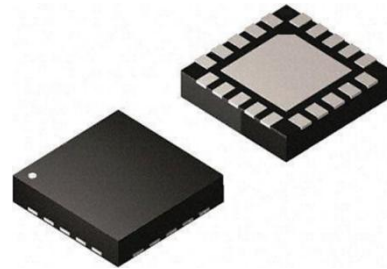


### Description

The H8G1819M10P is a LDMOS MMIC Integrated Asymmetrical Doherty based on 2-Stage with 10W saturated output power covering frequency range from 1.805 - 1.880 GHz.

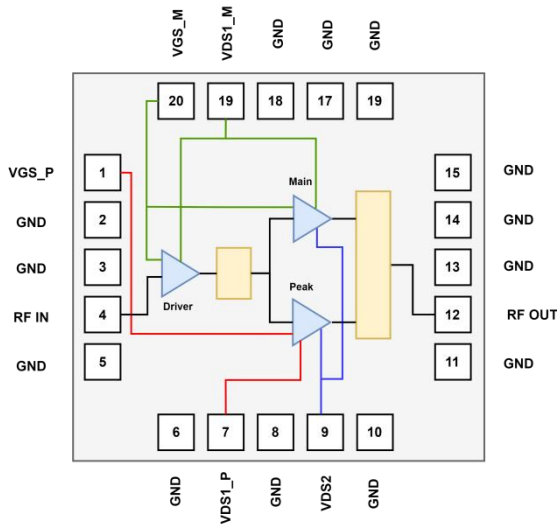
The amplifier is 50 Ω Input/Output matched with a small compact footprint 7x7 mm which makes it ideal for integration.



20 Pin LGA 7x7 mm Plastic Package



### Block Diagram



H8G1819M10P Block Diagram

### Features

- Operating Frequency Range: 1.805 - 1.880 GHz
- Operating Drain Voltage: +28V
- Saturation Output Power: 10W
- Power Average: 1.25W
- 50 Ω Input/Output matched
- Integrated Input Divider
- Integrated Output Combiner
- Integrated Asymmetrical Doherty Final Stage
- High Efficiency: 43.1%@1.880GHz, WCDMA
- High Gain: 27.7dB@1.880GHz, WCDMA
- Small footprint package: LGA 7x7 mm

### Applications

- 3GPP 5G NR FR1 n3 and 4G-LTE B3
- Power Amplifier for Small Cells
- Driver Amplifier for Micro and Macro Base Stations
- Active Antenna Array for 5G mMIMO
- Repeaters/DAS
- Mobile Infrastructure

### Ordering Information

Part Number	Description
H8G1819M10P	Reel Package
H8G1819M10PEVB	1.805 - 1.880 GHz EVB

### Typical Performance

#### RF Characteristics (Pulsed CW)

Freq (GHz)	P3dB (dBm)	Gain (dB)	Eff (%)	IRL (dB)
1.805	40.0	28.3	46.6	14.7
1.880	40.2	28.3	47.0	17.0

Test conditions unless otherwise noted: 25 °C,  $V_{DD} = +28V_{dc}$ ,  $I_{DQ} = 28mA$ ,  $V_{gsp} = V_{gsm} - 0.42V$ , Pulse Width = 100us, Duty Cycle = 10% test on WATECH Application Board

#### RF Characteristics (WCDMA)

Freq (GHz)	Gain (dB)	Eff (%)	IRL (dB)	ACPR* @5MHz (dBc)	ACPR* @10MHz (dBc)
1.805	27.7	43.0	15.3	-30.1	-44.3
1.880	27.7	43.1	17.9	-30.9	-44.3

Test conditions unless otherwise noted: 25 °C,  $V_{DD} = +28V_{dc}$ ,  $I_{DQ} = 28mA$ ,  $V_{gsp} = V_{gsm} - 0.42V$ ,  $PA_{AVG} = 31 dBm$

