1. Description

- The M0018 is a wideband adjustable attenuator fabricated on GaAs IPD MMIC process. It operates over DC-13GHz and provides adjustable attenuation from 0dB to 14dB with 2dB step.

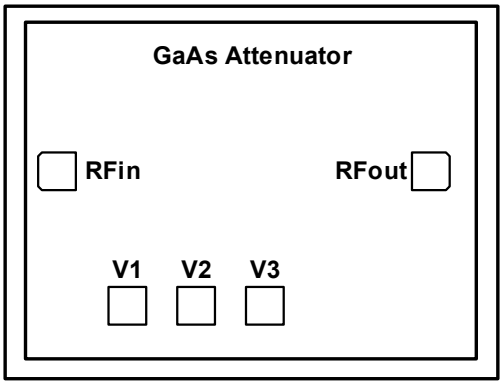


Figure 1. M0018 Functional Block Diagram

2. Applications

- TX/RX Modules
- Radar

3. Features[1]

- Frequency Range: DC-13GHz
- Insertion Loss: 1.1dB
- Attenuation Range: 0-14dB
- Attenuation Step: 2dB
- Control Voltage: 0/-5V
- Die Size: 1.85 x 1.25 x 0.10mm

[1] On-wafer Test

4. Brief Typical Performance

Table 1. Brief Typical Performance

Parameter	DC-13GHz	Units
Insertion Loss	1.1	dB
Input/Output Return Loss	-20	dB
Input Power for 0.1dB Compression	29.5	dBm

- Test condition: Input signal Pulsed, Pulse width = 100ms, Duty cycle = 30%

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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, V1-V3	-	0/-5	-	V

6. RF Characteristics (T_C = 25°C)

Table 3. RF Characteristics[1]

Parameter	Symbol	Min.	Typ.	Max.	Units
Insertion Loss	IL	-	1.1	-	dB
Attenuation accuracy[2]	△Ai	-(0.3+5%Ai)	-	0.3+5%Ai	-
Input/Output Return Loss	RL_{IN}/ RL_{OUT}	-	-20	-	dB
Input Power for 0.1dB Compression	$IP_{-0.1dB}$	-	29.5	-	dBm

