

A0101-08G-18G-P4-SMAFF Datasheet

Key Features

- Passive Device
- Frequency: 8.4 to 18 GHz
- Insertion Loss 8.4 to 18 GHz: < 3 dB
- Max CW Power Input: +40 dBm
- Max Peak Power Input: 1kW
 - 1 μ s Pulse Width
 - 0.1% Duty Cycle
- Steady State Recovery Time: < 550 ns at +30 dBm Pulsed
- -3 dB Response Time: < 250 ns at +30 dBm Pulsed
- Dimensions: 0.5in (W) x 0.5in (H) x 1.96in (L)



Applications

- Wideband Receiver Protection
- Cosite Interference Mitigation
- Simultaneous Transmit and Receive
- Enhance and Optimize Dynamic Range
- Wideband SDR/ADC Protection

Product Overview

The Metamagnetics' A0101-08G-18G-P4-SMAFF absorptive Auto-Tune Filter® (AtF) is a coaxially packaged adaptive wideband filter well suited for interference mitigation applications that require wide instantaneous bandwidth, low insertion loss, and high-power handling capability.

The AtF is a passive device that can be used to protect front end receivers and amplifiers from high power interfering signals. It is designed to selectively limit incident high power signals above the device's threshold ($P_{\text{threshold}}$), while exhibiting low linear insertion loss to below threshold signals.

The AtF automatically creates notches in its passband in response to above threshold signals without any prior knowledge about these high-power signals. The width and depth of these notches are proportional to how much above threshold the high-power signals are. The **selectivity** of the device corresponds to this notch width.

RF Specifications

Linear Mode ($P_{\text{input}} < P_{\text{threshold}}$) 8.4 – 18 GHz					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Return Loss (S_{11})	$T_{\text{ambient}} = +20^{\circ}\text{C}$ 50 Ω system $P_{\text{input}} = -20\text{dBm CW}$	13.5	20	—	dB
Insertion Loss (S_{21})		1.80	2.30	3	dB
Group Delay		0.55	0.60	0.65	ns
OIP3 ¹	Two Equal Power Tones 10 MHz Apart	44	45	46	dBm

Limiting Mode ($P_{\text{input}} > P_{\text{threshold}}$) 8.4 – 18 GHz					
Parameter	Conditions ²	Min.	Typ.	Max.	Unit
P1dB		3	15	24	dBm
Power Leakage	$P_{\text{input}} = +20\text{ dBm}$	9	15	19	dBm
	$P_{\text{input}} = +30\text{ dBm}$	15	21	26	dBm
Selectivity ³ (-3 dB Notch Width)	$P_{\text{input}} = +10\text{ dBm CW}$	1	4	7	MHz
	$P_{\text{input}} = +20\text{ dBm CW}$	3	8	12	MHz
	$P_{\text{input}} = +30\text{ dBm CW}$	20	36	50	MHz
Selectivity ⁴ (Notch Depth)	$P_{\text{input}} = +10\text{ dBm CW}$	4	6	8	dB
	$P_{\text{input}} = +20\text{ dBm CW}$	10	12	15	dB
	$P_{\text{input}} = +30\text{ dBm CW}$	12	14	17	dB
Response Time ⁵ (-3 dB)	1 μs Pulse Width 0.1% Duty Cycle	250	550	800	ns
Recovery Time ⁵ (Steady State)	1 μs Pulse Width 0.1% Duty Cycle	250	350	550	ns

¹ See graph on Page 6 for IMD3 across input power level and tone spacing. (Tone Center Frequency: 12 GHz)

² Unless otherwise noted test conditions are as follows: $T_{\text{ambient}} = +20^{\circ}\text{C}$, 50 Ω system.

³ See graphs on Page 8 for selectivity magnitude and phase curves for several input power levels.

⁴ See graphs on Page 9 for average notch depth across frequency for several input power levels.

⁵ See graph on Page 10 for response and recovery time vs. input power. (High Power Signal Frequency: 12 GHz)

