1. Description

- The M5306 is a 28dBm ($IP_{-0.1dB}$) wideband single-pole, triple-throw (SP3T) switch fabricated on GaAs p-HEMT MMIC process. It operates over DC-13GHz with a 0/-5V control voltage.

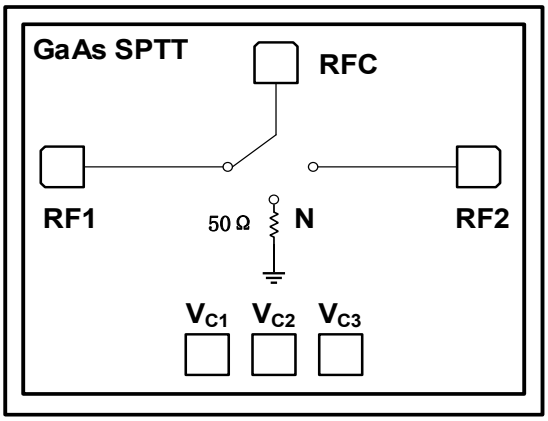


Figure 1. M5306 Functional Block Diagram

2. Applications

- Commercial and Military Radar
- Communications
- Test Instruments

3. Features[1]

- Frequency Range: DC-13GHz
- Insertion Loss: 1.2dB
- Isolation: 28dB
- Input/Output Return Loss: -15dB
- Input Power ($IP_{-0.1dB}$): 28dBm
- Control Voltage: 0/-5V
- Die Size: 1.55 x 1.20 x 0.10mm

[1] On-wafer Test

4. Brief Typical Performance

Table 1. Brief Typical Performance

Parameter	DC-13GHz	Units
Insertion Loss	1.2	dB
Isolation	28	dB
Input/Output Return Loss	-15	dB
Input Power for 0.3dB Compression	28	dBm

- Test condition: Input signal Pulsed, Pulse width = 50μs, Duty cycle = 5%

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5. Recommended Operating Conditions

Table 2. Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
Operating Temperature Range	-55	25	125	°C
Control Voltage, $V_{C1}/V_{C2}/V_{C3}$	-	0/-5V	-	V

6. RF Characteristics (T_C = 25°C)

Table 3. RF Characteristics[1]

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	On-State[2]	-	1.2	-	dB
Isolation	On-State[2]	-	28	-	dB
Isolation	Off-State[3]	-	24	-	dB
Input Return Loss	On-State[2]	-	-15	-	dB
Output Return Loss	On-State[2]	-	-17	-	dB
Input Return Loss	Off-State[3]	-	-10	-	dB
Input Power for 0.1dB Compression	On-State[2]	-	28	-	dBm

[1]. Test condition: Input signal Pulsed, Pulse width = 50μs, Duty cycle = 5%

[2]. On-State: The RF signal is switched from RFC to RF port.

[3]. Off-State: The RF signal is switched from RFC to N port, and the N port is connected to 50Ω load.

