

**COAXIAL**

Medium Power Amplifier

ZVA-15453X+**50Ω 15 to 45 GHz P_{SAT} +18 dBm 2.4 mm Female**

KEY FEATURES

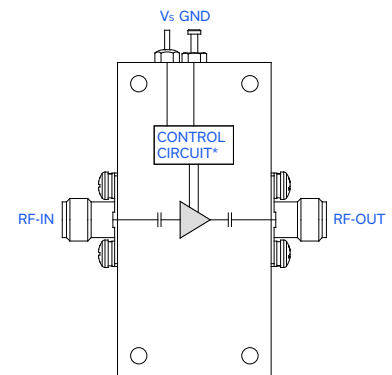
- High P_{SAT} , +18 dBm Typ.
- Wideband Coverage, 15 to 45 GHz
- High Output IP3, +25 dBm Typ.
- Single +10 V Supply
- Reverse Voltage Protected
- Ideal Evaluation Module for [PMA3-15453+](#)

*Generic photo used for illustration purposes only*

APPLICATIONS

- Wideband Test and Instrumentation
- Military EW and Radar
- K-, Ka- & Q-Band
- Ideal LO Driver Amplifier for Ka-Band SATCOM Frequency Converters
- 5G mmWave and Backhaul Radio Systems
- Aerospace and Defense

FUNCTIONAL DIAGRAM



*Voltage regulation, overvoltage, reverse voltage, and in-rush current protection circuits.

PRODUCT OVERVIEW

Mini-Circuits' ZVA-15453X+ is a coaxial, Medium Power Amplifier offering flat gain across a wide frequency range from 15 to 45 GHz. This model operates on a single +10 V supply with 140 mA typical current consumption and can deliver up to +21 dBm output power in saturation at 29 GHz. The amplifier incorporates DC-protection feature of reverse voltage to safeguard the device against potential damage if mishandled during operation. The ZVA-15453X+ comes in a rugged, compact housing (1.85 × 0.90 × 0.67") with 2.4 mm Female RF connectors.

ELECTRICAL SPECIFICATIONS AT +25 °C BASEPLATE AND $V_s = +10$ V

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		15		43.5	GHz
Gain	15	17.4	19.0	-	dB
	20	15.6	17.0	-	
	30	13.3	17.0	-	
	40	13.0	15.0	-	
	45	10.0	12.0	-	
Input Return Loss	15	-	23.0	-	dB
	20	-	13.0	-	
	30	-	15.0	-	
	40	-	13.5	-	
	45	-	13.7	-	
Output Return Loss	15	-	11.7	-	dB
	20	-	10.8	-	
	30	-	18.0	-	
	40	-	10.8	-	
	45	-	12.7	-	





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50Ω 15 to 45 GHz P_{SAT} +18 dBm 2.4 mm FemaleELECTRICAL SPECIFICATIONS AT +25 °C BASEPLATE AND $V_S = +10$ V

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Noise Figure	15	-	3.2	-	dB
	20	-	2.8	-	
	30	-	3.7	-	
	40	-	4.8	-	
	45	-	5.7	-	
Output Power at 1 dB Compression (P1dB)	15	-	+14.0	-	dBm
	20	-	+16.0	-	
	30	-	+21.0	-	
	40	-	+17.5	-	
	45	-	+15.5	-	
Saturated Output Power (P_{SAT}) ¹	15	-	+15.5	-	dBm
	20	-	+17.5	-	
	30	-	+21.5	-	
	40	-	+20.0	-	
	45	-	+17.8	-	
Output Third Order Intercept Point (Output Power = 0 dBm/Tone)	15	-	+23.0	-	dBm
	20	-	+25.0	-	
	30	-	+26.0	-	
	40	-	+24.0	-	
	45	-	+25.0	-	
DC Supply Voltage (V_S)	-	+9.5	+10	+15	V
DC Current ²	-	-	140	165	mA

1. At P_{SAT} , P_{OUT} changes less than 0.1 dB for a 1 dB change in P_{IN} .2. Typical current measured under small signal conditions. Max DC current measured at P_{SAT} . DC current increases as amplifier is driven into compression.



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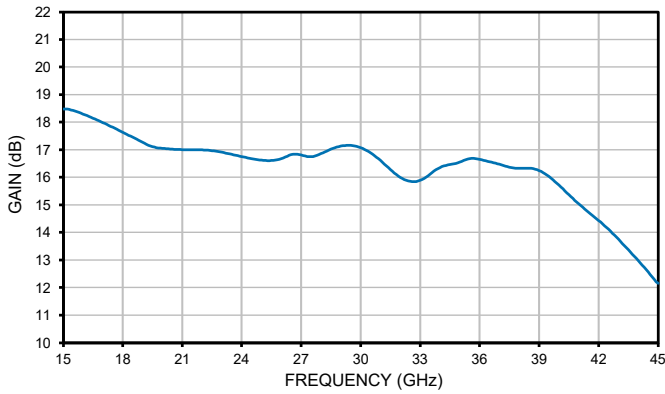
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ZVA-15453X+

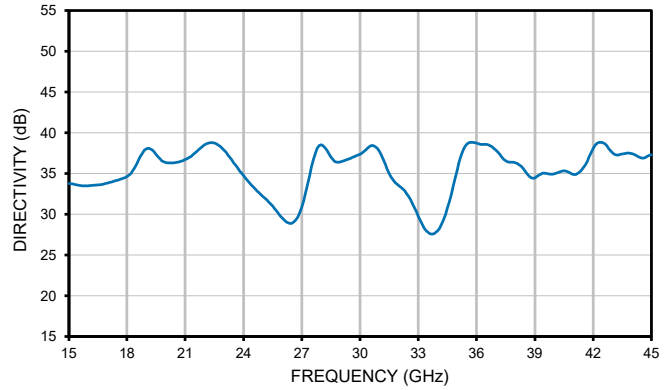
50Ω 15 to 45 GHz $P_{SAT} +18$ dBm 2.4 mm Female

