

Preliminary

GaN Power Transistors

D046A1C



Product Features

- Operating Frequency 2900~3300MHz
- 180 W Saturated Power @ 50V
- 62% Drain Efficiency @ Psat
- 50 Ohm Internally Matched
- Small Size & Weight
- GaN on SiC Technology

Applications

- Weather Radar Systems
- Marine Radar Systems
- Military Radar Systems



Package Type: MP24001

Description

The D046A1C is a fully integrated GaN power amplifier for S-band military and commercial radar applications covering 2900 to 3300 MHz. Utilizing GaN HEMT technology, it offers high breakdown voltage, wide bandwidth, and high efficiency in a compact 9.8 mm × 20.6 mm × 3.8 mm package.

Typical Performance @ $V_{DS} = +50V$, $T_c = 25^\circ C$, 50Ω

Frequency [MHz]	Pulsed Power*1				
	Signal Type	Input Power [dBm]	Output Power [dBm]	Large Signal Gain [dB]	Drain Efficiency [%]
2900	Pulse	39	52.7	13.7	62.8
3000		39	52.7	13.7	62.9
3100		39	52.8	13.8	62.0
3200		39	52.6	13.6	60.0
3300		39	52.3	13.3	59.5

Note

*1 Measured on the D046A1C test board, under Pulse Width 100usec and Duty Cycle 10%.

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Absolute Maximum Ratings(not simultaneous)

Rating	Symbol	Value	Unit	Condition
Drain to Source Voltage	V_{DSS}	110	V	$T_c=25^{\circ}\text{C}$
Gate to Source Voltage	V_{GS}	-10, +0	V	$T_c=25^{\circ}\text{C}$
Operating Voltage	V_{DD}	52	V_{DC}	
Maximum Forward Gate Current	I_{GMAX}	21.6	mA	$T_c=25^{\circ}\text{C}$
Storage Temperature	T_{STG}	-50, +125	$^{\circ}\text{C}$	
Case Operating Temperature	T_C	-20, +75	$^{\circ}\text{C}$	
Operating Junction Temperature ^{*1}	T_J	225	$^{\circ}\text{C}$	
Soldering Temperature ^{*2}	T_S	245	$^{\circ}\text{C}$	

Note

*1 Continuous use at maximum temperature will affect MTTF.

*2 Refer to the Application Note(AN-002) on soldering - "Solder Condition for RFHIC's GaN Device"