7. Typical Performance Curve (T_C = 25˚C)

■ Small-signal Characteristics Curve

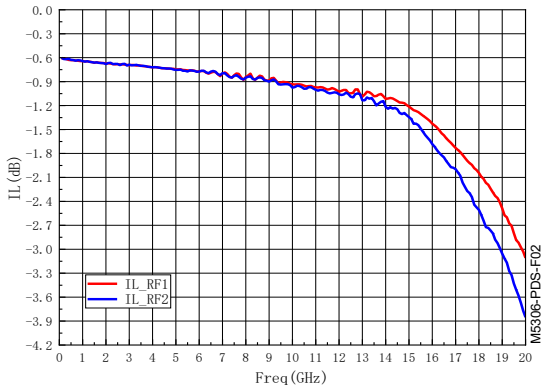


Figure 2. Insertion Loss Characteristics

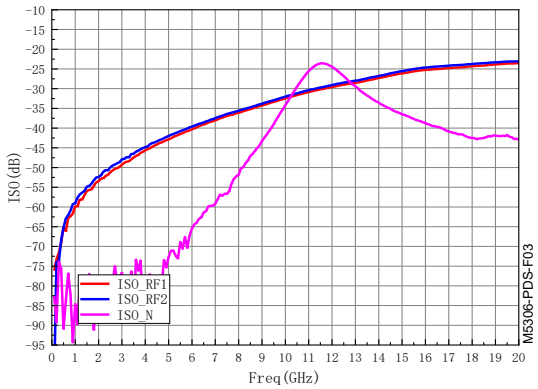


Figure 3. Isolation Characteristics

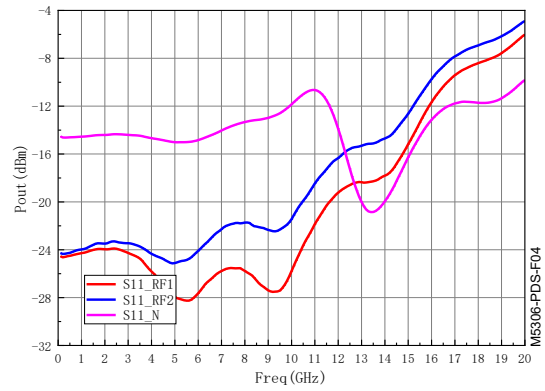


Figure 4. Input Return Loss Characteristics

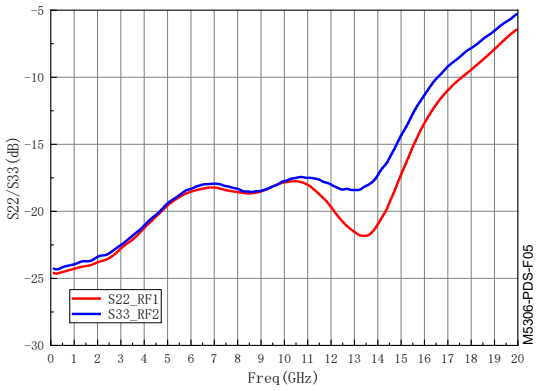


Figure 5. Output Return Loss Characteristics

Notes:

- ISO_N: The ISO between RF1 and RF2 ports when RFC switched to port N
- S11_N: The RL of the RFC port when RFC switched to port N

■ Power Characteristic Curve（V_{on}=0V, V_{off}=-5V, On-wafer test）

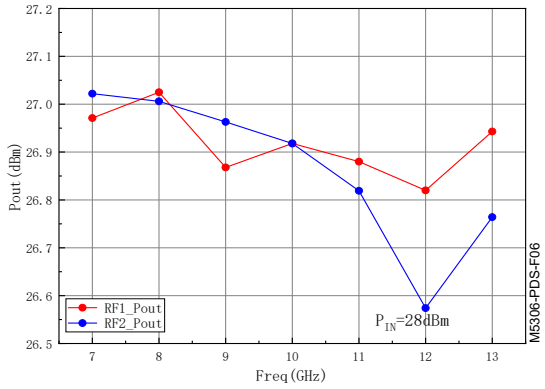


Figure 6. P_{out} at P_{in}=28dBm

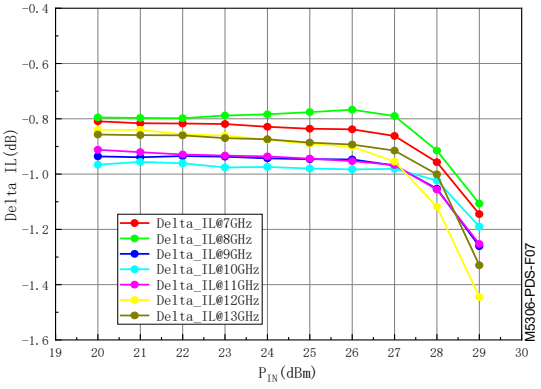
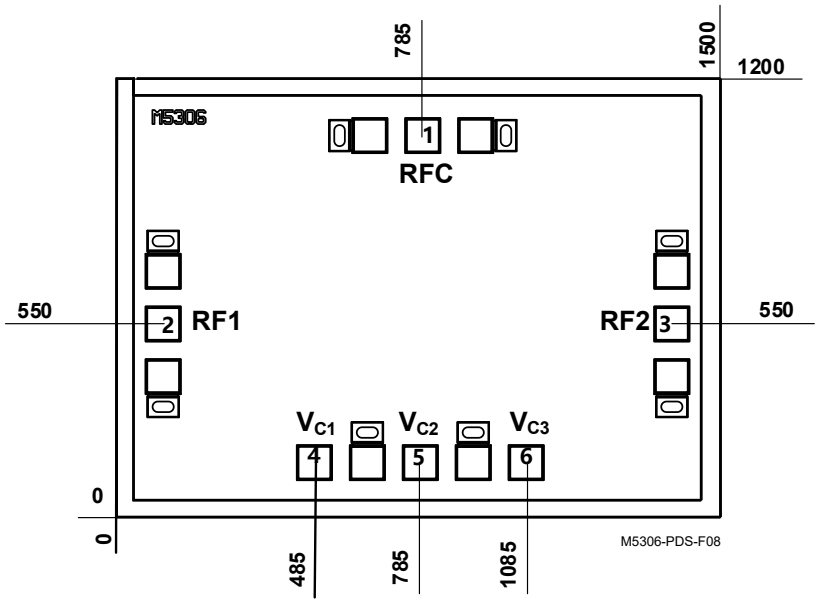


