GaN Power Transistors

RDC40D10B

Product Features

- Operating Frequency 2000~6000MHz
- 12.6W Output Power @ Pin=25dBm
- 35% Drain Efficiency @ Pin=25dBm
- Large Signal Gain 16dB @ Pin=25dBm
- Internally 50ohm Matched
- 2-Stage Cascade Amplifier Module
- GaN on SiC Technology

Applications

- Commercial Radar System
- Jammer Radar System
- Military Radar System

Package Type: PP-3G

Description

The RDC40D10B is a fully integrated GaN Hybrid power amplifier module designed for applications in Broadband Wireless Access Systems covering 2000–6000 MHz, including driver-stage amplifier applications for RADAR and EW devices. The RDC40D10B is an integrated 2-stage power amplifier module with 50-ohm matched input and output impedance. It can deliver up to 12.6 W of output power at a fixed input power of 25 dBm and an operating drain voltage of 28 V. The device measures 8 × 14 × 2.6 mm and is packaged in a ceramic surface-mount package.

Typical Performance @ V_{DS} = +28V, Tc=25℃, 50Ω

Frequency [MHz]	Fixed Input Power 25dBm*1		
	Power [W]	Gain [dB]	Drain Efficiency [%]
2000	14.2	16.5	33.7
3000	10.4	15.2	41.3
4000	13.1	16.2	46.1
5000	11.8	15.7	28.0
6000	12.2	15.9	28.7

Note

*1 Measured in the RDC40D10B test board amplifier circuit, under CW 1-tone.

Absolute Maximum Ratings

Rating	Symbol	Value	Unit	Condition
Drain to Source Voltage	V_{DSS}	110	V	Tc=25℃
Gate to Source Voltage	V_{GS}	-10, +0	V	Tc=25℃
Operating Voltage	V_{DD}	52	V_{DC}	
Storage Temperature	T_{STG}	-50, +125	℃	
Case Operating Temperature	T_C	-20, +75	℃	30 seconds
Operating Junction Temperature*1	T_J	225	℃	
Soldering Temperature*2	T_S	245	℃	

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"

Electrical Characteristics[*1] (T =25℃ unless otherwise noted)

Characteristics	Conditions	Symbol	Min	Typ	Max	Unit
DC Characteristics (Main)						
Maximum Forward Gate Current	**Tc= 25℃**	I_{GMAX}	-	-	4	mA
Maximum Drain Current[*2]	**Tc= 25℃**	I_{DMAX}	-	-	2.54	A
Power Dissipation	**Tc= 85℃**	P_{DMAX}	-	-	26.4	W
Gate Threshold Voltage	**V_{DS} = 10V** **I_D = 4.16mA**	$V_{GS(TH)}$	-3.8	-3.0	-2.3	V_{DC}
Gate Quiescent Voltage	**V_{DS} = 28V** **I_D = 150mA**	$V_{GS(Q)}$	-3.7	-2.9	-2.2	V_{DC}
Drain-Source Breakdown Voltage	**V_{GS} = -8V** **I_D = 4.16mA**	V_{BR}	150	-	-	V
Saturated Drain Current[*3]	**V_{DS} = 6V** **V_{GS} = 2V**	I_{DS}	3.4	4.2	-	A
Gate Leakage Current	**V_{GS} = -8V** **V_{DS} = 150V**	$I_{GLKG150}$	-1.3	-	-	mA
Drain Leakage Current	**V_{GS} = -8V** **V_{DS} = 150V**	$I_{DLKG150}$	-	-	1.7	mA
DC Characteristics (Drive)						
Maximum Forward Gate Current	**Tc= 25℃**	I_{GMAX}	-	-	1	mA
Maximum Drain Current[*2]	**Tc= 25℃**	I_{DMAX}	-	-	0.6	A
Power Dissipation	**Tc= 85℃**	P_{DMAX}	-	-	16.5	W
Gate Threshold Voltage	**V_{DS} = 10V** **I_D = 1.04mA**	$V_{GS(TH)}$	-3.8	-3.0	-2.3	V_{DC}
Gate Quiescent Voltage	**V_{DS} = 28V** **I_D = 100mA**	$V_{GS(Q)}$	-3.7	-2.9	-2.2	V_{DC}
Drain-Source Breakdown Voltage	**V_{GS} = -8V** **I_D = 1.04mA**	V_{BR}	150	-	-	V
Saturated Drain Current[*3]	**V_{DS} = 6V** **V_{GS} = 2V**	I_{DS}	0.8	1.0	-	A
Gate Leakage Current	**V_{GS} = -8V** **V_{DS} = 150V**	$I_{GLKG150}$	-0.3	-	-	mA
Drain Leakage Current	**V_{GS} = -8V** **V_{DS} = 150V**	$I_{DLKG150}$	-	-	0.4	mA

