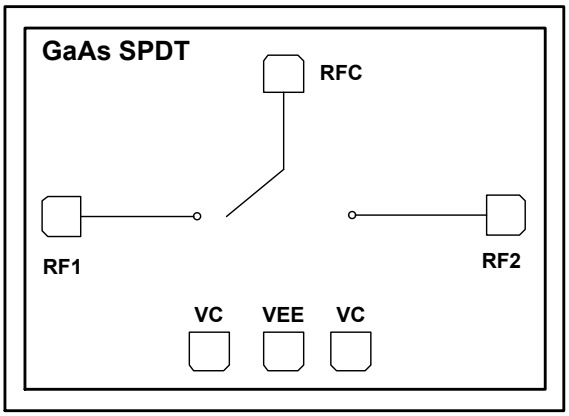
1. Description

- The M5313(M) is a 25dBm (IP_{-1dB}) wideband SPDT absorptive switch fabricated on GaAs p-HEMT MMIC process. It operates over DC-24GHz utilizing -5V supply voltage with 0V/+5V positive control voltage (compatible with 3.3V).
-



M5313-PDS-F01

Figure 1. M5313 Functional Block Diagram

2. Applications

- TX/RX Modules
- Communications
- Test Instruments

3. Features[1]

- Frequency Range: DC-24GHz
- Insertion Loss: 1.4dB
- Isolation: 50dB
- Input/Output Return Loss: -15dB
- Input Power (IP_{-1dB}): 25dBm
- Supply Voltage: -5V
- Control Voltage: 0/3.3V or 0/5V
- Die Size: 1.7 x 1.2 x 0.1mm

[1] On-wafer Test

4. Brief Typical Performance

Table 1. Brief Typical Performance

Parameter	DC-24GHz	Units
Insertion Loss	1.4	dB
Isolation	50	dB
Input/Output Return Loss	-15	dB
Off-state Output Return loss	-20	dB
Input Power for 1dB Compression	25	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
Supply Voltage, VEE	-	-5	-	V
Control Voltage, VC	-	0/+5V or 0/+3.3V	-	V

6. RF Characteristics (T_C = 25˚C)

Table 3. RF Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Insertion Loss	IL	-	1.4	-	dB
Isolation	ISO	-	50	-	dB
Input/Output Return Loss	RL_{IN}/ RL_{OUT}	-	-15	-	dB
Off-state output return loss	RL_{OUT} (Off)	-	-20	-	dB
Input Power for 0.1dB Compression	IP_{-1dB}	-	25	-	dBm