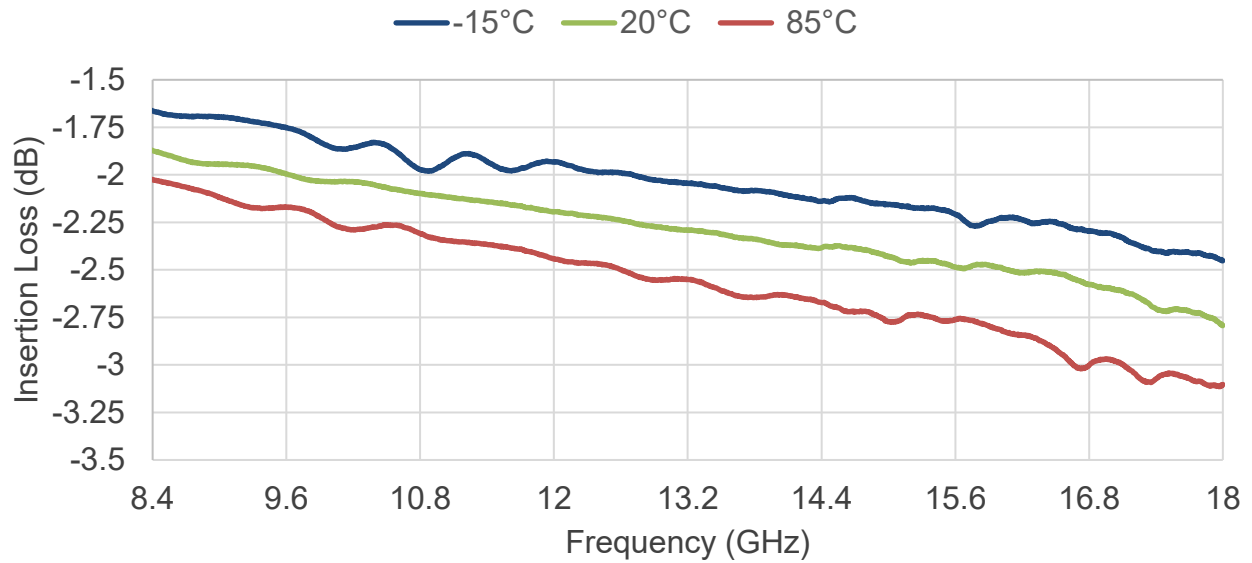
Maximum Ratings and Handling Procedures

Absolute Maximum Ratings		
Parameter	Rating	Unit
Peak Power (1μs Width, 0.1% Duty Cycle)	1000	Watts
RF Incident Power (CW)	+40	dBm
Operating Temperature	-15 to +85	°C
Storage Temperature	-40 to +85	°C

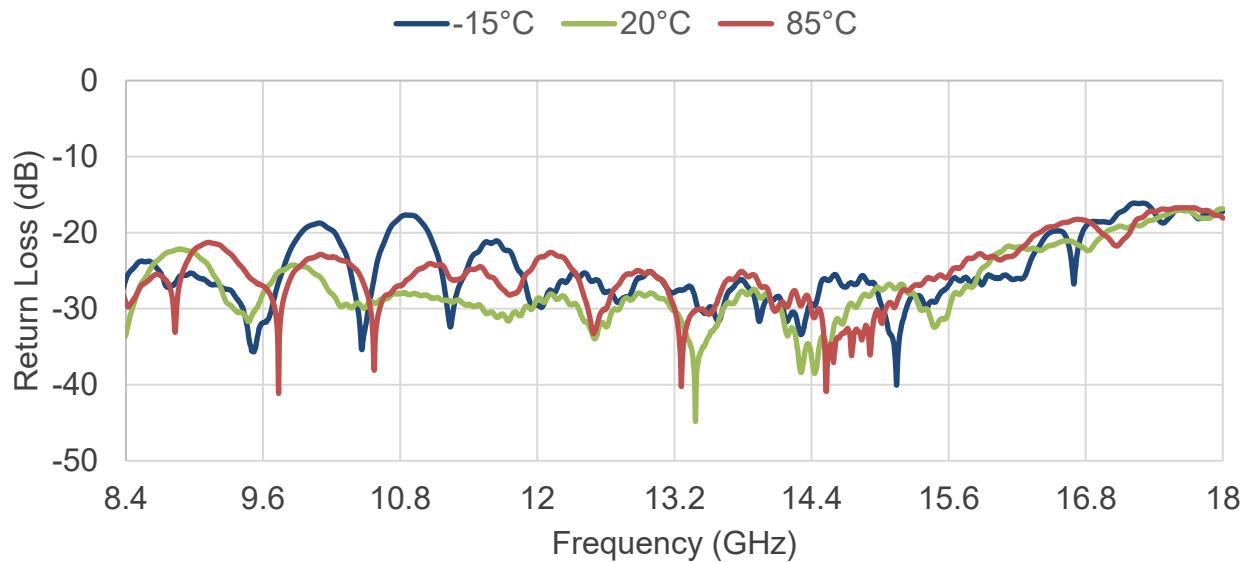
Handling Procedures	
Magnetic Field Sensitivity	These devices ARE sensitive to magnetic fields
	Keep away from permanent magnets or ferrous tools during operation and testing
Electrostatic Discharge Sensitivity	These devices are NOT sensitive to ESD

Performance Data – Linear Mode

Insertion Loss (S_{21})