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"

Characteristics	Conditions	Symbol	Min	Typ	Max	Unit
RF Characteristics (F=4000MHz unless otherwise noted)						
Output Power	**V_{DS} = 28V**	P_{OUT}	9	12.6	20	W
Power Gain		G_P	14	16	18	dB
Drain Efficiency		η	20	35	60	%

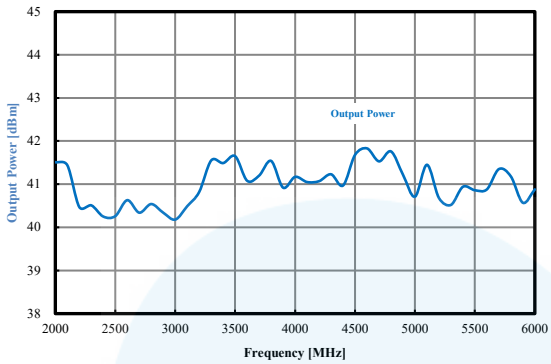
Note

***1 Measured in the RDC40D10B test board amplifier circuit, under CW 1-tone. Drive Idq=100mA, Main Idq=150mA**

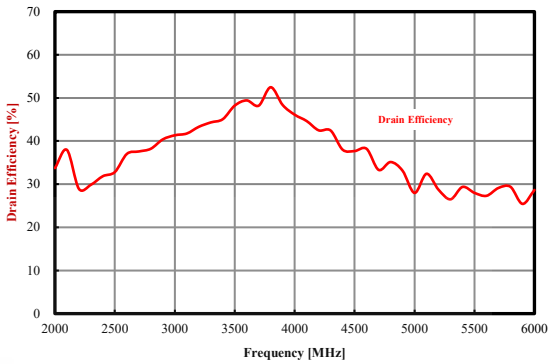
***2 Measured in the RDC40D10B test board amplifier circuit. No damage at all phase angles.**

Typical CW Signal Performance (Tc=25℃, Measured in the RDC40D10B test board amplifier circuit)

Output Power vs. Frequency

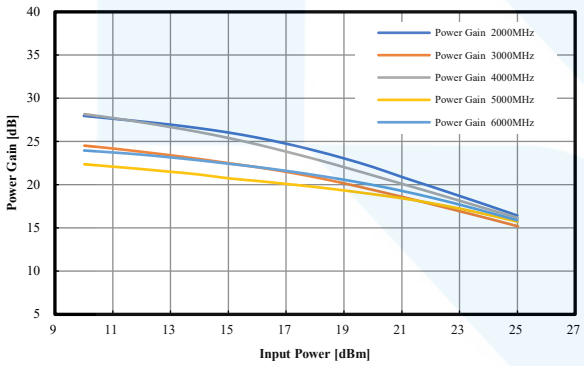


Drain Efficiency vs. Frequency

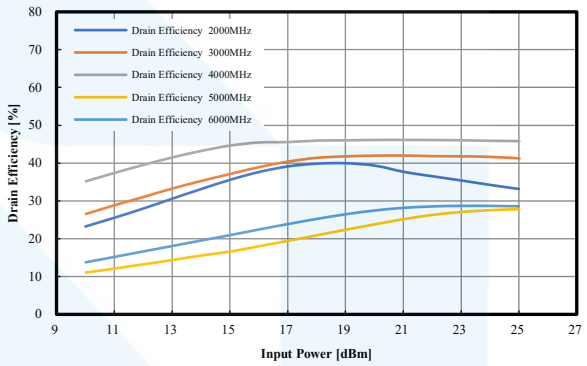


VDS = 28V, Drive Idq=100mA, Main Idq=150mA, Continuous Wave, Input Power 25dBm Fixed

