

Description

The H8G1822M100P is a LDMOS MMIC Integrated Asymmetrical Doherty based on 2-Stage with 100W saturated output power covering frequency range from 1.805 - 2.170 GHz.

The amplifier is 50 Ω Input matched with integrated input divider and output combiner into a small compact footprint which makes it ideal for integration.

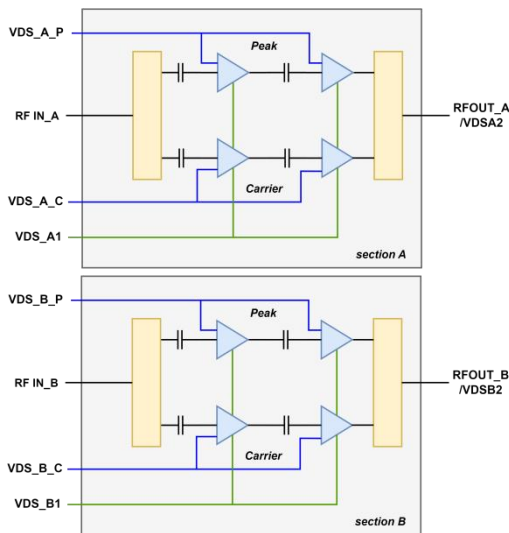


OMP780-16



Over Molded Plastic Package 16 pin

Block Diagram



H8G1822M100P Block Diagram

Features

- Operating Frequency Range: 1.805 - 2.170 GHz
- Operating Drain Voltage: +28V
- Saturation Output Power: 100W
- Power Average: 6.3W
- 50 Ω Input matched
- Integrated Input Divider
- Integrated Output Combiner
- Integrated Asymmetrical Doherty Final Stage
- Efficiency: 26.6%@2.11GHz, WCDMA
- Gain: 26.6dB@2.11GHz, WCDMA
- Small footprint: OMP780-16, 20.75x9.96mm

Applications

- 3GPP 5G NR FR1 n1/34/39 and 4G-LTE B1/3/4/25/34/37/39/70
- Power Amplifier for Micro and Macro Base Stations
- Active Antenna Array for 5G mMIMO
- Repeaters/DAS
- Mobile Infrastructure

Ordering Information

Part Number	Description
H8G1822M100P	Reel Package
H8G1822M100PEVB	1.805 - 2.170 GHz EVB

Typical Performance

RF Characteristics (Pulsed CW)

Freq (GHz)	P3dB (dBm)	Gain (dB)	Eff (%)	IRL (dB)
1.805	51.3	26.3	28.1	21.2
1.840	51.4	26.1	26.7	23.6
1.880	51.5	26.1	26.0	27.5
2.110	50.5	26.4	26.3	13.4
2.140	50.3	26.5	26.2	13.1
2.170	50.1	26.4	26.0	12.4

Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQ_Carrier= 290mA, IDQ_Peak= 60mA, PW = 100us, DC= 10%, Input/Output Load 50 Ω test on WATECH Application Board

RF Characteristics (WCDMA)

Freq (GHz)	Gain (dB)	Eff (%)	ACPR* @5MHz (dBc)	ACPR* @10MHz (dBc)
1.805	26.2	27.0	-38.1	-52.6
1.840	26.2	26.2	-40.5	-54.8
1.880	26.3	26.0	-40.2	-56.4
2.110	26.6	26.6	-40.0	-54.2
2.140	26.7	26.5	-39.3	-52.3
2.170	26.6	26.2	-38.4	-51.2

Test conditions unless otherwise noted: 25 °C, VVDD = +28Vdc, IDQ_Carrier= 290mA, IDQ_Peak= 60mA, PAVG = 38 dBm 1C-WCDMA 5MHz Signal, 7.6 dB PAR @ 0.01% CCDF, Input/Output Load 50 Ω test on WATECH Application Board

*Uncorrected DPD

Absolute Maximum Ratings

Parameter	Range/Value	Unit
Drain Voltage (V _{DSS})	-0.5 to +65	V
Gate Voltage (V _{GS})	-5 to +10	V
Drain Voltage (V _{DD})	0 to +28	V
Storage Temperature (T _{STG})	-55 to +150	°C
Case Temperature (T _C)	-40 to +125	°C
Junction Temperature (T _J)	-40 to +175	°C