1C-WCDMA 5MHz Signal, 7.2 dB PAR @ 0.01% CCDF 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

### 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 $V_{GS(th)}$	$V_{gs}=V_{ds}, I_{ds}=5.2\mu A$	1.2	-	1.8	V
Drain Leakage Current $I_{DSS}$	$V_{gs}=0V, V_{ds}=28V$	-	-	0.5	$\mu A$
Gate Leakage Current $I_{GSS}$	$V_{gs}=5V, V_{ds}=0V$	-	-	0.05	$\mu A$

#### RF Characteristics (Pulsed CW)

Parameter	Freq (GHz)	Min	Typ.	Max	Unit
P3dB	1.880	39.5	40	-	dBm

Test conditions unless otherwise noted: 25 °C,  $V_{DD} = +28Vdc$ ,  $I_{DQ} = 28mA$ ,  $V_{gsp} = V_{gsm}-0.42V$ , Pulse Width = 100us, Duty Cycle = 10% test on WATECH Production Board

#### RF Characteristics (WCDMA)

Parameter	Conditions	Min	Typ.	Max	Unit
Frequency		1.880			GHz
Gain	$PAVG = 31\text{ dBm}$	25.5	27.5	30	dB
Eff	$PAVG = 31\text{ dBm}$	40	43	-	%
IRL	$PAVG = 31\text{ dBm}$	10	18	-	dB
ACPR@5MHz*	$PAVG = 31\text{ dBm}$	-	-30	-28	dBc

Test conditions unless otherwise noted: 25 °C,  $V_{DD}=+28Vdc$ ,  $I_{DQ} = 28mA$ ,  $V_{gsp} = V_{gsm}-0.42V$ , 1C-WCDMA 5MHz Signal, 7.2 dB PAR @ 0.01% CCDF test on WATECH Production Board

\*Uncorrected DPD

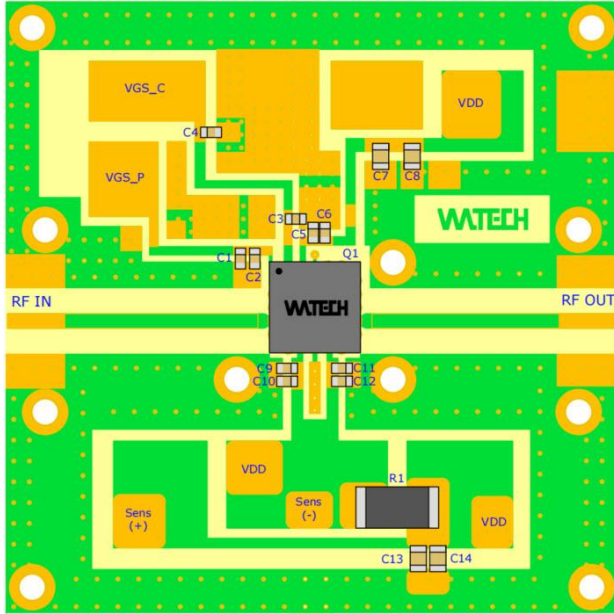
#### Load Mismatch Test

Condition	Test Result
VSWR=10:1, at all Phase Angles, $V_{DD}=+28Vdc$ , $I_{DQ} = 28\text{ mA}$ , $V_{gsp}=V_{gsm}-0.42V$ , $PAVG = 34\text{ dBm}$ , Frequency 1.880 GHz, test on WATECH Application Board	No Device Degradation

