

Preliminary

GaN Hybrid PAM

PRM33016-4S



Product Features

- 3100~3500MHz
- 42.3dBm Output Power @ 14dBm, 3300MHz
- 64% Power-added Efficiency @ 42.3dBm
- Large Signal Gain 28dB @ Pin=14dBm
- Internally 50ohm Matched
- GaN on SiC Technology

Applications

- Military Radar
- Commercial Radar



Package Type : PP-3G

Description

The PRM33016-4S is a fully integrated GaN Hybrid power amplifier module designed for applications in S-band military and commercial Radar Systems covering 3100~3500MHz. The PRM33016-4S provides 28dB of large-signal gain and 64% power added efficiency while achieving over 16W of saturated output power. The PRM33016-4S is matched to 50 ohms with integrated DC blocking capacitors on both I/O ports. This device's size is 8x14x2.6mm and is packaged in a ceramic surface mount package. Lead-free and RoHS compliant.

Typical Performance

($V_{DS}=+24V$, $T_C=25^{\circ}C$, 50 Ω)

Frequency [MHz]	Parameter ^{*1}			
	Saturated Power [W]	Output Power [dBm] @ Pin = 14dBm	Power Added Efficiency [%] @ Pin = 14dBm	Large Signal Gain @ Pin = 14dBm
3100	16.4	42.1	64.7	28.1
3300	17.8	42.4	66.2	28.4
3500	17.5	42.4	64.8	28.4

Note

*1 Measured in the PRM33016-4S test board amplifier circuit, under Pulsed CW @ Pulse Width 200 usec, Pulse Period 1 msec

Absolute Maximum Ratings

Rating	Symbol	Value	Unit	Condition
Drain to Source Voltage	V_{DSS}	100	V	$T_C=25^{\circ}C$
Gate to Source Voltage	V_{GS}	-10, +2	V	$T_C=25^{\circ}C$
Operating Voltage	V_{DD}	52	V_{DC}	
Storage Temperature	T_{STG}	-40, +125	$^{\circ}C$	
Case Operating Temperature	T_C	-35, +85	$^{\circ}C$	
Operating Junction Temperature ^{*1}	T_J	225	$^{\circ}C$	
Soldering Temperature ^{*2}	T_S	250	$^{\circ}C$	

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"

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Electrical Characteristics^{*1} (T_c = 25°C unless otherwise noted)

Characteristics	Conditions	Symbol	Min	Typ	Max	Unit
DC Characteristics (Main)						
Maximum Forward Gate Current	Tc= 25℃	I _{GMAX}	-	-	5	mA
Maximum Drain Current ^{*2}	Tc= 25℃	I _{DMAX}	-	-	3.2	A
Power Dissipation	Tc= 85℃	P _{DMAX}	-	-	29.8	W
Gate Threshold Voltage	V _{DS} = 10V	V _{GS(TH)}	-3.80	-3.00	-2.30	V _{DC}
	I _D = 5.2mA					
Gate Quiescent Voltage	V _{DS} = 24V	V _{GS(Q)}	-3.75	-2.80	-2.25	V _{DC}
	I _D = 80mA					
Drain-Source Breakdown Voltage	V _{GS} = -8V	V _{BR}	150	-	-	V
	I _D = 5.2mA					
Saturated Drain Current ^{*3}	V _{DS} = 6V	I _{DS}	4.2	5.2	-	A
	V _{GS} = 2V					
Gate Leakage Current	V _{GS} = -8V	I _{GLKG150}	-1.6	-	-	mA
	V _{DS} = 150V					
Drain Leakage Current	V _{GS} = -8V	I _{DLKG150}	-	-	2.1	mA
	V _{DS} = 150V					
	DC Characteristics (Drive)					
Maximum Forward Gate Current	Tc= 25℃	I _{GMAX}	-	-	1	mA
Maximum Drain Current ^{*2}	Tc= 25℃	I _{DMAX}	-	-	0.8	A
Power Dissipation	Tc= 85℃	P _{DMAX}	-	-	8	W
Gate Threshold Voltage	V _{DS} = 10V	V _{GS(TH)}	-3.80	-3.00	-2.30	V _{DC}
	I _D = 1.2mA					
Gate Quiescent Voltage	V _{DS} = 24V	V _{GS(Q)}	-3.75	-2.80	-2.25	V _{DC}
	I _D = 40mA					
Drain-Source Breakdown Voltage	V _{GS} = -8V	V _{BR}	150	-	-	V
	I _D = 1.2mA					
Saturated Drain Current ^{*3}	V _{DS} = 6V	I _{DS}	0.8	1.1	-	A
	V _{GS} = 2V					
Gate Leakage Current	V _{GS} = -8V	I _{GLKG150}	-0.4	-	-	mA
	V _{DS} = 150V					
Drain Leakage Current	V _{GS} = -8V	I _{DLKG150}	-	-	0.5	mA
	V _{DS} = 150V					

