

Description

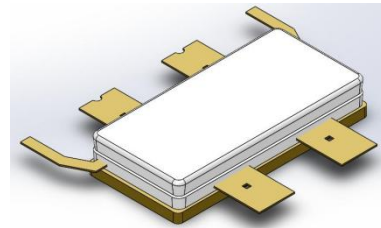
The HTN7G15P180H is an unmatched discrete LDMOS Power Amplifier with 180W saturated output power covering frequency range from 1300 - 1500 MHz.

Features

- Operating Frequency Range: 1300-1500 MHz
- Operating Drain Voltage: 20-28V
- Saturation Output Power: 180W
- Power Average: 30.2W
- Device can be used on a single-ended or in a push-pull configuration. Doherty application applicable
- External pins to improve VBW
- Excellent thermal stability due to low thermal resistance package
- Enhanced robustness design without device degradation
- Efficiency: 41%@1457MHz, WCDMA
- Gain: 19.8dB@1457MHz, WCDMA

Applications

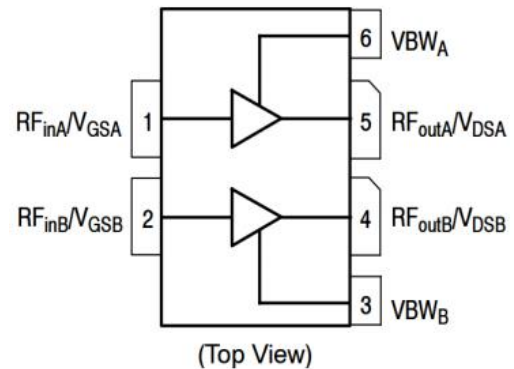
- 3GPP 5G NR FR1
n50/51/74/75/76/91/92/93/94
- 4G-LTE B11/21/50/51/74/75/76
- Amplifier for Micro and Macro Base Stations
- Repeaters/DAS
- Mobile Infrastructure
- Broadband communication base station
- L-band communication transmitter
- Radar
- Digital pre-distortion correction system



ACC2110S-4L2L



Earless Flanged balanced
Air Cavity Ceramic Package; 6 Leads
HTN7G15P180H



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

Pin Connections

Ordering Information

Part Number	Description
HTN7G15P180H	Tray Package
HTN7G15P180HEVB	1447- 1467 MHz EVB

Typical Performance

RF Characteristics (Pulsed CW)

Freq (MHz)	P3dB (dBm)	P3dB (W)	Eff (%)	Gain (dB)
1447	52.5	177.8	58.5	19.9
1457	52.5	177.8	57.8	19.9
1467	52.4	173.8	57.1	19.8

Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQA= 550mA, VGSB= 0.4V, PW = 100us, DC= 10% test on WATECH Application Board

RF Characteristics (WCDMA)

Freq (MHz)	Gain (dB)	Eff (%)	Output PAR (dB)	ACPR* @5MHz (dBc)
1447	19.9	41.6	7.4	-32.2
1457	19.9	41.4	7.5	-32.8
1467	19.8	41.1	7.5	-33.6

Test conditions unless otherwise noted: 25 °C, VVDD = +28Vdc, IDQA= 550mA, VGSB= 0.4V, PAVG = 44.8 dBm 1C-WCDMA 5MHz Signal, 9.9 dB PAR @ 0.01% CCDF test on WATECH Application Board

*Uncorrected DPD

RF Characteristics (LTE)

Freq (MHz)	Gain (dB)	Eff (%)	Output PAR (dB)	ACPR* @5MHz (dBc)
1447	19.8	41.0	7.5	-30.3

Test conditions unless otherwise noted: 25 °C, VVDD = +28Vdc, IDQA= 550mA, VGSB= 0.4V, PAVG = 44.8 dBm 1C-LTE 20 MHz Signal, 10 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