H8G1822M100P

100W, 1.805 - 2.170 GHz LDMOS MMIC Amplifier

Product datasheet

Electrical Specification

DC Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Breakdown Voltage $V_{(BR)DSS}$	$V_{GS}=0V, I_{DS}=100\mu A$	65	-	-	V
Gate-Source Threshold Voltage $V_{GS(th)}$	$V_{GS}=28V, I_{DS}=17\mu A$	1.2	-	2.0	V
Drain Leakage Current I_{DSS}	$V_{GS}=0V, V_{DS}=28V$	-	-	0.5	μA
Gate Leakage Current I_{GSS}	$V_{GS}=10V, V_{DS}=0V$	-	-	0.05	μA

Test conditions unless otherwise noted: 25 °C

RF Characteristics (Pulsed CW)

Parameter	Freq (GHz)	Min	Typ.	Max	Unit
P3dB	2.170	46.5	47.0	-	dBm

Test conditions unless otherwise noted: 25 °C, $V_{DD} = +28Vdc$, $IDQ_{Carrier} = 145mA$, $IDQ_{Peak} = 30mA$, $PW = 100\mu s$, $DC = 10\%$, Input/Output Load 50 Ω test on WATECH Production Board (single path test board)

RF Characteristics (WCDMA)

Parameter	Conditions	Min	Typ.	Max	Unit
Frequency		2.170			GHz
Gain	$PAVG = 35 dBm$	25.5	26.5	28.5	dB
Eff	$PAVG = 35 dBm$	24	26	-	%
IRL	$PAVG = 35 dBm$	10	15	-	dB
ACPR@5MHz*	$PAVG = 35 dBm$	-	-33	-28	dBc

Test conditions unless otherwise noted: 25 °C, $V_{DD} = +28Vdc$, $IDQ_{Carrier} = 145mA$, $IDQ_{Peak} = 35mA$, 1C-WCDMA 20MHz Signal, 7.6 dB PAR @ 0.01% CCDF, Input/Output Load 50 Ω test on WATECH Production Board (single path test board)

*Uncorrected DPD

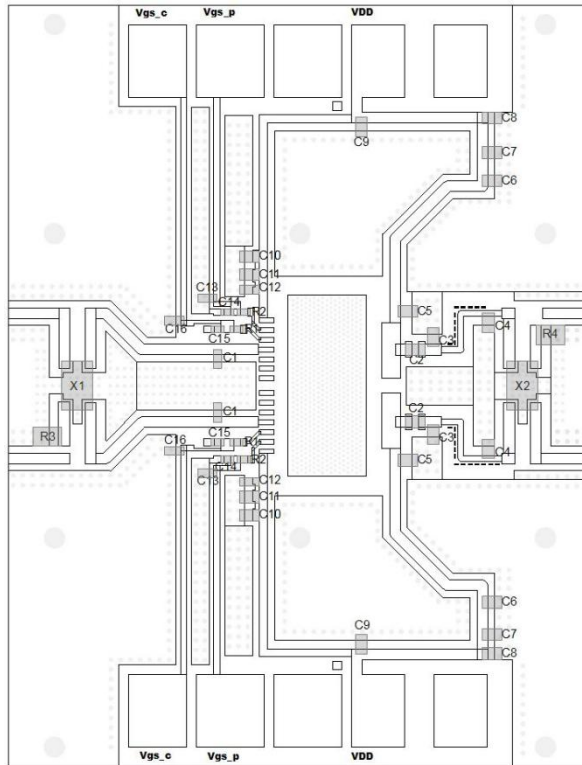
Load Mismatch Test

Condition	Test Result
VSWR=10:1, at all Phase Angles, $V_{DD}=+28Vdc$, $IDQ_{Carrier} = 290mA$, $IDQ_{Peak} = 60mA$, $PAVG = 38 dBm$, Frequency 2.170 GHz, test on WATECH Application Board	No Device Degradation

