HTN3D30S120S

120W, 400 - 3000 MHz GaN Amplifier

Preliminary Datasheet

Description

The HTN3D30S120S is a discrete GaN Power Amplifier with 120W saturated output power covering frequency range from 0.4GHz to 3GHz.

Features

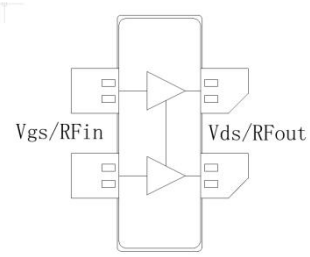
- Operating Frequency Range: 0.4 - 3GHz
- Operating Drain Voltage: +28V
- Saturation Output Power: 120W
- Excellent thermal stability due to low thermal resistance package
- Enhanced robustness design without device degradation

Applications

- Analog and Digital Broadcasting
- Meteorological and Aviation Radar
- Industrial Laser Sources and Plasma Equipment
- Various nuclear magnetic resonance instruments
- Particle accelerator



ACS1506S-4L
Earless Flanged
Air Cavity Spliced Package; 4 Leads
HTN3D30S120S



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

Ordering Information

Part Number	Description
HTN3D30S120S	Reel Package
HTN3D30S120S EVB	0.7 - 1.0 GHz EVB
HTN3D30S120S EVB	2.3 - 2.5 GHz EVB
HTN3D30S120S EVB	2.9 - 3.0 GHz EVB

Typical Performance

RF Characteristics (Pulsed CW)

Freq (MHz)	Gain (dB)	P1dB (dBm)	Eff (%)@P1dB	P3dB (dBm)	Eff(%)@P3dB
2300	16.69	51.03	57.3	52.04	63.05
2400	17.39	50.26	59.82	51.49	66.95
2500	16.95	48.97	59.91	50.44	67.49

Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQ = 150mA Pulse Width = 100us, Duty Cycle = 10% test on WATECH Application Board

RF Characteristics (CW)

Freq (MHz)	Gain (dB)	P1dB (dBm)	Eff (%)@P1dB	P3dB (dBm)	Eff(%)@P3dB
700	16.88	49.23	61.83	50.28	67.51
800	18.36	49.82	66.53	50.87	74.16
900	18.03	49.23	62.76	50.13	68.67
1000	16.88	49.12	62.87	50.09	65.65

Test conditions unless otherwise noted: 25 ℃, VDD = +28Vdc, IDQ = 150mA , CW test on WATECH Application Board

RF Characteristics (CW)

Freq (MHz)	Gain (dB)	P1dB (dBm)	Eff (%)@P1dB	P3dB (dBm)	Eff(%)@P3dB
2300	16.32	50.40	53.85	51.72	61.94
2400	17.13	49.82	57.32	51.28	66.48
2500	16.84	48.69	58.48	50.34	67.27

Test conditions unless otherwise noted: 25 ℃, VDD = +28Vdc, IDQ = 150mA , CW test on WATECH Application Board

RF Characteristics (CW)

Freq (MHz)	Gain (dB)	P1dB (dBm)	Eff (%)@P1dB	P3dB (dBm)	Eff(%)@P3dB
2900	17.62	51.23	61.62	51.92	65.36
2950	17.69	50.89	62.68	51.59	66.32
3000	18.33	50.41	63.68	51.13	67.03

Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQ = 150mA , CW test on WATECH Application Board

Absolute Maximum Ratings

Parameter	Range/Value	Unit
Drain voltage (VDSS)	0 to +84	V
Gate voltage (VGS)	-15 to 0	V
Storage Temperature (TSTG)	-55 to +150	°C
Junction Temperature (TJ)	+225	°C

Electrical Specification

DC Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Breakdown Voltage V(BR)DSS	Vgs=-10V, Vd=84V, Ids<16mA	84	-	-	V
Gate-Source Threshold Voltage VGS(th)	VDS=3V, Ids=16mA	-2.6	-1.85	-1.4	V
Drain Leakage Current IDSS	VDS=30V; VGS=-10V	-	-	16	mA
Gate Leakage Current IGSS	VDS=30V; VGS=-10V	-	-	16	mA

