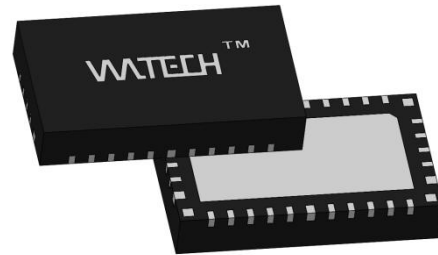


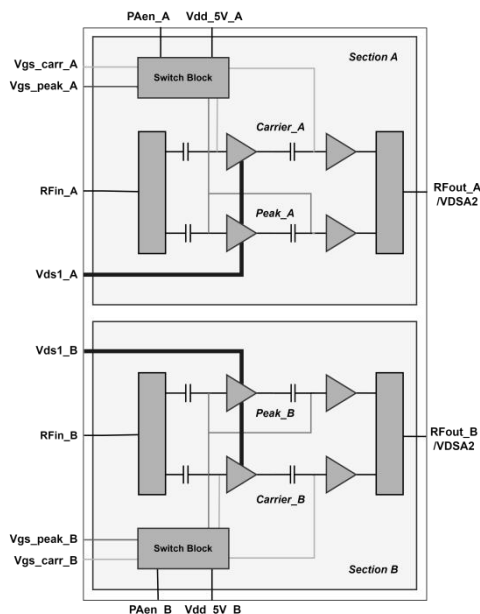
Description

The H9G3742M80Q is a LDMOS integrated Asymmetrical Doherty 3-stage Power Amplifier designed for cellular base station applications with 80W saturated output power covering frequency range from 3.7-4.2GHz. The amplifier is 50Ω Input matched with integrated input divider and output combiner into a small compact footprint which makes it ideal for integration.



PQFN 12 x 7 x 2.1 mm, 36-pins

Block Diagram



Features

- Operating Frequency Range: 3700 - 4200 MHz
- Operating Drain Voltage: +26V
- P1dB: 64W (+48.1 dBm)
- P3dB: 70W (+48.5 dBm)
- 50 Ω Input matched
- Integrated Input Divider
- Integrated Output Combiner
- Integrated Bias Gate Switch
- Integrated Asymmetrical Doherty Final Stage
- High linearity
- High Gain
- Footprint: PQFN 12x7x2.1 mm, 36-pin

Applications

- 3GPP 5G NR FR1 FR1 n77(n78), n48(CBRS) and 4G-LTE band B42/43/48
- Multi-carrier and multi-standard GSM, W-CDMA and LTE base stations
- Driver Amplifier for Macro Base Stations
- Repeaters/DAS.

Order Information

Part Number	Description
H9G3742M80Q	Reel Package
H9G3742M80Q EVB	3.7-4.2 GHz EVB

Typical Performances

RF Characteristics (Pulsed CW)

Freq(MHz)	P1dB(dBm)	P3dB(dBm)	Gain(dB)*	PAE(%)*
3700	48.6	49.1	32.6	18.0
4000	48.7	49.1	32.3	18.4
4200	48.1	48.5	31.6	16.6

Test conditions unless otherwise noted: 25°C, 10% Pulse, PAen = 5 V, Vdd_5V = 5 V, Vds = 26 V, Idq_carr = 250 mA, Vgs_peak = Vgs_carr - 0.51 V, test on WATECH Application Board.

*Pout=36dBm

RF Characteristics (WCDMA)

Freq(MHz)	Gain(dB)	PAE(%)	5MHz(dBc)*	10MHz(dBc)*
3700	32.3	19.7	-38.3	-53.5
4000	32.0	20.1	-37.4	-53.2
4200	31.3	18.9	-39.3	-54.0

Test conditions unless otherwise noted: 25°C, PAen = 5 V, Vdd_5V = 5 V, Vds = 26 V, Idq_carr = 250 mA, Vgs_peak = Vgs_carr - 0.51 V, Pavg = 36 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	Units
Drain voltage (VDSS)	-0.5 to 65	V
Gate voltage (VGS)	-5 to 10	V
Storage Temperature (TSTG)	-55 to 150	°C
Junction Temperature (TJ)	-40 to 200	°C

