HTH8G02P1K4H(B)

1400W, 1.8 - 200 MHz LDMOS Amplifier

Product datasheet

Description

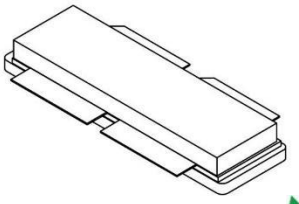
The HTH8G02P1K4H(B) is high ruggedness device designed for use in high VSWR ISM, Broadcast and Mobile Radio applications. Their unmatched Input/Output design supports frequency use from 1.8 to 200 MHz

Features

- Saturated output power :1400W
- Operating Drain Voltage: 50V
- Efficiency :70%
- Device can be used on a single-ended or in a push-pull configuration. Doherty application applicable
- Integrated ESD protection
- Excellent thermal stability due to low thermal resistance package
- Enhanced robustness design without device degradation

Applications

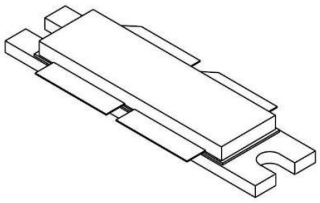
- Industrial Scientific Medical (ISM)
  - Laser generation
  - Plasma generation
  - Particle accelerators
  - MRI, RF ablation and skin treatment
  - Industrial heating, welding and drying systems



ACC3210S-4L

Earless Flanged balanced
Air Cavity Ceramic Package; 4 Leads

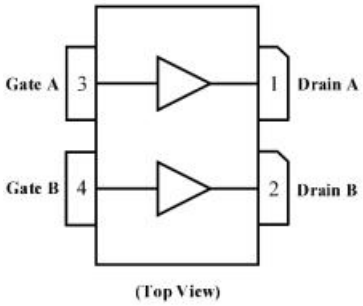
HTH8G02P1K4H



ACC3210B-4L

Flanged balanced
Air Cavity Ceramic Package; 4 Leads,
2 Mounting holes

HTH8G02P1K4HB



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

Pin Connections

Ordering Information

Part Number	Description
HTH8G02P1K4H(B)	Tray Package
HTH8G02P1K4H(B) EVB	60 MHz EVB

Typical Performance

RF Characteristics (Pulsed-CW)

Vdd (V)	Gain (dB)	Pout(dBm)	Pout(W)	Eff (%)
50	26.8	61.40	1380	78
55	27.1	61.80	1510	73

Test conditions unless otherwise noted: 25 °C (Indirect water cooling), Freq@60 MHz, IDQ= 100mA, PW = 100us, DC = 10% test on WATECH Application Board

RF Characteristics (CW)

Vdd (V)	Gain (dB)	Pout(dBm)	Pout(W)	Eff (%)
50	27.08	61.32	1350	78
55	27.43	61.76	1500	74

Test conditions unless otherwise noted: 25 °C (Indirect water cooling), Freq@60 MHz, IDQ= 100mA,CW, test on WATECH Application Board

Absolute Maximum Ratings

Parameter	Range/Value	Unit
Drain voltage (V_{DSS})	-0.5 to +135	V
Gate voltage (V_{GS})	-5 to +10	V
Drain voltage (V_{DD})	0 to +55	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 $V_{(BR)DSS}$	Vgs=0V, Ids=200uA	-	135	-	V
Gate-Source Threshold Voltage $V_{GS(th)}$	Vds=10V, Ids=200uA	1.5	2.25	2.9	V
Drain Leakage Current I_{DSS}	Vds=50V, Vgs=0V	-	0.0029	10	uA
Gate Leakage Current I_{GSS}	Vds=0V, Vgs=10V	-	0.0001	1	uA

Load Mismatch Test

Condition	Test Result
VSWR=65:1 at all Phase Angles, V_{DD}=+55Vdc, I_{DQ} = 100 mA, Freq = 60MHz, PW = 200 us, DC = 20%, P_{out} = 1500W test on WATECH Application Board	No Device Degradation