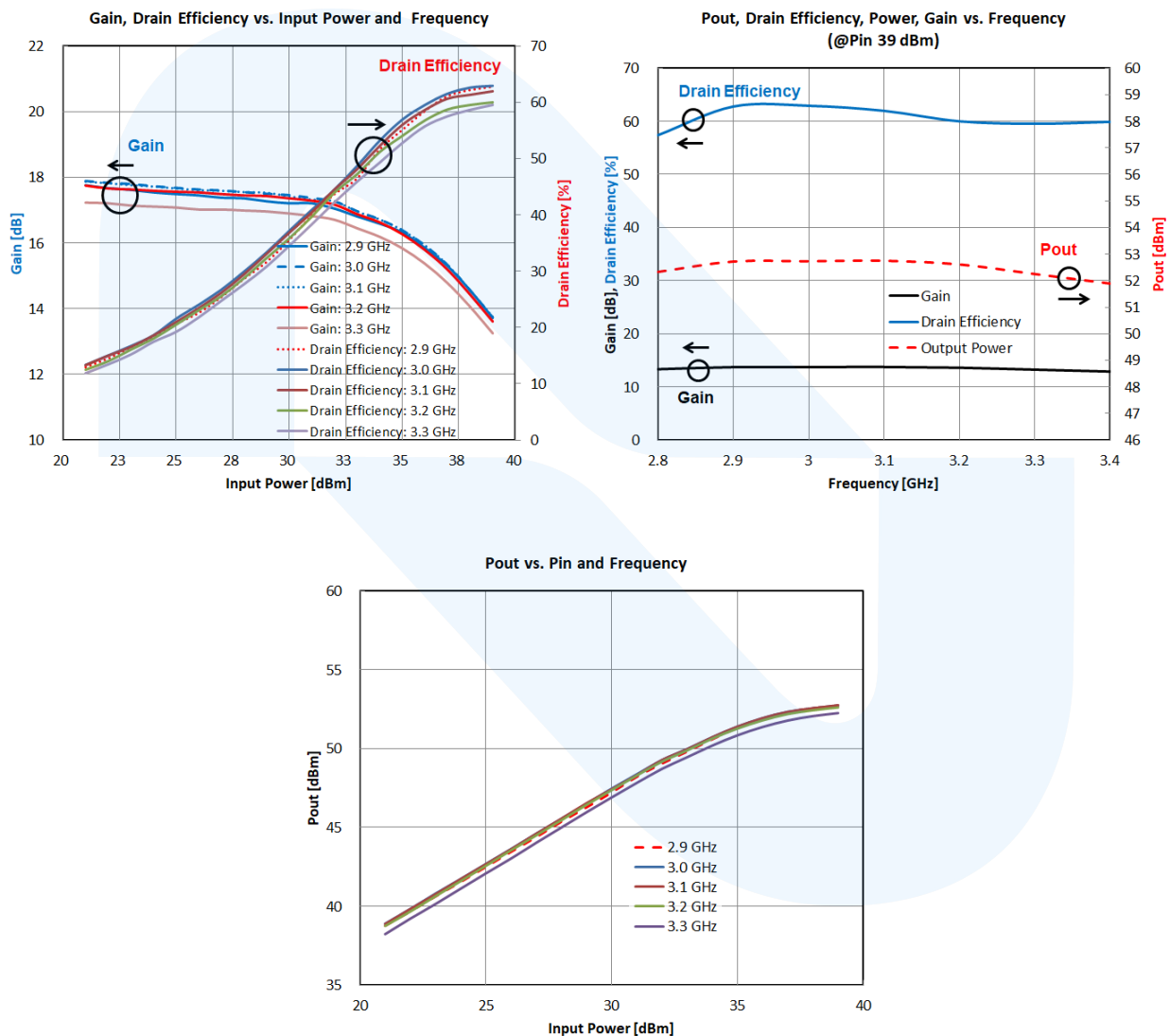
Typical Pulsed Signal Performance

* Test Conditions

V_{ds}: 50 V, I_{dq}: 400 mA, V_{gs}(Typ.): -2.67 V, Pulse Width: 200 usec, Duty Cycle: 10 %,

Forced Air Cooling, Ambient Temperature: 25°C. Measured in the D046A1C_EVB test board.

Provided solely for engineering evaluation – Does not constitute a revision of RFHIC's published datasheet limits.



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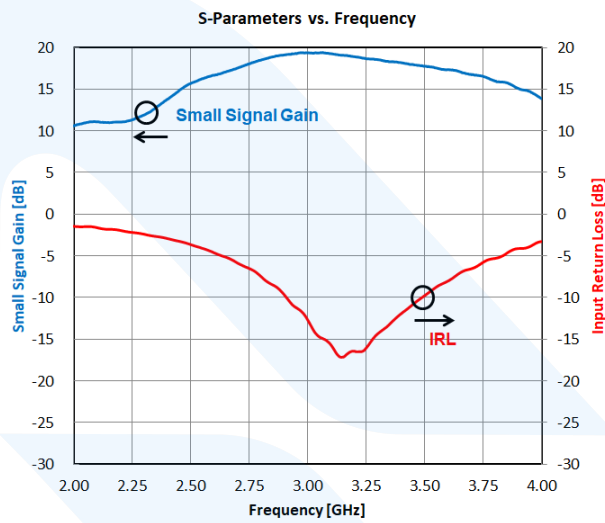


