

Description

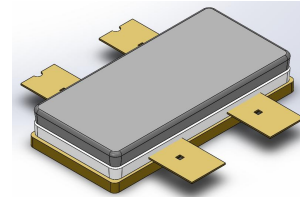
The HTH8G09P550S is an unmatched discrete LDMOS Power Amplifier with 550W saturated output power covering frequency range from 700 - 960 MHz.

Features

- Operating Frequency Range: 700 - 960 MHz
- Operating Drain Voltage: +48V
- Saturation Output Power: 550W
- Power Average: 79.4W
- Device can be used on a single-ended or in a push-pull configuration. Doherty application applicable
- Excellent thermal stability due to low thermal resistance package
- Enhanced robustness design without device degradation
- Efficiency: 53.4%@758MHz, WCDMA
- Gain: 20.4dB@758MHz, WCDMA

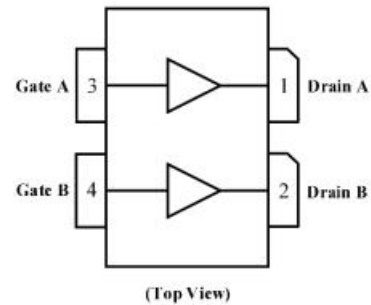
Applications

- 3GPP 5G NR FR1
n5/8/12/13/14/18/20/26/28/29/67/85/100
- 4G-LTE
B5/8/12/13/14/17/18/19/20/26/28/67/85/103
- Amplifier for Micro and Macro Base Stations
- Repeaters/DAS
- Mobile Infrastructure



ACS2110S-4L

Earless Flanged
Air Cavity Spliced Package; 4 Leads
HTH8G09P550S



Note: Exposed backside of the package is the source terminal for the transistor

Pin Connections

Ordering Information

Part Number	Description
HTH8G09P550S	Reel Package
HTH8G09P550SEVB	758 - 803 MHz EVB

Typical Performance

RF Characteristics (Pulsed CW)

Freq (MHz)	P5dB (dBm)	Gain (dB)	Eff (%)	IRL (dB)
758	57.8	21.0	54.5	10
780.5	57.7	20.8	53.2	12
803	57.2	20.6	53.0	15

Test conditions unless otherwise noted: 25 °C, VDD = +48Vdc, IDQ_Carrier= 450mA, Vgsp = Vgsc - 5.7V, PW = 100us, DC= 10% test on WATECH Application Board

RF Characteristics (WCDMA)

Freq (MHz)	Gain (dB)	Eff (%)	ACPR* @5MHz (dBc)	ACPR* @10MHz (dBc)	IRL (dB)
758	20.4	53.4	-28.8	-43.6	11
780.5	20.2	54.1	-29.7	-43.3	13
803	19.7	53.5	-28.6	-41.4	15

Test conditions unless otherwise noted: 25 °C, VVDD = +48Vdc, IDQ_Carrier= 450mA, Vgsp = Vgsc - 5.7V, PAVG = 49 dBm 1C-WCDMA 5MHz Signal, 9.9 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
Storage Temperature (T _{STG})	-55 to +150	°C
Junction Temperature (T _J)	-40 to +225	°C

Electrical Specification

DC Characteristics (Carrier)

Parameter	Conditions	Min	Typ	Max	Unit
Breakdown Voltage $V_{(BR)DSS}$	$V_{gs}=0V, I_{ds}=180\mu A$	110	-	-	V
Gate-Source Threshold Voltage $V_{GS(th)}$	$V_{gs}=10V, I_{ds}=180\mu A$	-	2.2	-	V
Drain Leakage Current I_{DSS}	$V_{gs}=0V, V_{ds}=110V$	-	-	500	nA
Gate Leakage Current I_{GSS}	$V_{gs}=10V, V_{ds}=0V$	-	-	500	nA

DC Characteristics (Peak)

Parameter	Conditions	Min	Typ	Max	Unit
Breakdown Voltage $V_{(BR)DSS}$	$V_{gs}=0V, I_{ds}=260\mu A$	110	-	-	V
Gate-Source Threshold Voltage $V_{GS(th)}$	$V_{gs}=10V, I_{ds}=260\mu A$	-	2.2	-	V
Drain Leakage Current I_{DSS}	$V_{gs}=0V, V_{ds}=110V$	-	-	500	nA
Gate Leakage Current I_{GSS}	$V_{gs}=10V, V_{ds}=0V$	-	-	500	nA

