

Wideband Power Amplifier RWP1020100-53



Product Features

- GaN on SiC Broadband High Power Amplifier
- 1000 ~ 2000MHz Operation Bandwidth
- Power Gain 53dB @ Pin -3dBm
- 100W Minimum @ Pin -3dBm

Applications

- Aerospace & Defense
- Military
- Electronic Warfare
- Rader
- SATCOM
- Communication
- EMI/RFI
- Jamming



Description

The power amplifier module is designed for Broadcasting, Telecommunication, Medical and Other markets.

Operating frequency range is from 1000 ~ 2000MHz.

Gallium Nitride on SiC technology is used and attached on an aluminum sub carrier. Full in/out matching for broadband performance is already applied.

Improved thermal handling by patented technology.

Electrical Specifications @ $V_{CC} = 36V$; $T_c = 45^\circ C$; $Z_S = Z_L = 50\Omega$

PARAMETER	UNIT	MIN	TYP	MAX	CONDITION
Operating Frequency	MHz	1000	-	2000	-
Power Gain @ Pin -3dBm	dB	53	53.8	-	1000 ~ 2000MHz
Power Gain Flatness @ Pin -3dBm	dBpp	-	± 1.0	± 2.0	1000 ~ 2000MHz
Output Power @ Pin -3dBm	dBm	50	50.8	-	1000 ~ 2000MHz
Third-Order Intercept Point(OIP3) 2-Tone @ 40dBm/Tone, 1MHz Spacing	dBm	48	55		
Input Return Loss	dB	-	-9	-5	-
Supply Voltage*	V	-	36.0	-	$V_{CC}(=V_{ds})$
Quiescent Current consumption	A	-	4.0	4.4	-
Current Consumption @ Pin -3dBm	A	-	9	12	CW 1-tone

Absolute Maximum Ratings

PARAMETER	UNIT	RATING
Input RF Power	dBm	0
Supply Voltage	V	37
Load Mismatch Value	-	3 : 1 @all load phase

* Input Signal Condition : CW 1-Tone

Environmental Characteristics

PARAMETER	UNIT	MIN	TYP	MAX	SYMBOL
Operating Flange Temperature	°C	-40	-	85	Tc
Storage Temperature	°C	-40	-	105	Tstg
Vibration	MIL-STD-810G Method 514.6 ANNEX C				VI

Mechanical Specifications

PARAMETER	UNIT	TYP
Dimension	mm	134(L) x 105(W) x 30(H)
Weight	g	635
RF Connector	-	RF Input : SMA Female
		RF Output : N-Type Female
DC Connector	-	C7W2 / D-SUB / Male type
Cooling	-	External Heat-sink

Typical Performance @ 45°C

Frequency (MHz)	RF Input Power (dBm)	RF Output Power		DC Current (A)	Supply Voltage (V)	Efficiency (%)	2nd Harmonics (dBc)	3rd Harmonics (dBc)
		(dBm)	(W)					
1000	-13	50.05	101.2	8.69	36	32.3	-25	-30
1100	-13	50.06	101.4	7.87	36	35.8	-24	-37
1200	-13	50.05	101.2	7.20	36	39.0	-25	-45
1300	-11.6	50.05	101.2	7.00	36	40.1	-26	-30
1400	-12.2	50.04	100.9	7.39	36	37.9	-20	-32
1500	-11.4	50.03	100.7	8.25	36	33.9	-28	-55
1600	-8.5	50.04	100.9	9.15	36	30.6	-34	-68
1700	-9.7	50.04	100.9	9.18	36	30.5	-35	-64
1800	-9.7	50.04	100.9	8.85	36	31.7	-48	-41
1900	-11.9	50.05	101.2	8.58	36	32.7	-34	-80
2000	-11.9	50.04	100.9	9.57	36	29.3	-28	-50