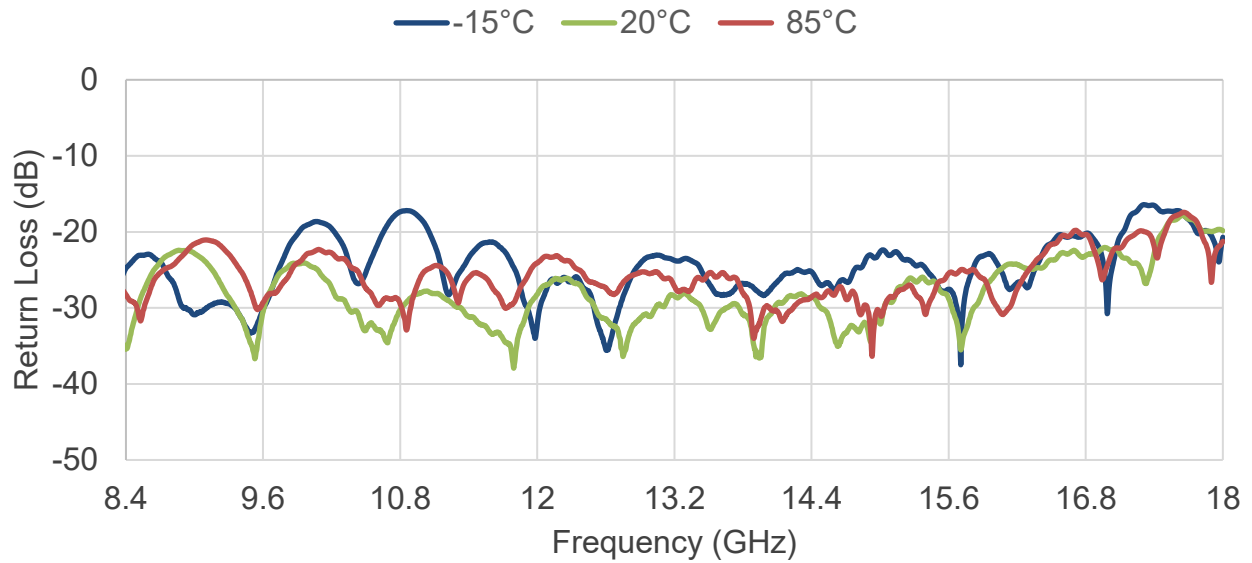


Input Return Loss (S_{11})