Electrical Specification

DC Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Breakdown Voltage V(BR)DSS	Vgs=0V, Ids=119.6uA	65	-	-	V
Gate-Source Threshold Voltage VGS(th)	Vds=28V, Ids=119.6uA	1.0	-	2.0	V
Drain Leakage Current IDSS	Vgs=0V, Vds=28V	-	-	0.5	uA
Gate Leakage Current IGSS	Vgs=5V, Vds=0V	-	-	0.1	uA

Test conditions unless otherwise noted: 25 °C

RF Characteristics (Pulsed CW)

Parameter	Conditions	Min	Typ	Max	Unit
P1dB	Freq=3.7GHz	TBD	TBD	TBD	dBm
P3dB	Freq=3.7GHz	TBD	TBD	TBD	dBm
IRL	Freq=3.7GHz, Pout=36dBm	TBD	TBD	TBD	dB
P1dB	Freq=4.2GHz	TBD	TBD	TBD	dBm
P3dB	Freq=4.2GHz	TBD	TBD	TBD	dBm
IRL	Freq=4.2GHz, Pout=36dBm	TBD	TBD	TBD	dB

Test conditions unless otherwise noted: 25°C, 10% Pulse, PAen = 5 V, Vdd_5V = 5 V, Vds = 26 V, Idq_carr = 250 mA, Vgs_peak = Vgs_carr - 0.5 V, test on WATECH Production Board.

RF Characteristics (WCDMA)

Parameter	Conditions	Min	Typ.	Max	Unit
Gain	Freq=3.7GHz, Pout=36dBm	TBD	TBD	TBD	dB
Eff	Freq=3.7GHz, Pout=36dBm	TBD	TBD	TBD	%
ACPR@5MHz	Freq=3.7GHz, Pout=36dBm	TBD	TBD	TBD	dBc
Gain	Freq=4.2GHz, Pout=36dBm	TBD	TBD	TBD	dB
Eff	Freq=4.2GHz, Pout=36dBm	TBD	TBD	TBD	%
ACPR@5MHz	Freq=4.2GHz, Pout=36dBm	TBD	TBD	TBD	dBc

Test conditions unless otherwise noted: 25°C, PAen = 5 V, Vdd_5V = 5 V, Vds = 26 V, Idq_carr = 250 mA, Vgs_peak = Vgs_carr - 0.5 V, Pavg = 36 dBm, 1C-WCDMA 5MHz Signal, 9.9 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, Vds=+26Vdc, PAen = 5 V, Vdd_5V = 5 V, Idq_carr = 250mA, Vgs_peak = Vgs_carr - 0.5 V, Pavg = 36 dBm, Frequency = 3.6 GHz, test on WATECH Application Board	No Device Degradation, pass

Thermal Information

Parameter	Condition	Value (Typ)*	Unit
Thermal Resistance Junction to Case (Rth)	T _{CASE} = 90°C, 1C-WCDMA 5MHz Signal, 9.9dB PAR, Pavg = 36dBm	1.20	°C /W

* $R_{th} = (T_j - T_{case}) / (P_{dissA} + P_{dissB})$

Impedance Information

Freq (MHz)	ZL(Ω)*	P1dB(dBm)	Gp(max)(dB)	Eff(%)**	Eff(%)***
3700	35.5-j*33.8	45.9	33.5	37.9	19.5
4000	37.5-j*35.9	46.1	33.0	38.9	19.3
4200	43.4-j*46.3	45.6	32.6	39.5	18.8

