1. Description

- The M2605CP is a packaged, X-band power amplifier manufactured using a 0.25μm gate-length gallium nitride high electron mobility transistor (HEMT) process on SiC.
- Operation between 8-12GHz, the M2605CP provides 25W of saturated output power and 23dB of large-signal gain while achieving 40% power-added efficiency.
- The M2605CP is packaged in a 10-lead 15.24 x 15.24mm bolt-down package. With good thermal properties, it can perform well under both short and long pulse operations.
- The M2605CP MMIC has DC blocking capacitors on both RF ports, which are matched to 50ohms.
- Evaluation board available on request.

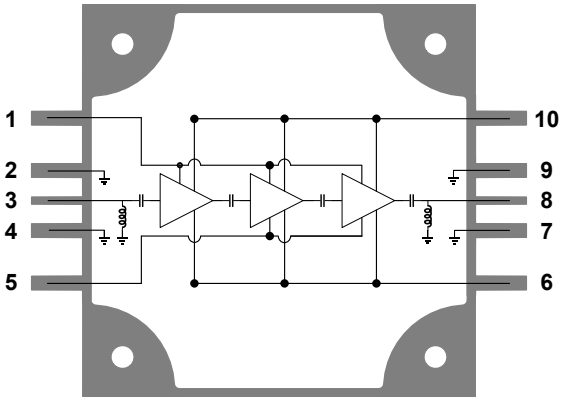


Figure 1. M2605CP Functional Block Diagram

2. Applications

- TX/RX Modules
- Wireless Communications

3. Features

- Operating Frequency: 8-12GHz
- Output Power (P_{SAT}): 44dBm (25W)
- Power Gain: 23dB
- Typical Power Added Efficiency: 40%
- Operating Bias: 28V (V_D), I_{DQ}=330mA
- Small Signal Gain: 35dB
- Input Return Loss: -10dB
- Package Size: 15.24 x 15.24 x 3.50mm

4. Brief Typical Performance

Table 1. Brief Typical Performance

Parameter	8-12GHz	Units
Output Power	44	dBm
Power Gain	23	dB
Power Added Efficiency	40	%
Drain Dynamic Current	2.8	A
Small Signal Gain	35	dB
Input Return Loss	-10	dB

- Test condition: RF input signal and V_D pulsed, Pulse width=100μs, Duty cycle=10%

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5. Absolute Maximum Ratings

Table 2. Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DSS}	32	V
Gate-Source Voltage	V_{GS}	-2.5	V
Operating Voltage Range	V_{DS}	0 ~ +32	V
Maximum Input Power	P_{IN}	25	dBm
Maximum Forward Gate Current	I_{GMax}	10	mA
Storage Temperature Range	T_{STG}	- 65 ~ +150	°C
Operating Junction Temperature	T_J	250	°C

6. Recommended Operating Conditions

Table 3. Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
Operating Temperature Range	-55	25	85	°C
Drain-Source Voltage Range, V_{DSS}	-	28	-	V
Drain Bias Current, I_{DQ}	-	330	-	mA
Gate-Source Voltage, V_{GS}	-3.1	-3.0	-2.9	V

7. RF Characteristics (T_C = 25˚C)

Table 4. RF Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Output Power	P_{SAT}	43.8	44.0	45.0	dBm
Output Power, P_{SAT}, W	P_{SAT}	24	25	31.5	W
Power Gain	G_P	21.8	23.0	24.0	dB
Power Added Efficiency	PAE	39	40	45	%
Drain Dynamic Current	I_D	-	-	2.8	A
Small Signal Gain	G_{ss}	30	35	38	dB
Input Return Loss	S11	-	-10.0	-	dB

- Test condition: RF input signal pulsed and V_D pulsed, Pulse width=100μs, Duty cycle=10%