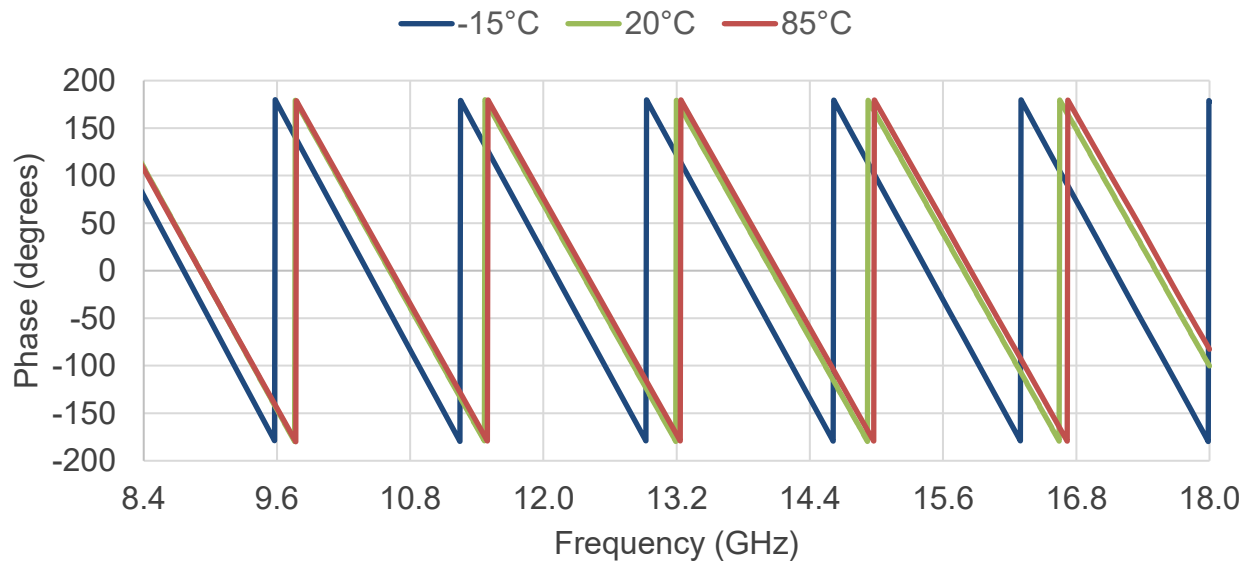


Performance Data – Linear Mode

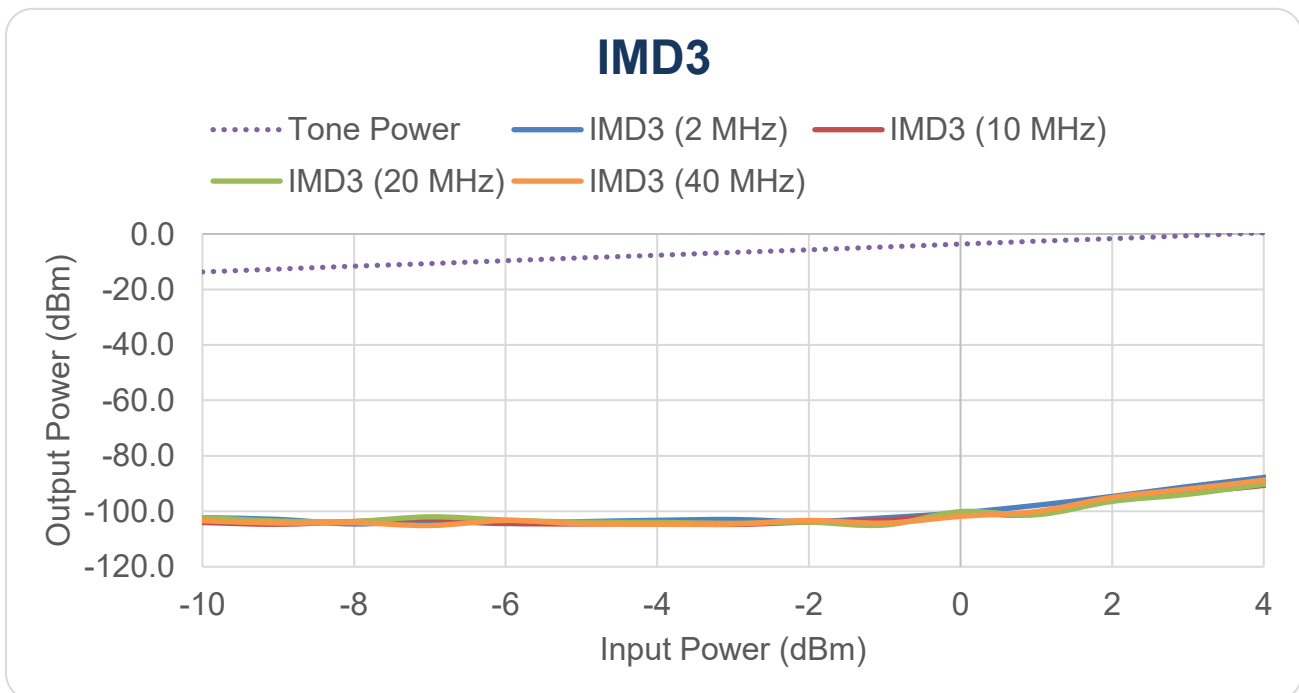
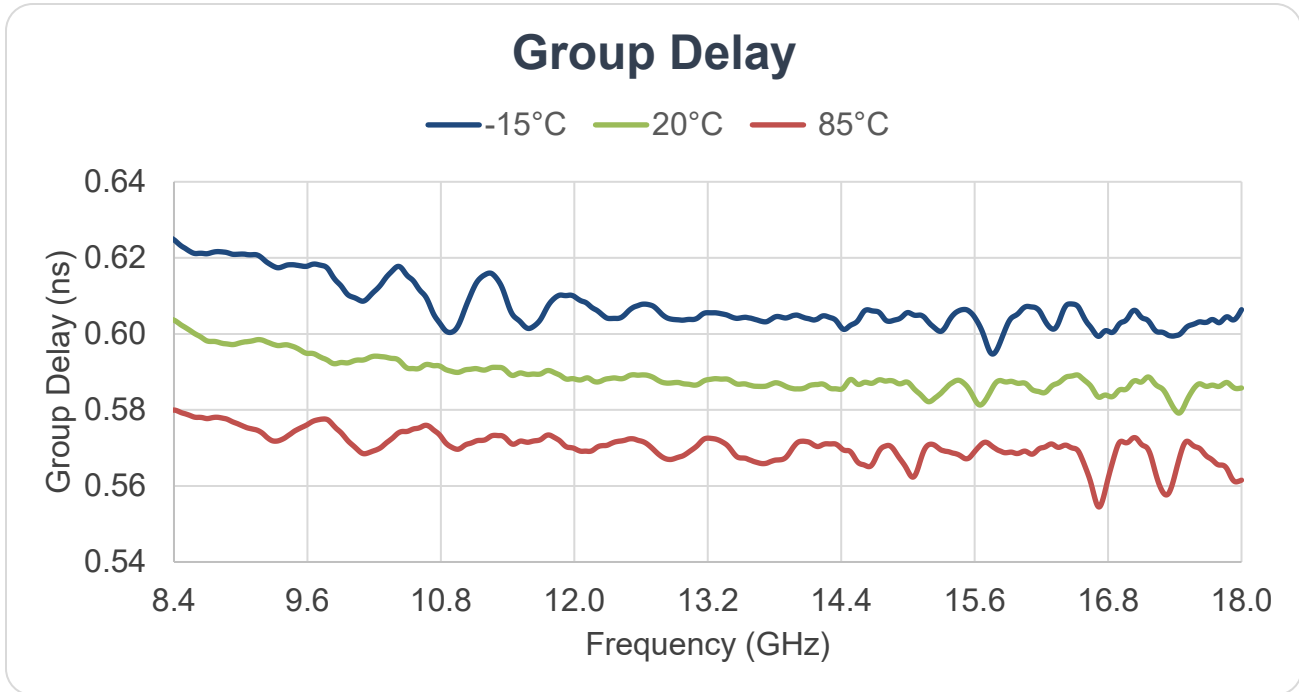
Output Return Loss (S_{22})



Phase (S_{21})