Load Mismatch Test

Condition	Test Result
VSWR=10:1, at all Phase Angles, VDD = +48Vdc, IDQ_Carrier= 450mA, 1C-WCDMA 5MHz Signal, 9.9 dB PAR, PAVG = 52 dBm, Frequency 758 MHz, test on WATECH Application Board	No Device Degradation

Thermal Information

Parameter	Condition	Value (Typ)	Unit
Thermal Resistance Junction to Case (R_{TH})	$T_{CASE}= 80^{\circ}C, VDD = +48Vdc, I_{DQ_Carrier}= 450mA, 1C-WCDMA 5MHz$ Signal, 9.9 dB PAR, PAVG = 49 dBm	0.46	$^{\circ}C / W$



Load Pull Performance Carrier

Test conditions unless otherwise noted: 25 °C, VDD = +48Vdc, IDQ= 400mA, PW = 40us, DC= 4%

Max Output Power (Carrier)						
Freq (MHz)	Z_source (Ω)	Z_load [1] (Ω)	Gain (dB)	P3dB (dBm)	P3dB (W)	Eff (%)
760	1.44-j*2.79	1.74-j*0.89	25.4	55.4	346	66.7
860	1.69-j*5.4	1.73-j*1.08	24.4	55.3	339	65.4
960	3.99-j*9.72	1.14-j*0.68	23.6	55.0	316	67.4

[1] Load impedance for optimum P3dB pout

Max Drain Efficiency (Carrier)						
Freq (MHz)	Z_source (Ω)	Z_load [2] (Ω)	Gain (dB)	P3dB (dBm)	P3dB (W)	Eff (%)
760	1.44-j*2.79	1.46+j*0.62	27.6	53.7	234	77.6
860	1.69-j*5.4	1.17+j*0.08	26.4	53.7	234	77.9
960	3.99-j*9.72	0.87+j*0.08	25.9	53.0	199	75.2

[2] Load impedance for optimum P3dB efficiency

Load Pull Performance Peak

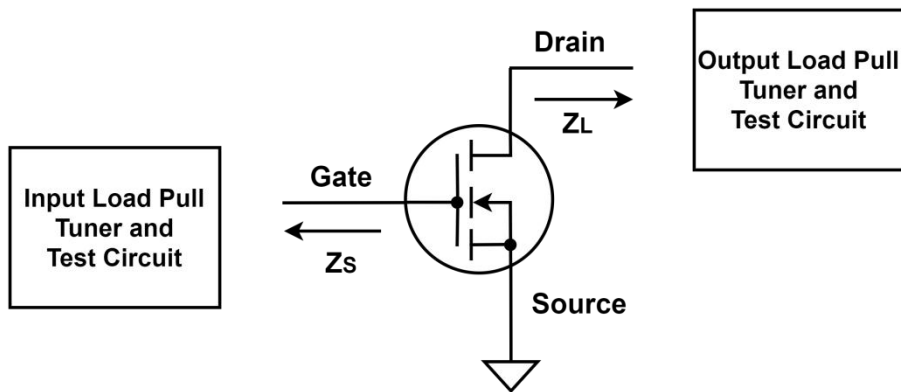
Test conditions unless otherwise noted: 25 °C, VDD = +48Vdc, IDQ= 500mA, PW = 40us, DC= 4%

Max Output Power (Peak)						
Freq (MHz)	Z_source (Ω)	Z_load [1] (Ω)	Gain (dB)	P3dB (dBm)	P3dB (W)	Eff (%)
760	1.21-j*4.26	1.44-j*1.25	24.2	57.0	501	66.1
860	1.47-j*6.63	1.29-j*1.25	23.4	57.0	501	66.5
960	3.91-j*11.83	0.85-j*1.05	22.3	56.8	478	63.4

[1] Load impedance for optimum P3dB pout

Max Drain Efficiency (Peak)						
Freq (MHz)	Z_source (Ω)	Z_load [2] (Ω)	Gain (dB)	P3dB (dBm)	P3dB (W)	Eff (%)
760	1.21-j*4.26	1.36-j*0.22	25.9	55.7	371	77.5
860	1.47-j*6.63	0.63-j*0.26	25.9	54.6	288	76.1
960	3.91-j*11.83	0.62-j*0.37	24.3	54.7	295	74.3