8. Typical Performance Curve(T_C=25℃)

■ Small Signal Characteristics Curve

（V_D=28V, I_{DQ}=330mA, P_{IN}=-15dBm，CW）

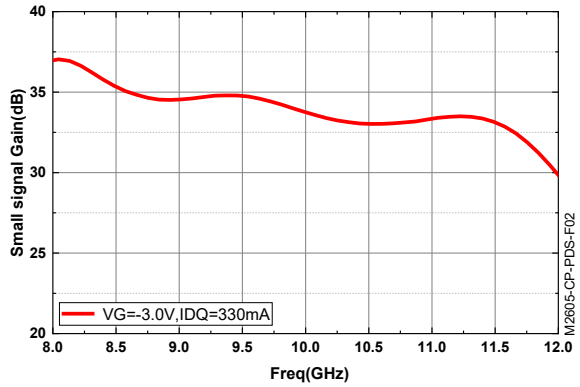


Figure 2. Small Signal Gain vs. Frequency

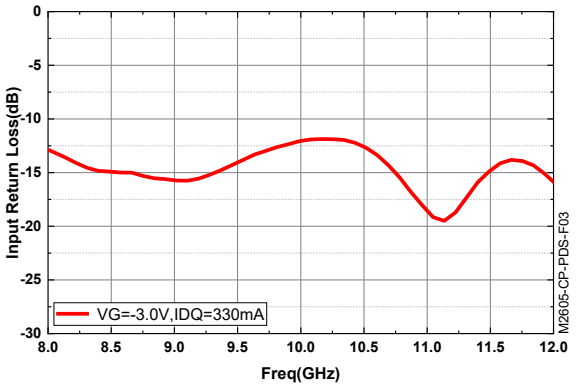


Figure 3. Input Return Loss vs. Frequency

■ Power Characteristic Curve

（P_{IN}=21dBm, V_D=28V, I_{DQ}=330mA, Pulse width=100μs，Duty cycle=10%）

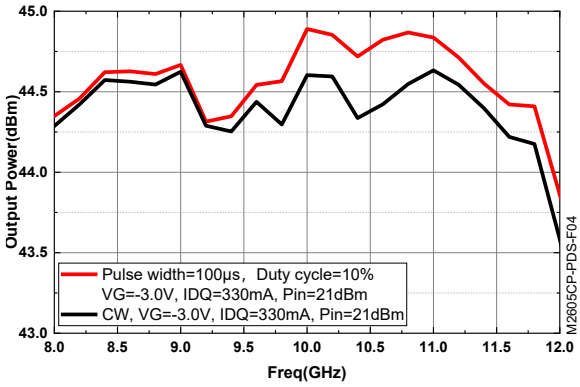


Figure 4. Output Power vs. Frequency

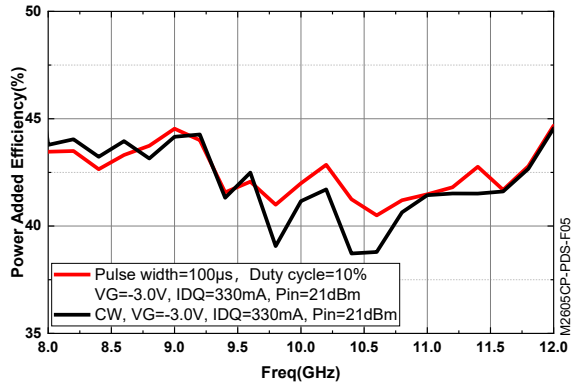


Figure 5. Power Added Efficiency vs. Frequency

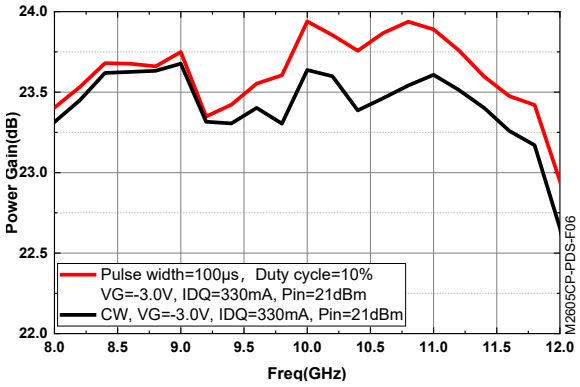