Parameter	Conditions	Min	Typ	Max	Unit
Breakdown Voltage $V_{(BR)DSS}$	$V_{gs}=0V, I_{ds}=108\mu A$	65	-	-	V
Gate-Source Threshold Voltage $V_{GS(th)}$	$V_{gs}=V_{ds}, I_{ds}=108\mu A$	-	1.5	-	V
Drain Leakage Current I_{DSS}	$V_{gs}=0V, V_{ds}=65V$	-	-	10	μA
Gate Leakage Current I_{GSS}	$V_{gs}=5V, V_{ds}=0V$	-	-	1	μA

Load Mismatch Test

Condition	Test Result
VSWR=20:1, at all Phase Angles, VDD = +28Vdc, IDQ = 550mA, VGSB= 0.4V, PW = 100us, DC= 10%, 177.8W Ppeak, Frequency 1457 MHz, test on WATECH Application Board	No Device Degradation

Thermal Information

Parameter	Condition	Value (Typ)	Unit
Thermal Resistance Junction to Case (R_{TH})	$T_{CASE}= 80^{\circ}C, CW 180W$	0.4	$^{\circ}C /W$

Load Pull Performance

Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQ= 400mA, PW = 40us, DC= 4%

Max Output Power (P1dB)						
Freq (MHz)	Z_source (Ω)	Z_load [1] (Ω)	Gain (dB)	P1dB (dBm)	P1dB (W)	Eff (%)
1400	1.54-j*4.97	1.79-j*4.62	21.62	50.80	120.23	59.25
1500	3.04-j*4.46	1.45-j*4.67	21.71	50.68	116.95	57.19

[1] Load impedance for optimum P1dB pout

Max Drain Efficiency (P1dB)						
Freq (MHz)	Z_source (Ω)	Z_load [2] (Ω)	Gain (dB)	P1dB (dBm)	P1dB (W)	Eff (%)
1400	1.54-j*4.97	4.31-j*5.29	24.23	48.91	77.80	69.89
1500	3.04-j*4.46	3.67-j*3.86	24.67	48.81	76.03	69.45

[2] Load impedance for optimum P1dB efficiency

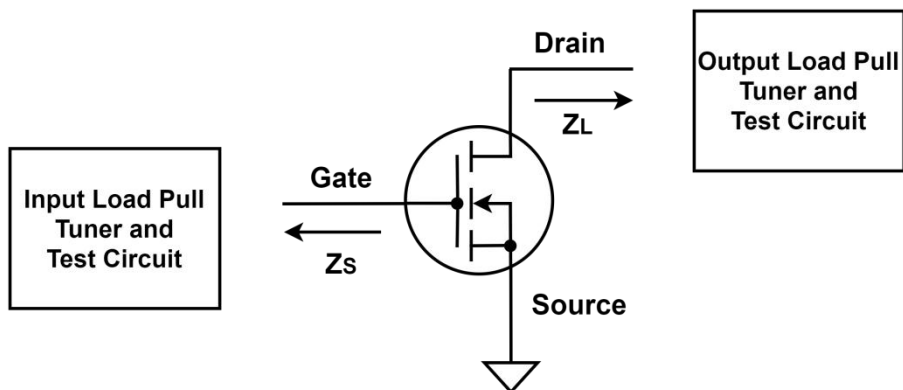
Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQ= 400mA, PW = 40us, DC= 4%

Max Output Power (P3dB)						
Freq (MHz)	Z_source (Ω)	Z_load [1] (Ω)	Gain (dB)	P3dB (dBm)	P3dB (W)	Eff (%)
1400	1.48-j*4.84	1.51-j*5.52	21.3	51.76	149.97	62.61
1500	2.84-j*4.73	1.35-j*5.24	21.9	51.64	145.88	63.07