Power Gain vs. Input Power

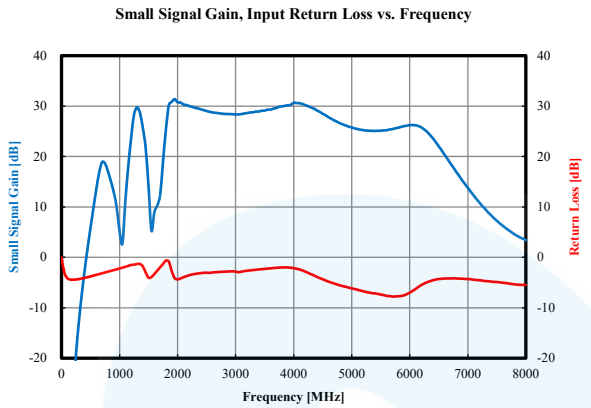


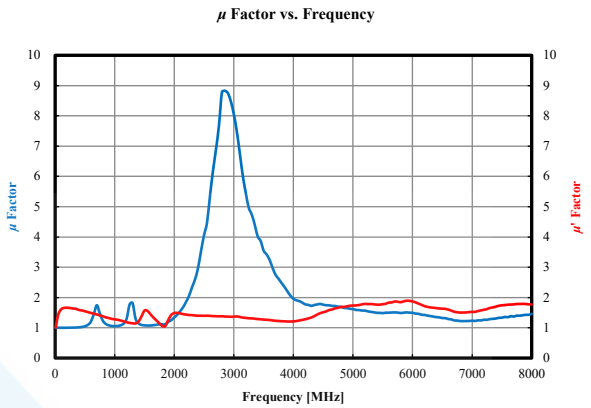
Drain Efficiency vs. Input Power



VDS = 28V, Drive Idq=100mA, Main Idq=150mA, Continuous Wave, Input Power 10dBm to 25dBm

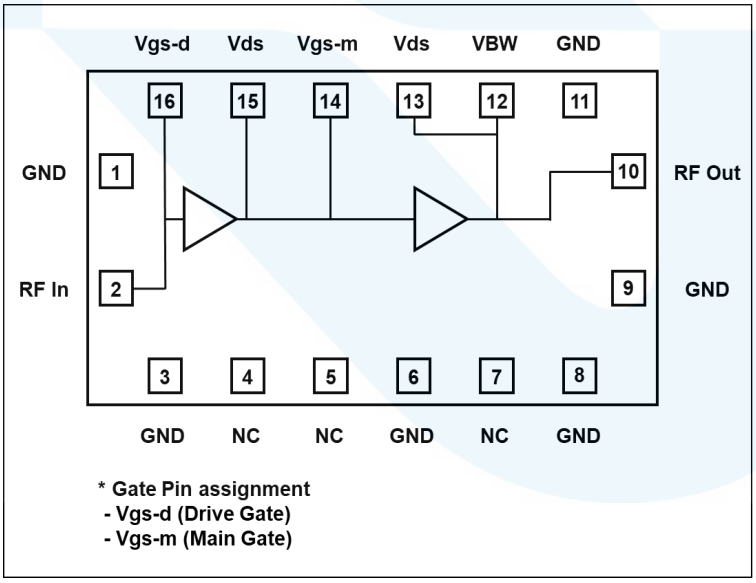
Typical Small Signal Performance (Tc=25°C, Measured in the RDC40D10B test board amplifier circuit)