Thermal Information

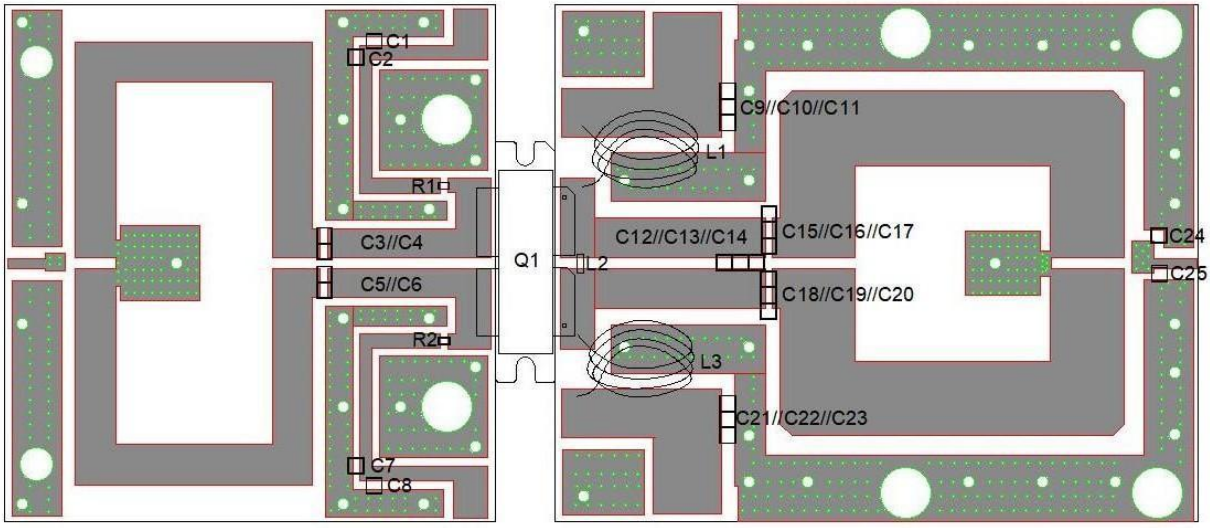
Parameter	Condition	Value (Typ)	Unit
Thermal Resistance Junction to Case (R_{TH})	T_{CASE}= 45°C, CW, V_{DD}=+50Vdc, I_{DQ}=100 mA, Pout = 1400W	0.1	°C /W

RF Characteristics (Pulsed CW) @50V

Freq (MHz)	Gain (dB)	Pout(dBm)	Pout(W)	Eff (%)
60	28.83	61.40	1380	78

Test conditions unless otherwise noted: 25 °C (Indirect water cooling), Freq@60 MHz, IDQ= 100mA, PW = 100us, DC = 10% test on WATECH Production Board