[1] Test condition: Input signal Pulsed, Pulse width = 100ms, Duty cycle = 30%

[2] Ai: Attenuation Value

7. Typical Performance Curve

■ Small-signal Characteristics Curve

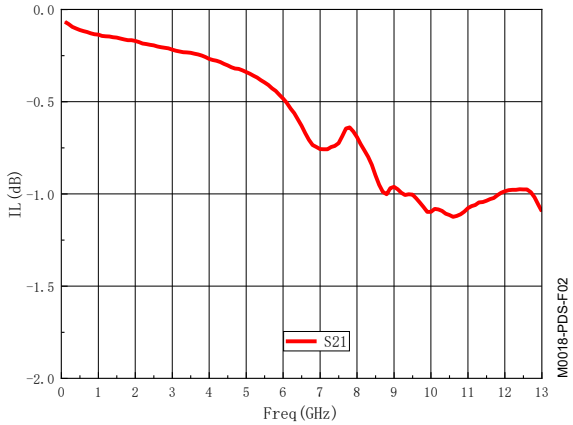


Figure 2. Insertion Loss Characteristics

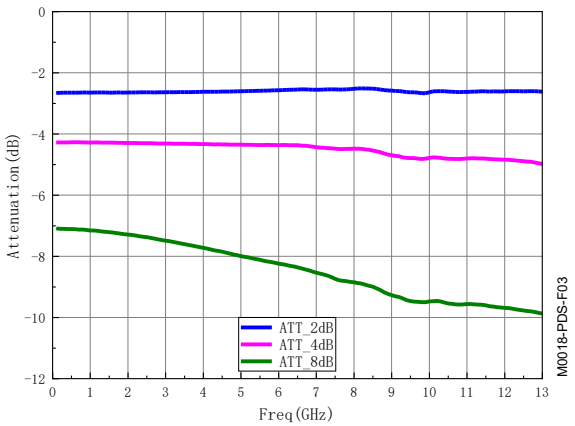


Figure 3. Attenuation Characteristics

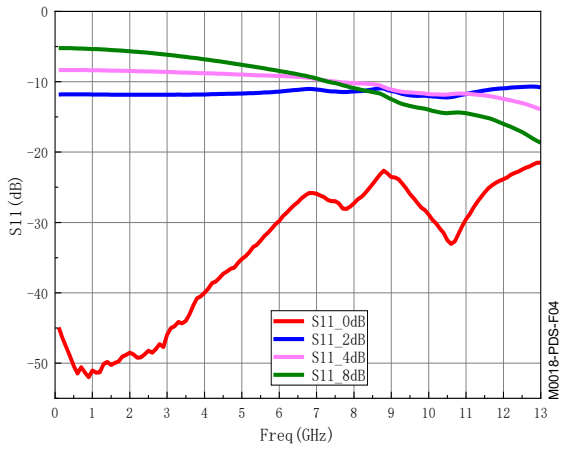


Figure 4. Input Return Loss Characteristics

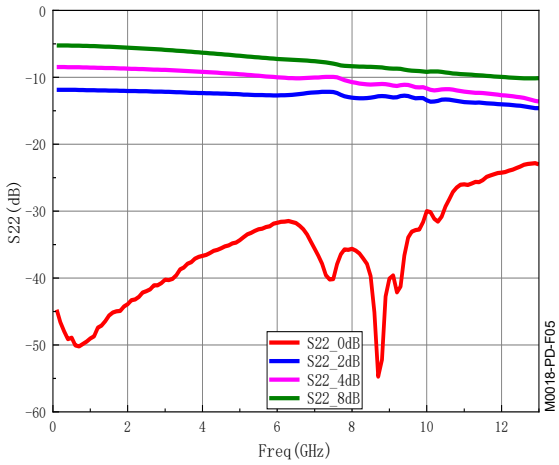
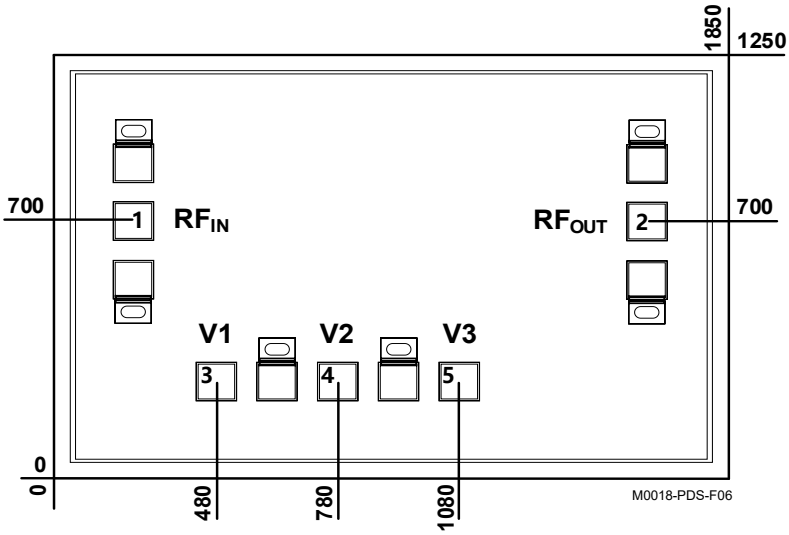


Figure 5. Output Return Loss Characteristics

8. Outline Dimensions



- Dimensions shown in micrometre

Figure 6. M0018 Outline Dimensions

Table 4. Pad Description

Pad	Symbol	Description
1	RF_{IN}	RF Input
2	RF_{OUT}	RF Output
3,4,5	V1/V2/V3	Control Voltage

Table 5. Truth Table

V1	V2	V3	Attenuation
-5V	-5V	-5V	0dB
-5V	0V	-5V	2dB
0V	0V	-5V	4dB
0	0	0	8dB

9. Assembly Information

■ Assembly Diagram

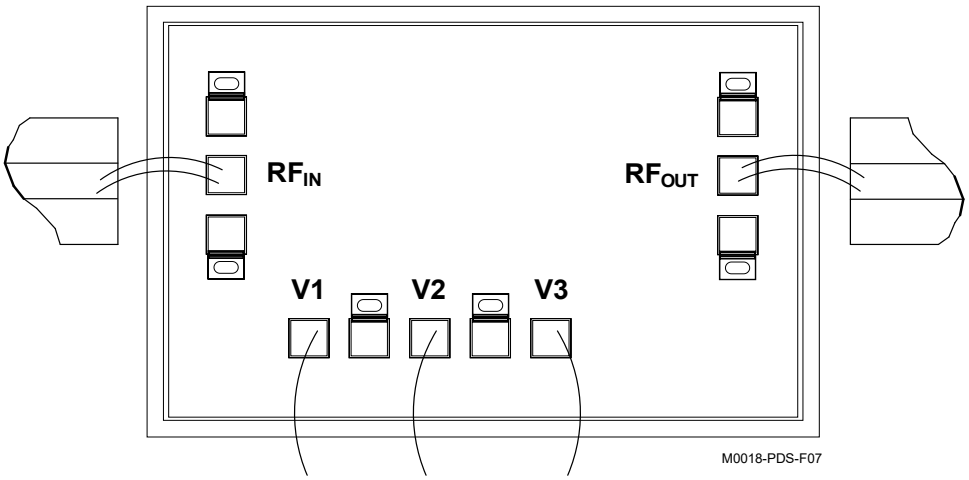


Figure 7. M0018 Assembly Diagram

- **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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