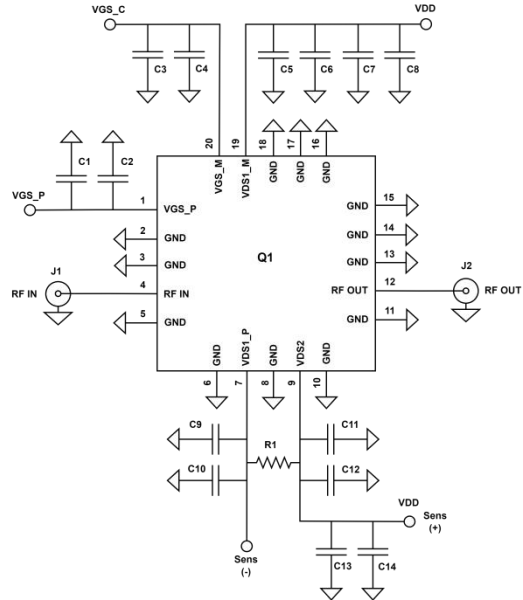
#### Thermal Information

Parameter	Condition	Value (Typ)	Unit
Thermal Resistance Junction to Case ( $R_{TH}$ )	$T_{CASE}= 90^{\circ}C$ , 1C-WCDMA 5MHz Signal, 7.2 dB PAR, $PAVG = 31\text{ dBm}$	11	$^{\circ}C /W$