HTH8G02P1K4H(B) 60 MHz Reference Design

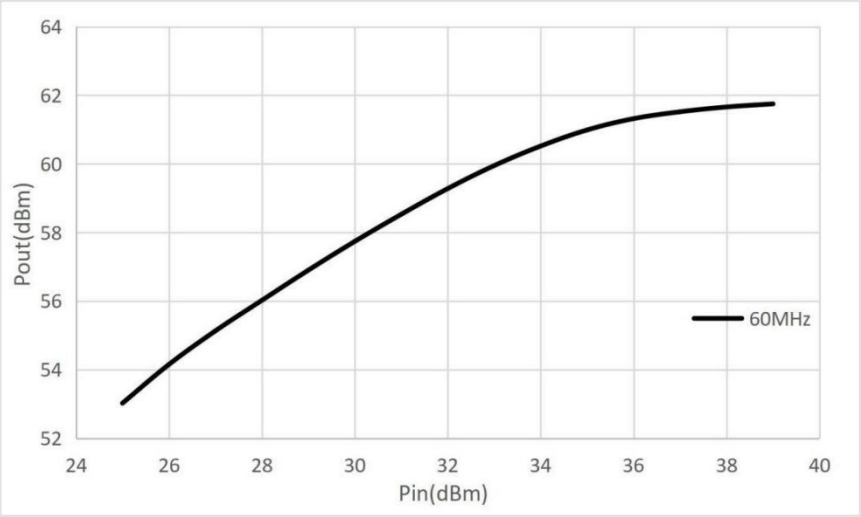


EVB Layout @60 MHz

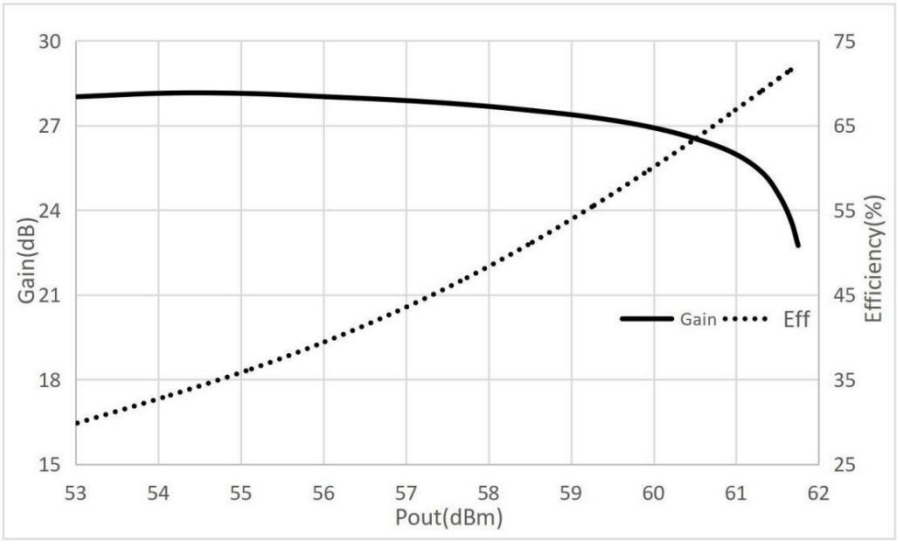
Bill of Materials (BoM) - HTH8G02P1K4H(B) 60 MHz Reference Design

Reference	Value	Description	Manufacturer	P/N
Q1	-	1400W, 1.8-200 MHz LDMOS Power Transistor	Watech	HTH8G02P1K4H(B)
C1,C8.C10,C11,C22, C23	470pF	MLCC	ATC	ATC100B471JT
C2,C7	680pF	MLCC	ATC	ATC100B681KT
C3,C5	30pF	MLCC	ATC	ATC100B300JT
C4,C6,C9,C21	56pF	MLCC	ATC	ATC100B560JT
C12	68pF	MLCC	ATC	ATC100B680JT
C13	240pF	MLCC	ATC	ATC100B241JT
C14	4p7F	MLCC	ATC	ATC100B4R7CT
C15,C16,C17,C18, C19, C20	24pF	MLCC	ATC	ATC100B240JT
C24	1nF	MLCC	ATC	ATC800B102JT50XT
C25	4u7F	MLCC	Murata	GRM31CR71H475KA12L
R1, R2	51Ω	Thick Film Resistor	-	-
L1, L3	1*10*10T	Enameled wire	-	-
L2	R:1,W:3,H:17	Enameled wire	-	-
PCB	TC350 (er = 3.5), 30 mil (0.762 mm), 35 µm (1oz)			

Performance Plots HTH8G02P1K4H(B) 60 MHz



CW, Pin vs Pout

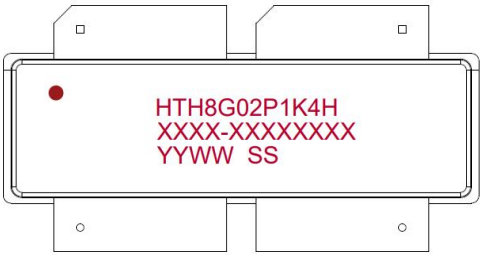


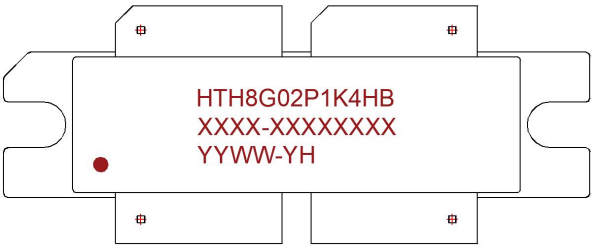
CW, Gain and Eff vs Pout

Test conditions unless otherwise noted: 25 °C (Indirect water cooling) (Indirect water cooling), VDD = +50Vdc, IDQ = 100 mA,