[3] Load impedance for optimum P1dB pout

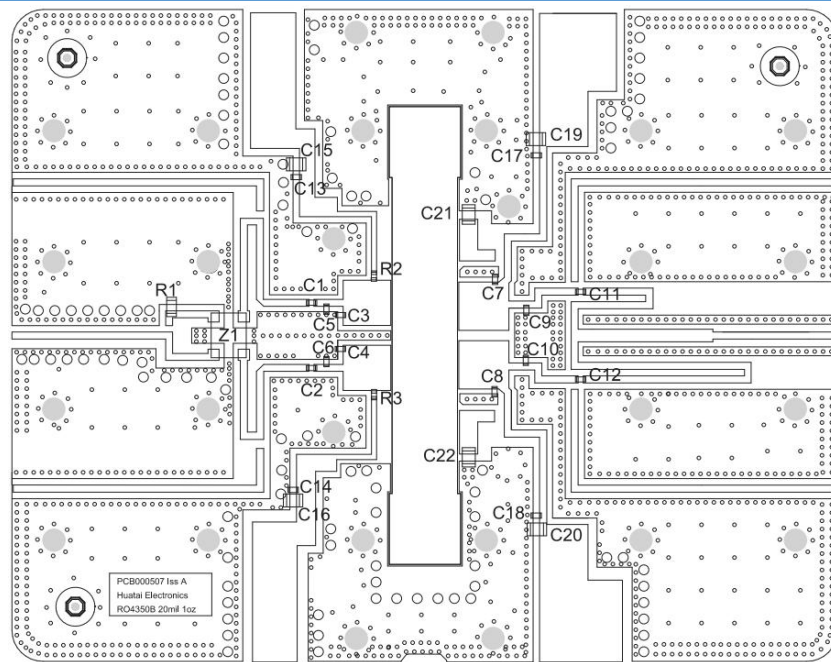
Max Drain Efficiency (P3dB)						
Freq (MHz)	Z_source (Ω)	Z_load [2] (Ω)	Gain (dB)	P3dB (dBm)	P3dB (W)	Eff (%)
1400	1.48-j*4.84	3.08-j*5.98	23.64	50.34	108.18	72.37
1500	2.84-j*4.73	2.84-j*4.79	24.69	49.72	93.76	73.50

[4] Load impedance for optimum P1dB efficiency



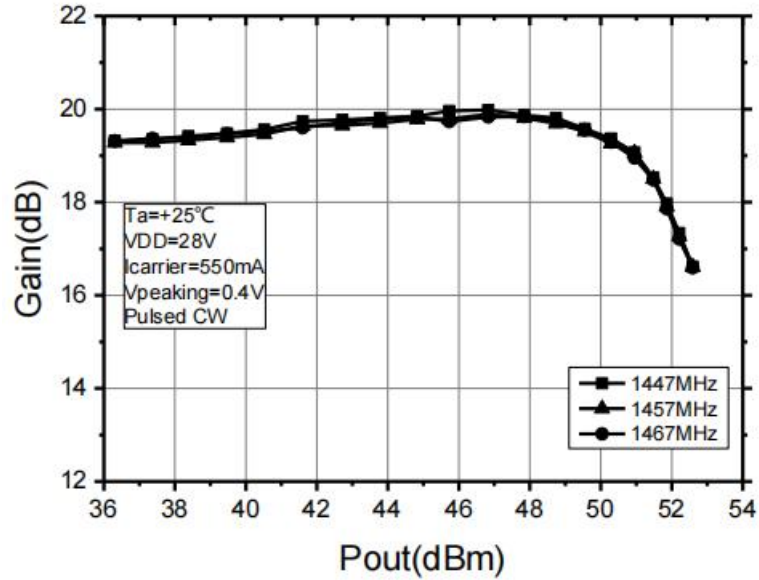
Z_{source} : Measured impedance presented to the input of the device at the package reference plane

Z_{load} : Measured impedance presented to the output of the device at the package reference plane