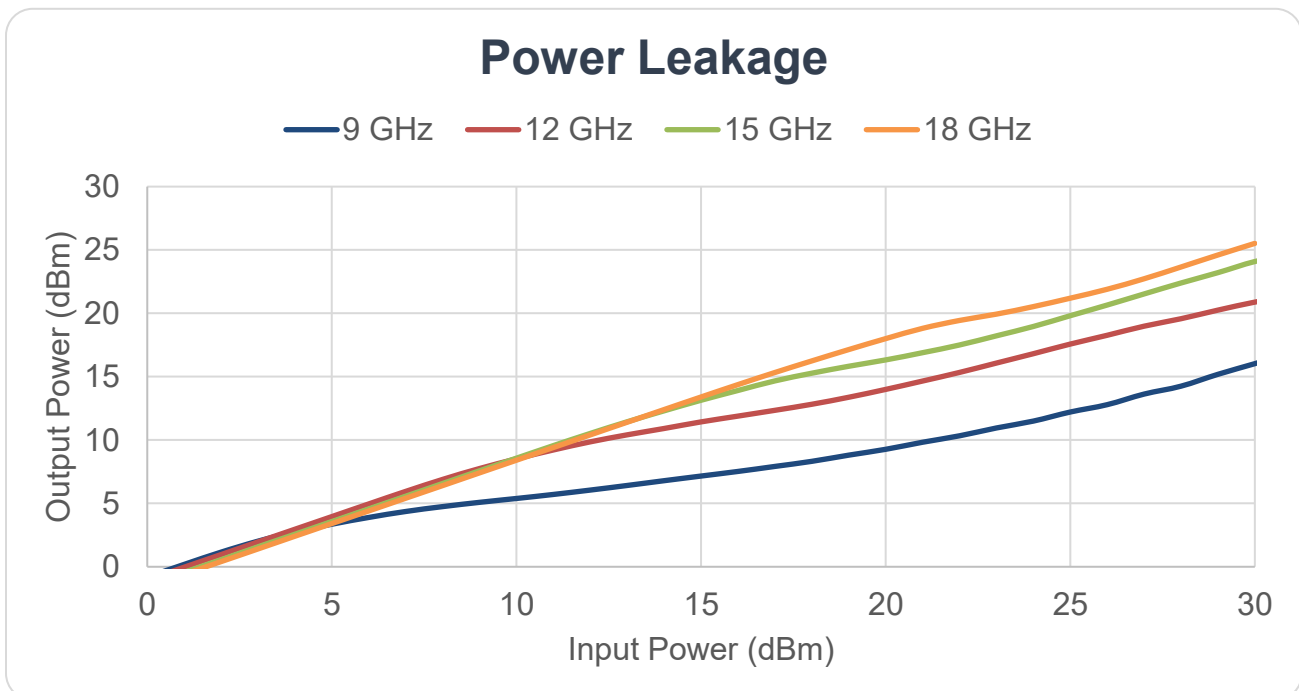
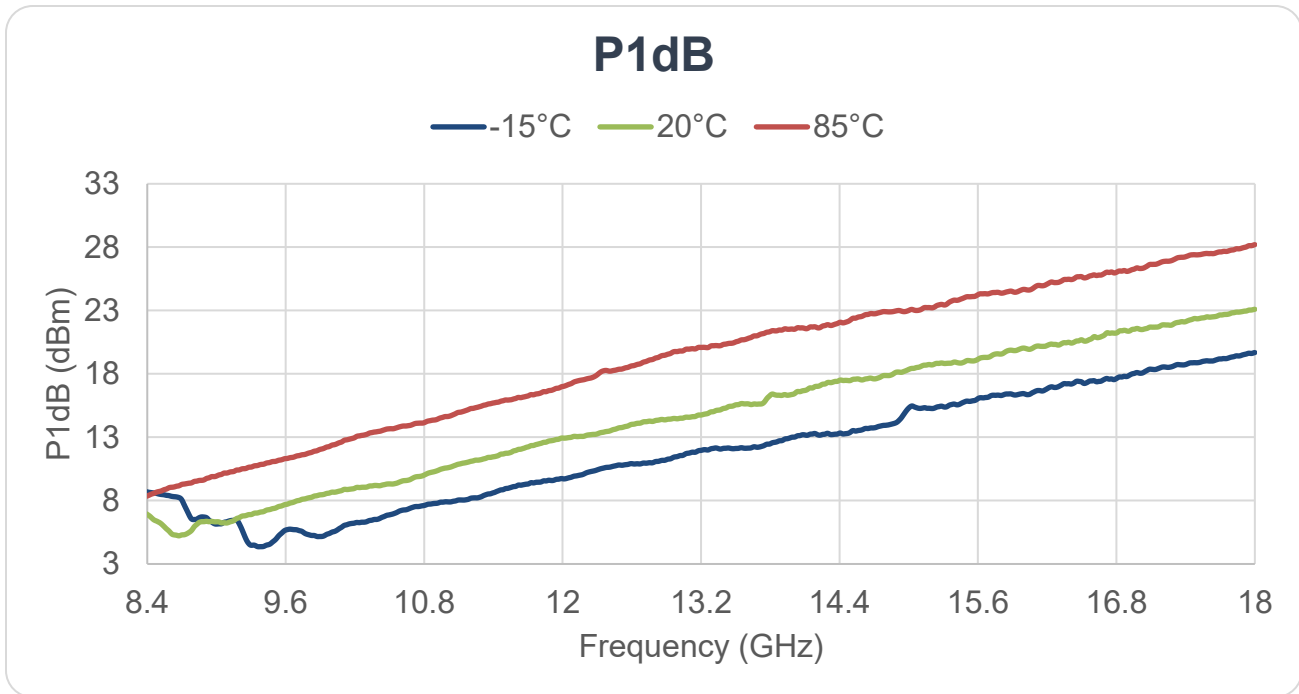