TYPICAL PERFORMANCE GRAPHS AT +25 °C

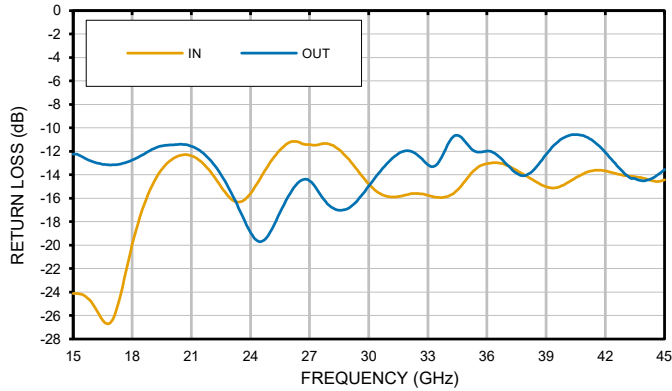
GAIN



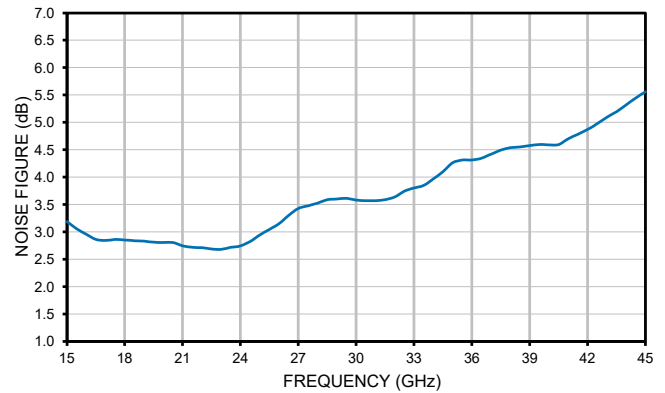
DIRECTIVITY



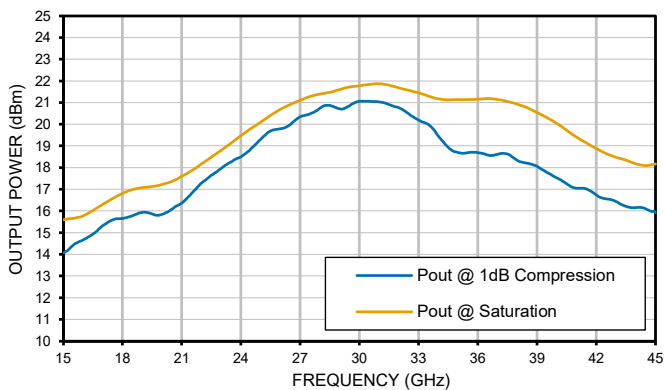
RETURN LOSS



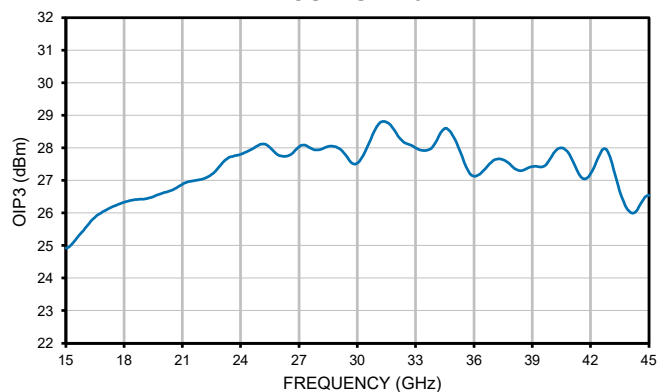
NOISE FIGURE



OUTPUT POWER



OUTPUT IP3





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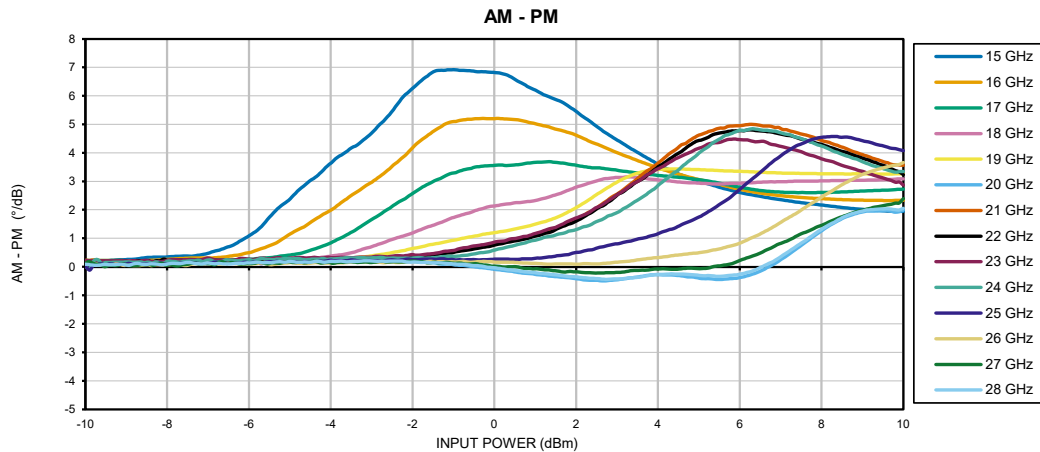
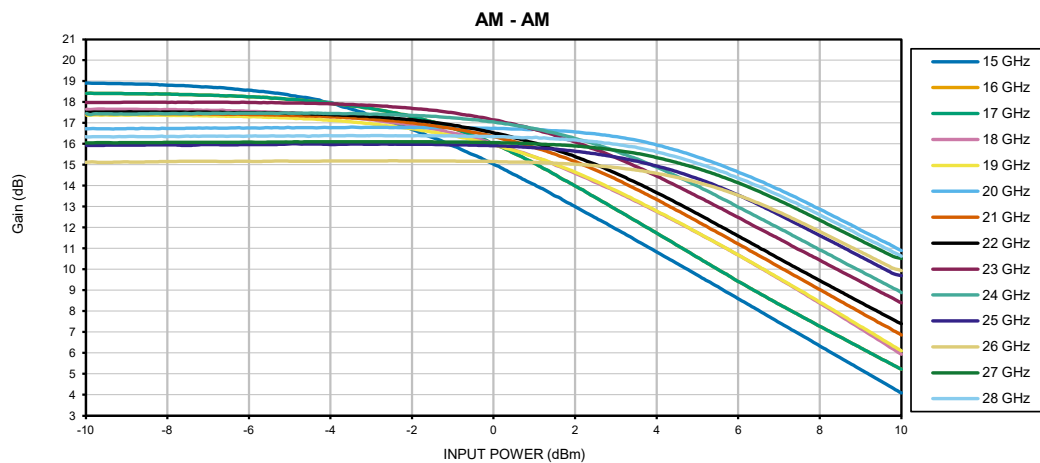
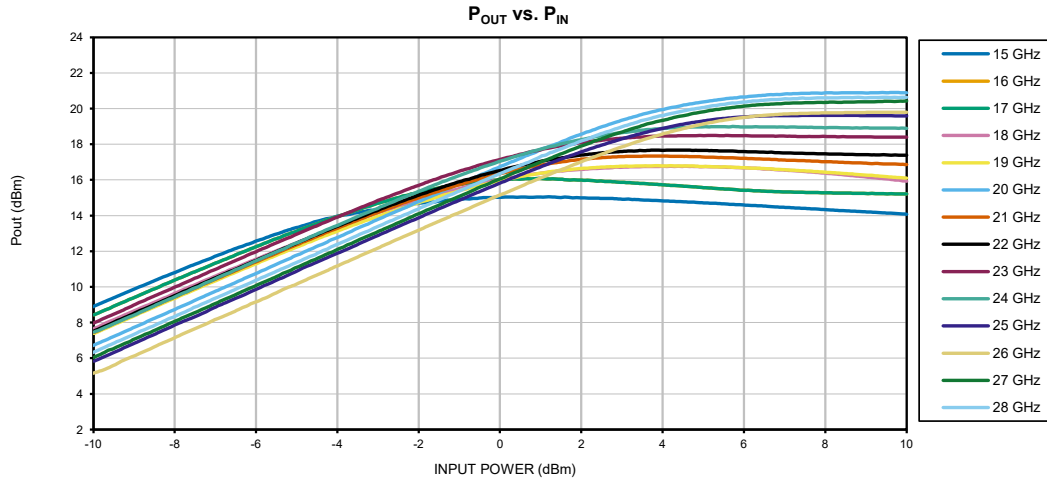
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TYPICAL PERFORMANCE GRAPHS AT +25 °C