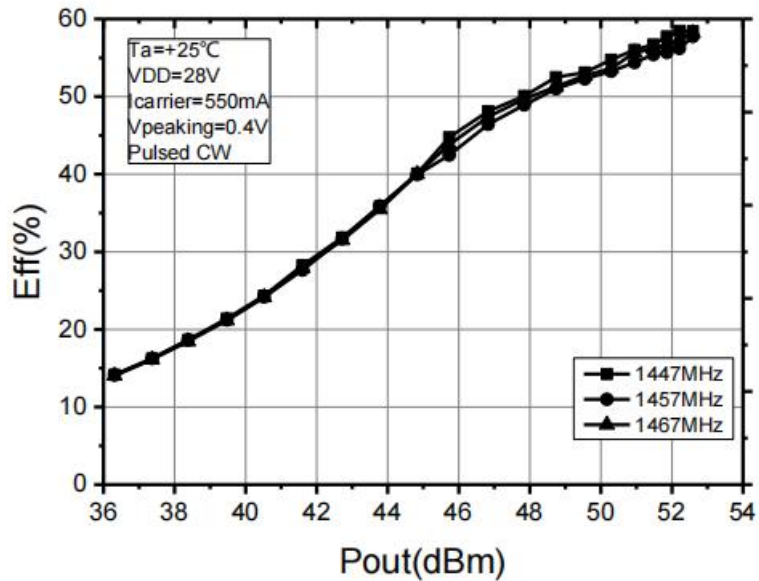
HTN7G15P180H 1447 - 1467 MHz Reference Design

EVB Layout
Bill of Materials (BoM) - HTN7G15P180H 1447 - 1467 MHz Reference Design

Reference	Value	Description	Manufacturer	P/N
Q1	-	180W, 1300- 1500 MHz LDMOS PA	Watech	HTN7G15P180H
C1,C2,C11,C12, C13, C14,C17,C18	30pF	MLCC	ATC	600S300BT260XT
C3,C4	3.3pF	MLCC	ATC	600S3R3BT260XT
C5,C6	3pF	MLCC	ATC	600S3R0BT260XT
C7,C8	4.7pF	MLCC	ATC	600S4R7BT260XT
C9,C10	2pF	MLCC	ATC	600S2R0BT260XT
C15,C16,C19,C20 C21,C22	10uF/50V	MLCC	-	-
R1	50Ω/1206	Thick Film Resistor	-	-
R2,R3	4.7Ω/0603	Thick Film Resistor	-	-
Z1	90°, 3dB Hybrid Couplers		Yantel	HC1500P03
PCB	RO4350B (er = 3.66), 20 mil (0.508 mm), 35 μm (1oz)			