Figure 6. Power Gain vs. Frequency

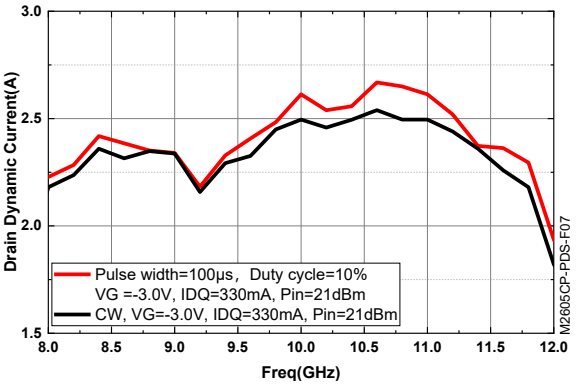
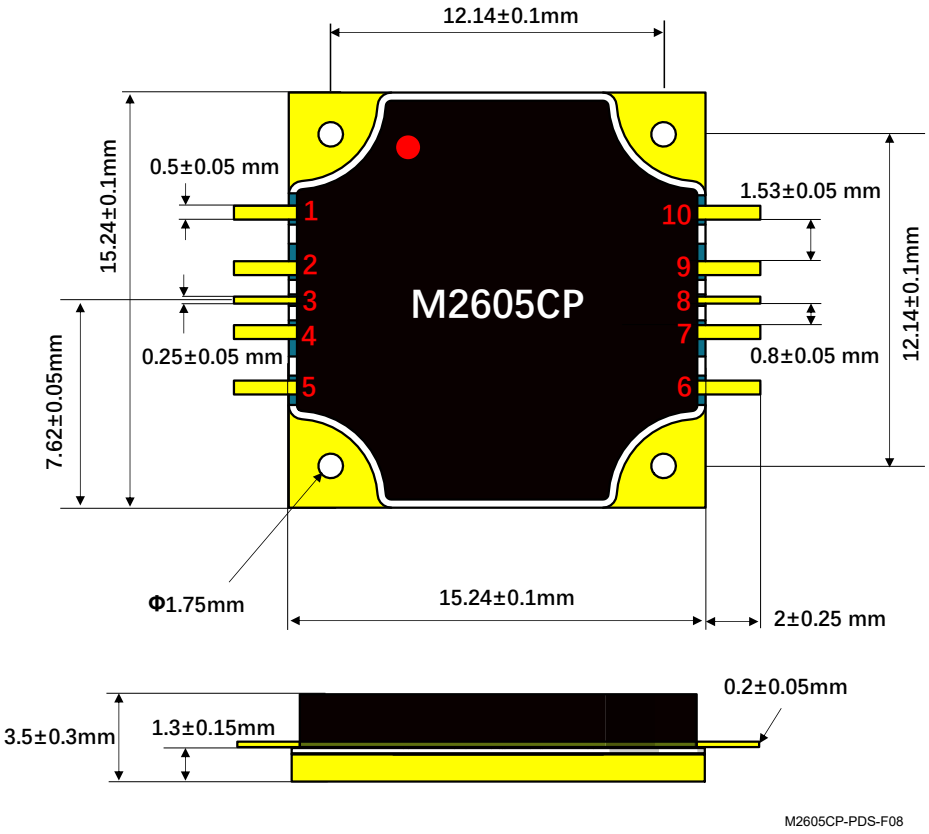


Figure 7. Drain Dynamic Current vs. Frequency

9. Outline Dimensions



• Dimensions shown in mm

Figure 8. M2605CP Outline Dimensions

Table 5. Pin Description

Pin	Symbol	Description
1,5	V_G	Gate Voltage. Bypass network required, refer to figure 9.
6,10	V_D	Drain Voltage.
3	RF_{IN}	RF Input. 50Ohms. DC blocking capacitor is not required.
8	RF_{OUT}	RF Output. 50Ohms. DC blocking capacitor is not required.
2,4,7,9	GND	Must be grounded on the PCB.

