

General Description

The NWSTR178193-35 is a highly linear solid-state power amplifier (SSPA) and a low noise LNA for continuous wave (CW) operation. The minimum output power at 1 dB compression at output is 36dBm (4W). The noise figure at ambient is 1.7dB.

There are two (2) Low Noise Amplifiers. Each LNA receives uplink RF signal in Ka-band and amplifies this RF signal with a low noise contribution. A hybrid combines the two LNA output signals into one signal RF. There are two (2) Solid-State Power Amplifiers. The two SSPAs combine RF signal through a hybrid and amplify before transmission.

One (1) monitoring and control function (MCS) receives telecommands from ground via a serial bus to command/configure the LNAs and SSPAs and provide status through telemetry.

One (1) D/DC converter is used to convert the power bus primary voltage into secondary voltages required to power SSPAs, LNAs and MCS.

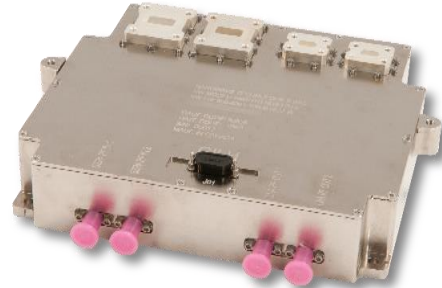


Fig. 1: NWSTR178193-35

Features

- Linear CW SSPA and low noise LNA
- Frequency: 17.5 - 20.5 GHz for SSPA, 27 - 30GHz for LNA
- Fixed Gain Mode
- SOCAN bus interface
- Radiation qualified

Applications

- Payloads for LEO
- SATCOM
- Aerospace

Electrical Parameters

Parameter	Unit	Min	Typ	Max	Remarks
Receiver Frequency range	GHz	27		30	
Low Noise Amplifier Module					
Operating frequency	GHz	27		30	
Gain			42		
Gain versus frequency	dB			± 0.75	

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NWSTR178193-35

K/Ka Gateway Integrated LNA and SSPA



v 2.4

Parameter	Unit	Min	Typ	Max	Remarks
Noise figure	dB		1.7		
Group delay	Ns pk-pk			2	
OIP3	dBm	10			
Input return loss	dB			-14	
Output return loss	dB			-15	
High Power Amplifier Module					
Operating frequency	GHz	17.5		20.2	
Output power @ 1dB compression	dBm		36		
Input power range	dBm	-30.5		-22.5	
Gain versus frequency	dB			± 0.75	
EVM	%			14	
Spectrum regrowth	dBc			-20	
Absolute phase shift between -30.5dBm and -22.5dBm	deg			10	
Maximum tolerable input power	dBm			-17.5	5dB above the maximum input power
Input return loss	dB			-15	
Output return loss	dB			-14	

Note: Customized specification are available on request.

Mechanical and Environmental Parameters

Parameter	Unit	Min	Typ	Max	Remarks
Operating Temperature Range	°C	-25		+65	
Input SSPA/ Output LNA Connectors			K-connector		Female
SSPA Output			WR51		
LNA Input			WR34		
Size (L, W, H)	mm		165.0 141.9 40.0		
Weight	kg		1.2		
Input Bus Voltage	V	22		34	
DC Power	W			50	At P1dB
Total Ionizing Dose (TID)	krad			44	Including RDM = 2
LET	MeVcm2/mg	20			

Digital Control Interface

The monitor and control activity of all subassemblies in the unit is done internally. The interface with the Payload Controller for the communication of telemetry and tele-commands is done via a customized CAN-Bus communication link (SOCAN). The internal Monitor and Control Subassembly (MCS) communicates through the same CAN-Bus link and carries out the control as requested, reports failures and monitored status, and has the ability to shut down various sections of the unit (HPA, LNA, EPC) in the event of a catastrophic failure. Optionally, other higher-level communication protocols (e.g. SpaceWire, UART via RS485) can be implemented.

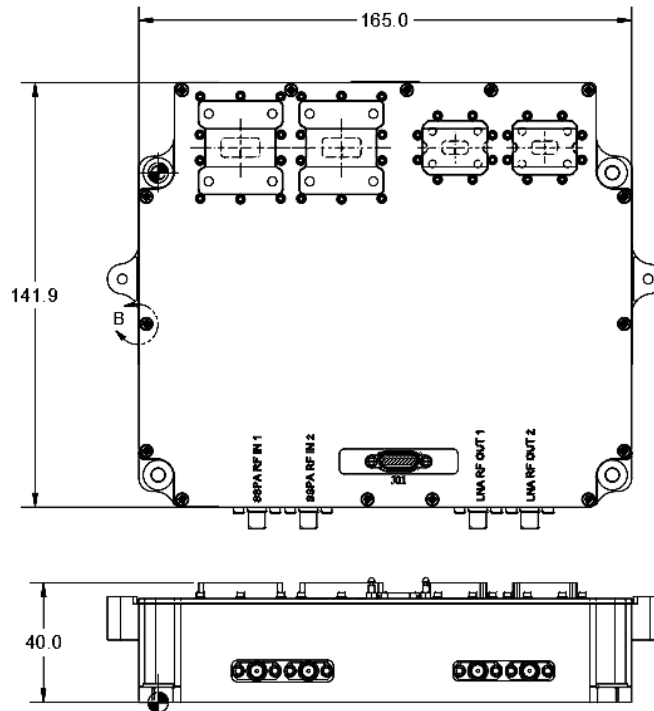
Monitored parameters are:

- Temperatures
- Voltages
- RF Power
- SSPA1 FGM Level
- SSPA2 FGM Level
- General Status

The following functions can be remote controlled:

- Unit Operational Mode
- SSPA1/LNA1 Power ON / OFF
- SSPA2/LNA2 Power ON / OFF
- SSPA1 FGM Control Level
- SSPA2 FGM Control Level
- (further options on request)

Outline Drawing



Unit: mm

Fig 2: Outline Drawing of K/Ka-band Integrated LNA and SSPA

Notes:

The outline of this unit is fully customizable. Arbitrary shapes are possible to accommodate form-fit functionality.

Additional features:

- Marking: the unit is marked with manufacturer part no., date code, and Serial Number.
- All plating and painting is RoHS compliant

For further information please contact NANOWAVE Technologies Inc. at sales@nanowavetech.com, or call at (+1) 416-252-5602.