Performance Data – Linear Mode



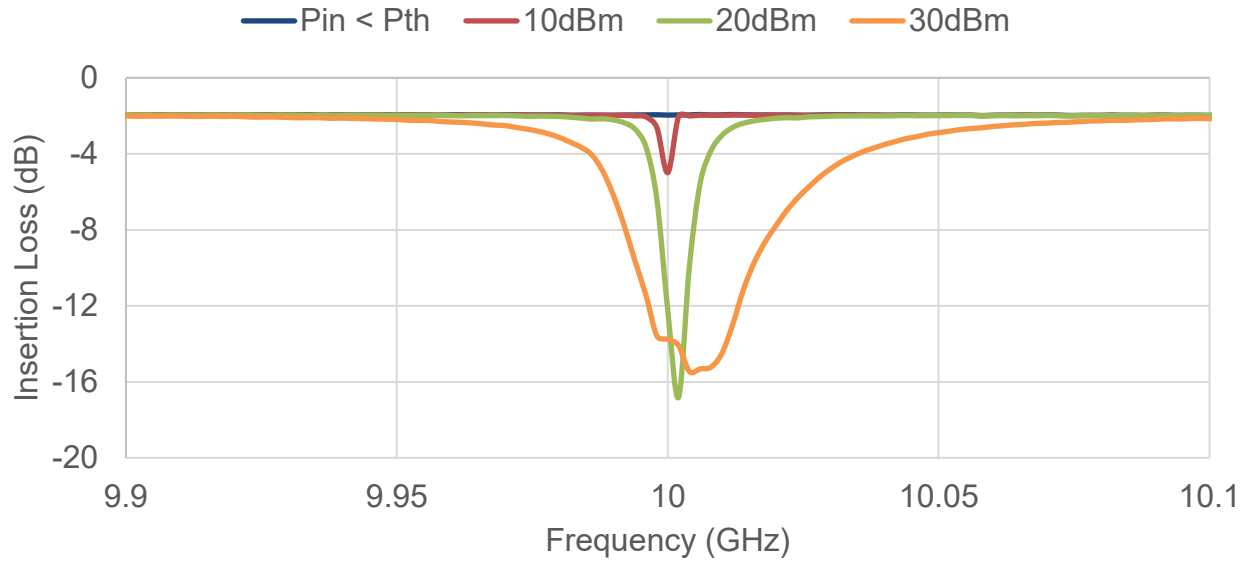
Tone Center Frequency: 12 GHz

Performance Data – Limiting Mode

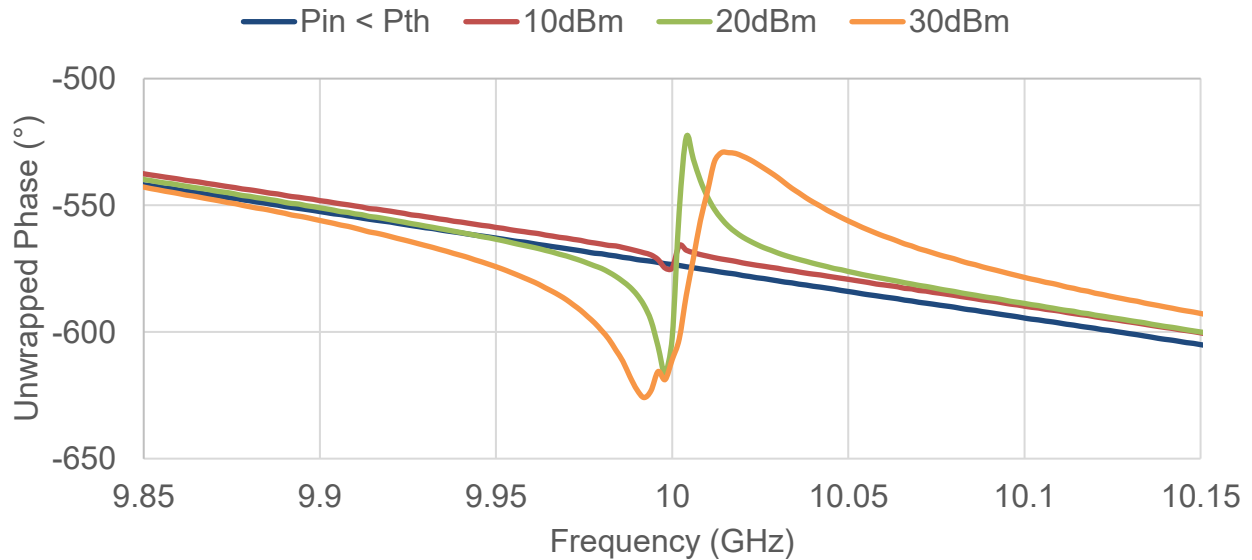


Performance Data – Limiting Mode

Selectivity Magnitude