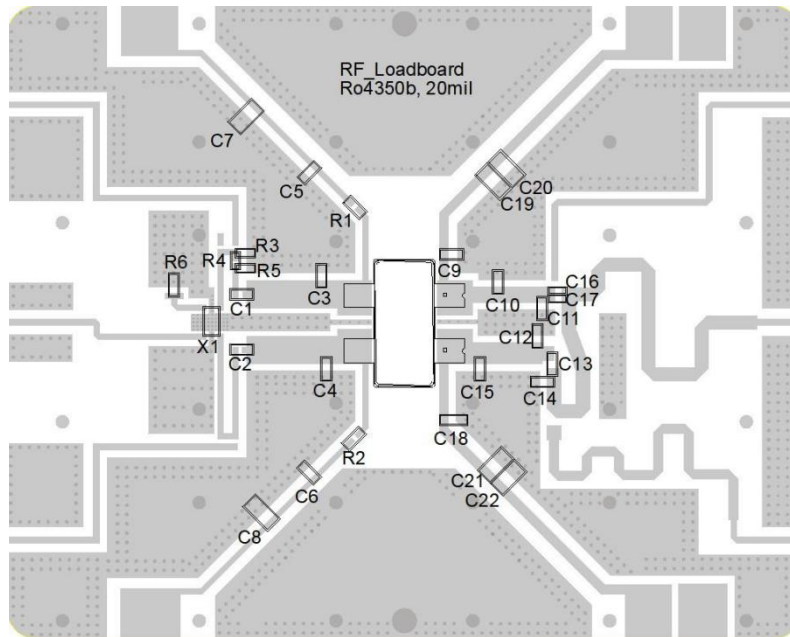
[2] Load impedance for optimum P3dB efficiency



Z_source : Measured impedance presented to the input of the device at the package reference plane

Z_load : Measured impedance presented to the output of the device at the package reference plane

HTH8G09P550S 758 - 803 MHz Reference Design



EVB Layout

Bill of Materials (BoM) - HTH8G09P550S

758 - 803 MHz Reference Design

Reference	Value	Description	Manufacturer	P/N
Q1	-	550W, 700 - 960 MHz LDMOS PA	Watech	HTH8G09P550S
C1,C2,C5,C6, C9,C13,C18	56pF	MLCC	Murata	GQM2195C2E560JB12
C3	16pF	MLCC	Murata	GQM2195C2E160JB12
C4	15pF	MLCC	Murata	GQM2195C2E150JB12
C10	12pF	MLCC	Murata	GQM2195C2E120JB12
C11, C12	9p1F	MLCC	Murata	GQM2195G2E9R1BB12
C14	3p3F	MLCC	Murata	GQM2195G2E3R3BB12
C15	18pF	MLCC	Murata	GQM2195C2E180JB12
C16,C17	10pF	MLCC	Murata	GQM2195C2E100JB12
C19,C20,C21,C22	10uF /100V	MLCC	Murata	GRM32EC72A106KE05