Performance Plots

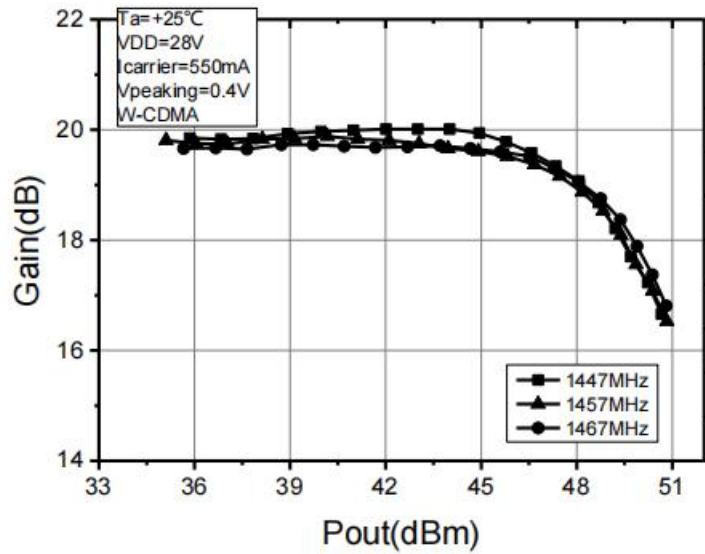


Pulsed CW, Gain vs Pout

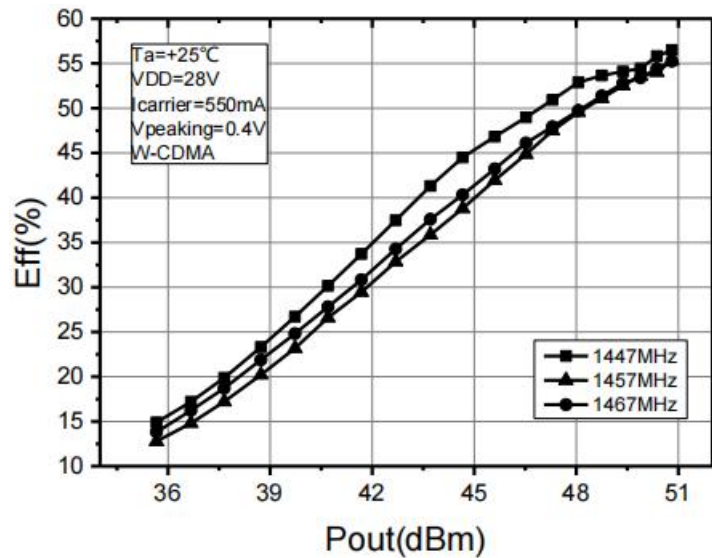


Pulsed CW, Efficiency vs Pout

Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQA = 550mA, VGSB = 0.4V, PW = 100us, DC = 10% test test on WATECH Application Board

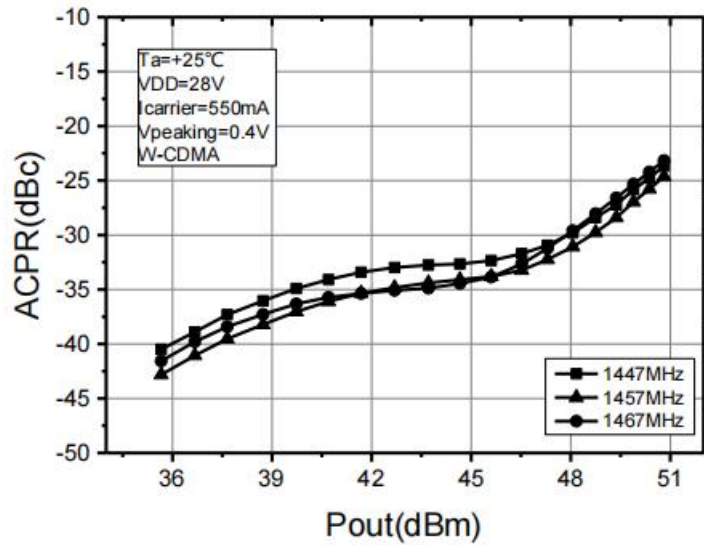


WCDMA, Gain vs Pout



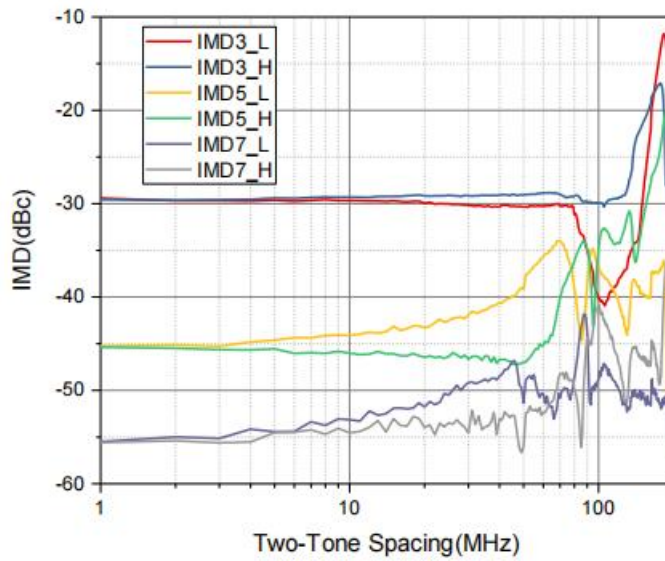
WCDMA, Efficiency vs Pout

Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQA= 550mA, VGSB= 0.4V, 1C-WCDMA 5MHz Signal, 9.9 dB PAR @ 0.01% CCDF test on WATECH Application Board