PW = 100us, DC = 10% tested on WATECH Application Board

Package Marking and Dimensions

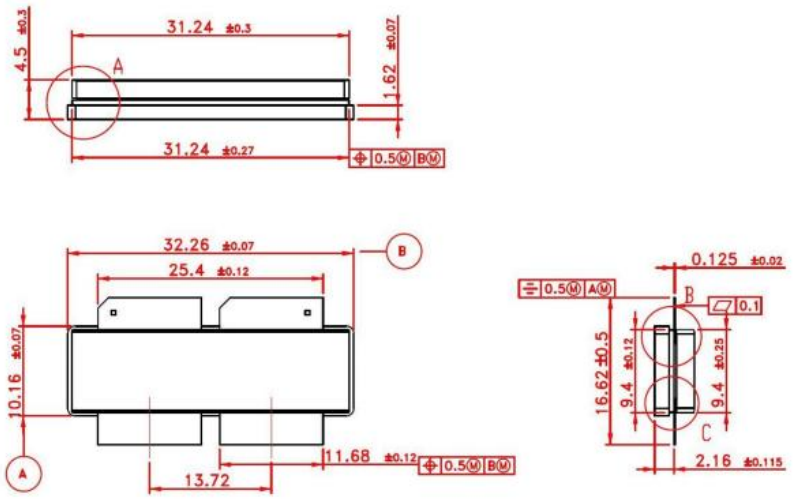




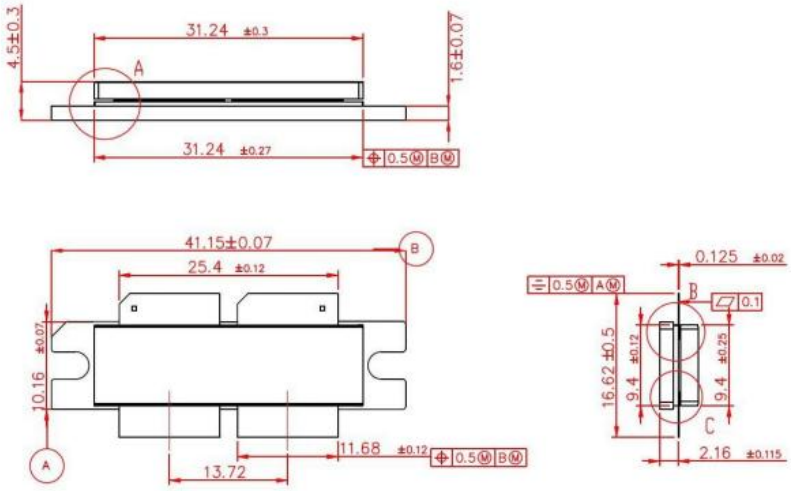
- Line1 (fixed): Device name in W/O
- Line2 (unfixed): Marking Lot No in W/O (Sample: E596-EERA0001)
- Line3 (unfixed): Date Code+YH

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



ACC3210S-4L; Earless flanged balanced Ceramic Package; 4 Leads



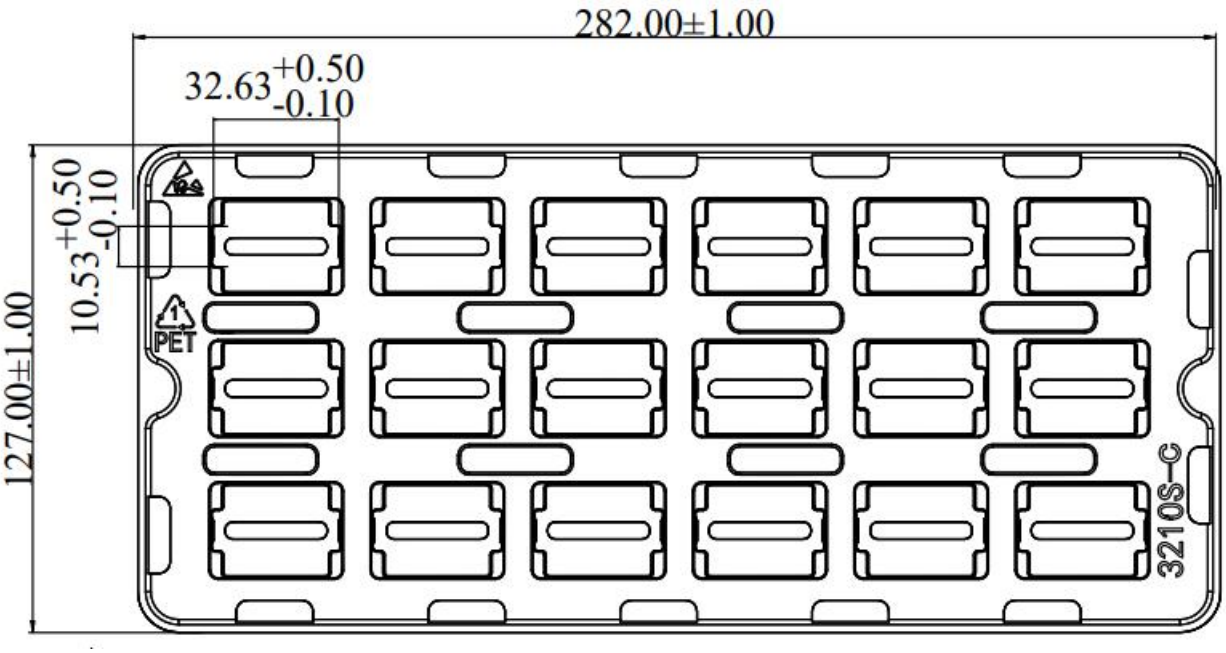
ACC3210B-4L; Flanged balanced Ceramic Package; 2 Mounting holes, 4 Leads