### H8G1819M10P 1.805 - 1.880 GHz Reference Design (47 x47 mm)



EVN Layout

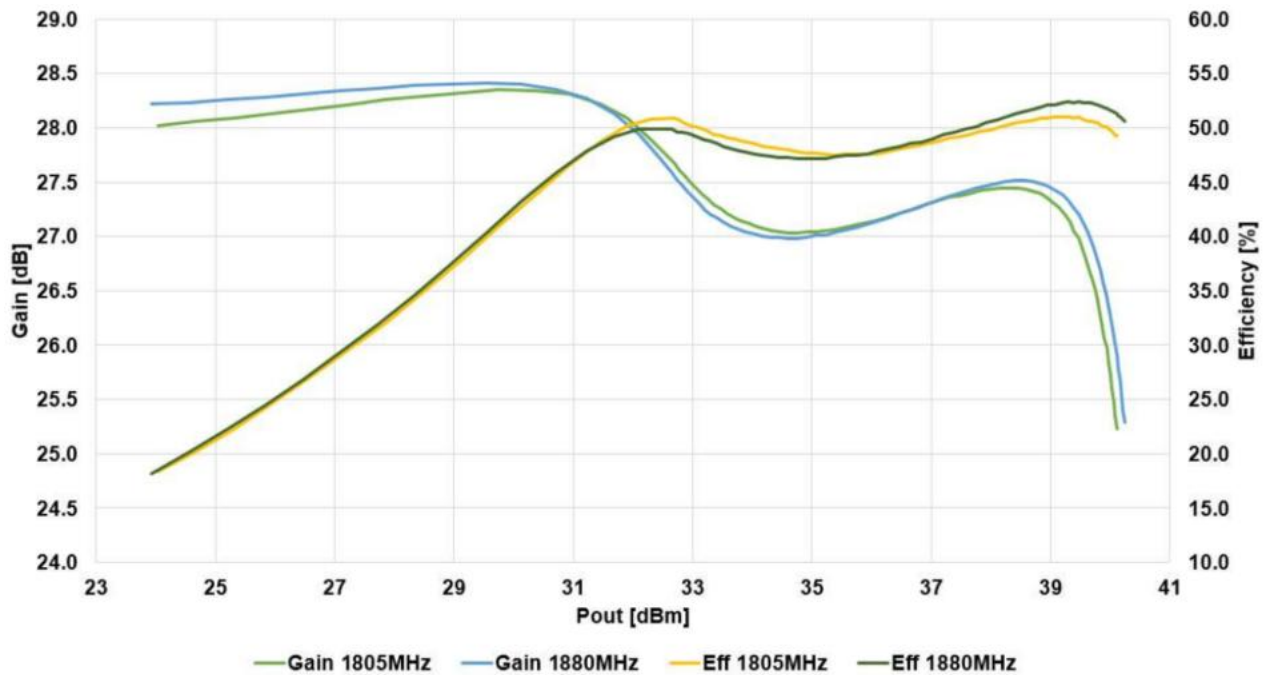


EVN Schematic

### Bill of Materials (BoM) - H8G1819M10P 1.805 - 1.880 GHz Reference Design

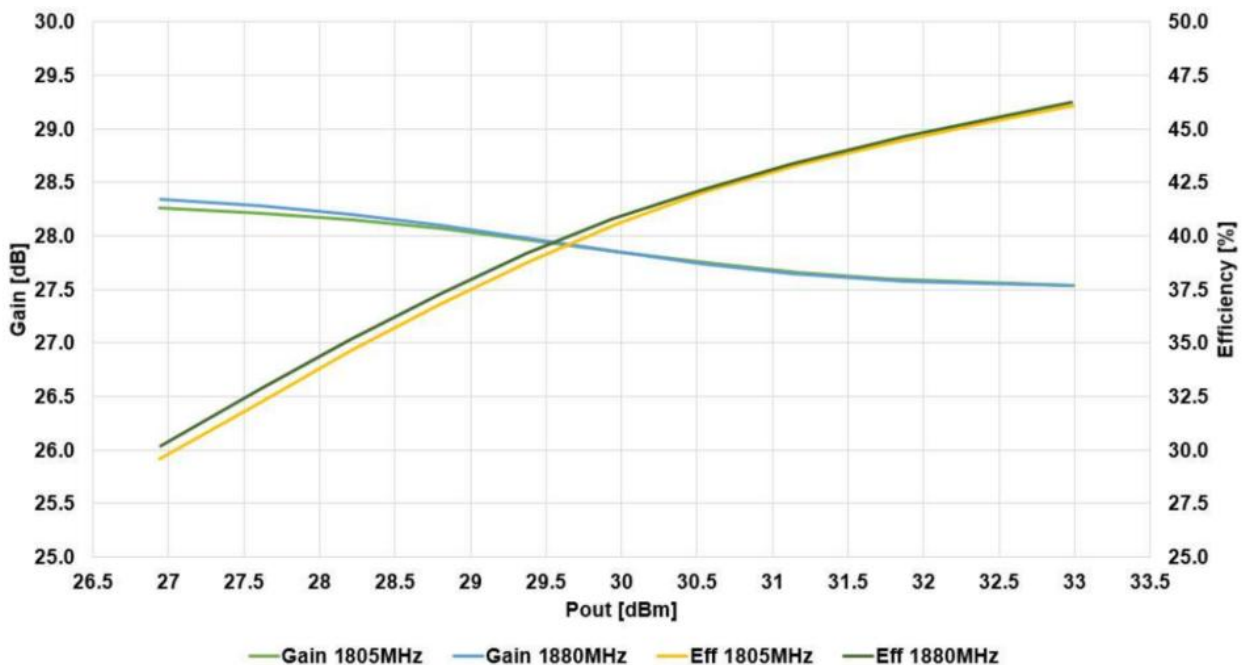
Reference	Value	Description	Manufacturer	P/N
Q1	-	10W, 1.805 - 1.880 GHz LDMOS MMIC PA	Watech	H8G1819M10P
C7,C8, C13,C14	1uF ±10%, 0805	Multi-Layer Ceramic Capacitor	Murata	GRM219R7YA105KA12
C1-C6, C9 - C12	1uF ±10%, 0603	Multi-Layer Ceramic Capacitor	Murata	GCM188R71E105KA64D
R1	100mΩ/1W, 0.1%	High-Precision Resistor	Vishay	Y44870R10000B0R
PCB	<ul style="list-style-type: none"> <li>Rogers 4350B, er = 3.66; Thickness= 20 mil (0.508 mm); Thickness copper plating = 35 μm (1oz)</li> <li>Soldered on a 47x47x10 mm Copper Base-Plate</li> </ul>			