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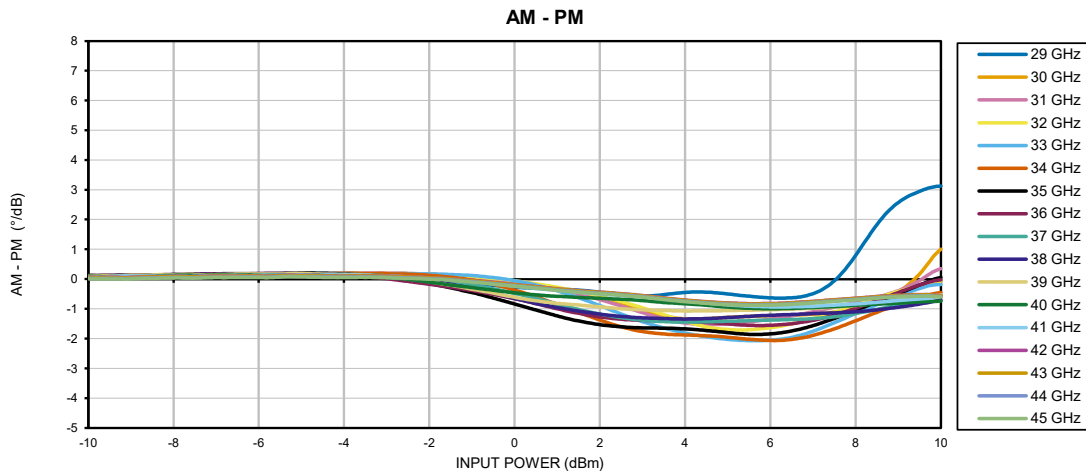
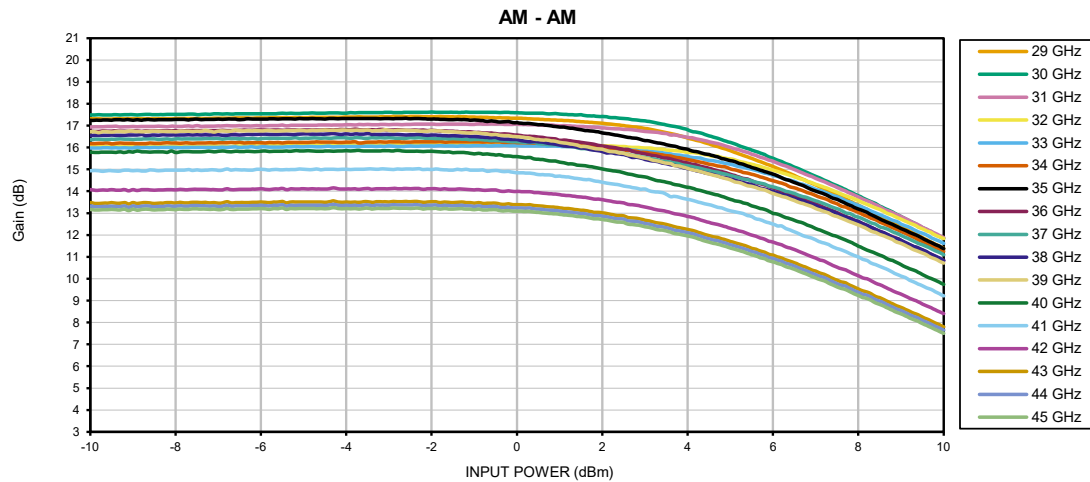
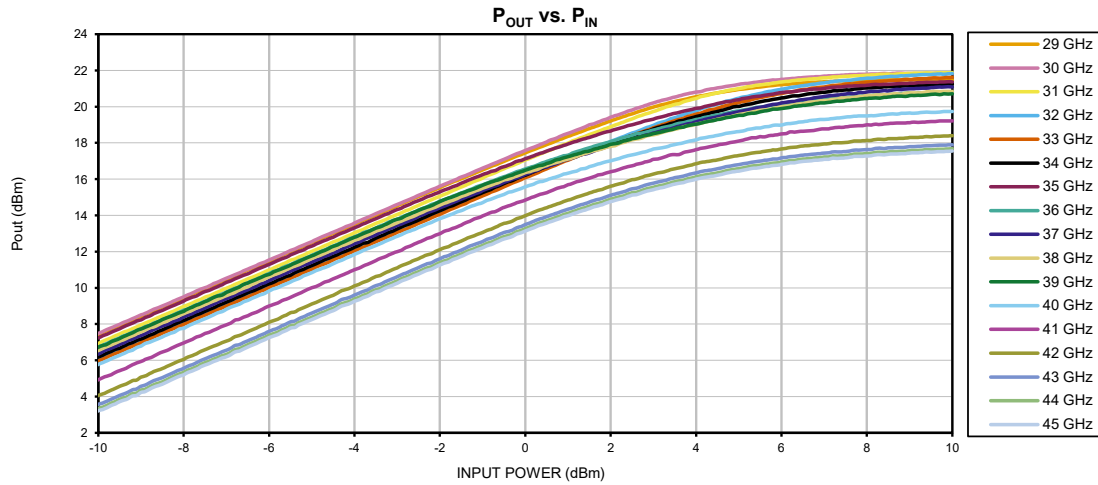
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TYPICAL PERFORMANCE GRAPHS AT +25 °C



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ABSOLUTE MAXIMUM RATINGS^{3,4}

Parameter	Ratings
Operating Temperature	-40 °C to +85 °C Baseplate
Storage Temperature	-55 °C to +100 °C
Total Power Dissipation ⁵	1.8 W
RF Input Power (CW)	+15 dBm
DC Operating Voltage	+16.0 V

3. Specified under matched load to 50Ω.

4. Continuous operation is not recommended at these extremes. Permanent damage may occur if any of these limits are exceeded.

5. Total power dissipation determined at $V_S = +10$ V with the amplifier operating in saturation.

DETERMINING MAXIMUM THERMAL RESISTANCE OF USERS' EXTERNAL HEATSINK

$\text{MAXIMUM THERMAL RESISTANCE} = \frac{\text{MAXIMUM OPERATING CASE TEMP} - \text{MAXIMUM USER AMBIENT TEMP}}{\text{POWER DISSIPATION}}$	
Example:	MAXIMUM OPERATING CASE TEMP = +50 °C (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE) MAXIMUM USER AMBIENT TEMP = +30 °C (USER DEFINED) POWER DISSIPATION = 10 WATTS (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE) THEN MAXIMUM ALLOWABLE THERMAL RESISTANCE = 2 °C/W