Package Dimensions

Packaging Information

HTH8G02P1K4H：

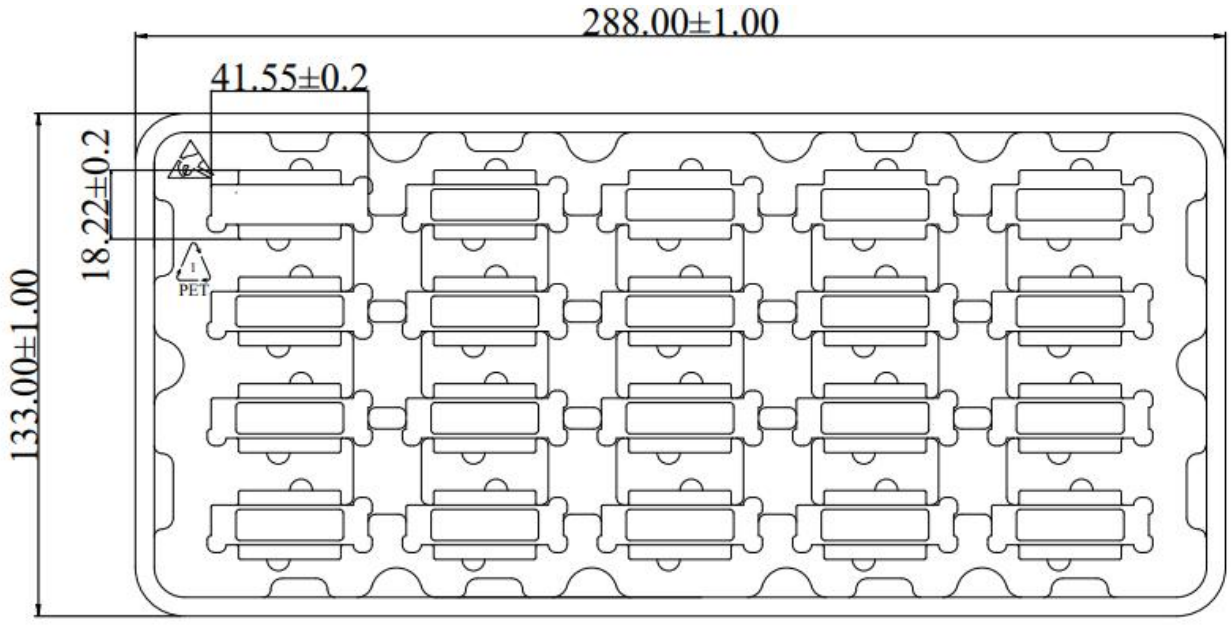
Package Type	Qty/Tray(pcs)	Qty/Box(pcs)	Qty/Carton(pcs)
ACC3210S-4L	18	90	540



Packaging Descriptions

HTH8G02P1K4HB：

Package Type	Qty/Tray(pcs)	Qty/Box(pcs)	Qty/Carton(pcs)
ACC3210B-4L	20	100	600



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
VSWR	Voltage Standing Wave Ratio

Revision history

Document ID	Datasheet Status	Release Date	Revision Version
Rev 1.3	Preliminary	March 2021	Add HTH8G02P1K4HB package diagram
Rev 1.4	Preliminary	Sept. 2021	Update package name
Rev 1.5	Product	Sept. 2021	Add thermal resistance data
Rev 1.6	Product	Sept. 2021	Add Demo data chart
Rev 1.7	Product	Sept. 2021	Correct the frequency of BoM header
Rev 1.8	Product	Dec. 2021	Correct writing errors
Rev 1.9	Product	Dec. 2021	1. Correct the typo in the load mismatch test conditions; 2. Correct the typo of the component manufacturer in the reference design BoM
Rev 2.0	Product	March 2023	New format based on English version datasheet
Rev 2.1	Product	Sept. 2023	Update TBD information
Rev 2.2	Product	March 2024	Version released after re review

Contact Information

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