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

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

■ Small-signal Characteristics Curve（VEE=-5V, VC=0V/+3.3V, On-Wafer Test）

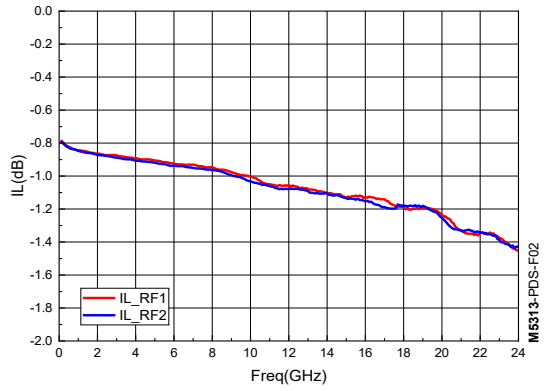


Figure 2. Insertion Loss Characteristics

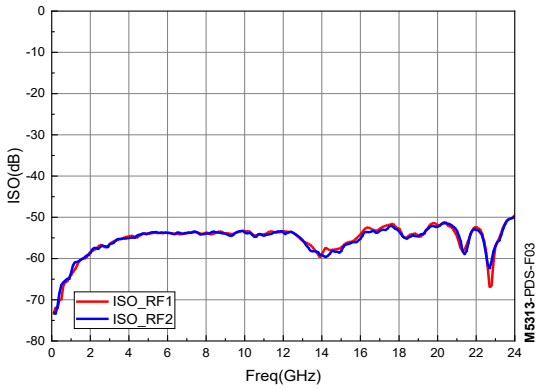


Figure 3. Isolation Characteristics

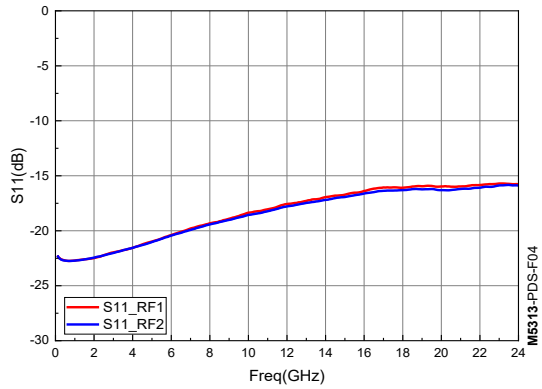


Figure 4. Input Return Loss Characteristics

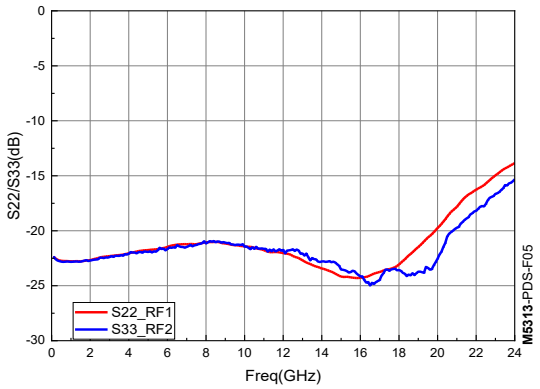


Figure 5. On-State Output Return Loss Characteristics

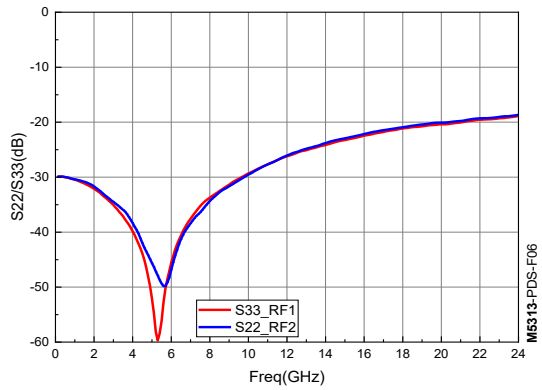


Figure 6. Off-State Output Return Loss Characteristics

■ Power Characteristic Curve（VEE=-5V, VC=0V/+3.3V, On-Wafer Test）

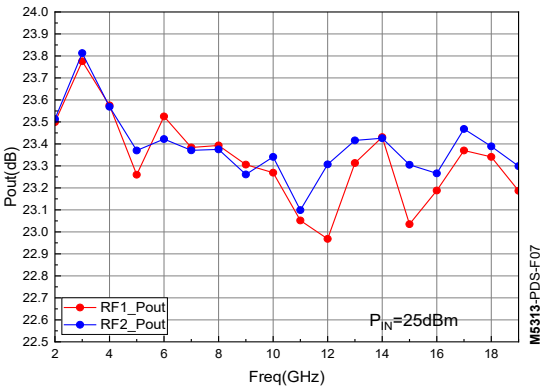


Figure 6. P_{out} at P_{in}=25dBm

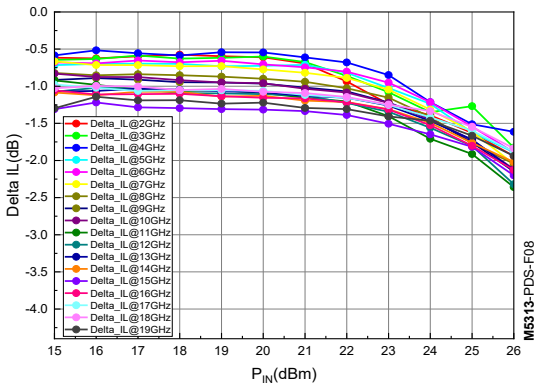
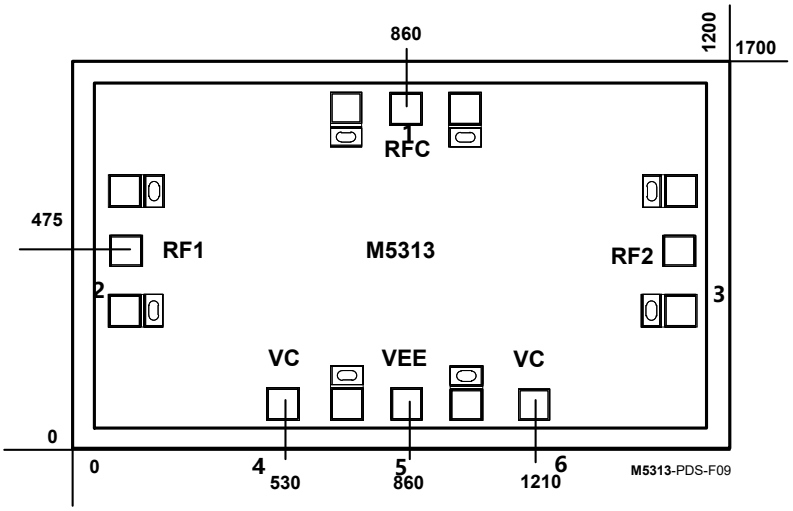