Typical Small Signal Performance

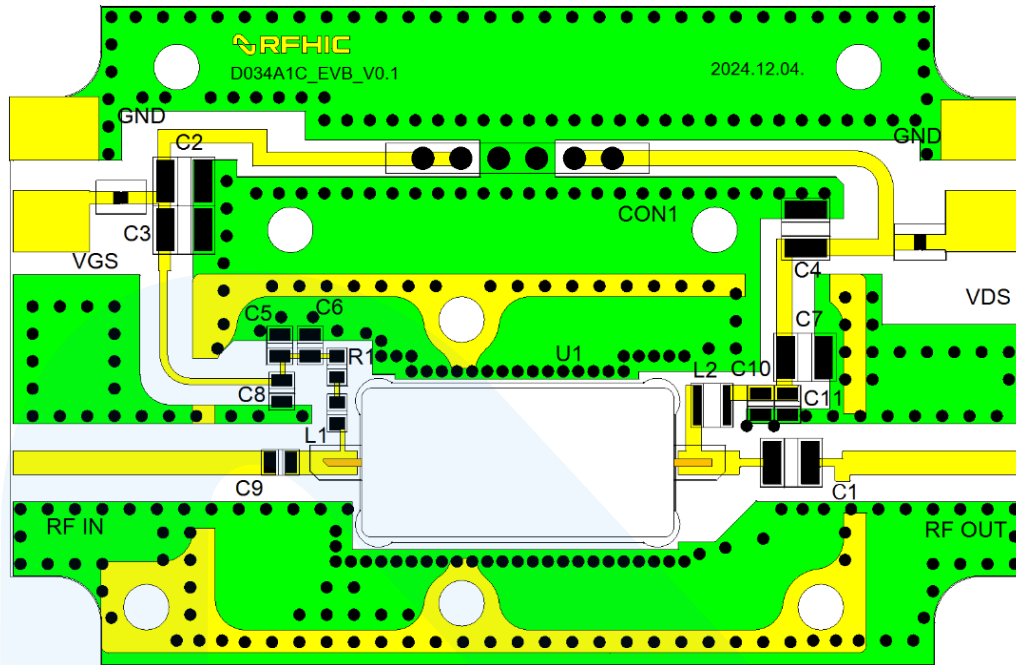
* Test Condition

V_{ds}: 50 V, I_{dq}: 600 mA, V_{gs}(Typ.): -2.73 V, Ambient Temperature: 25 °C. Measured in the D046A1C_EVB test board.

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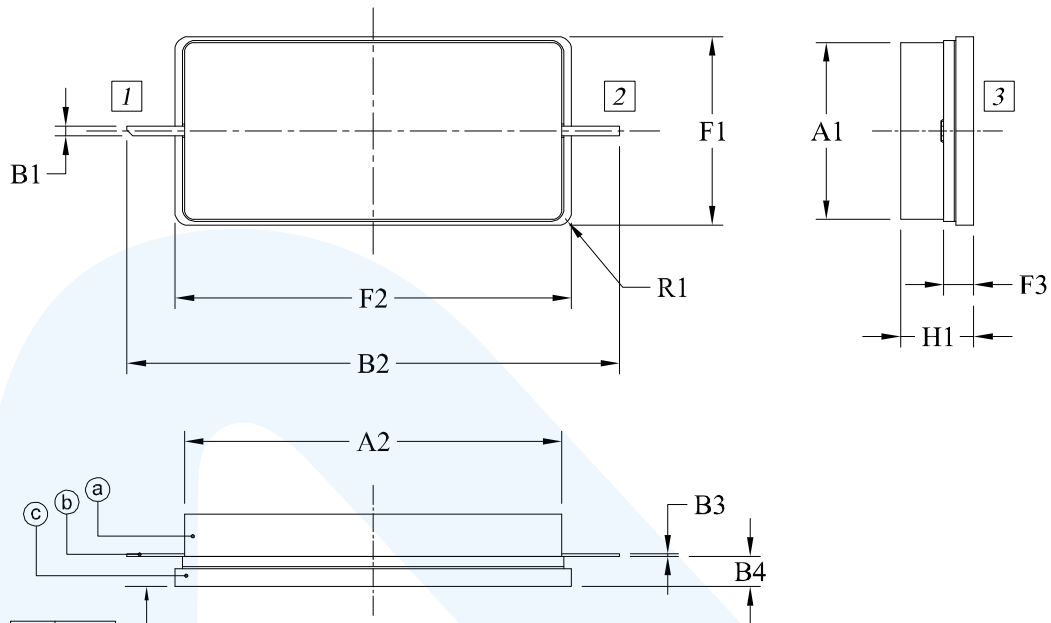
Test Board Component Layout