Load Mismatch Test

Condition	Test Result
VSWR=65:1, at all Phase Angles, V_{DD} = +28Vdc, I_{DQ}= 150mA, Pout = P3dB(120W), CW signal, Freq = 3000MHz, test on WATECH Application Board	TBD

Thermal Information

Symbol	Parameter	Condition	Value (Typ)	Units
Rth(s-c)(IR)	thermal resistance from active die surface to case by Infrared measurement	VDD=+28Vdc,IDQ=1.56A,Tcase=30.5℃,Tj=60.3℃ Measured under DC condition	TBD	℃/W

Load Pull Performance

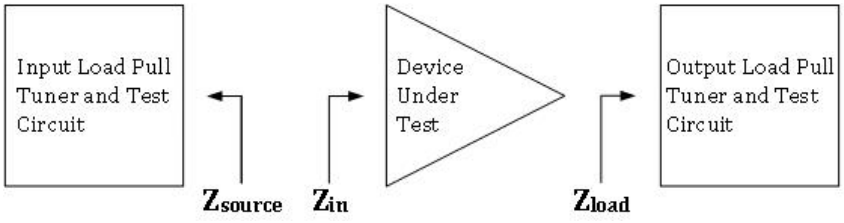
Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQ= 150mA, Pulse Width = 40us, Duty Cycle = 4%

Max Output Power						
Freq (MHz)	Z_source (Ω)	Z_load [1] (Ω)	Gain (dB)	P3dB (dBm)	P3dB (W)	Eff (%)
800	1.3+j*1.2	2.2-j*0.2	28.1	50.8	120.0	57.5
2400	1.2-j*1.8	1.6-j*2	19.0	52.4	173.8	56.7

[1] Load impedance for optimum P3dB pout

Max Drain Efficiency						
Freq (MHz)	Z_source (Ω)	Z_load [2] (Ω)	Gain (dB)	P3dB (dBm)	P3dB (W)	Eff (%)
800	1.3+j*1.2	6.3+j*1.4	29	48.8	75.9	74.7
2400	1.2-j*1.8	1.7-j*0.2	21.3	50.1	102.3	68.9

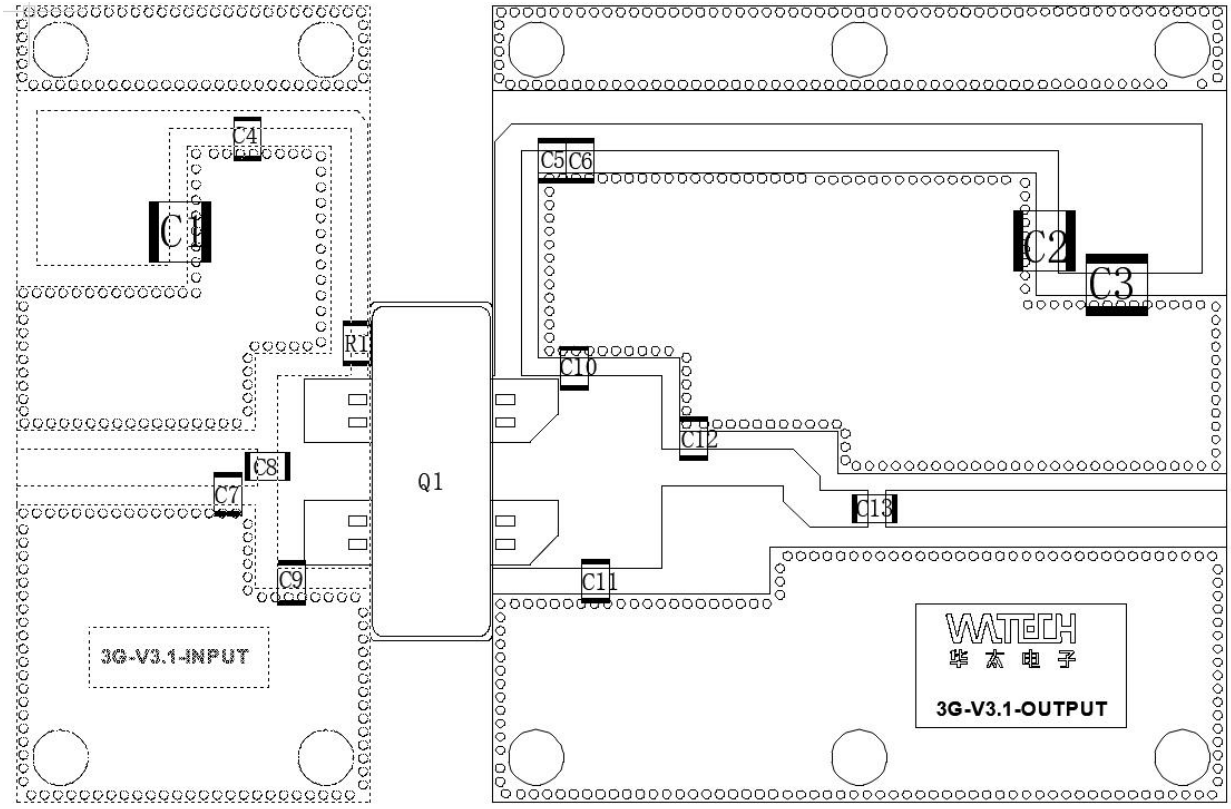
[2] Load impedance for optimum P3dB efficiency