Note

*1 Measured on wafer prior to packaging.

*2 Current Limit for long term, reliable operation

*3 Scaled from PCM data.

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Electrical Characteristics^{*1} (T_{amb} = 25°C unless otherwise noted) - continued

Characteristics	Conditions	Symbol	Min	Typ	Max	Unit
RF Characteristics (Operating Frequency Range)						
Output Power @ Pin=14dBm^{*1, 2}	Frequency = 3.1GHz	P _{OUT}		42.1		dBm
	Frequency = 3.3GHz			42.4		
	Frequency = 3.5GHz			42.4		
Power Added Efficiency @ Pin=14dBm^{*1, 2}	Frequency = 3.1GHz	η		64.7		%
	Frequency = 3.3GHz			66.2		
	Frequency = 3.5GHz			64.8		
Large Signal Gain^{*1, 2}	Frequency = 3.1GHz	G _p		28.1		dB
	Frequency = 3.3GHz			28.4		
	Frequency = 3.5GHz			28.4		
Duty Cycle	Operating Freq. Range	DC		20	30	%
Pulse Width	Operating Freq. Range	PW		200	500	μs
Amplitude Pulse Droop	Operating Freq. Range	Droop		0.3	0.5	dB
Rise Time	Operating Freq. Range	t _r		20	100	ns
Fall Time	Operating Freq. Range	t _f		20	100	ns

Note

*1 Pulse width 200μsec, Pulse period 1msec.

*2 Measured in the PRM33016-4S test board amplifier circuit, biasing Drive : ΔV_{gs}-d = -0.5V at Idq 40mA, Main Idq : 80mA

* Above electrical specifications are measured by connecting electrolytic condenser 470μF to V_{DS}. Please make sure that electrolytic condenser is connected properly while testing the PAM.

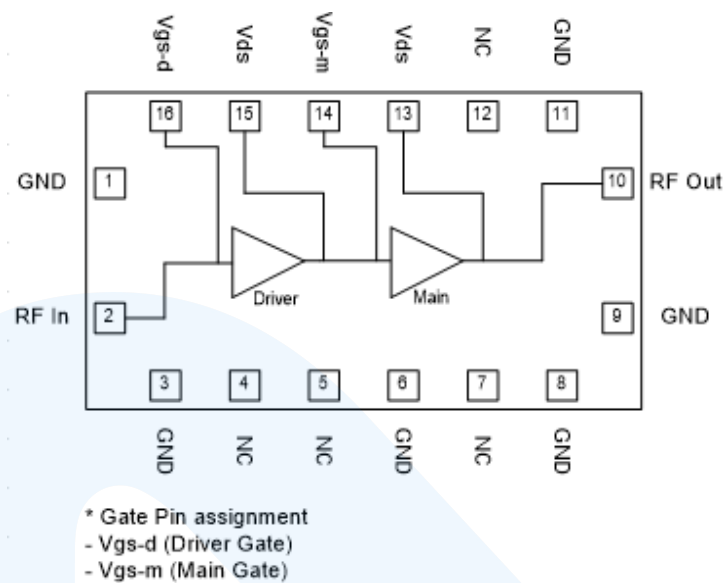
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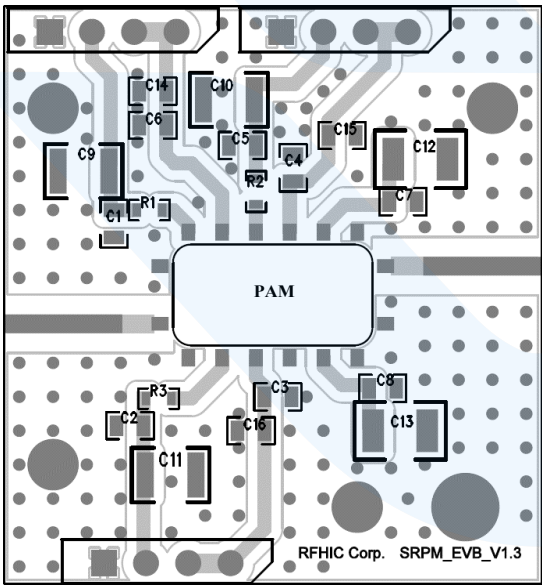
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Block Diagram

