

50Ω Broadband 0.2 to 3000 MHz

### The Big Deal

- Wideband, 0.2 to 3000 MHz
- Wide limiting range, +12 to +33 dBm
- Low output power leakage, +13 dBm
- Very fast recovery time, 5 ns typ.



CASE STYLE: FF704

### Product Overview

Mini-Circuits' VLM-33-2W+ is a coaxial RF limiter ideal for protecting sensitive receiver circuitry from high-power signals, while allowing low-scattered signals to be received. Providing input limiting range from +12 to +33 dBm and +13 dBm output power, the VLM-33-2W+ is ideal for many situations where unwanted signals prevail such as manufacturing sites, train tunnels, radar transceivers and more. The unit features rugged, unbody construction (1.43" x 0.410" dia.) with SMA connectors and provides excellent thermal stability from -55 to 100°C, suitable for hi-reliability military applications.

Feature	Advantages
Wideband, from 0.2 to 3000 MHz	Ideal for a variety of applications requiring protection of sensitive receiver circuitry from unwanted signals, ESD and power surges on the network.
Wide limiting range from +12 to +33 dBm	Prevents a wide range of high input signal levels from passing through the network and damaging sensitive electronic components.
Low output / 1 dB input • 0.3 dB, +12 to +20 input range	Low delta output per 1 dB delta input maintains signal stability in the presence of volatile input signal conditions.
Rapid recovery, 5 ns	Minimal downtime after unwanted signals are removed with very quick restoration of standard operating levels.
Low insertion loss, 0.4 dB	Preserves the strength of low-power signals in the receive path.
Low-output power, +13 dBm	Low output power prevents saturation of receiver circuitry and provides extra protection for sensitive components.

**Notes**

- A. 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.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- C. 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/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)



# +12 to +33dBm Limiter

50Ω Broadband 0.2 to 3000 MHz

# VLM-33W-2W-S+



Generic photo used for illustration purposes only

CASE STYLE: FF704

Connectors	Model
SMA	VLM-33W-2W-S+

**+RoHS Compliant**

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

## Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Input Power	2.5W

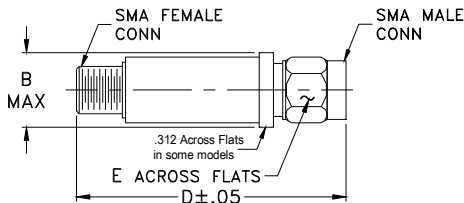
Permanent damage may occur if any of these limits are exceeded.

## Coaxial Connections\*

INPUT	SMA FEMALE
OUTPUT	SMA MALE

\*Suggested Connections. For reverse connections, consult Mini-Circuits.

## Outline Drawing



## Outline Dimensions (inch/mm)

B	D	E	wt
.410	1.43	.312	grams
10.41	36.32	7.92	10.0

## Features

- wideband, 0.2 to 3000 MHz
- low insertion loss 0.4 dB typ.
- fast recovery time, 5nsec typ.
- excellent VSWR 1.05:1 typ.
- low leakage power, 11.5 dBm typ.