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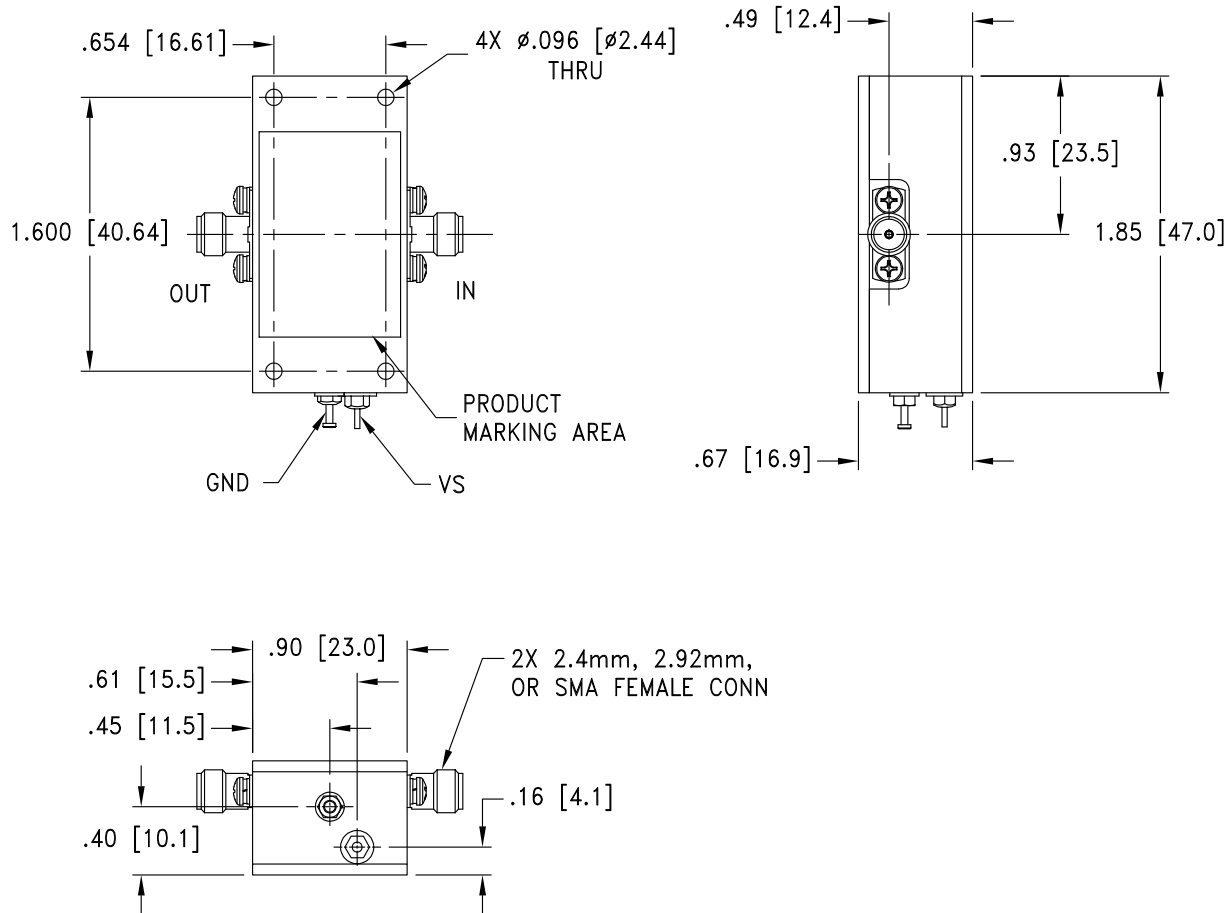
Medium Power Amplifier

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CASE STYLE DRAWING



Weight: 31.2 grams

Dimensions are in inches [mm]. Tolerances: 2 PL. $\pm .03$; 3 PL. $\pm .015$ inch

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ADDITIONAL INFORMATION IS AVAILABLE ON OUR DASHBOARD.

Performance Data & Graphs	Data
	Graphs
	S-Parameter (S2P Files) Data Set (.zip file)
RoHS Status	Compliant
Environmental Ratings	ENV141
Export Information	ECCN#EAR99

ORDERING INFORMATION

Model No. Links	ZVA-15453X+
Product Marking	ZVA-15453X+
Case Style	VP3083-1
Connector	2.4 mm Female

NOTES

- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' applicable established test performance criteria and measurement instructions.
- The parts covered by this specification document are subject to Mini-Circuits' standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/terms/viewterm.html



