage;
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Manual and Product Labeling information to The End User:
The end user manual shall include all required regulatory information/warning as show in this manual.
And when this module is installed in the host product, you must include a "Contains IC: 22589-R4265RT" in the label of the host product.

RF Exposure Statement (For FCC and ISED)

This equipment complies with radio frequency exposure limits set forth by the FCC and Industry Canada for an uncontrolled environment. This equipment should be installed and operated with **a minimum distance of 2.0 cm** between the device and the user or bystanders. This device must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux radiofréquences définies par la FCC et Industrie Canada pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 2.0 cm de distance entre le dispositif et l'utilisateur ou des tiers. Ce dispositif ne doit pas être utilisé à proximité d'une autre antenne ou d'un autre émetteur.

Category: K-Band Doppler Sensor Module

Type Name: NJR4265RTF3

Description:

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This is an antenna integrated module with a MMIC having transmission/reception circuit.

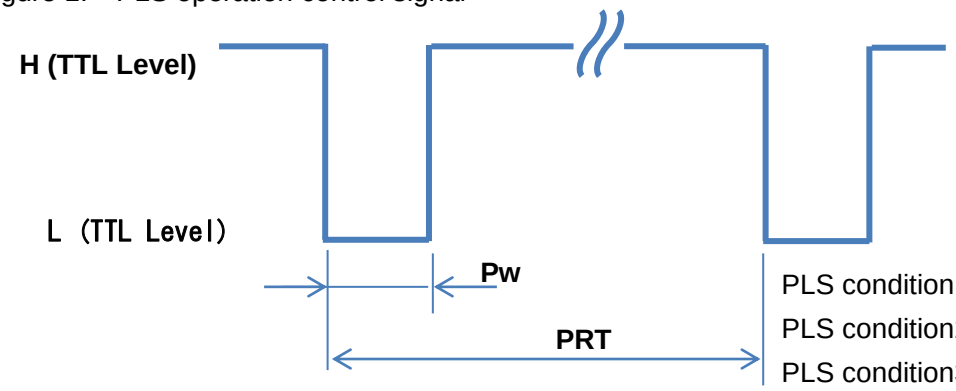
Specification:

1. Electric Characteristics (Common measure condition Ta= +25 deg.C)

Item	Symbol	Specification			Unit	Condition / Note
		Min	Typ	Max		
1.1 Power Supply						
1.1.1 Supply Voltage (+5V)	Vop1	4.75	-	5.25	V	performance warrant range
1.1.2 Supply Voltage (+3.3V)	Vop2	3.3	3.3	3.47	V	performance warrant range
1.1.3 Operating Voltage	-	3.14	-	5.25	V	
1.1.4 Operating Current (CW)	Id_CW	—	45	55	mA	CW condition
1.1.5 Operating Current (PLS 1)	Id_PLS1	—	0.9	1.0	mA	PLS condition 1 (Refer to Figure 1)
1.1.6 Operating Current (PLS 2)	Id_PLS2	—	9	11	mA	PLS condition 2 (Refer to Figure 1)
1.1.7 Operating Current (PLS 3)	Id_PLS3	—	0.30	0.35	mA	PLS condition 3 (Refer to Figure 1)
1.2 Transmission						
1.2.1 Operating Frequency	Ftx	24.075	—	24.175	GHz	All condition in operation specification
1.2.2 Occupied Bandwidth (99%)	Obw1	—	—	200	MHz	FCC Certification PLS condition 1 Design assurance
	Obw2					FCC Certification PLS condition 2 Design assurance
	Obw3					FCC Certification PLS condition 3 Design assurance
1.2.3 Frequency Stability (Temp.)	Ftx_d	—	+/-0.2	—	MHz/C	0 to +50deg.C, Design assurance
1.2.4 Output Power (E.I.R.P.)	Ptx1	8.5	11.5	13.5	dBm	FCC Certification Mean power & Peak power in a CW operation and a PLS operation.
1.2.5 Antenna Power	Ptx2	1.55	4.55	6.50	dBm	
1.2.6 2nd Harmonics	Ps1	—	—	2.5	uW	Antenna power、 Design assurance
	Ps1E			-30	dBm	E.I.R.P, Design assurance FCC Certification