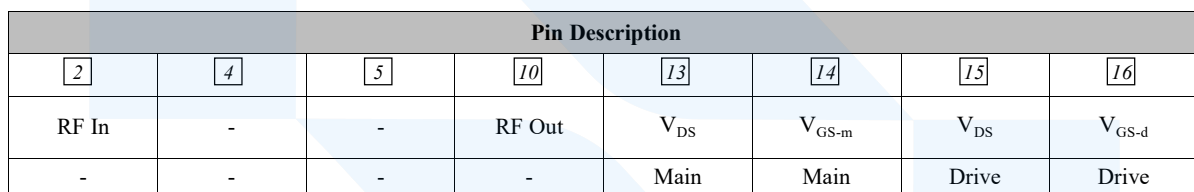


Test Board Component Layout with Coin Embedded

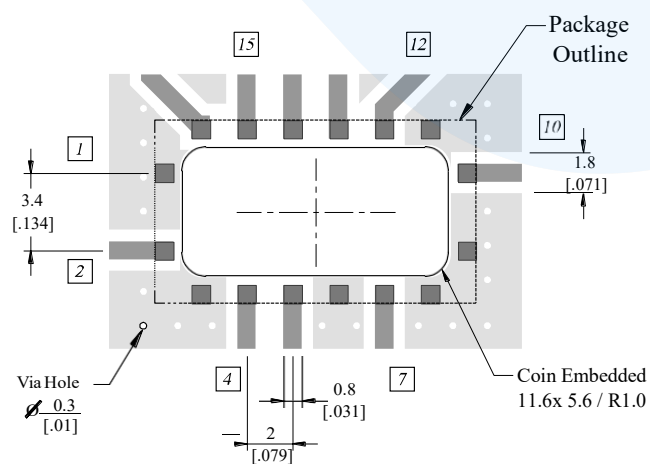


Part	Description	Part Number	Manufacturer
C4, C6, C14, C15	1.0uF / 100V	GRM21BC72A105KE01	MURATA
R1, R2	0ohm, 1608, 0.1W, 50V, -55~155°C	MCR03 EZP0000	ROHM
PCB	2Layer, 20mil, 1oz	RO4350B	ROGERS
CON1~2	2.54mm Male Connector	5267-04A	MOLEX
SMA1~2	Female Connector	-	-
PAM	GaN Hybrid PAM	PRM33016-5S	RFHIC

* Unit: mm[inch] | Tolerance: $\pm 0.15[.006]$



Recommended Footprint & Coin Embedded



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ESD Sensitivity Ratings

	ESD Class	Standard
HBM	1C	ANSI/ESDA/JEDEC Standard JS-001
CDM	C2	ANSI/ESDA/JEDEC Standard JS-002

Packing Information

Part Number	Description
PRM33016-4S	600 pcs on a 13" reel (Standard)

Lot Number Description

2	5	1	4	0	1
①	②	③	④	⑤	⑥

- ①② Year Number
③④ Week Number
⑤⑥ Production Number

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Revision History

Part Number	Release Date	Version	Description	Data Sheet Status
PRM33016-4S	Sep, 2026	0.1	Initial Release	Preliminary



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

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