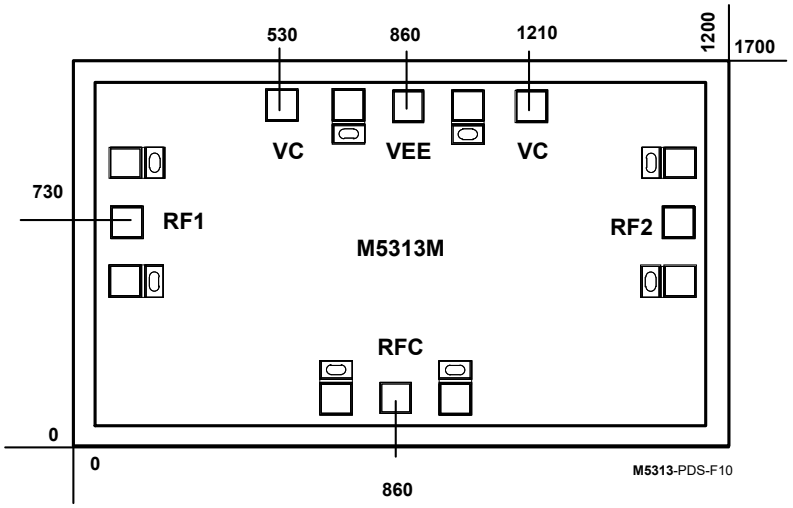
Figure 7. IL vs. P_{in} Characteristics

8. Outline Dimensions



• Dimensions shown in micrometre

Figure 9. M5313 Outline Dimensions



• Dimensions shown in micrometre

Figure 10. M5313(M) Outline Dimensions

Table 4. Pad Description

Pad	Symbol	Description
1	RFC	RF Input
2,3	RF1/RF2	RF Output 1 / RF Output 2
4,6	VC	Control Voltage
5	VEE	Supply Voltage

Table 5. Truth Table

VEE	VC	RFC to RF1	RFC to RF2
-5V	3.3V	ON	OFF
-5V	0V	OFF	ON

9. Assembly Information

■ Assembly Diagram

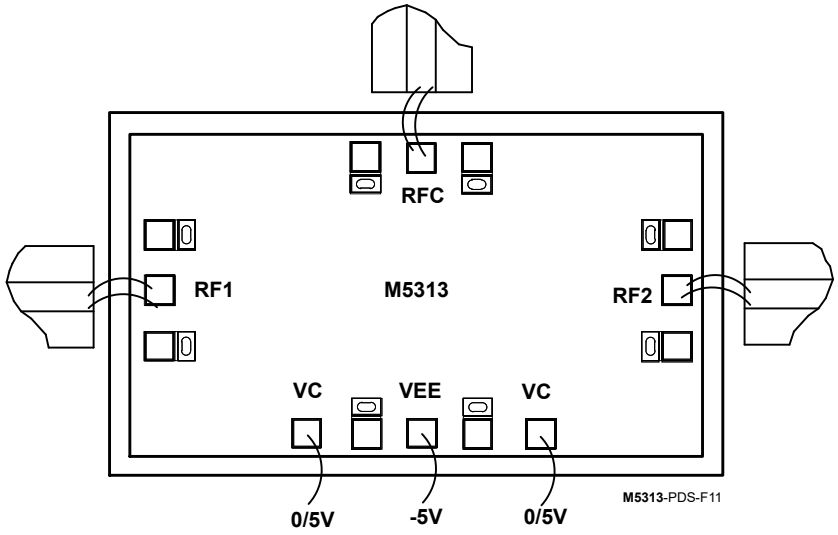


Figure 11. M5313 Assembly Diagram

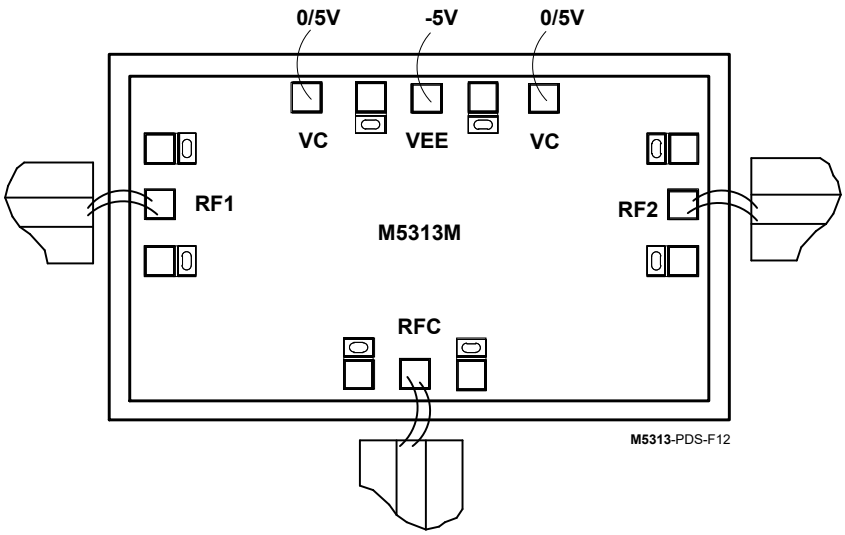


Figure 12. M5313(M) Assembly Diagram

- **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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