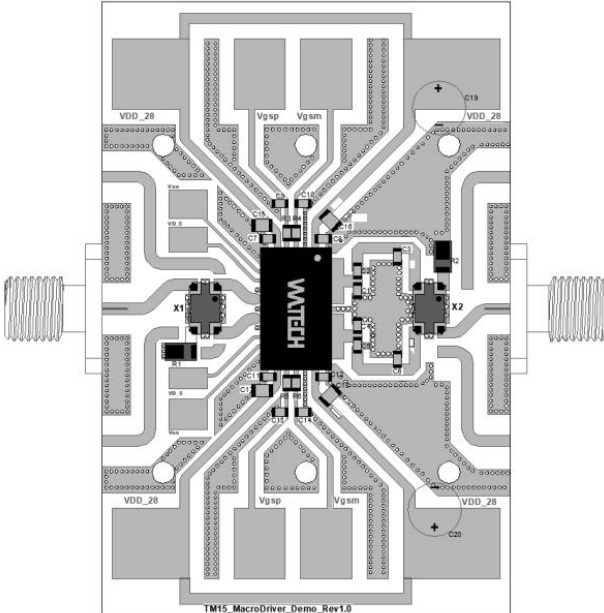
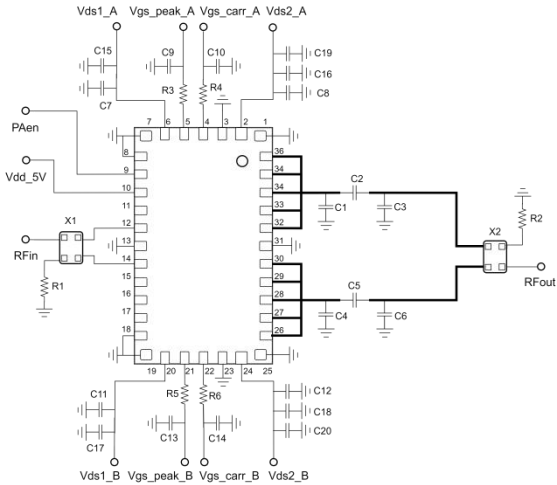
Measured Load-pull data per section, 25°C, 10% Pulse, PAen = 5 V, Vdd_5V = 5 V, Vds = 26 V, Idq_carr = 120 mA, Vgs_peak = Vgs_carr - 0.40 V, Pavg = 33 dBm,

*Reference package plane

**Pout=P1dB dBm

***Pout=33 dBm

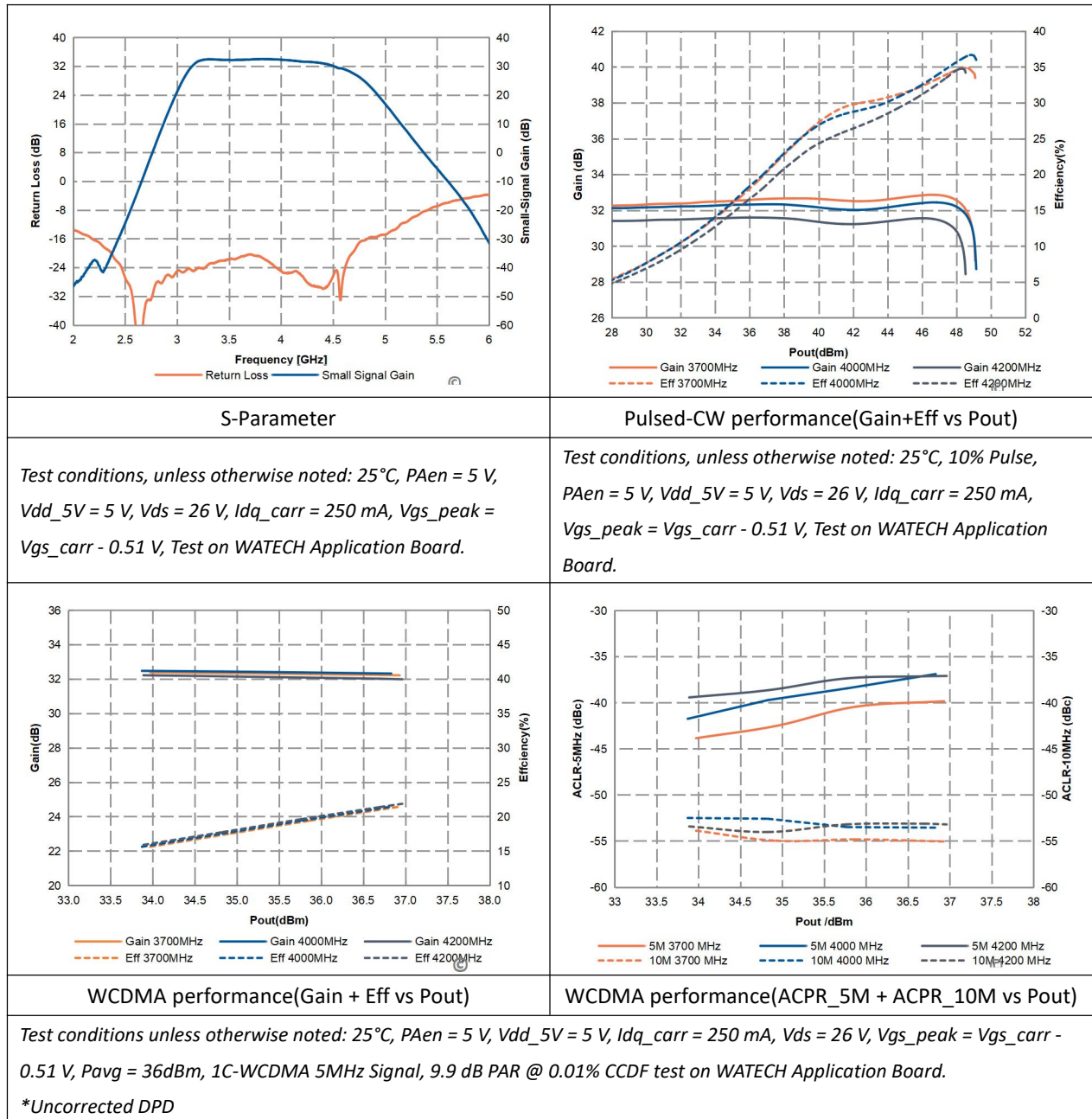
H9G3742M80Q 3.7-4.2 GHz Reference Design