### Performance Plots



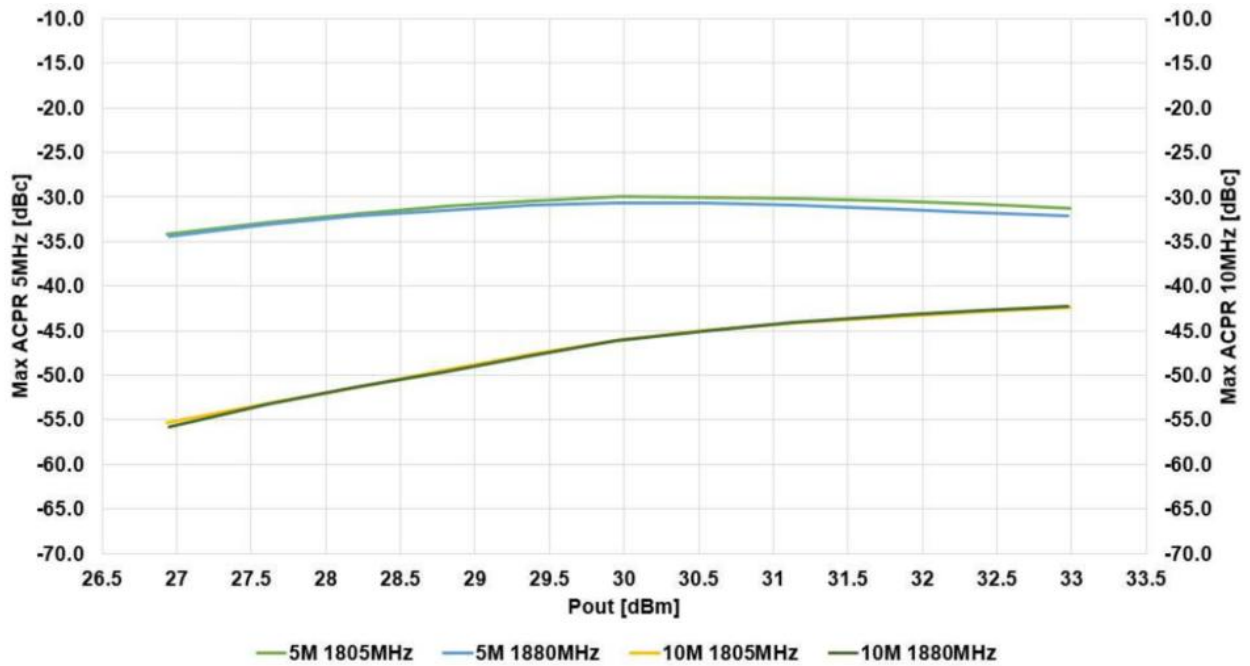
**Pulsed CW, Gain and Efficiency vs Pout**

Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQ = 28mA, Vgsp = Vgsm-0.42V, Pulse Width = 100 us, Duty Cycle = 10% test on WATECH Application Board



**WCDMA, Gain and Efficiency vs Pout**

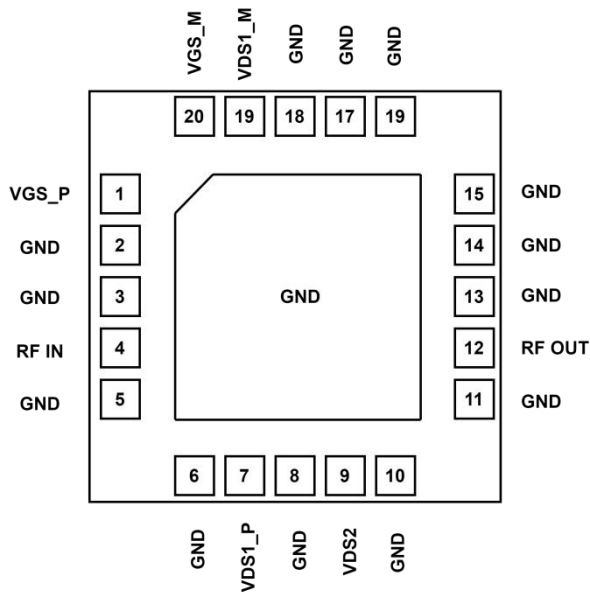
Test conditions unless otherwise noted: 25 °C, VDD=+28Vdc, IDQ = 28mA, Vgsp = Vgsm-0.42V, 1C-WCDMA 5MHz Signal, 7.2 dB PAR @ 0.01% CCDF test on WATECH Application Board