Item	Symbol	Specification			Unit	Condition / Note
		Min	Typ	Max		
1.2.7 Spurious Radiation Power Level to the out of band	Ps2-CW	—	—	2.5	uW	CW condition, Design assurance
	Ps2-1					PLS condition 1, (Refer to Figure 2) Design assurance
	Ps2-2					PLS condition 2, (Refer to Figure 2) Design assurance
	Ps2-3					PLS condition 3, (Refer to Figure 2) Design assurance
1.3 Reception						
1.3.1 Output Signal Voltage	Vif_I	570	950	1330	mV	I-ch, Refer to Figure 3
	Vif_Q	660	1100	1540		Q-ch, Refer to Figure 3
1.3.2 Output Noise Voltage	Nif_I	—	—	770	mV	I-ch, Refer to Figure 3
	Nif_Q	—	—	770		Q-ch, Refer to Figure 3
1.3.3 S/N Ratio	SN-I	3.4	—	—	dB	Calculation 20*LOG(Vif/Nif)
	SN-Q	3.4	—	—		
1.3.4 Output Offset Voltage	Voff_I	1.20	1.35	1.50	V	No reception condition
	Voff_Q	1.20	1.35	1.50		
	ΔVoff	-0.21	0	0.21		Voff_Q - Voff_I
1.3.5 I/Q Phase difference	θ_dif	90	—	100	deg.	Design assurance
1.4 Antenna						
1.4.1 –3dB Beam Width (H plane)	Aw_H	—	70	—	deg.	Refer to Figure 4 Design assurance
1.4.2 –3dB Beam Width (V plane)	Aw_V	—	54	—	deg.	Refer to Figure 4 Design assurance
1.4.3 Antenna Gain	Ag	—	7	—	dBi	Design assurance

Figure 1. PLS operation control signal



PLS condition1: Pw=24uS / PRT=1876uS
PLS condition2: Pw=24uS / PRT=124uS
PLS condition3: Pw=24uS / PRT=39380us

＜During +5v power supply＞

・H Level（min） : 2.73V

・L Level（max） : 0.50V

＜During +3.3v power supply＞

・H Level（min） : 2.64V

・L Level（max） : 0.50V

Figure 2. Spurious Radiation Power Level to the out of band

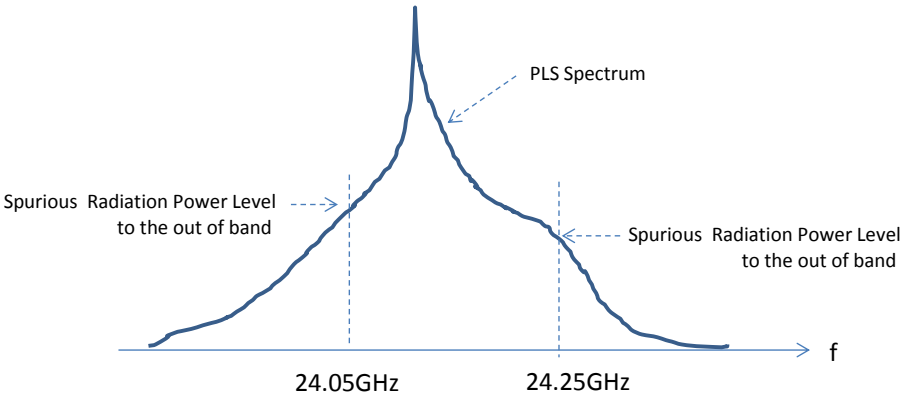


Figure 3. Output Signal Voltage / Output Noise Voltage measurement system

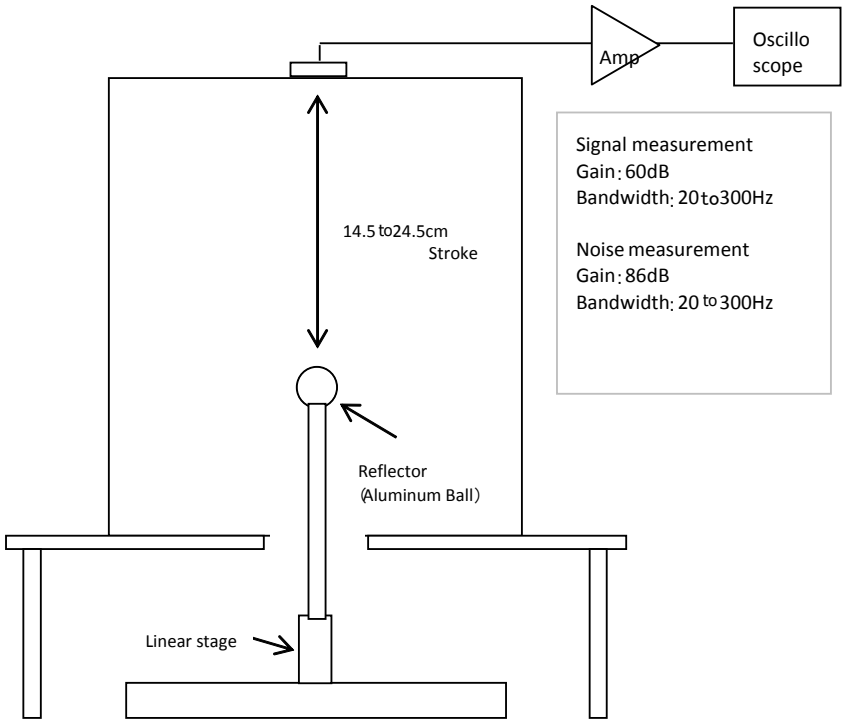
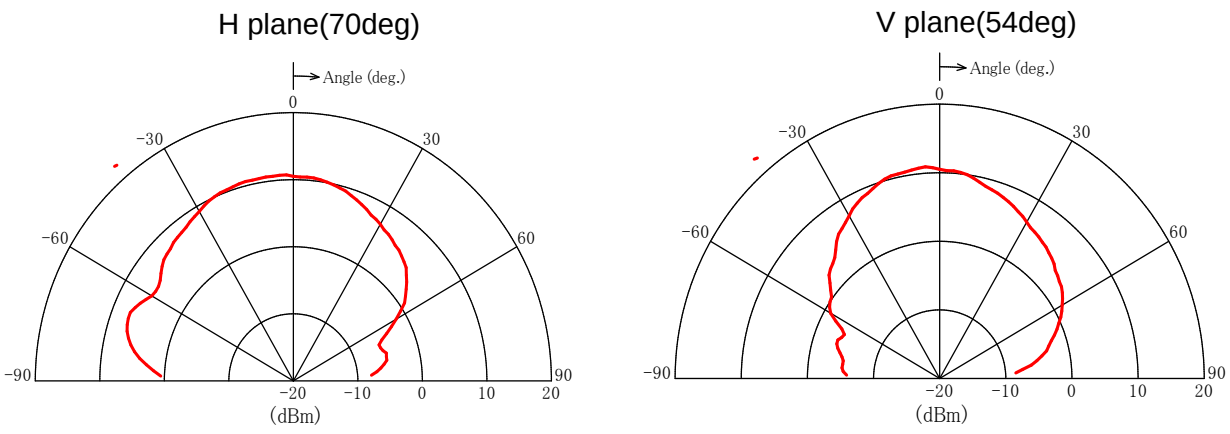


