

Product Features

- GaN on SiC HEMT
- In/Out Impedance Matching
- Surface Mount Hybrid Type
- Compact Size & Weight
- High Efficiency
- Low Cost
- Custom design available

Applications

- Marine Radar System
- Weather Radar System



Package Type : NP-18

Description

The HR9395-08A is designed for Radar system application frequencies from 9.3GHz to 9.5GHz and GaN HEMT technology has been used that performs high breakdown voltage, wide bandwidth and high efficiency.

Electrical Specifications @ $V_{DS}=50V$, V_{GS} @ I_{dQ} , $T_a=25^\circ C$

PARAMETER	UNIT	MIN	TYP	MAX	SYMBOL
Operating Frequency	MHz	9300	9400	9500	f_o
Operating Bandwidth	MHz	-	200	-	BW
Output Pulse Power	W	5	6	8	P_o
Input Pulse Power	dBm	-	27	-	P_i
Power Gain	dB	10	11	-	G_p
Gain Flatness	dB	-	0.5	1.0	ΔG_p
Duty Cycle	%	-	10	20	DC
Pulse Width	us	-	50	100	PW
Efficiency	%	-	45	-	E_{ff}
Amplitude Pulse Droop	dB	-	0.5	1.0	Droop
Harmonics 1 to N	dBc	20	30	-	H_N
Spurious Level	dBc	60	-	-	Spur
Rise Time	ns	-	-	200	t_r
Fall Time	ns	-	-	200	t_f
Phase Deviation	°	-15	-	15	$\Delta\phi$

* Test Pulse conditions = 100us, 10%
Custom design available

Caution

The drain voltage must be supplied to the device after the gate voltage is supplied

Turn on : Turn on the Gate Voltage supply and last turn On the Drain voltage supplies

Turn off : Turn off the Drain Voltage and last turn off the Gate voltage

Mechanical Specifications

PARAMETER	UNIT	TYP	REMARK
Mass	g	2	-
Dimension	mm	10 x 15 x 5.4	-

Absolute Maximum Ratings

PARAMETER	UNIT	RATING	SYMBOL
Gate-Source Voltage	V	-10 ~ 0	V _{GS}
Drain-Source Voltage	V	110	V _{DS}
Gate Current	mA	1.2	I _G
Operating Junction Temperature	°C	225	T _J
Operating Case Temperature	°C	-20 ~ 75	T _C
Storage Temperature	°C	-50 ~ 125	T _{STG}

Operating Voltages

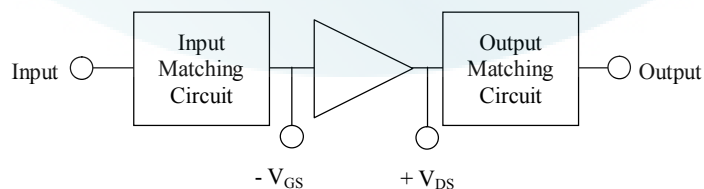
PARAMETER	UNIT	NOMINAL VOLTAGE	VOLTAGE ACCURACY	SYMBOL
Drain Voltage	V	50	± 2%	V _{DS}
Gate Voltage	V	-3(ON) , -8(OFF)	± 5%	V _{GS}