WCDMA, ACPR_5MHz vs Pout

Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQA= 550mA, VGSB= 0.4V, 1C-WCDMA 5MHz Signal, 9.9 dB PAR @ 0.01% CCDF test on WATECH Application Board



Two Tones IMD vs Two-Tone Spacing

Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQ=550mA, VGSB= 0.4V, f=1457MHz envelope peak power 30W test on WATECH Application Board

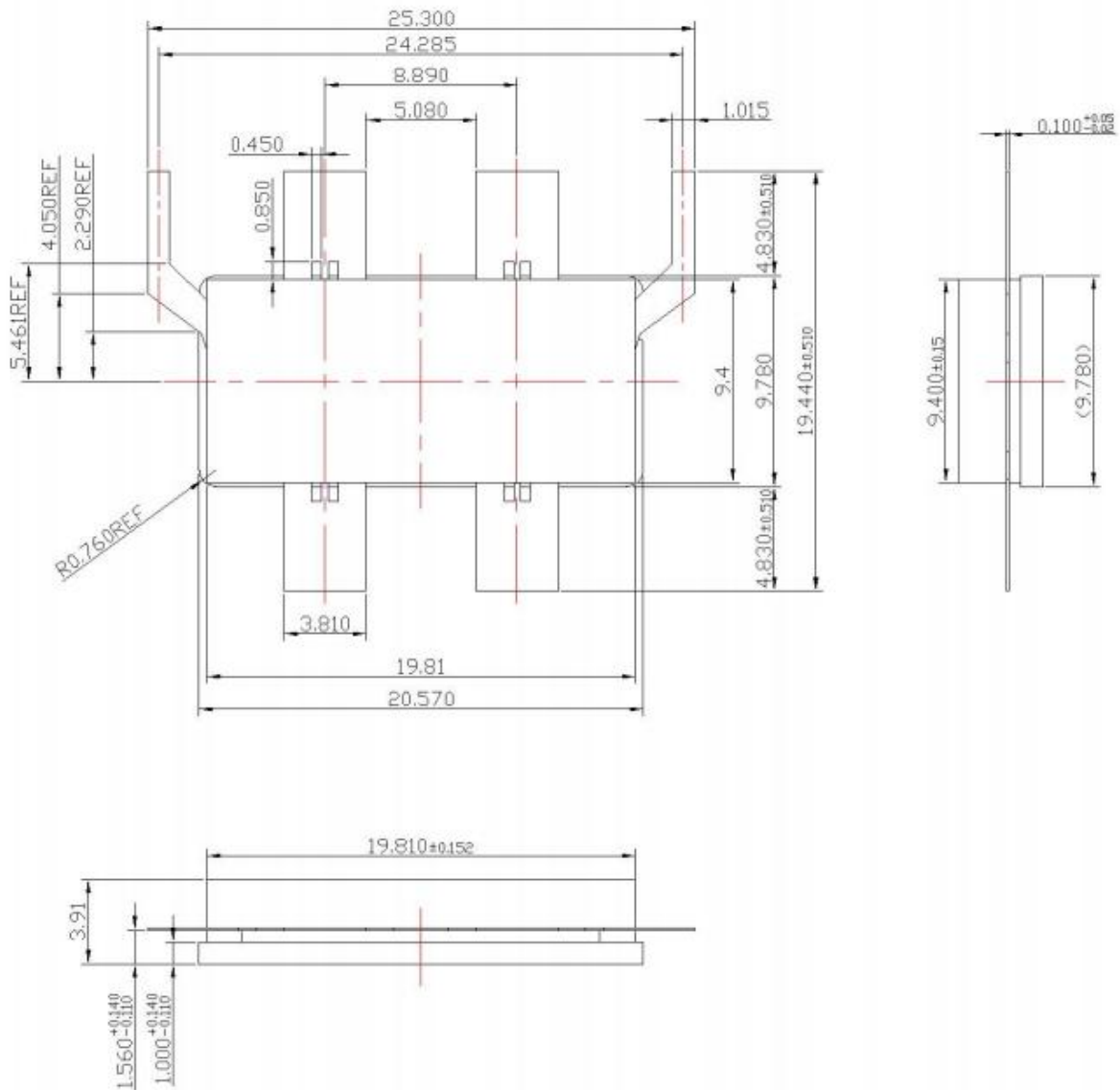
Package Marking and Dimensions



- Line1 (fixed): Device name in W/O
- Line2 (unfixed): Marking Lot No in W/O (Sample: E596-20140001)
- Line3 (unfixed): Date Code + SS(sub lot info)

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”

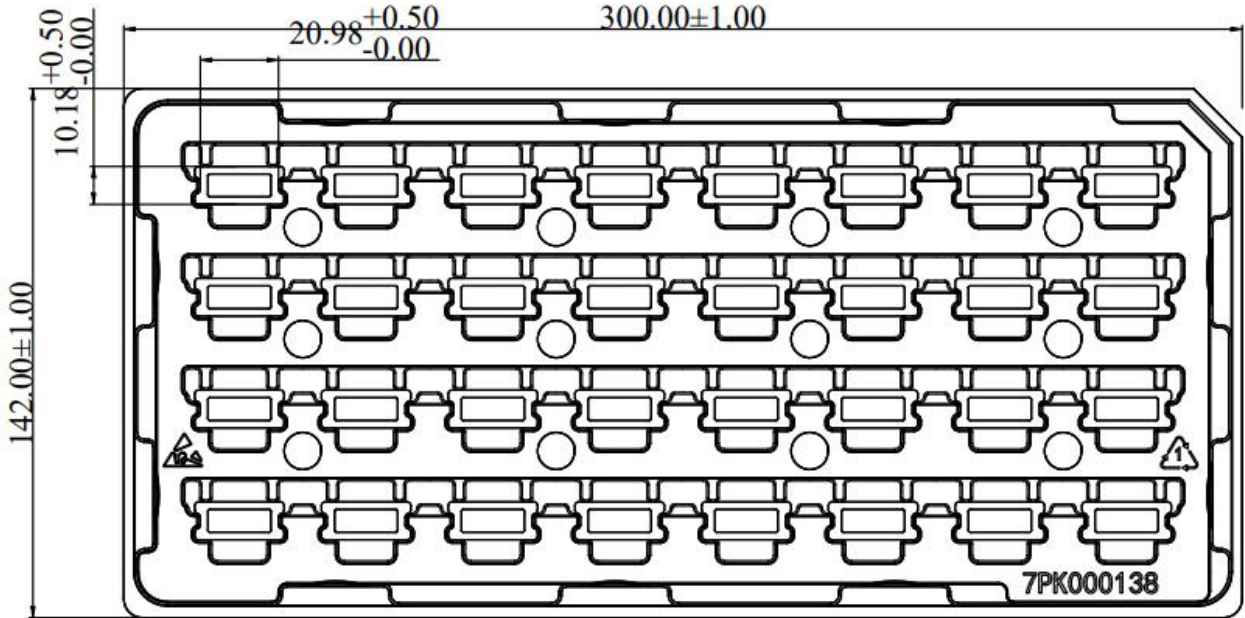
Marking



Package Dimensions

Tape and Reel Information

Package Type	Qty/Tray(pcs)	Qty/Box(pcs)	Qty/Carton(pcs)
ACC2110S-4L2L	32	160	960



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 2.3	Product	March 2023	New format based on English version datasheet
Rev 2.4	Product	March 2024	Update TBD information



HTN7G15P180H

180W, 1300 - 1500 MHz LDMOS Amplifier

Product datasheet

Contact Information

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

- Web: www.watechelectronics.com
- Email: MKT@huatai-elec.com

For technical questions and application information:

- Email: MKT@huatai-elec.com

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