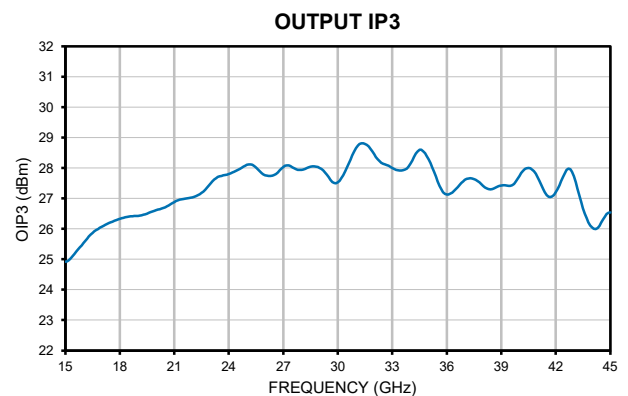
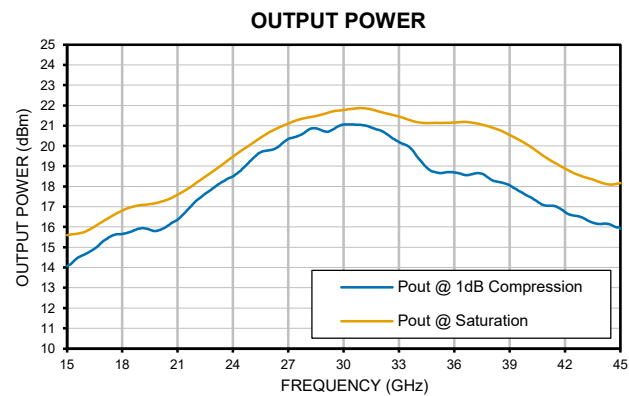
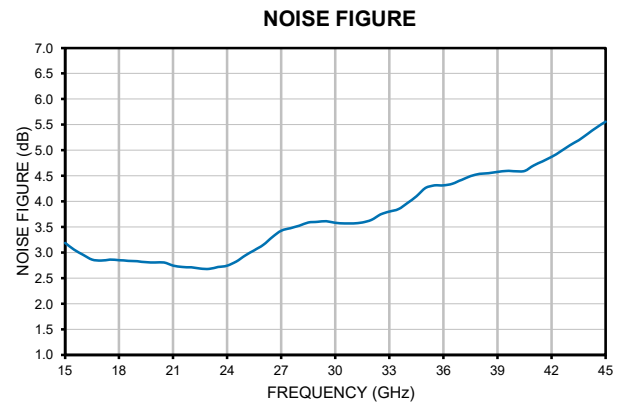
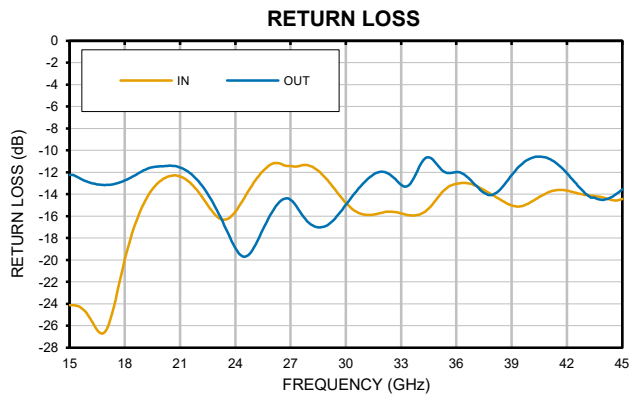
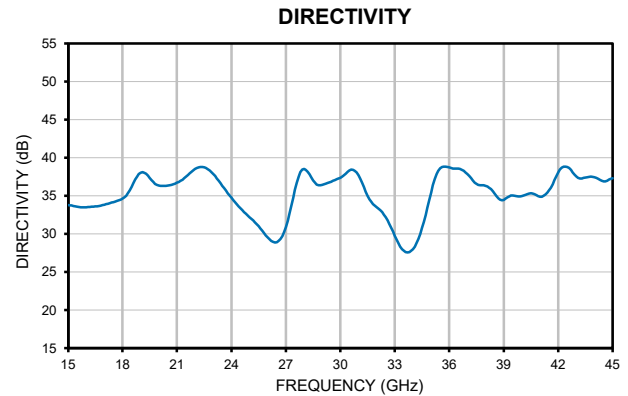
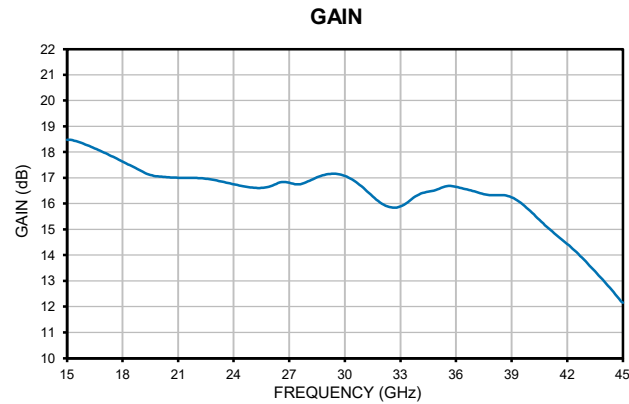
Typical Performance Data