	
Reference PCB Layout	Reference Schematic
Rogers 4350B (er = 3.66), Substrate thickness 20 mil (0.508 mm), Copper thickness 35 μ m (1oz)	

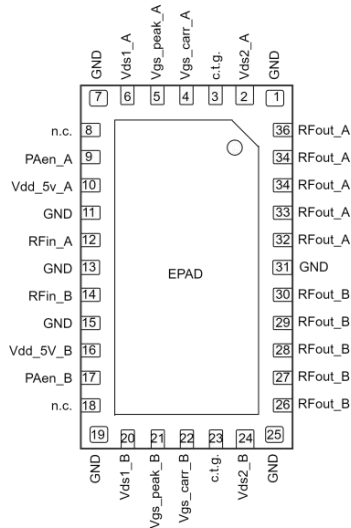
Bill of Materials (BoM) - H9G3338M60Q 3.7-4.2 GHz Reference Design

Component	Type	Value	Description	P/N
R1, R2	Resistor	51ohm	Resistor	RC0402FR-0751RL
R3, R4, R5, R6	Resistor	20ohm	Resistor	RC0402FR-0720RL
C1, C4	Capacitor	/	/	/
C2, C5	Capacitor	0.8pF	0603, 250V	GQM1555G2DR80WB01D
C3, C6	Capacitor	/	/	/
C7, C9, C10, C11, C13, C14	Capacitor	1uF	0805, 100V	GRM21BC72A105KE01L
C8, C12	Capacitor	15pF	0603, 100V	GQM1875C2E150JB12D
C16, C18	Capacitor	0.1uF	0603, 100V	GRM188R72A104KA35D
C15, C17	Capacitor	10uF	1210, 100V	GRM32EC72A106KE05L
C19, C20	Capacitor	4.7uF	1210, 100V	GRM32DC72A475KE01L
C21, C22	Capacitor	470uF	100V	Nichicon-UHE1E471MPD6
X1,X2	Coupler	3200-4200 MHz	Coupler	X3C35F1-03S