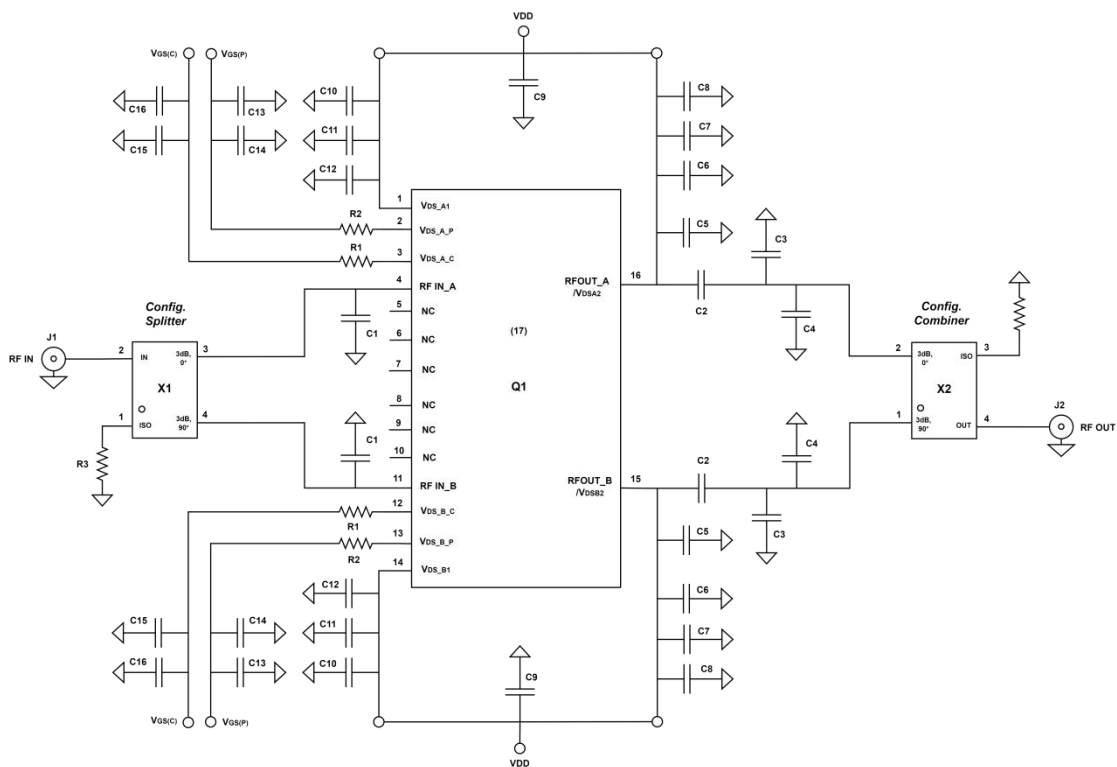
Thermal Information

Parameter	Condition	Value (Typ)	Unit
Thermal Resistance Junction to Case (R_{TH})	$T_{CASE} = 90^{\circ}C$, 1C-WCDMA 5MHz Signal, 7.6 dB PAR, $PAVG = 35 dBm$	1.02	$^{\circ}C / W$

H8G1822M100P 1.805 - 2.170 GHz Reference Design (50 x40 mm)



EVB Layout



EVB Schematic



H8G1822M100P

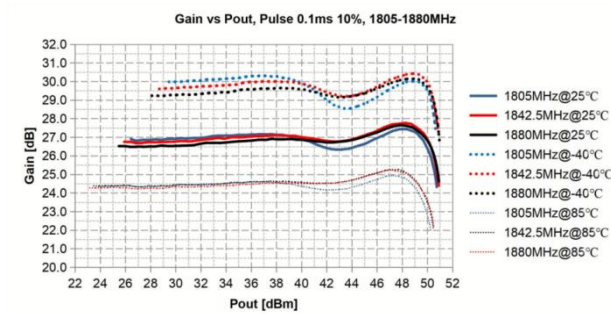
100W, 1.805 - 2.170 GHz LDMOS MMIC Amplifier

Product datasheet

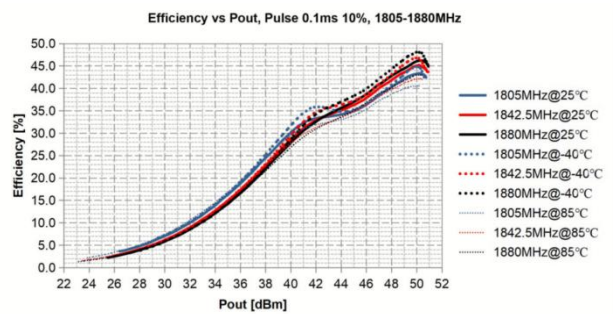
Bill of Materials (BoM) - H8G1822M100P 1.805 - 2.170 GHz Reference Design