**WCDMA, ACPR\_5MHz, ACPR\_10MHz vs Pout**

Test conditions unless otherwise noted: 25 °C, VDD=+28Vdc, IdQ = 28mA, Vgsp = Vgsm-0.42V, 1C-WCDMA 5MHz Signal, 7.2 dB PAR @ 0.01% CCDF test on WATECH Application Board

### Pin Configuration and Description



15	GND	Ground
16	GND	Ground
17	GND	Ground
18	GND	Ground
19	VDS1_M	Drain-Source Voltage Main Driver
20	VGS_M	Gate-Source Voltage Main

Pinout Device Configuration

Pin Number	Label	Description
1	VGS_P	Gate-Source Voltage Peak
2	GND	Ground
3	GND	Ground
4	RFIN	RF Input
5	GND	Ground
6	GND	Ground
7	VDS1_P	Drain-Source Voltage Peak Driver
8	GND	Ground
9	VDS2	Drain-Source Voltage Final Stage
10	GND	Ground
11	GND	Ground
12	RFOUT	RF Output
13	GND	Ground
14	GND	Ground

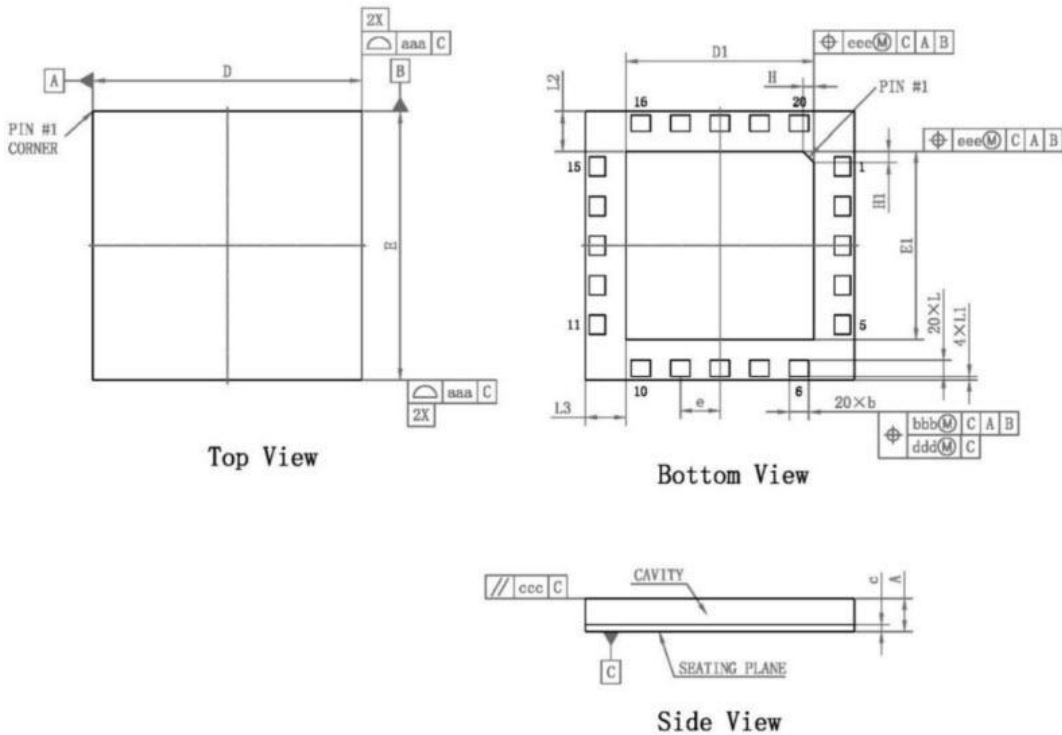


### Package Marking and Dimensions



- Line1 (fixed): Device name in W/O
- Line2 (unfixed): Marking Lot No in W/O (Sample: E596-20140001)
- Line3 (unfixed): Date Code + JY
- This Marking SPEC only stipulates the content of Marking. For marking requirements such as font and size, please refer to the latest version of “Watech Product Printing Specification”