Power Supply

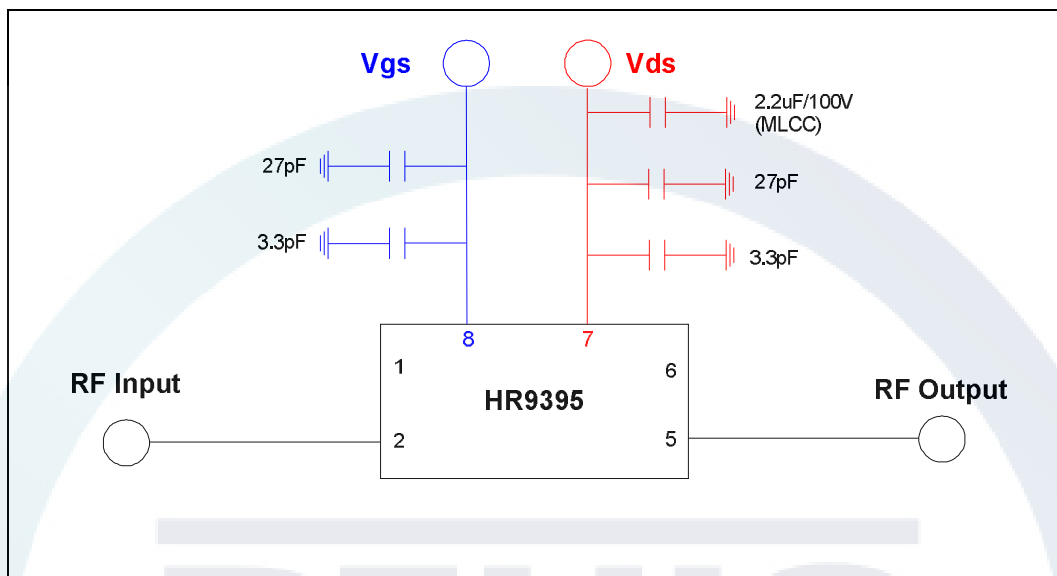
PARAMETER	UNIT	MIN	TYP	MAX	SYMBOL
Drain-Source Current(AVG)	A	-	0.03	0.04	I _{DS}

* Duty Cycle 10%, Pulse Width 50us

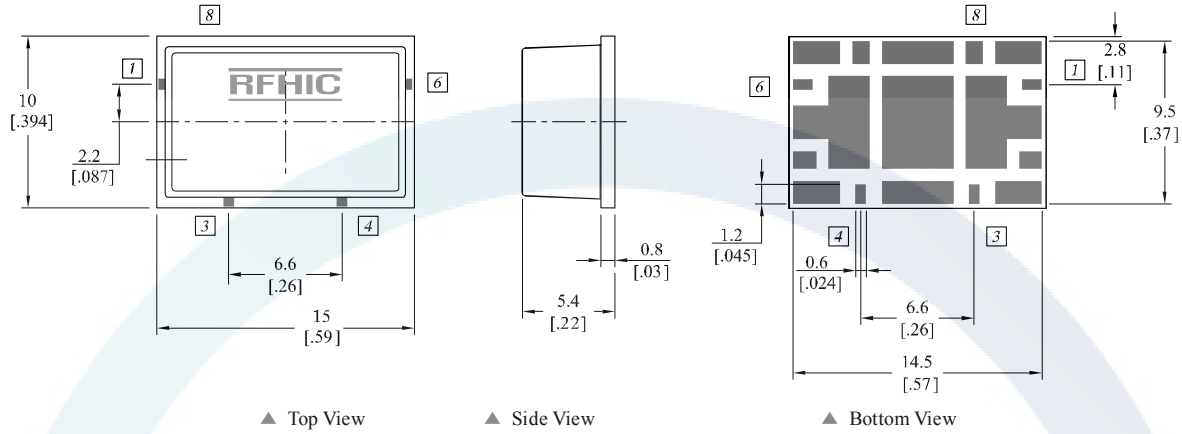
Block Diagram



Application Circuit



Package Dimensions (Type: NP-18)

* Unit: mm[inch] | Tolerance: ± 0.15 [.006]

Pin Description							
Pin No	Function	Pin No	Function	Pin No	Function	Pin No	Function
1	GND	3	GND	5	RF Output	7	Drain Bias (+V _{DS})
2	RF Input	4	GND	6	GND	8	Gate Bias (-V _{GS})

* Mounting Configuration Notes

1. For the proper performance of the device, Ground / Thermal via holes must be designed to remove heat.
2. To properly use heat sink, ensure the ground/thermal via hole region to contact the heat sink. We recommend the mounting screws be added near the heat sink to mount the board.
3. In designing the necessary RF trace, width will depend upon the PCB material and construction.
4. Use 1 oz. Copper minimum thickness for the heat sink.
5. Do not put solder mask on the backside of the PCB in the region where the board contacts the heat sink.
6. We recommend adding as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.