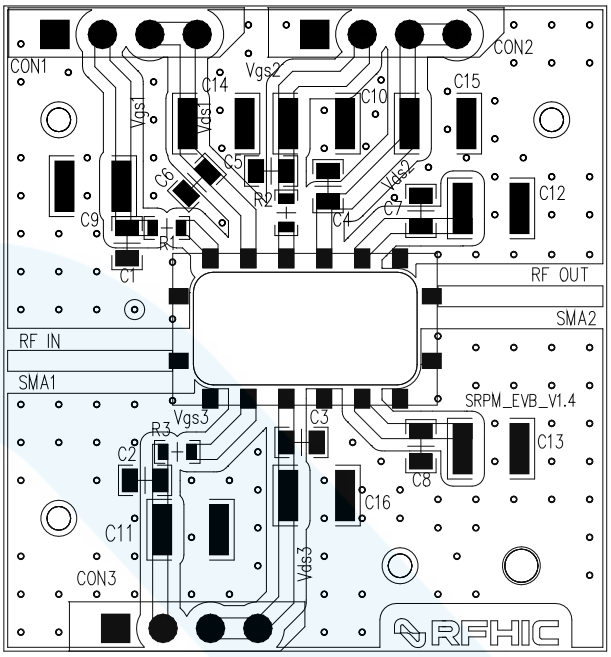


Input Power 20dBm, VDS = 28V, Drive Idq=100mA, Main Idq=150mA

Block Diagram



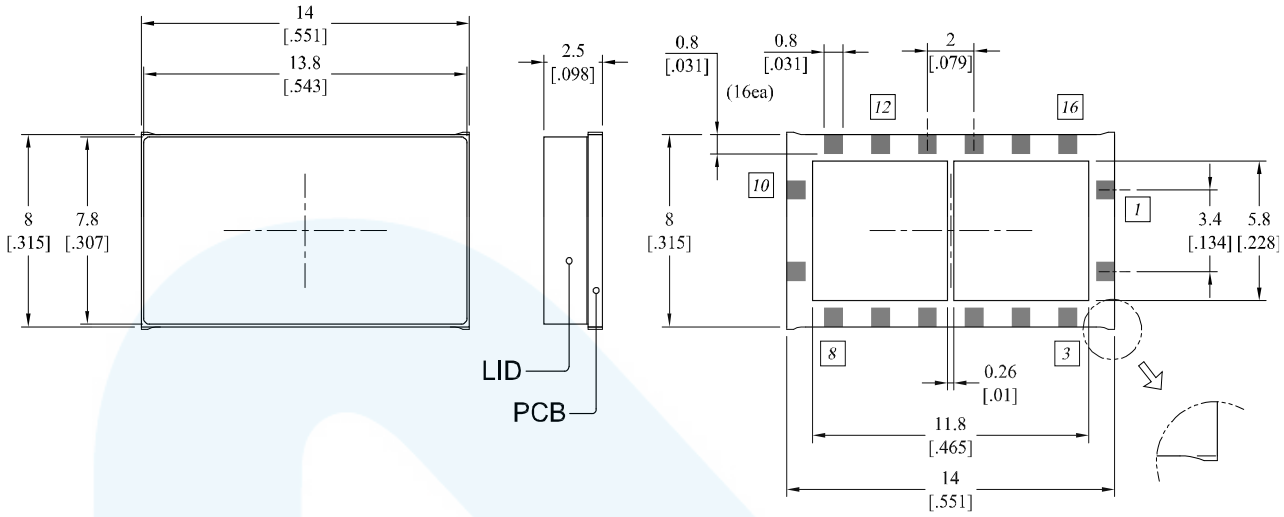
Test Board Component Layout



Parts List

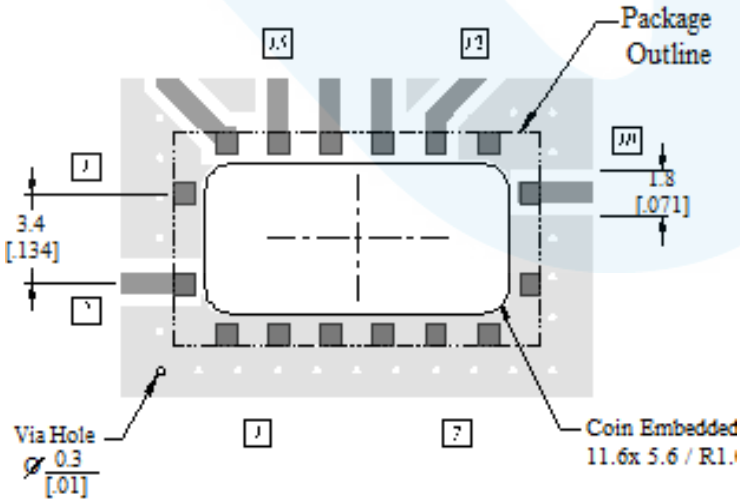
Part	Description	Part Number	Manufacturer
C4, C6	1.0uF / 100V	GRM21BC72A105KE01	MURATA
C14, C15	10uF / 100V	GRM32EC72A106KE05L	MURATA
C1, C5	4.7uF / 16V	GRM21BR71C475KA73L	MURATA
R1, R2	0ohm, 1608, J	MCR03 EZPJ000	ROHM
PCB	2Layer, 20mil, 1oz	RO4350B	ROGERS
CON 1~2	2.54mm Male Connector	5267-04A	MOLEX
SMA 1~2	Female Connector	-	-
PAM	GaN Hybrid PAM	RDC40D10B	RFHIC

Package Dimensions (Type: PP-3G)



Pin Description								
2	**4**	**5**	**10**	**13**	**14**	**15**	**16**	**12**
RF In	**-**	**-**	**RF Out**	**V_{DS}**	**V_{GS-m}**	**V_{DS}**	**V_{GS-d}**	**VBW**
-	**-**	**-**	**-**	**Main**	**Main**	**Drive**	**Drive**	

Recommended Footprint & Coin Embedded



Revision History

Part Number	Release Date	Version	Description	Data Sheet Status
RDC40D10B	March, 2026	1.0	Product Release	

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