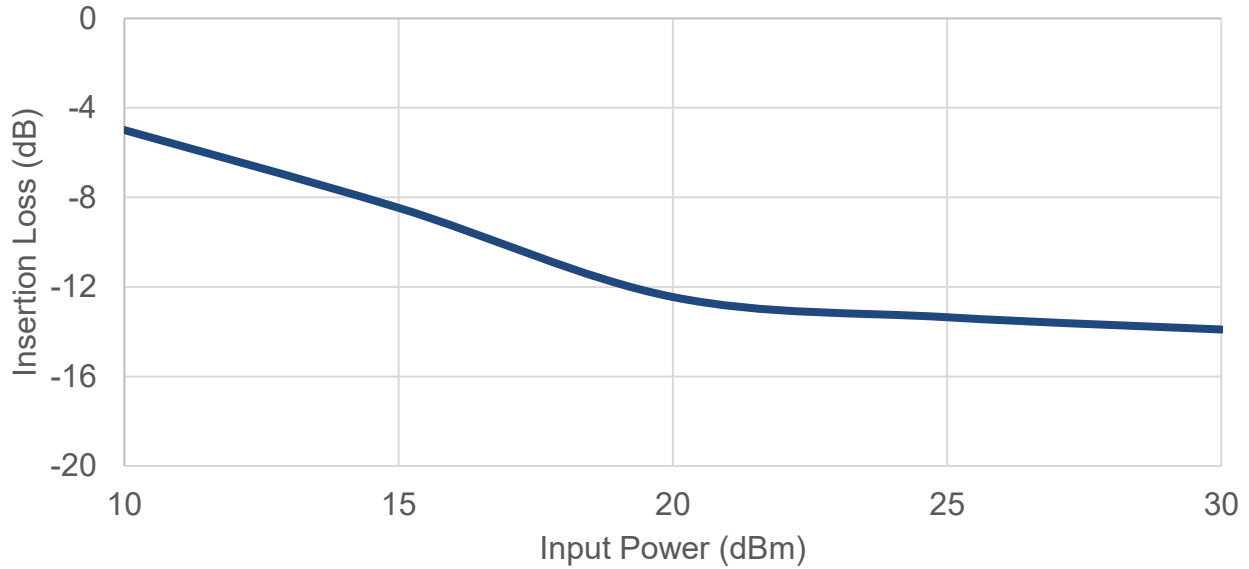


Selectivity Phase

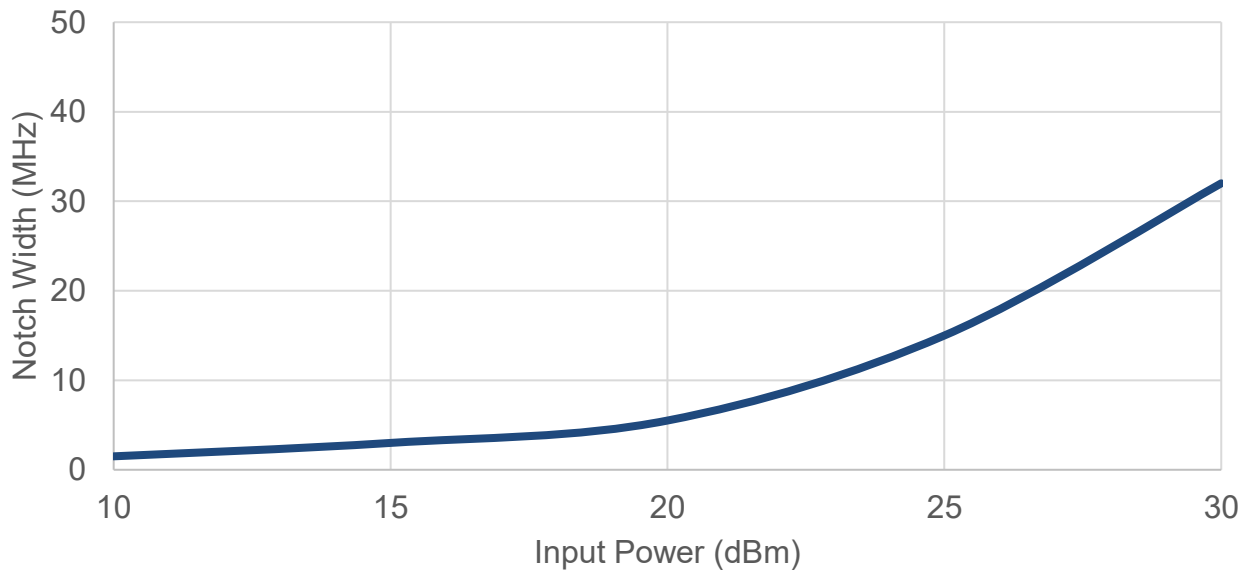


Performance Data – Limiting Mode

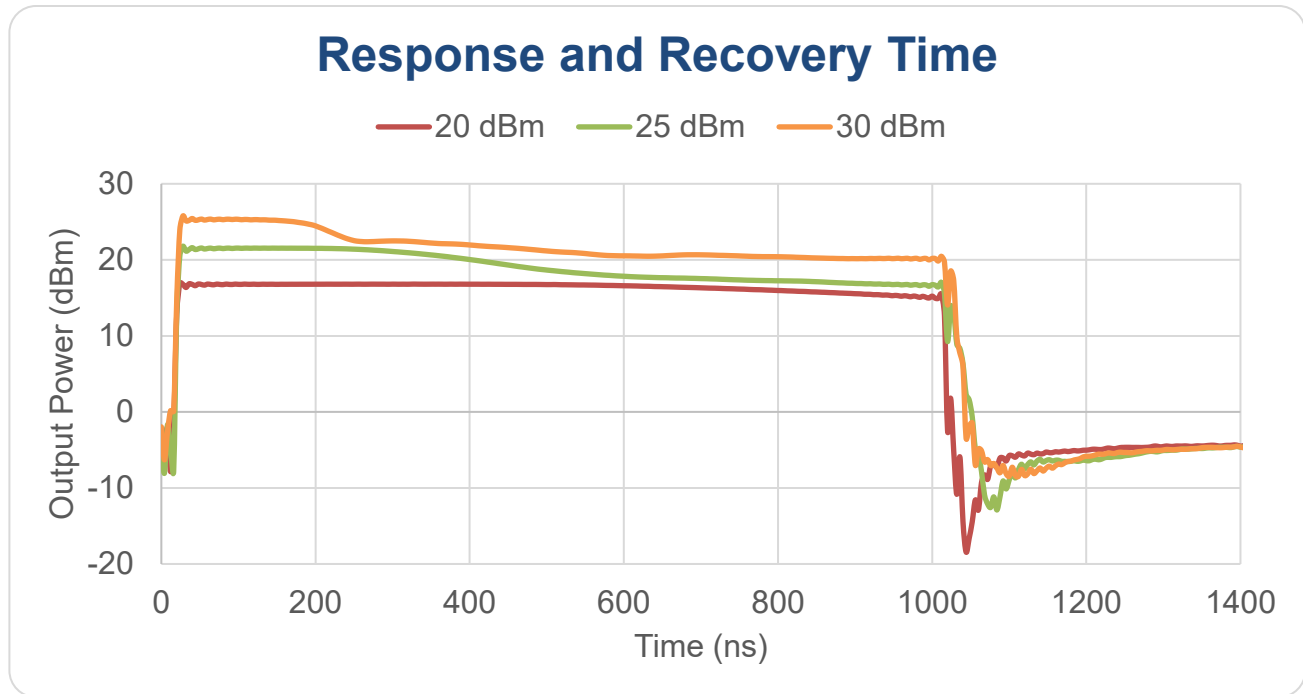
Notch Depth



Notch Width

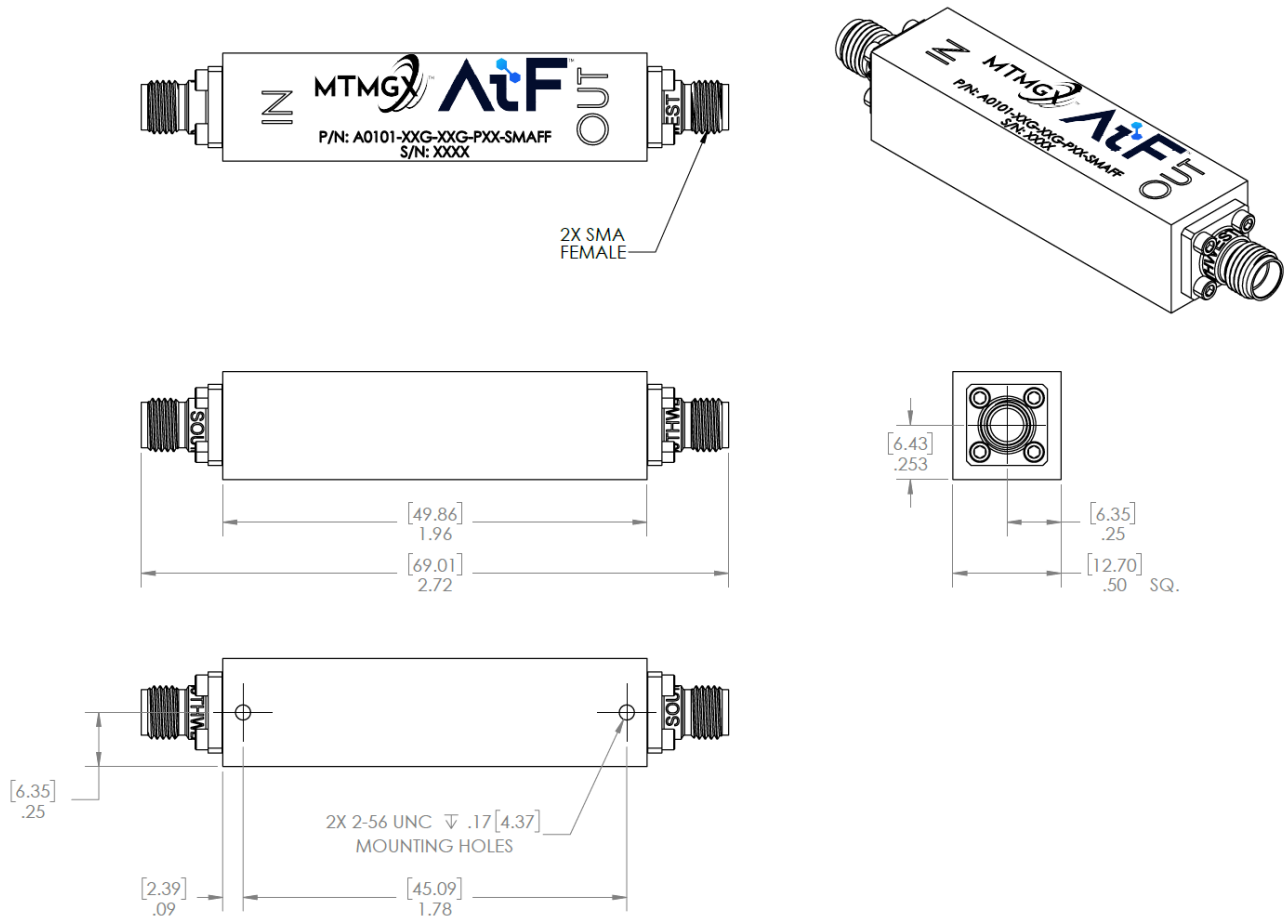


Performance Data – Limiting Mode



High Power Signal Frequency: 12 GHz

Package Outline Dimensions



Part Number to Quote:
A0101-08G-18G-P4-SMAFF

Contact Information

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