Reference	Value	Description	Manufacturer	P/N
Q1	-	100W, 1.805 - 2.170 GHz LDMOS MMIC PA	Watech	H8G1822M100P
C1	0p7F (x2)	Multi-Layer Ceramic Capacitor	Murata	GQM2195G2ER70BB12
C2	3pF (x2)	Multi-Layer Ceramic Capacitor	Murata	GQM2195G2E3R0BB12
C3	0p8F (x2)	Multi-Layer Ceramic Capacitor	Murata	GQM2195G2ER80BB12
C4, C5	1p3F (x2)	Multi-Layer Ceramic Capacitor	Murata	GQM2195G2E1R3BB12
C6	10pF (x2)	Multi-Layer Ceramic Capacitor	Murata	GQM2195G2E100GB12
C7, C12, C14, C15	1nF/0805 (x2)	Multi-Layer Ceramic Capacitor	Murata	GRM21A5C2E102JWA1
C8, C11, C13, C16	1uF/0805 (x2)	Multi-Layer Ceramic Capacitor	Murata	GRM21BC72A105KE01
R1, R2	5Ω/0805 (x2)	Thick Film Resistor	YAGEO	RC0805FR-074R99L
R3, R4	50Ω/2010 (x2)	Thick Film Resistor	YAGEO	RC2010FK-0749R9L
X1, X2	-	Hybrid Coupler 3dB, 90°	Anaren	X3C19F1-03S
PCB	Rogers 4350B, er = 3.66; Thickness= 20 mil (0.508 mm); Thickness copper plating = 35 μm (1oz)			

Performance Plots

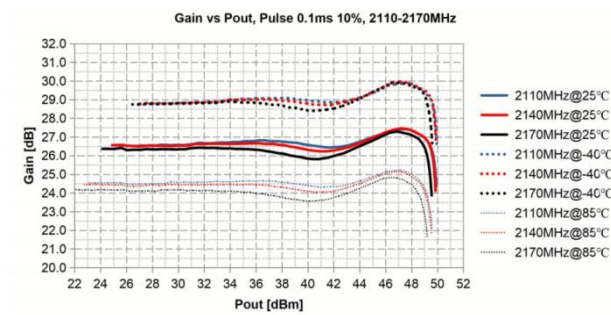


Pulsed CW, Gain vs Pout, 1.805 - 1.880 GHz

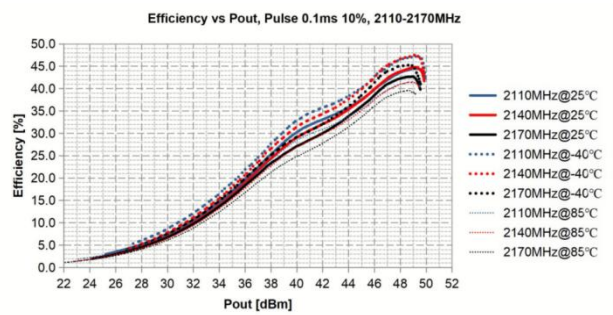


Pulsed CW, Efficiency vs Pout, 1.805 - 1.880 GHz

Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQ_Carrier= 290mA, IDQ_Peak= 60mA test on WATECH Application Board



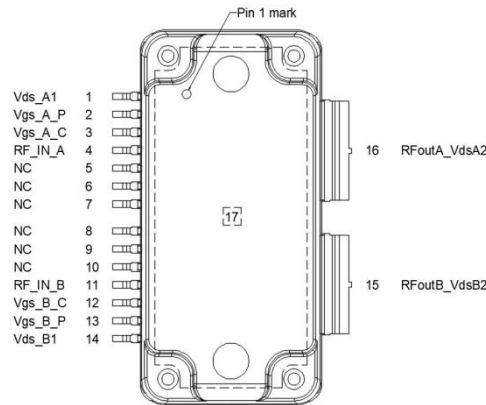
Pulsed CW, Gain vs Pout, 2.110 - 2.170 GHz



Pulsed CW, Efficiency vs Pout, 2.110 - 2.170 GHz

Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQ_Carrier= 290mA, IDQ_Peak= 60mA test on WATECH Application Board