< Chart1. RF Performance at 100W Output >

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Frequency (MHz)	RF Input Power (dBm)	RF Output Power		DC Current (A)	Supply Voltage (V)	Efficiency (%)	2nd Harmonics (dBc)	3rd Harmonics (dBc)
		(dBm)	(W)					
1000	-3	50.59	114.6	9.93	28	41.2	-20	-28
1100		50.56	113.8	9.17	28	44.3	-21	-33
1200		49.46	88.3	7.25	28	43.5	-22	-42
1300		49.06	80.5	6.54	28	44.0	-25	-30
1400		49.72	93.8	7.39	28	45.3	-20	-34
1500		49.17	82.6	8.01	28	36.8	-30	-52
1600		49.02	79.8	8.56	28	33.3	-34	-69
1700		49.60	91.2	9.51	28	34.3	-33	-65
1800		49.61	91.4	9.15	28	35.7	-48	-42
1900		49.09	81.1	9.17	28	31.6	-34	-61
2000		49.30	85.1	10.02	28	30.3	-30	-51

Frequency (MHz)	RF Input Power (dBm)	RF Output Power		DC Current (A)	Supply Voltage (V)	Efficiency (%)	2nd Harmonics (dBc)	3rd Harmonics (dBc)
		(dBm)	(W)					
1000	-3	51.84	152.8	11.23	36	37.8	-17	-27
1100		51.99	158.1	10.23	36	42.9	-20	-32
1200		51.17	130.9	8.44	36	43.1	-21	-42
1300		50.81	120.5	7.63	36	43.9	-33	-28
1400		51.73	148.9	8.85	36	46.7	-20	-32
1500		50.80	120.2	9.18	36	36.4	-28	-52
1600		50.70	117.5	9.81	36	33.3	-34	-69
1700		51.14	130.0	10.61	36	34.0	-33	-62
1800		51.08	128.2	10.28	36	34.7	-48	-40
1900		50.85	121.6	10.04	36	33.6	-33	-72
2000		50.82	120.8	10.88	36	30.8	-30	-49

< Chart2. RF Performance Comparison: 28VDC vs 36VDC Operation >

Frequency	Power Monitor			
MHz	dBm	V	dBm	V
1000	48	0.895	50	0.840
1100		0.878		0.832
1200		0.874		0.819
1300		0.839		0.787
1400		0.839		0.788
1500		0.826		0.775
1600		0.814		0.768
1700		0.804		0.754
1800		0.798		0.747
1900		0.789		0.735
2000		0.794		0.745