Precautions

This product is a Gallium Nitride Transistor.

The Gallium Nitride Transistor requires a Negative Voltage Bias which operates alongside a Positive Voltage Bias. These Biases are applied in accordance to the Sequence during Turn-On and Turn-Off.

The Pallet Amplifier does not have a built-in Bias Sequence Circuit. Therefore, users need to either apply positive voltages and negative voltages in the required sequence, or add an external Bias Circuit to this Amplifier.

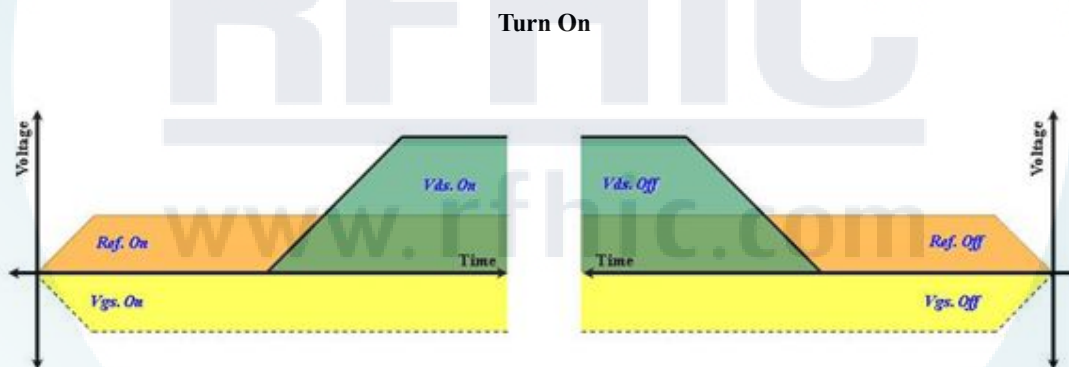
The required sequence for power supply is as follows.

During Turn-On

1. Connect GND.
2. Apply V_{GS} .
3. Apply V_{DS} .
4. Turn on the V_{GS} , and then, turn on the V_{DS} .
5. Apply the RF Power.

During Turn-Off

1. Turn off RF power.
2. Turn off V_{DS} , and then, turn off the V_{GS} .
3. Remove all connections.



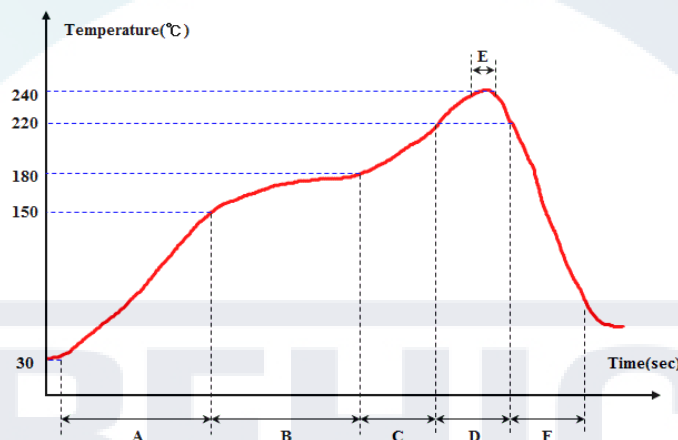
- Sequence Timing Diagram -

Reflow Profile

* Reflow oven settings

Zone	A	B	C	D	E	F
Temperature(°C)	30 ~ 150 °C	150 ~ 180 °C	180 ~ 220 °C	220 ~ 220 °C	235 ~ 240 °C	2 ~ 6 °C/ Sec Drop
Belt speed	55 ~ 115 sec	55 ~ 75 sec	30 ~ 50 sec	30 ~ 50 sec	5 ~ 10 sec	60 ~ 90 sec

* Measured reflow Profile



Ordering Information

Part Number	Package Design
HR9395-08A	-R (Reel)
	-B (Bulk)
	-EVB (Evaluation Board)

Revision History

Part Number	Release Date	Version	Modification	Data Sheet Status
HR9395-08A	2012.12.28	0.1	-	Preliminary

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