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

HTN3D30S120S 2.3 - 2.5GHz Reference Design



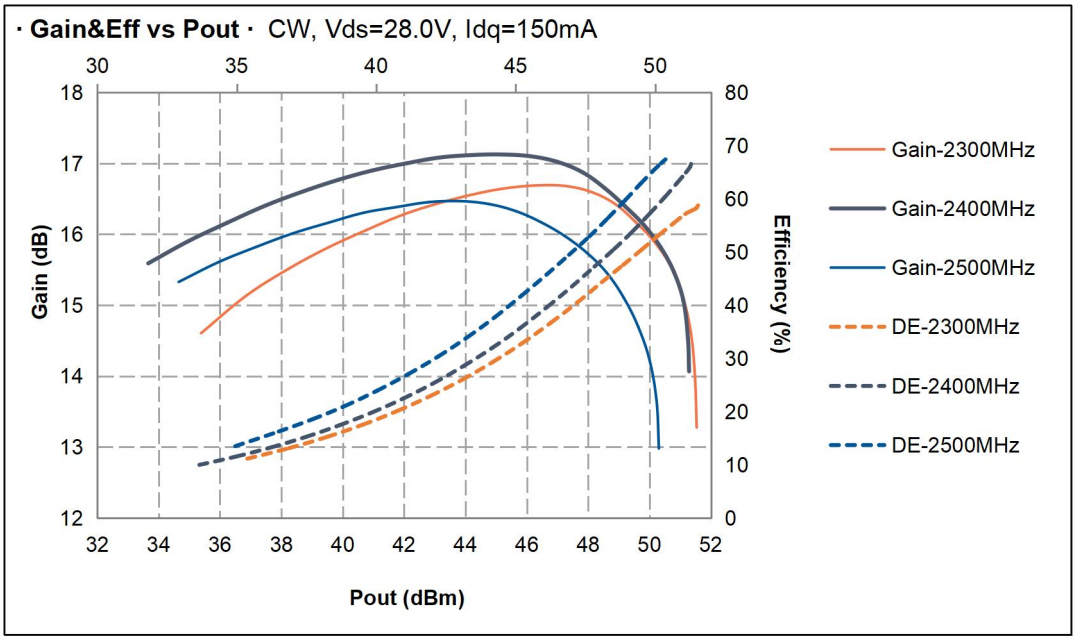
EVB Layout

Bill of Materials (BoM) - HTN3D30S120S 2.3 - 2.5GHz Reference Design

Reference	Value	Description	Manufacturer	P/N
Q1	120W	0.4-3.0 GHz GaN PA	Watech	HTN3D30S120S
C1/C2/C3	10uF	1210 Chip Capacitor	Murata	GRM32ER61H106KA12L
C4/C5	8.2pF	0805 Chip Capacitor	Murata	GQM2195C2E8R2BB12D
C6	20pF	0805 Chip Capacitor	Murata	GQM2195C2E200BB12D
C7/C9	2.2pF	0805 Chip Capacitor	Murata	GQM2195C2E2R2BB12D