Pin Configuration and Description



Pinout Device Configuration

Pin Number	Label	Description
1	VDS_A1	Drain-Source Voltage Driver section A
2	VDS_A_P	Gate-Source Voltage Peak section A
3	VDS_A_C	Gate-Source Voltage Carrier section A
4	RF IN_A	RF Input section A
5	NC	Not Connected
6	NC	Not Connected
7	NC	Not Connected
8	NC	Not Connected
9	NC	Not Connected
10	NC	Not Connected
11	RF IN_B	RF Input section B
12	VDS_B_C	Gate-Source Voltage Carrier section B
13	VDS_B_P	Gate-Source Voltage Peak section B
14	VDS_B1	Drain-Source Voltage Driver section B
15	RFOUT_B/VDSB2	RF Output section B/Drain-Source Voltage Final section B
16	RFOUT_A/VDSA2	RF Output section A/Drain-Source Voltage Final section A
17	GND	Ground



Package Marking and Dimensions

TBD
Marking

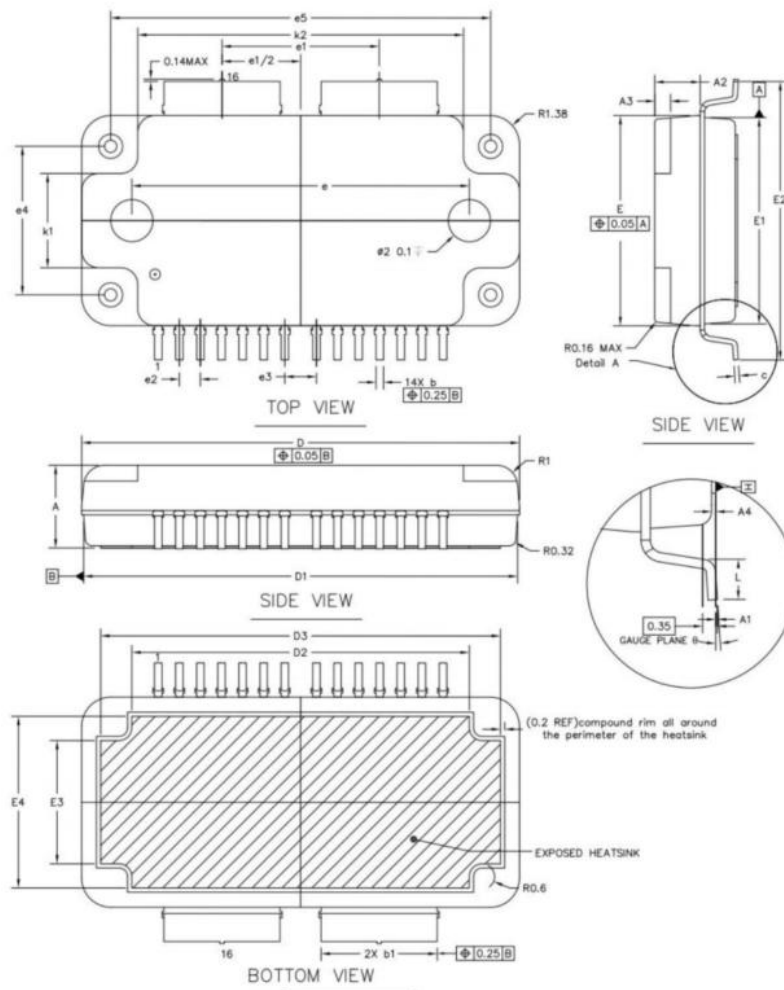


TABLE MEASURES MISSED

Package Dimensions


Tape and Reel Information

TBD

Tape & Reel Packaging Descriptions

Handling Precautions

Parameter	Grade
Moisture Sensitivity Level MSL	3

Parameter	Rating	Standard	
ESD – Human Body Model (HBM)	Class 1B	JESD22-A114	
ESD – Human Body Model (MM)	Class A	EIA/JESD22-A115	
ESD – Charged Device Model (CDM)	Class III	JESD22-C101	

RoHS Compliance

This product is compliant with the 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment), as amended by Directive 2015/863/EU.

Datasheet Status

Document status	Product status	Definition
Objective Datasheet	Design simulation	Product objective specification
Preliminary Datasheet	Customer sample	Engineering samples and first test results
Product Datasheet	Mass production	Final product specification

Abbreviations

Acronym	Definition
LDMOS	Laterally-Diffused Metal-Oxide Semiconductor
CW	Continuous Waveform
MMIC	Monolithic Microwave Integrated Circuit

Revision history

Document ID	Datasheet Status	Release Date	Revision Version
Rev 1.0	Product	Jan 2022	Product release
Rev 1.1	Product	March 2023	New format based on English version datasheet



100W, 1.805 - 2.170 GHz LDMOS MMIC Amplifier

H8G1822M100P

Product datasheet

Contact Information

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