10. Applications Information

■ Applications Diagram

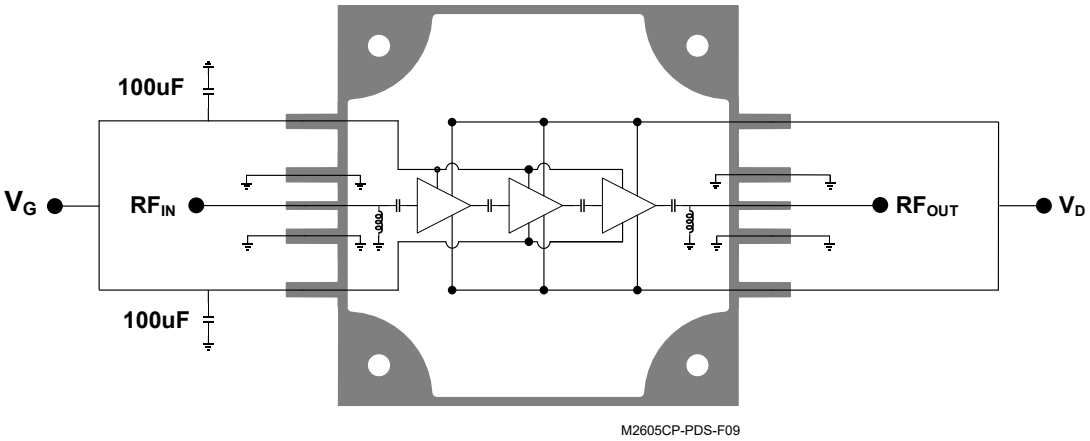


Figure 9. M2605CP Applications Diagram

11. Evaluation Board (EVB) Layout Assembly

■ Assembly Diagram

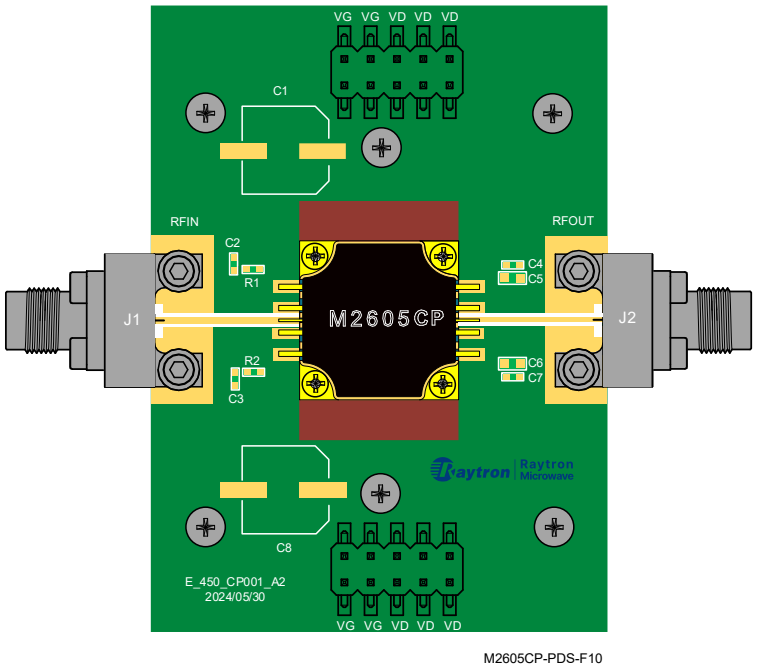


Figure 10. M2605CP Assembly Diagram

Table 6. Bill of Materials

Pin	Symbol	Description
C1, C8	100uF	CAP, 100uF, 63V, 20%, X5R
J1, J2	2.92mm	Female End Launch Connector
PCB	-	Rogers 4003C, 8mil Dielectric, 1oz. Copper

12. Handling Precautions

- **Solderability**
  The component leads should be manually soldered, and the package cannot be subjected to conventional reflow processes. The use of no-clean solder to avoid washing after soldering is recommended.
- **Cleanliness**
  Handle the components in a clean environment. Never use liquid cleaning systems to clean the components.
- **ESD Caution**
  ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore proper ESD precautions should be taken to avoid performance degradation or loss of functionality.



13. Contact Information

For the latest specifications, additional product information, technical support and sales support, please contact:

- **Email:** RF.support@raytrontek.com
- **Web:** www.raytrontek.com

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