C8/C13	10pF	0805 Chip Capacitor	Murata	GQM2195C2E100BB12D
C10	1.3pF	0805 Chip Capacitor	Murata	GQM2195C2E1R3BB12D
C11	2.4pF	0805 Chip Capacitor	Murata	GQM2195C2E2R4BB12D
C12	1.8pF	0805 Chip Capacitor	Murata	GQM2195C2E1R8BB12D
R1	10 Ω	0603 Chip Resistor		
PCB	Rogers 4350B (er = 3.5), 30 mil, 35 µm (1oz)			

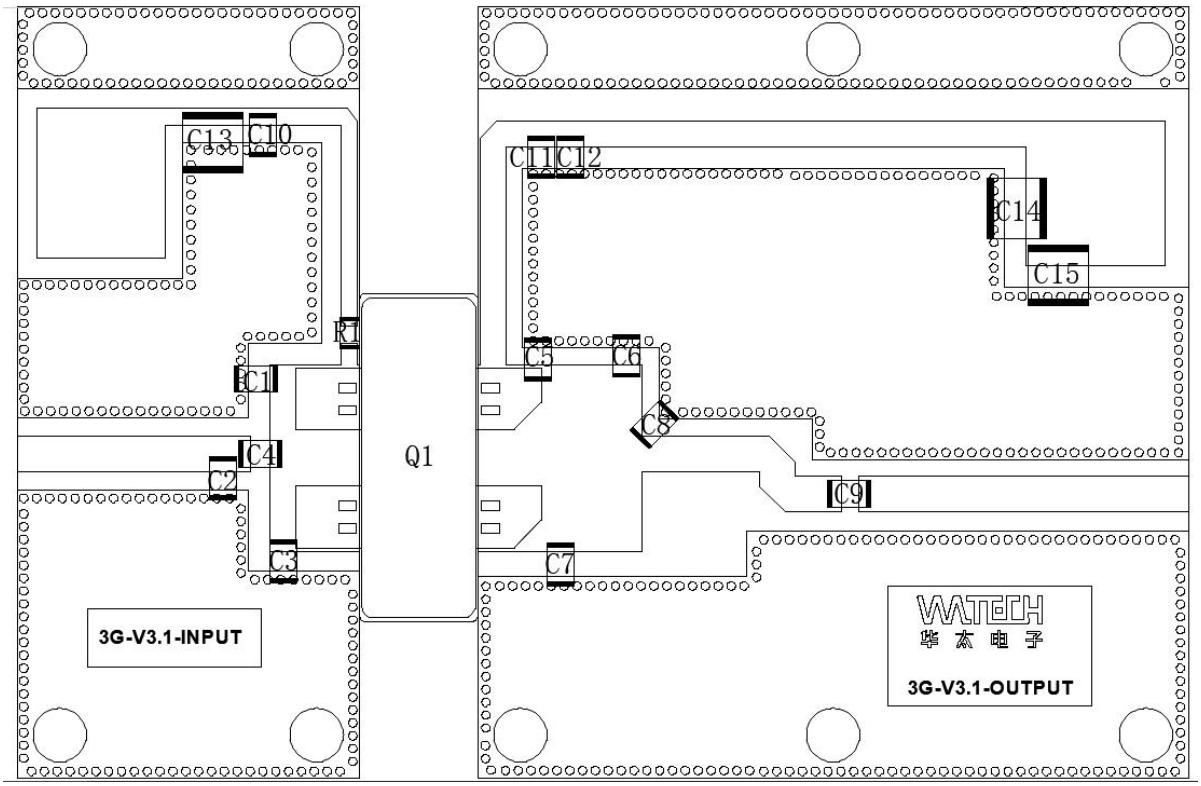
Performance Plots



CW, Gain and Efficiency vs Pout

Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQ = 150mA , CW, test on WATECH Application Board