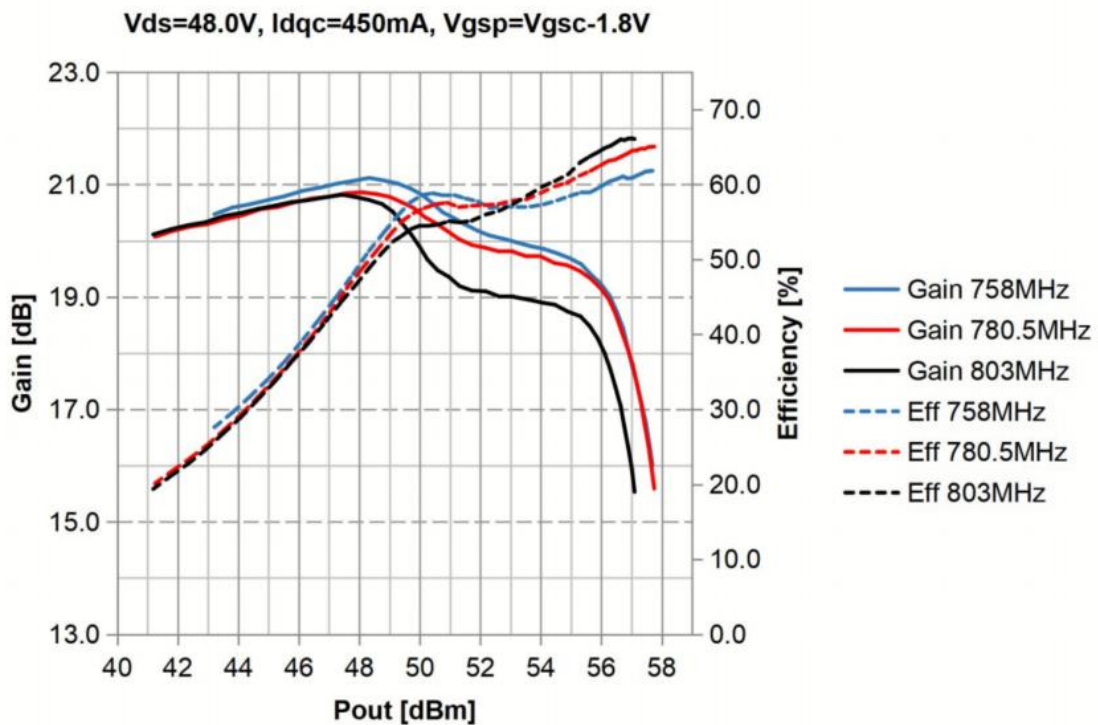
HTH8G09P550S

550W, 700 - 960 MHz LDMOS Amplifier

Product datasheet

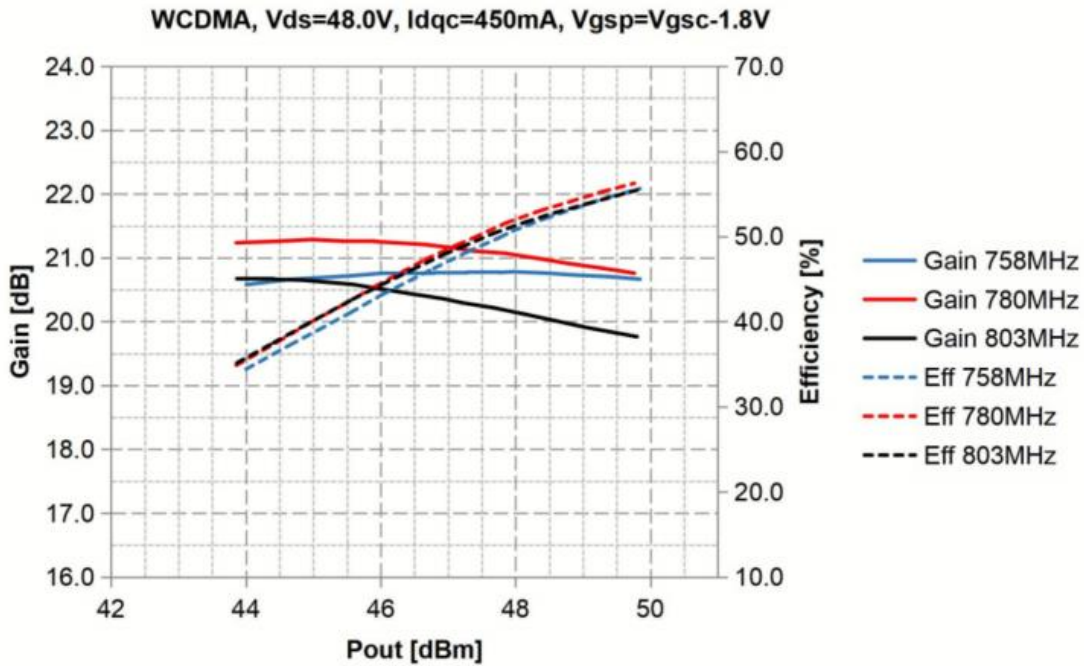
Reference	Value	Description	Manufacturer	P/N
R1, R2	9.1Ω	Thick Film Resistor	YAGEO	RC0805FR-079R1L
R3, R5	330Ω	Thick Film Resistor	YAGEO	RC0805FR-07330RP
R4	15Ω	Thick Film Resistor	YAGEO	RC0805FR-7W15RL
R6	-	Hybrid Coupler 2dB, 90°	ANAREN	X3C07F1-02S
PCB	Rogers 4350B (er = 3.66), 20 mil (0.508 mm), 35 μm (1oz)			