Parts List

Part	Description	Part Number	Manufacturer
R1	10 Ohm Chip Resistor, 1608	MCR03EZPJ100	ROHM
C1	7.5pF High Q Capacitor	501CHB7R5CSLE	EXXELIA SAS
C2, C4	-	-	-
C3	4.7 uF, 16V, 3215, Tantal	TAJA475M016RNJ	KYOCERA AVX
C5	100 pF High Q Capacitor	201CHA101JSLE	EXXELIA SAS
C6	10pF High Q Capacitor	201CHA100JSLE	EXXELIA SAS
C7	2.2uF, 100V, 3225	GRM32ER72A225KA35	MURATA
C8	100pF, 100V, 2012	0805B101K101CT	WALSIN
C9	6.8pF High Q Capacitor	201CHA6R8CSLE	EXXELIA SAS
C10	12pF High Q Capacitor	201CHA120JSLE	EXXELIA SAS
C11	100pF High Q Capacitor	201CHA101JSLE	EXXELIA SAS
L1	15nH, 1608, 700mA	0603CS-15NXJR	COILCRAFT
L2	15.7nH, 2.9A	0806SQ-16NJLC	COILCRAFT
CON1	-	-	-
PCB	$\epsilon_r=3.48 \pm 0.05$, 0.030" (0.762mm), 1OZ	RO4350B	ROGERS
U1	180W GaN Transistor	D046A1C	RFHIC

Package Dimensions (Type: MP24001 PKG)



Pin Description	
Pin No	Function
1	Gate
2	Drain
3	Source

Dim.	INCH			MILLIMETER		
	MIN	TYP	MAX	MIN	TYP	MAX
A1	.357	.362	.367	9.08	9.20	9.33
A2	.767	.772	.777	19.48	19.60	19.73
B1	.015	.020	.025	0.37	0.50	0.63
B2	.996	1.008	1.020	25.30	25.60	25.90
B3	.003	.005	.007	0.08	0.13	0.18
B4	.057	.062	.067	1.45	1.57	1.70
F1	.381	.386	.391	9.67	9.80	9.93
F2	.806	.811	.816	20.47	20.60	20.73
F3	.057	.062	.067	1.44	1.57	1.70
F4		.001			0.03	
H1	.138	.150	.161	3.50	3.80	4.10
R1 (Radius)	.022	.026	.030	0.55	0.65	0.75

- Ⓐ- Lid
- Ⓑ- Lead Frame
- Ⓒ- Flange

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Revision History

Part Number	Release Date	Version	Description	Data Sheet Status
D046A1C	Apr, 2025	0.1	Initial release of datasheet	Preliminary
D046A1C	Apr, 2025	0.2	Typical Performance Values have been updated Small Signal & Pulse Signal Performance has been added. Test Board Component Layout has been added. Parts List has been added.	Preliminary
D046A1C	Apr, 2025	0.3	Parts List has been updated	Preliminary
D046A1C	Sep, 2026	0.4	Updated pulsed operating condition from 200 μ s / 15% duty cycle to 100 μ s / 10% duty cycle	Preliminary



Certification

This product is manufactured by a company that is certified for the AS9100D quality management system.

RFHIC Corporation reserves the right to make changes to any products herein or to discontinue any product at any time without notice. While product specifications have been

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