<Chart3. Power Monitor>

Precautions

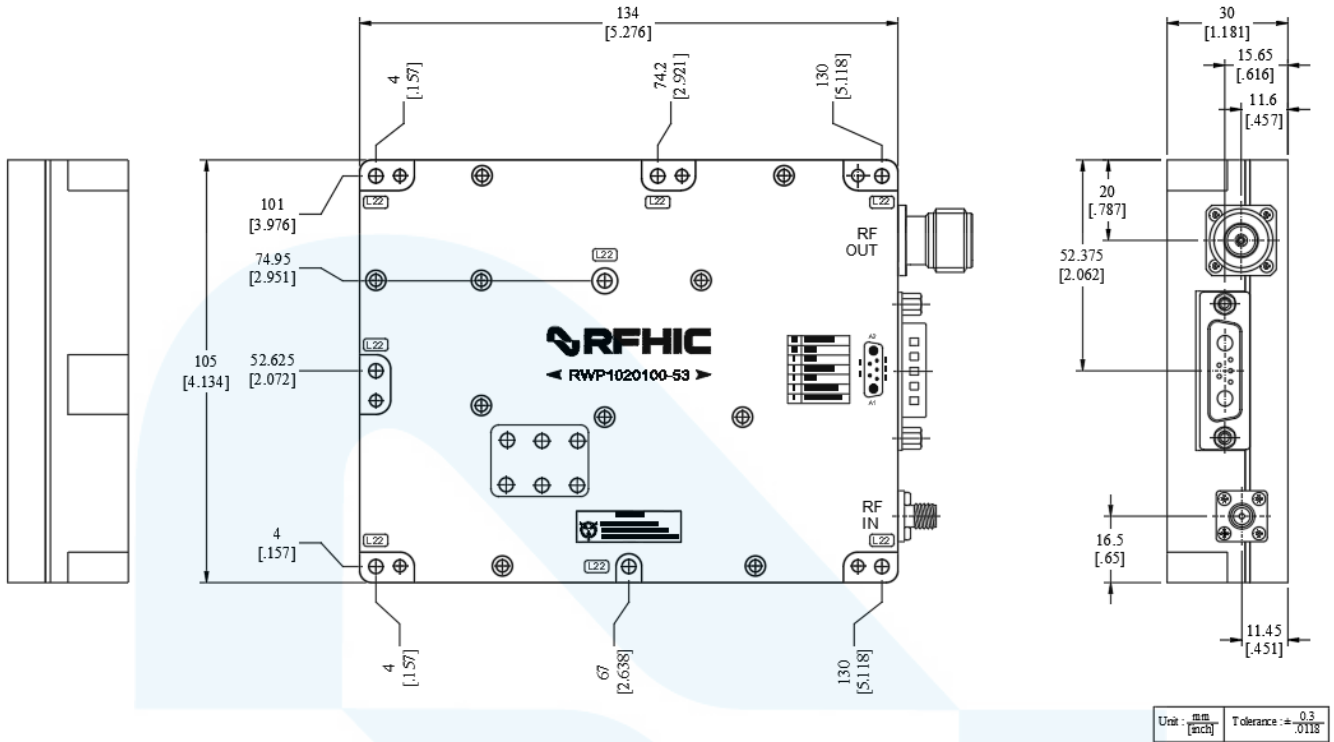
1. This product is designed to be used for broadband amplification. Heat generation is higher when there is RF signal in the device. Therefore, the worst case scenario is when there is RF signal. The temperature must be calculated properly. Case temperature must maintain below 85°C.
2. Thermal Grease or Metal Thermal Interface Materials are recommended for heat dissipation. An example would be spreading thermal grease on the bottom of the device.

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Package Dimensions

* Unit: mm[inch] | Tolerance: ± 0.3 [.012]



Unit : mm [inch]	Tolerance : ±0.3 [.012]
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Pin Description (C7W2 / D-SUB / Male type)			
Pin No	Description	I/O	Specifications
A1	Vcc	I	+36VDC
A2	GND	I	Ground
1	GND	I	Ground
2	HPA Enable	I	Enable : TTL "High", Disable : TTL "Low" (Low : 0 ~ 1.0V, High : 4.0 ~ 5.0V) Disable Status : 150mA Current consumption (Turn ON Delay Time : 450mS Max)
3	GND	I	Ground
4	Temperature Monitor	O	Reference voltage : 750mV @ 25°C
5	Power Monitor	O	Pout 48dBm Voltage : 700 ~ 1000mV

* Recommended Screw Torque : 8.0kgf.cm ± 1 using SEMS M3 22mm Bolt

Revision History

Part Number	Release Date	Version	Modification	Data Sheet Status
RWP1020100-53	2024.02.14	0.1		-
RWP1020100-53	2024.02.22	0.2	Change the Shut Down method (High -> Low)	-
RWP1020100-53	2024.02.23	0.3	Shut Down -> HPA Enable Package Dimensions & Picture Update	
RWP1020100-53	2024.05.10	1.0	Chart, Package Dimensions Update	
RWP1020100-53	2024.08.20	1.1	Quiescent Current Consumption	1.5A / 2.0A -> 4.0A / 4.4A
RWP1020100-53	2024.09.03	1.2	OIP3 Compliance	
RWP1020100-53	2026.05.18	1.3	Typical Performance Update	



Certification

This product is manufactured by a company that is certified for the AS9100D quality management system.

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