FREQUENCY (GHz)	GAIN (dB)	DIRECTIVITY (dB)	RETURN LOSS (dB)		Pout @ 1 dB COMPRESSION (dBm)	NOISE FIGURE (dB)	OIP3 (dBm)
			IN	OUT			
15.0	18.48	33.87	24.14	12.23	14.0	3.2	24.89
15.5	18.42	33.54	24.23	12.51	14.4	3.1	25.03
16.0	18.29	33.48	25.02	12.88	14.7	3.0	25.48
16.5	18.14	33.60	26.42	13.10	14.9	2.9	25.75
17.0	17.98	33.83	26.40	13.16	15.3	2.8	26.20
17.5	17.81	34.17	23.59	13.03	15.6	2.9	26.11
18.0	17.63	34.57	19.95	12.74	15.6	2.9	26.36
18.5	17.45	36.10	17.03	12.32	15.8	2.8	26.35
19.0	17.26	38.15	14.91	11.84	16.0	2.8	26.37
19.5	17.11	37.35	13.50	11.54	15.9	2.8	26.47
20.0	17.05	36.30	12.68	11.45	15.9	2.8	26.57
20.5	17.02	36.34	12.29	11.40	16.1	2.8	26.85
21.0	17.00	36.70	12.36	11.55	16.4	2.7	26.65
21.5	17.00	37.49	12.87	12.02	16.8	2.7	27.10
22.0	16.99	38.56	13.79	12.82	17.3	2.7	27.01
22.5	16.96	38.76	15.00	13.97	17.7	2.7	27.03
23.0	16.91	37.91	16.06	15.45	18.0	2.7	27.63
23.5	16.83	36.31	16.35	17.20	18.3	2.7	27.68
24.0	16.75	34.73	15.62	18.92	18.5	2.7	27.75
24.5	16.67	33.33	14.30	19.70	18.9	2.8	27.70
25.0	16.62	32.20	12.94	18.89	19.3	2.9	28.28
25.5	16.60	31.01	11.86	17.20	19.7	3.0	28.27
26.0	16.67	29.49	11.20	15.61	19.8	3.2	27.69
26.5	16.82	28.82	11.25	14.56	20.0	3.3	27.61
27.0	16.80	30.72	11.48	14.50	20.4	3.4	28.22
27.5	16.74	35.84	11.32	15.56	20.5	3.5	28.18
28.0	16.85	38.73	11.51	16.63	20.7	3.5	27.68
28.5	17.01	36.99	12.16	17.01	20.9	3.6	27.73
29.0	17.13	36.47	13.11	16.81	20.7	3.6	28.38
29.5	17.15	36.84	14.19	16.04	20.9	3.6	27.22
