1.145 – 1.616 GHz SMT LOW NOISE AMPLIFIER WHM14-2035AE/LE[1]

WHM14-2035AE is a low noise figure, wideband, and SMT packaged amplifier with exceptional low input and output VSWR. The amplifier offers typical 1.0 dB noise figure, 16 dB input and output return losses, 20.0 dB gain, and 18 dB output P_{1dB} at the frequency range from 1.145 GHz to 1.616 GHz GPS and DGPS bands. WHM14-2020LE has built-in limiter that provides the LNA protection up to 20-dBm continuous input power. WHM14-2035AE/LE is most suitable for GPS receivers, wireless data communications, and wireless measurement applications.

Preliminary

WHM14-2035AE/LE is designed to meet the rugged standards of MIL-STD-202, MIL-STD-883, and MIL-STD-810F.

Key Features:

Impedance:	50 Ohm
MTBF[2]:	>600,000 hrs (68 Years)
Low Noise:	0.90 dB, 1.0 dB for LE version
Gain:	20.0 dB
P_{1dB}:	18.0 dBm
Single Power Supply:	65 mA @ +5.0V with built-in bias-T
Frequency Range:	1.145~ 1.616 GHz, extended operating band, 1.0 ~ 1.8 GHz.
Operating Temperature:	-40 ~ +85 ℃
VSWR:	1.5:1
Small Size:	0.30” x 0.30” x 0.08” or 0.25” x 0.25” x 0.08
Built-In Functions:	DC blocks at input and output, DC-DC converter, temperature Compensation circuits, Bias-T at output port, and auto DC biases.

Absolute Maximum Ratings[3]:

Symbol	Parameters	Units	Absolute Maximum
V_{dd}	DC Power Supply Voltage	V	7.0
I_{dd}	Drain Current	mA	80
P_{diss}	Total Power Dissipation	mW	500
$P_{In,Max}$	RF Input Power	dBm	10, AE version 20, LE version
T_{ch}	Channel Temperature	°C	150
T_{STG}	Storage Temperature	°C	-65 ~ 150
$T_{O,MAX}$	Maximum Operating Temperature	°C	-55 ~ +85
$R_{th,c}$	Thermal Resistance	°C/W	220

[1] Specifications are subject to change without notice.
[2] MTBF: Mean Time Between Failure, Per TR-NWT-000332, ISSUE 3, SEPTEMBER, 1990, T=40℃
[3] Operation of this device above any one of these parameters may cause permanent damage.

Specifications:

a) Table 1 Summary of the electrical specifications WHM14-2035AE/LE at room temperature

Index	Testing Item	Symbol	Test Constraints	Nom (RT)	Min	Max	Unit
1	Gain	S_{21}	1.145 – 1.616 GHz	20	18.5	21	dB
2	Gain Variation	ΔG	1.145 – 1.616 GHz	+/- 1		+/- 1.2	dB
3	Input VSWR	$VSWR_1$	1.145 – 1.616 GHz	1.4:1		1.5:1	
4	Output VSWR	$VSWR_2$	1.145 – 1.616 GHz	1.4:1		1.5:1	
5	Reverse Isolation	S_{12}	1.145 – 1.616 GHz	25	20		dB
6	Noise figure, AE Version	NF	1.145 – 1.616 GHz	0.90		1.00	dB
	Noise figure, LE Version			1.00		1.10	
7	Output Power 1dB compression Point	P_{1dB}	1.145 – 1.616 GHz	18	16		dBm
10	Current Consumption	I_{dd}	V_{dd}= +5.0 V	65			mA
11	Power Supply Voltage	V_{dd}		+5.0	+4.5[4]	+5.5	V
12	Thermal Resistance	$R_{th,c}$	Junction to case			215	$^oC/W$
13	Operating Temperature	T_o			-40	+85	^oC
14	Maximum Average RF Input Power	$P_{IN, MAX}$	1.145 – 1.616 GHz			10/20	dBm

[4] The lower DC supply voltage reduces the LNA performance.