HTN3D30S120S 2.9 - 3.0GHz Reference Design



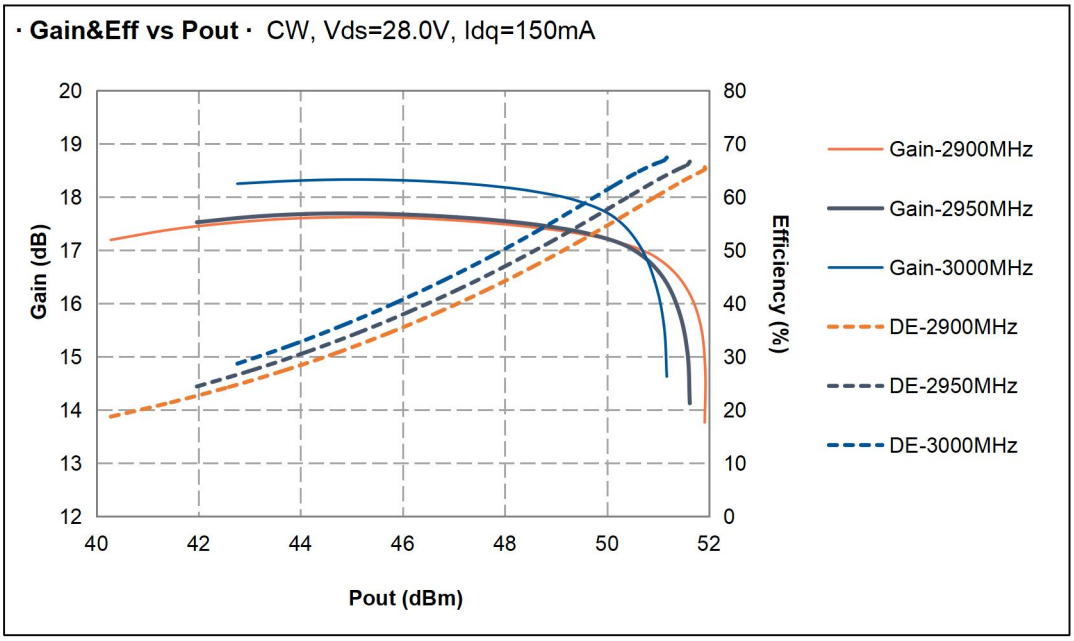
EVB Layout

Bill of Materials (BoM) - HTN3D30S120S 2.9 - 3.0GHz Reference Design

Reference	Value	Description	Manufacturer	P/N
Q1	120W	0.4-3.0 GHz GaN PA	Watech	HTN3D30S120S
C1/C2/C3	1.9pF	0805 Chip Capacitor	Murata	GQM2195C2E1R0BB12D
C4/C9/C10/C11	8.2pF	0805 Chip Capacitor	Murata	GQM2195C2E8R2BB12D
C5	0.6pF	0805 Chip Capacitor	Murata	GQM2195C2E0R6BB12D
C6	0.3pF	0805 Chip Capacitor	Murata	GQM2195C2E0R3BB12D
C7	1.8pF	0805 Chip Capacitor	Murata	GQM2195C2E1R8BB12D
C8	1.1pF	0805 Chip Capacitor	Murata	GQM2195C2E1R1BB12D
C9	1.3pF	0805 Chip Capacitor	Murata	GQM2195C2E1R3BB12D
C12	20pF	0805 Chip Capacitor	Murata	GQM2195C2E200BB12D
C13/C14/C15	10uF	1210 Chip Capacitor	Murata	GRM32ER61H106KA12L
R1	10Ω	0603 Chip Resistor		

PCB	Rogers 4350B (er = 3.5), 30 mil, 35 µm (1oz)