30.0	17.07	37.35	15.14	14.97	21.1	3.6	27.22
30.5	16.88	38.47	15.74	13.87	21.0	3.6	27.47
31.0	16.60	37.83	15.91	12.92	21.0	3.6	28.61
31.5	16.28	34.89	15.79	12.20	20.9	3.6	29.07
32.0	15.99	33.49	15.59	11.94	20.8	3.6	28.17
32.5	15.85	32.21	15.64	12.34	20.5	3.7	28.20
33.0	15.89	29.73	15.84	13.14	20.2	3.8	28.31
33.5	16.11	27.65	15.94	13.04	20.0	3.9	28.11
34.0	16.35	27.90	15.71	11.46	19.4	4.0	28.24
34.5	16.45	30.67	14.95	10.62	18.9	4.1	29.08
35.0	16.55	35.48	13.85	11.40	18.7	4.3	29.67
35.5	16.67	38.71	13.19	12.05	18.7	4.3	26.77
36.0	16.65	38.72	12.98	11.98	18.7	4.3	27.22
36.5	16.56	38.67	13.01	12.29	18.6	4.3	27.07
37.0	16.47	37.88	13.34	13.10	18.6	4.4	27.35
37.5	16.36	36.37	13.81	13.87	18.6	4.5	28.43
38.0	16.32	36.32	14.30	14.02	18.3	4.5	26.82
38.5	16.33	35.29	14.81	13.34	18.2	4.6	27.34
39.0	16.24	34.33	15.12	12.26	18.1	4.6	27.80
39.5	16.02	35.09	15.02	11.33	17.8	4.6	27.50
40.0	15.71	34.91	14.56	10.75	17.5	4.6	27.42
40.5	15.37	35.38	14.05	10.56	17.3	4.6	28.49
41.0	15.03	34.71	13.68	10.74	17.0	4.7	27.88
41.5	14.73	35.59	13.59	11.27	17.0	4.8	26.40
42.0	14.43	38.21	13.74	12.09	16.7	4.9	26.71
42.5	14.11	38.90	13.96	13.04	16.6	5.0	27.64
43.0	13.75	37.31	14.11	13.92	16.4	5.1	28.82
43.5	13.36	37.37	14.19	14.30	16.2	5.2	27.59
44.0	12.97	37.45	14.42	14.50	16.2	5.3	24.84
44.5	12.56	36.76	14.58	14.18	16.1	5.5	26.99
45.0	12.16	37.50	14.20	13.56	15.9	5.6	25.78

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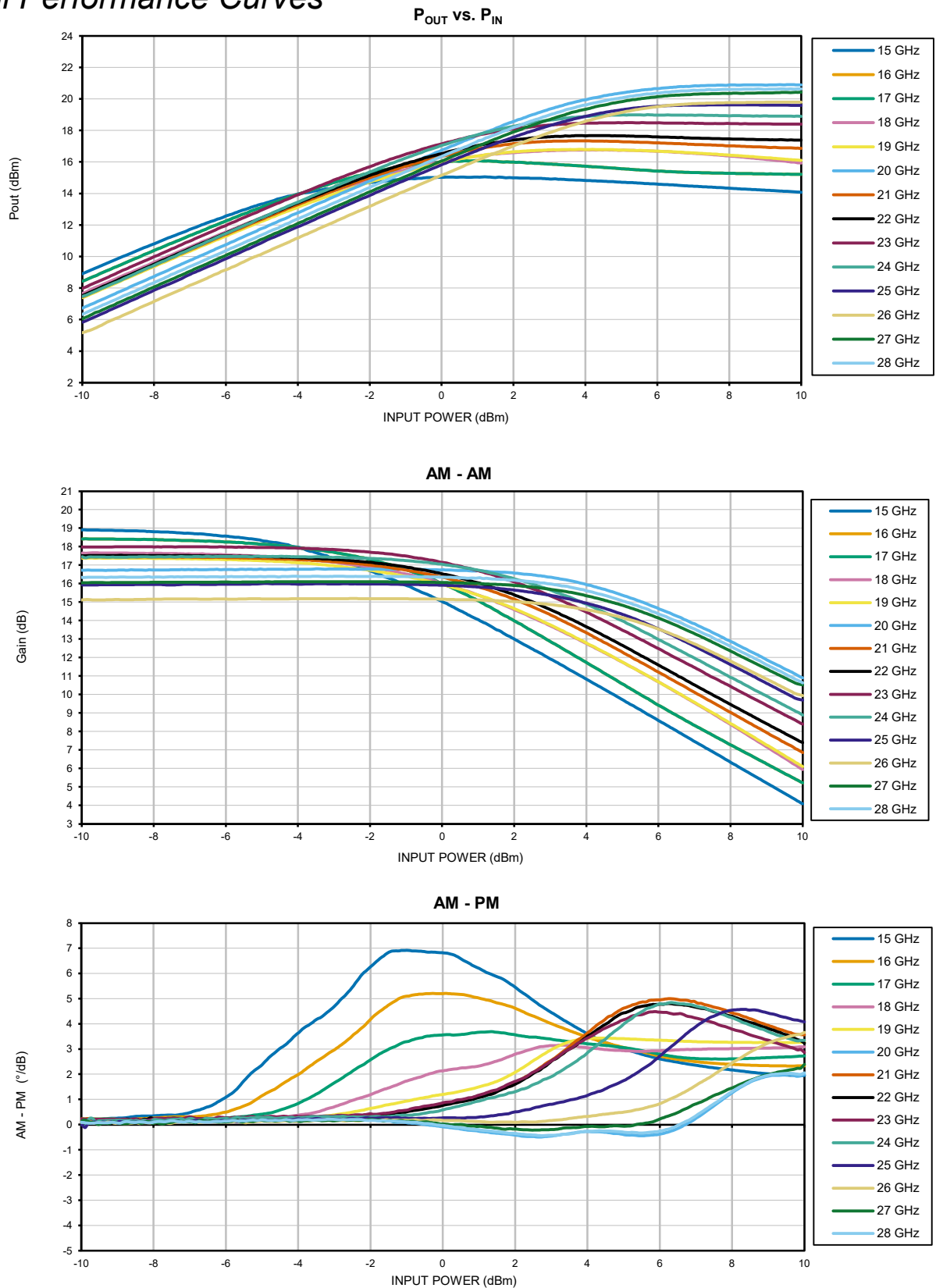
Typical Performance Curves