Figure 7. IL vs. P_{in} Characteristics

8. Outline Dimensions



• Dimensions shown in micrometre

Figure 8. M5306 Outline Dimensions

Table 4. Pad Description

Pad	Symbol	Description
1	RFC	RF Input
2,3	RF1/RF2	RF Output 1 / RF Output 2
4,5,6	V_{C1}/V_{C2}/V_{C3}	Control Voltage

Table 5. Truth Table

V_{C1}	V_{C2}	V_{C3}	RFC to RF1	RFC to RF2	RFC to N
-5V	-5V	0V	ON	OFF	OFF
0V	-5V	-5V	OFF	ON	OFF
-5V	0V	-5V	OFF	OFF	ON

9. Assembly Information

■ Assembly Diagram

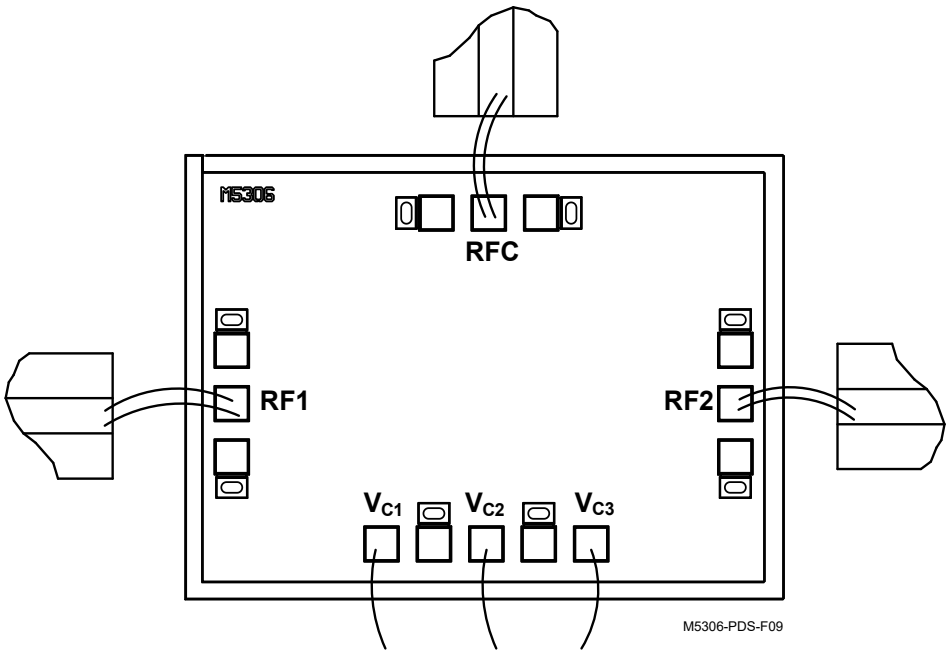


Figure 9. M5306 Assembly Diagram

- **Eutectic Die Attach:** It is best to use an 80% Au/20% Sn preform. Do not expose the chip to a temperature greater than 300°C for more than 30sec.
- **Wire Bonding:** RF bonds made with 1mil gold wire are recommended for the RF ports. Keep all bonds as short as possible, less than 0.35mm.

10. Handling Precautions

■ Storage

All bare dies ship in either Waffle or Gel Pak, which is an ESD protective container, and then sealed in an ESD protective bag. After opening the sealed ESD protective bag, all dies must be stored in a dry nitrogen environment.

■ Cleanliness

Handle the dies in a clean environment. Never use liquid cleaning systems to clean the dies.

■ 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.



11. 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

12. Disclaimer

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