## Applications

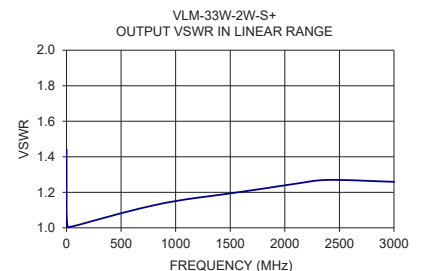
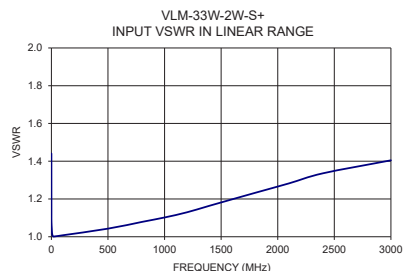
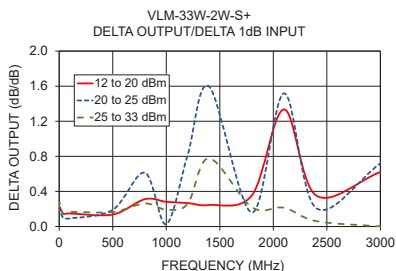
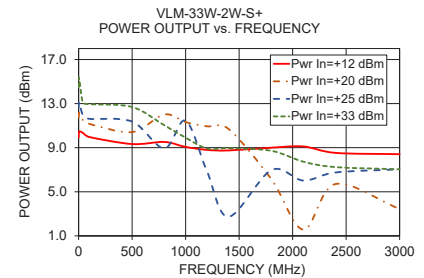
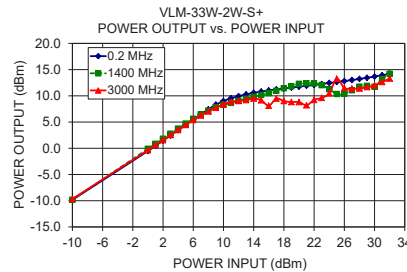
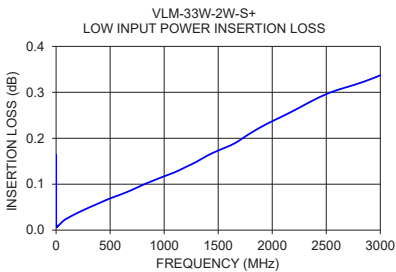
- protects low noise amplifiers and other devices from ESD or input power damage
- military, hi-rel applications

## Electrical Specifications

Parameter	Condition	Min.	Typ.	Max.	Units
Frequency Range		0.2		3000	MHz
Insertion Loss in Linear Range	<+4 dBm Input	—	0.2	0.7	dB
VSWR	<+4 dBm Input	—	1.33	1.7	:1
Input Power Limiting Range		+12	—	+33	dBm
Output Power	In limiting range	—	+13	—	dBm
Recovery Time	1 watt pulse 50 usec pw 1kHz duty cycle recovery to within 90% of final value.	—	5	—	nsec
Response Time	-30 to +33 dBm input 50 usec, BW 1 kHz duty cycle	—	7	—	nsec
Limiting $\Delta$ Output/1dB $\Delta$ Input	Input Power Range (dBm)				
	12 to 20	—	0.3	—	dB/dB
	20 to 25	—	0.5	—	
	25 to 33	—	0.6	—	

## Typical Performance Data

Freq. (MHz)	I. Loss in Linear Range (dB)	VSWR in Linear Range (:1)	Power Output (dBm)				$\Delta$ Output 1dB $\Delta$ Input		
			+12dBm Input	+20dBm Input	+25 dBm Input	+33dBm Input	+12 to +20dBm Input	+20 to +25 dBm Input	+25 to +33 dBm Input
0.20	0.16	1.44	9.93	11.74	12.62	14.49	0.23	0.18	0.23
0.60	0.03	1.13	10.30	12.14	13.12	15.29	0.23	0.20	0.27
1.00	0.02	1.08	10.34	12.17	13.16	15.38	0.23	0.20	0.28
10.00	0.01	1.01	10.48	12.13	12.96	14.94	0.21	0.17	0.25
40.00	0.01	1.00	10.34	11.50	11.98	13.09	0.15	0.10	0.14
100.00	0.03	1.01	9.97	11.16	11.62	12.95	0.15	0.09	0.17
500.00	0.07	1.04	9.33	10.42	11.37	12.69	0.14	0.19	0.17
800.00	0.10	1.08	9.52	12.01	8.94	11.04	0.31	0.61	0.26
1000.00	0.12	1.10	9.07	11.32	11.45	9.91	0.28	0.03	0.19
1200.00	0.14	1.13	8.80	10.94	6.85	8.92	0.27	0.82	0.26
1400.00	0.16	1.16	8.75	10.71	2.73	8.95	0.25	1.60	0.78
1800.00	0.21	1.23	9.00	6.16	6.96	8.72	0.36	0.16	0.22
2100.00	0.25	1.28	9.11	1.57	6.02	7.73	1.34	1.52	0.21
2400.00	0.29	1.34	8.53	5.70	6.75	7.24	0.35	0.21	0.06
3000.00	0.34	1.40	8.41	3.44	7.04	7.04	0.62	0.72	0.00