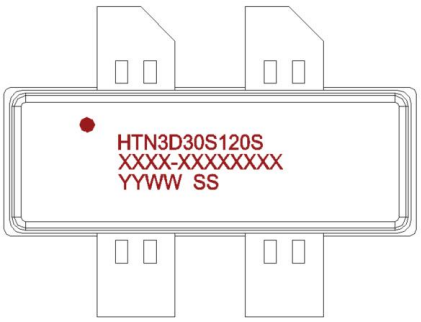
Performance Plots



CW, Gain and Efficiency vs Pout

Test conditions unless otherwise noted: 25 °C, VDD = +28Vdc, IDQ = 150mA , CW, test on WATECH Application Board

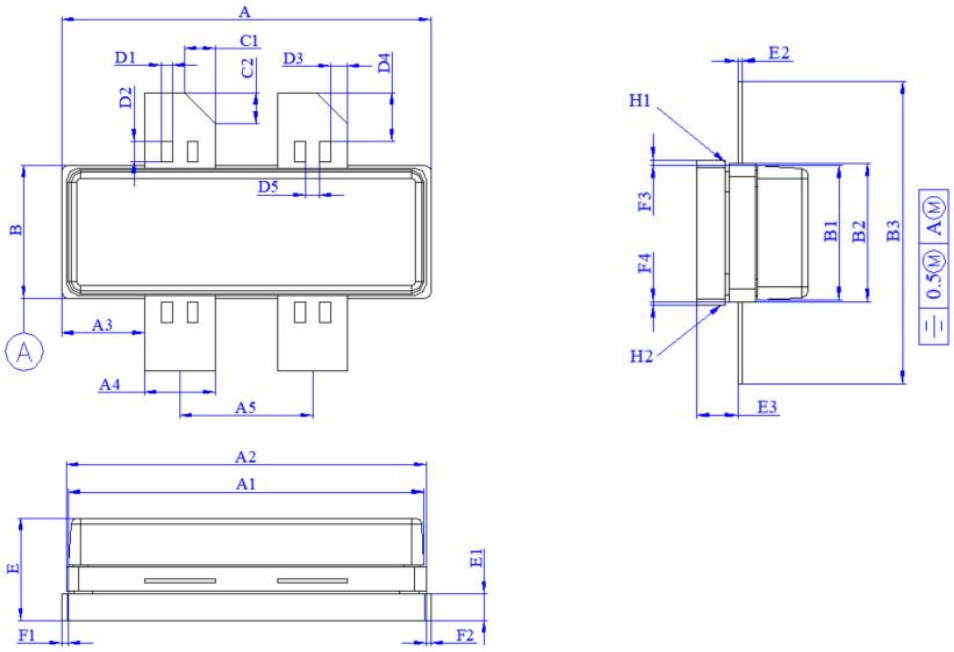
Package Marking and Dimensions



Marking

- Line1 (fixed): Device name in work order
- Line2 (unfixed): Mark Lot number in work order (Sample: E596-20140001)
- Line3 (unfixed): Date Code + “SS”(The last two digits of sub lot Number)

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”



编号	数值/mm	公差/mm	编号	数值/mm	公差/mm
A	15.30	±0.10	D1	0.45	±0.05
A1	14.70	参考值	D2	0.85	±0.05
A2	14.90	参考值	D3	0.70	±0.05
A3	3.45	±0.10	D4	2.00	±0.05
A4	2.90	±0.10	D5	0.60	±0.05
A5	5.50	±0.10	E	4.25	±0.25
B	5.50	±0.10	E1	1.10	±0.05
B1	5.10	参考值	E2	0.15	±0.03
B2	5.30	参考值	E3	1.57	±0.10
B3	11.50	±0.10	H1	MAX0.1	NA
C1	1.27	±0.05	H2	MAX0.02	NA
C2	1.27	±0.05			

Package Dimensions

ACS1506S-4L Earless Flanged Air Cavity Spliced Package; 4 Leads

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)	1C	JESD22-A114	
ESD – Charged Device Model (CDM)	C3	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
GAN	Gallium Nitride
CW	Continuous Waveform
RoHS	Restriction of Hazardous Substances
VSWR	Voltage Standing Wave Ratio

Revision history

Document ID	Datasheet Status	Release Date	Revision Version
Rev 0.1	Preliminary	Mar. 2026	Preliminary

Contact Information

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

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