Figure 4. Transmission Antenna Directivity (typical value)



2. Environmental characteristics

Item	Specification
2.1 Temperature	0 to +50 deg.C (Operation) -40 to +80 deg.C (Storage)
2.2 Humidity	0 to 95 % @ +30 deg.C
2.3 Vibration	49.03 m/s^2 (5 G) condition : 30 to 50Hz, 10 minutes, XYZ direction
2.4 Shock	196.13 m/s^2 (20 G) condition : Half sine, 11msec, XYZ direction, 3 times
2.5 RoHS directives	compliant

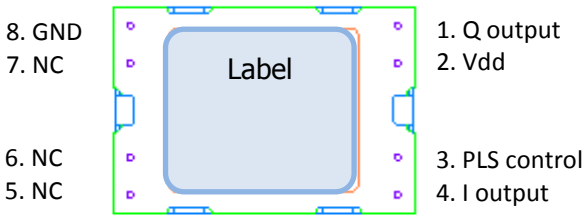
3. Absolute Maximum Rating

Item	Specification			Unit	Condition / Note
	Min	Typ	Max		
3.1 Supply Voltage	0	—	6.0	V	CW condition
3.2 Operating Temperature	-40	—	+85	deg.C	No damage
3.3 Storage Temperature	-40	—	+85	deg.C	

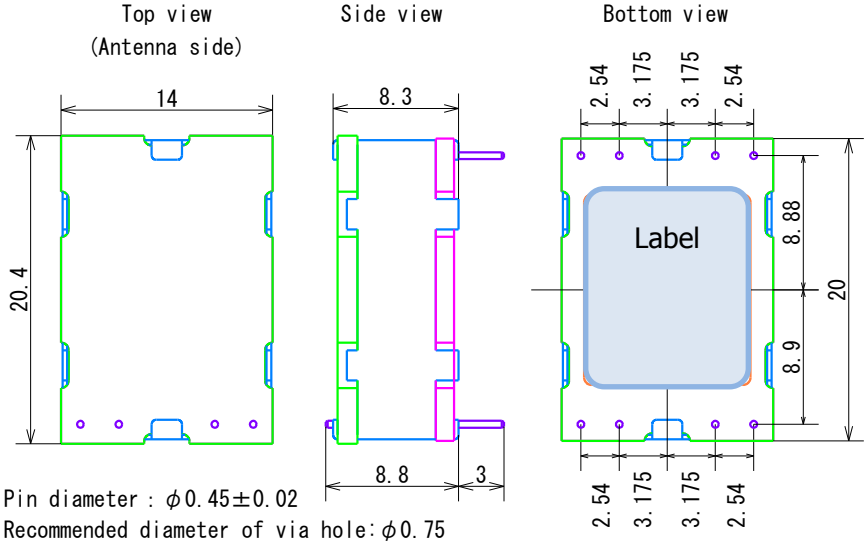
4. Mechanical characteristics

Item	Specification
4.1 Size	14.0(W) x 20.4(D) x 8.8(H) mm Tolerance : +/- 0.5mm
4.2 Weight	5 g max.
4.3 Pin diameter / pitch	φ0.45, 8pin, pitch 2.54mm
4.4 Interface	Refer to Figure 5.

Figure 5. Interface



5. Outline Drawing



Pin diameter : ϕ0.45±0.02
Recommended diameter of via hole: ϕ0.75

Tolerances ±0.5 (* Pin pitch tolerance ±0.2)

6. Label Drawing