Performance Plots



Pin Configuration and Description

		
Pin Configuration		
Pin Number	Label	Description
1	GND	Ground
2	Vds2_A	Drain-source voltage of final stages of section A
3	c.t.g	Ground
4	Vgs_carr_A	Gate-source voltage of carrier ^[1]
5	Vgs_peak_A	Gate-source voltage of peaking ^[2]
6	Vds1_A	Drain-source voltage of driver stages of section A
7	GND	Ground
8	n.c	Not connected
9	PAen_A	PA enable trigger signal for TDD and FDD application, 0V to 5V ^[3]
10	Vdd_5V_A	Supply voltage 5V ^[4]
11	GND	Ground
12	RFin_A	RF input of section A
13	GND	Ground
14	RFin_B	RF input of section B
15	GND	Ground
16	Vdd_5V_B	Supply voltage 5V ^[4]
17	PAen_B	PA enable trigger signal for TDD and FDD application, 0V to 5V ^[3]
18	n.c	Not connected
19	GND	Ground
20	Vds1_B	Drain-source voltage of driver stages of section B



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80W, 3.7-4.2 GHz Doherty Amplifier

Preliminary Datasheet

21	Vgs_peak_B	Gate-source voltage of peaking ^[2]
22	Vgs_carr_B	Gate-source voltage of carrier ^[1]
23	c.t.g	Ground
24	Vds2_B	Drain-source voltage of final stages of section A
25	GND	Ground
26,27,28,29,30	RFout_B	RF output of section B
31	GND	Ground
32,33,34,35,36	RFout_A	RF output of section A
EPAD	GND	Ground

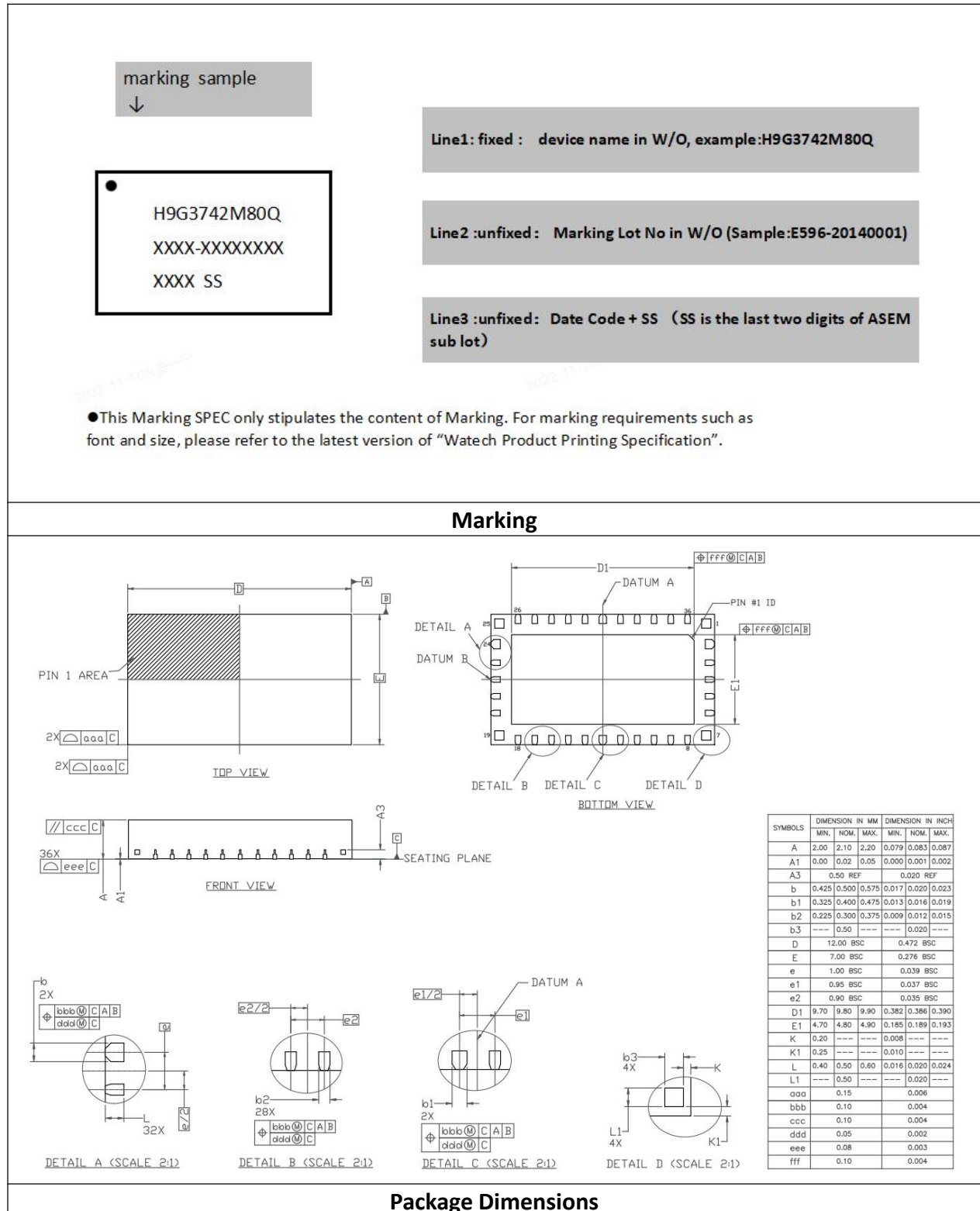
[1] Pins connected together inside package.