Coaxial Amplifier

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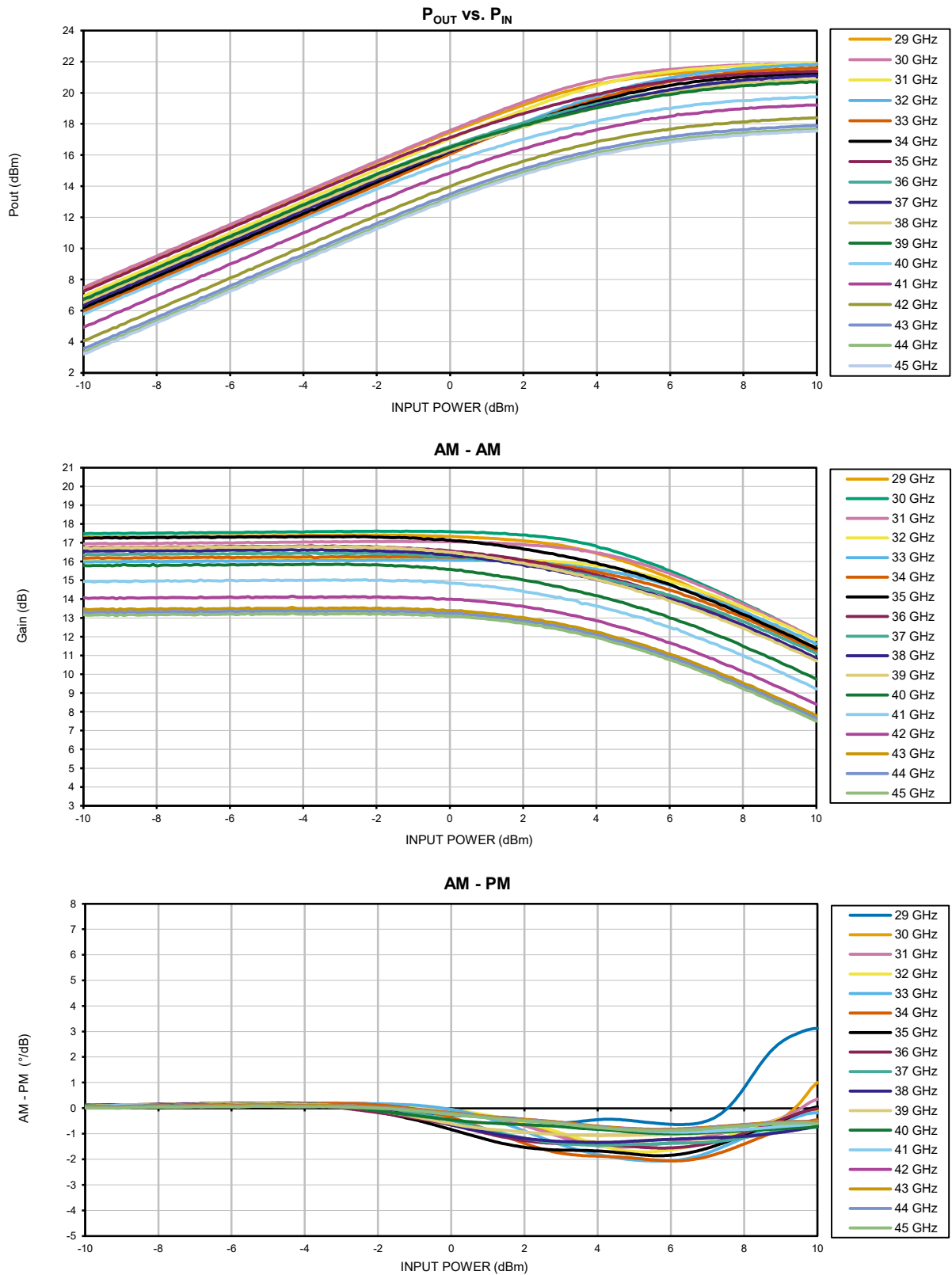
Typical Performance Curves



Coaxial Amplifier

ZVA-15453X+

Typical Performance Curves





All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	See Data Sheet	Individual Model Data Sheet
Storage Temperature	See Data Sheet	Individual Model Data Sheet
Burn-in	(DC on) 72 hours at 25°C	----
Thermal Shock	-55 °C to +100 °C, 5 cycles	MIL-STD-202, Method 108
Vibration	Random Vibration (non-operating)	MIL-STD-883K, Method 2025, Cond. 1A