Performance Plots



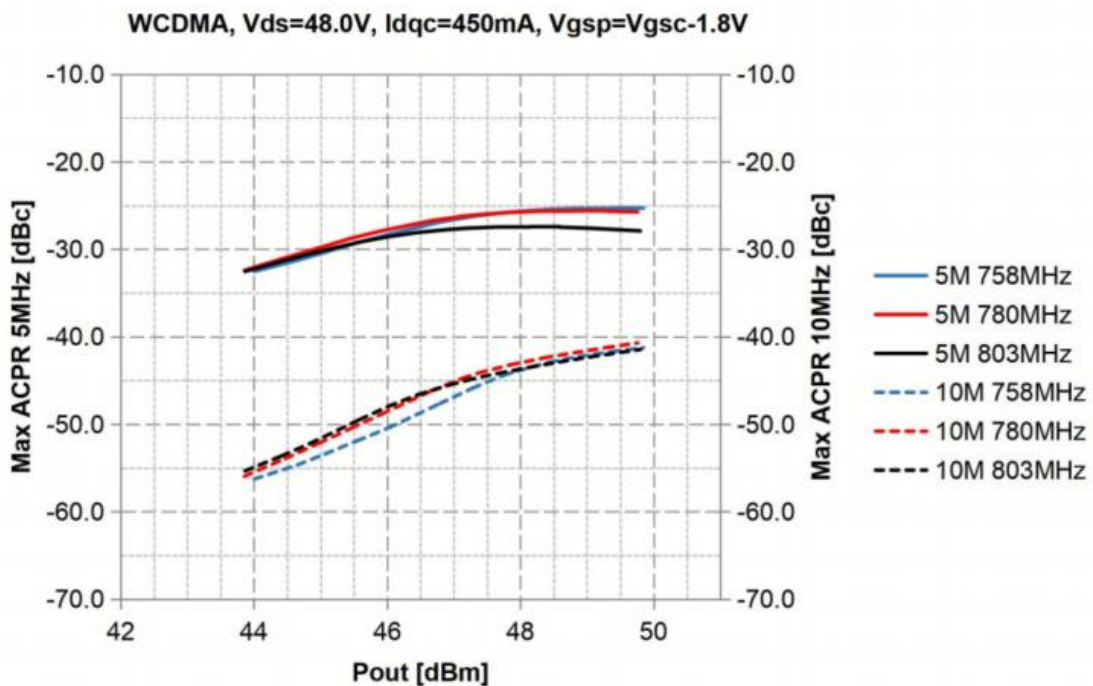
Pulsed CW, Gain and Efficiency vs Pout

Test conditions unless otherwise noted: 25 °C, VDD = +48Vdc, IDQ= 450mA, Vgsp = Vgsc - 1.8V, PW = 100us, DC= 10% test on WATECH Application Board



WCDMA, Gain and Efficiency vs Pout

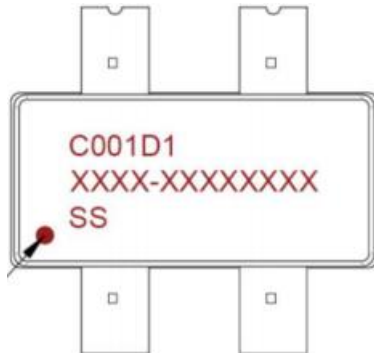
Test conditions unless otherwise noted: 25 °C, VDD = +48Vdc, IDQ = 450mA, Vgsp = Vgsc - 1.8V, 1C-WCDMA 5MHz Signal, 9.9 dB PAR @ 0.01% CCDF test on WATECH Application Board



WCDMA, ACPR_5MHz, ACPR_10MHz vs Pout

Test conditions unless otherwise noted: 25 °C, VDD = +48Vdc, IDQ= 450mA, Vgsp = Vgsc - 1.8V, 1C-WCDMA 5MHz Signal, 9.9 dB PAR @ 0.01% CCDF test on WATECH Application Board