[2] Pins connected together inside package.

[3] Pins connected together inside package.

[4] Pins connected together inside package.

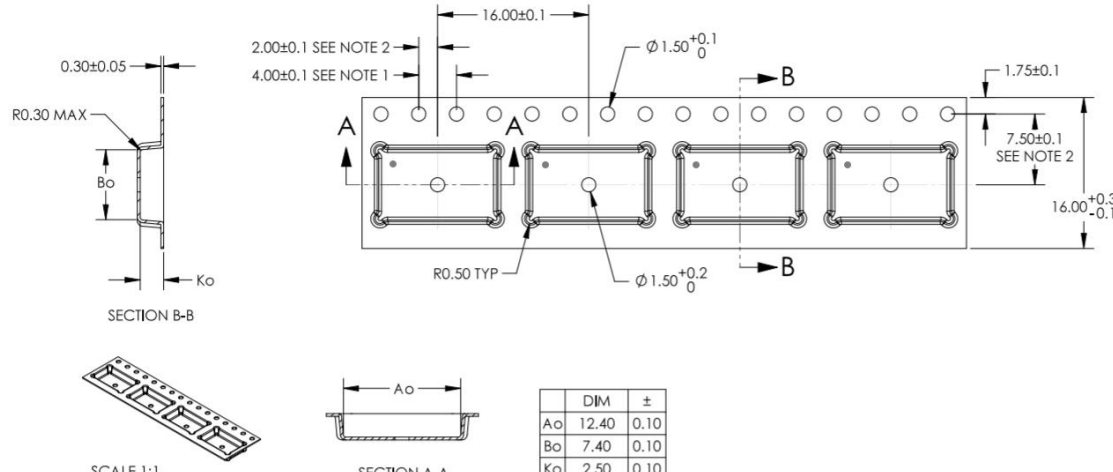
Package Marking and Dimensions



Package Dimensions

Packing Information

Package Type	Reel Size(inch)	Qty/Reel(pcs)	Qty/Box(pcs)	Qty/Carton(pcs)
PQFN7x12x2.1, 36-pins	13	1500	1500	7500



SECTION B-B

SECTION A-A

SCALE 1:1

	DIM	±
Ao	12.40	0.10
Bo	7.40	0.10
Ko	2.50	0.10

Tape & Reel Packaging Descriptions

Handling Precautions

Parameter	Grade	
Moisture Sensitivity Level MSL	3	
Parameter	Rating	Standard
ESD – Human Body Model (HBM)	2	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
LDMOS	Laterally-diffused metal-oxide semiconductor
GaN	Gallium Nitride
CW	Continuous Waveform
VSWR	Voltage Standing Wave Ratio



H9G3742M80Q
80W, 3.7-4.2 GHz Doherty Amplifier
Preliminary Datasheet

Revision History

Document ID	Datasheet status	Release date	Version revision record
Rev 0.1	Preliminary	2025/10/25	Preliminary datasheet
Rev 0.2	Preliminary	2026/04/03	Update format
Rev 0.3	Preliminary	2026/04/24	Add thermal information
Rev 0.4	Preliminary	2026/06/29	Add impedance information



H9G3742M80Q

80W, 3.7-4.2 GHz Doherty Amplifier

Preliminary Datasheet

Contact Information

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

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