### Marking

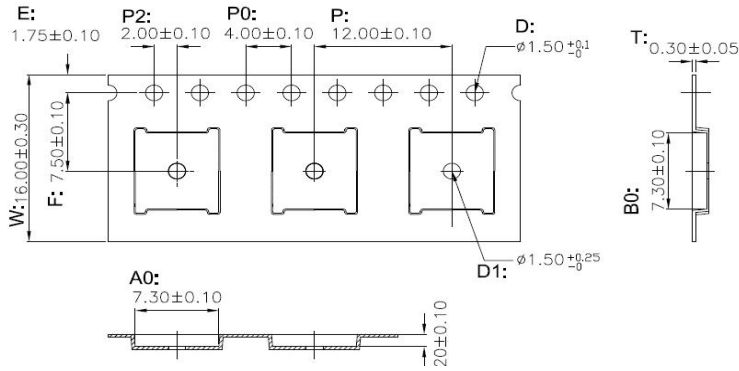


symbol	Dimension in mm			Dimension in inch		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.760	0.860	0.960	0.030	0.034	0.038
c	0.150	0.180	0.210	0.006	0.007	0.008
D	6.900	7.000	7.100	0.272	0.276	0.280
E	6.900	7.000	7.100	0.272	0.276	0.280
D1	4.800	4.900	5.000	0.189	0.193	0.197
E1	4.800	4.900	5.000	0.189	0.193	0.197
H	—	0.286	—	—	0.011	—
H1	—	0.286	—	—	0.011	—
L	0.370	0.420	0.470	0.015	0.017	0.019
L1	0.025	0.100	0.175	0.001	0.004	0.007
L2	0.975	1.050	1.125	0.038	0.041	0.044
L3	0.975	1.050	1.125	0.038	0.041	0.044
e	—	1.030	—	—	0.041	—
b	0.450	0.500	0.550	0.018	0.020	0.022
aaa	—	0.150	—	—	0.006	—
bbb	—	0.150	—	—	0.006	—
ccc	—	0.100	—	—	0.004	—
ddd	—	0.080	—	—	0.003	—
eee	—	0.150	—	—	0.006	—

### Package Dimensions



### Tape and Reel Information



**Notes:**

1. Carrier tape color: BLACK.
2. Carrier material :PS (Polystyrene).
3. ESD surface resistivity <math>< 1 \times 10^{11}</math> - 4. Heat deflection temperature for Tape & Reel material: 62°C
- 5. Vicat softening temperature (10N) for Tape & Reel material: 95°C
- 6. Dimension is millimeter.



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

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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

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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

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Acronym	Definition
LDMOS	Laterally-Diffused Metal-Oxide Semiconductor
CW	Continuous Waveform
VSWR	Voltage Standing Wave Ratio

### Revision history

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Document ID	Datasheet Status	Release Date	Revision Version
Rev 2.1	Product	May 2020	Product release
Rev 2.2	Product	March 2023	New format based on English version datasheet



## 10W, 1.805 - 1.880 GHz LDMOS MMIC Amplifier

**H8G1819M10P**

Product datasheet

### Contact Information

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For the latest specifications, additional product information, worldwide sales and distribution locations and information about WATECH:

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- Email: [MKT@huatai-elec.com](mailto:MKT@huatai-elec.com)

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- Email: [MKT@huatai-elec.com](mailto:MKT@huatai-elec.com)

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