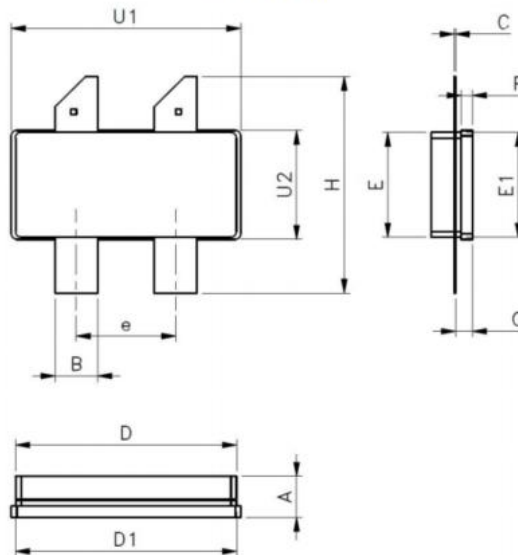
Package Marking and Dimensions



- 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

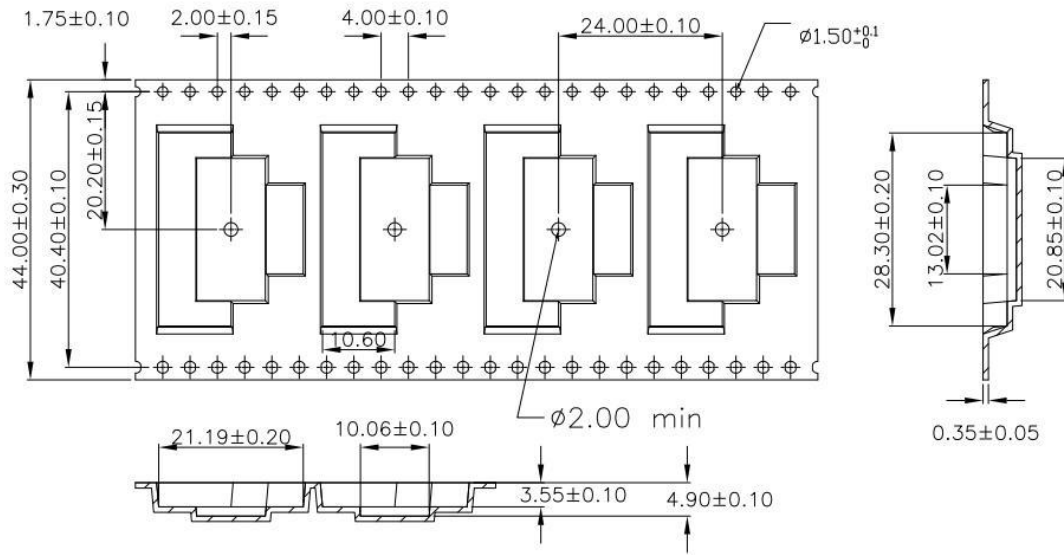
ACC2110S-4L



Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Mon.	Max.	Min.	Mon.	Max.
A	3.55	3.71	3.86	0.140	0.146	0.152
B	3.68	3.81	3.94	0.145	0.150	0.155
C	0.04	0.11	0.18	0.002	0.004	0.007
D	19.61	19.81	20.01	0.772	0.780	0.788
D1	19.61	19.81	20.01	0.772	0.780	0.788
E	9.28	9.40	9.52	0.365	0.370	0.375
E1	9.28	9.40	9.52	0.365	0.370	0.375
e	-	8.89	-	-	0.35	-
F	0.95	1.02	1.09	0.037	0.040	0.043
H	18.93	19.43	19.93	0.745	0.765	0.785
H1	12.57	12.70	12.83	0.495	0.500	0.505
L	4.71	4.83	4.95	0.185	0.190	0.195
Q	1.43	1.53	1.63	0.056	0.060	0.064
U1	20.51	20.58	20.65	0.807	0.810	0.813
U2	9.71	9.78	9.85	0.382	0.385	0.388

Package Dimensions

Tape and Reel Information



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

Revision history

Document ID	Datasheet Status	Release Date	Revision Version
Rev 1.0	Preliminary	Nov. 2020	Preliminary
Rev 1.1	Product	Feb. 2021	Updated RF/DC performance data, updated package dimensions, added moisture-sensitivity ratings
Rev 1.2	Product	May 2021	Added thermal resistance and robustness information; updated RF test performance; added LP data; updated silkscreen; changed Pin Map; added layout and BOM information
Rev 1.3	Product	May 2021	Product name changed to: HTH8G09P550S Add ordering information
Rev 1.4	Product	March 2023	New format based on English version datasheet



Contact Information

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

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