### Notes

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M171494  
VLM-33W-2W-S+  
ED-17134/1  
LC/CP/AM  
200522

# LIMITER

# VLM-33W-2W-S+

## Typical Performance Data

FREQUENCY	LOW INPUT POWER		POWER OUTPUT (dBm)				DELTA OUTPUT/1dB DELTA INPUT (dB/dB)			
	INSERTION LOSS	VSWR		+12 dBm	+20 dBm	+25 dBm	+33 dBm	+12 to +20 dBm	+20 to +25 dBm	+25 to +33 dBm
(MHz)	(dB)	Input	Output	INPUT	INPUT	INPUT	INPUT	INPUT	INPUT	INPUT
		(:1)								
0.2	0.16	1.44	1.44	9.93	11.74	12.62	14.49	0.23	0.18	0.23
0.6	0.03	1.13	1.13	10.30	12.14	13.12	15.29	0.23	0.20	0.27
0.8	0.02	1.10	1.10	10.31	12.16	13.15	15.35	0.23	0.20	0.28
1.0	0.02	1.08	1.08	10.34	12.17	13.16	15.38	0.23	0.20	0.28
4.0	0.01	1.02	1.02	10.36	12.21	13.16	15.46	0.23	0.19	0.29
7.0	0.01	1.01	1.01	10.41	12.19	13.07	15.22	0.22	0.18	0.27
10	0.01	1.01	1.01	10.48	12.13	12.96	14.94	0.21	0.17	0.25
40	0.01	1.00	1.01	10.34	11.50	11.98	13.09	0.15	0.10	0.14
70	0.02	1.01	1.01	10.11	11.24	11.66	12.62	0.14	0.08	0.12
100	0.03	1.01	1.01	9.97	11.16	11.62	12.95	0.15	0.09	0.17
200	0.04	1.02	1.03	9.78	10.71	11.19	12.93	0.12	0.10	0.22
300	0.05	1.03	1.05	9.79	10.80	11.60	13.68	0.13	0.16	0.26
400	0.06	1.04	1.07	9.87	10.57	11.43	13.20	0.09	0.17	0.22
500	0.07	1.04	1.08	9.33	10.42	11.37	12.69	0.14	0.19	0.17
600	0.08	1.05	1.10	10.08	11.97	11.88	11.36	0.24	-0.02	-0.07
700	0.09	1.06	1.11	9.16	9.92	11.07	10.48	0.10	0.23	-0.07
800	0.10	1.08	1.13	9.52	12.01	8.94	11.04	0.31	-0.61	0.26
900	0.11	1.09	1.14	9.16	10.69	11.67	7.64	0.19	0.20	-0.50
1000	0.12	1.10	1.15	9.07	11.32	11.45	9.91	0.28	0.03	-0.19
1100	0.13	1.11	1.16	8.89	11.05	10.40	8.61	0.27	-0.13	-0.22
1200	0.14	1.13	1.17	8.80	10.94	6.85	8.92	0.27	-0.82	0.26
1300	0.15	1.15	1.18	8.88	10.92	7.27	8.56	0.26	-0.73	0.16
1400	0.16	1.16	1.19	8.75	10.71	2.73	8.95	0.25	-1.60	0.78
1500	0.17	1.18	1.19	8.84	10.33	3.57	8.39	0.19	-1.35	0.60
1650	0.19	1.20	1.21	8.55	9.56	7.12	8.43	0.13	-0.49	0.16
1800	0.21	1.23	1.22	9.00	6.16	6.96	8.72	-0.36	0.16	0.22
1950	0.23	1.26	1.24	8.78	6.52	5.91	7.30	-0.28	-0.12	0.17
2100	0.25	1.28	1.25	9.11	-1.57	6.02	7.73	-1.34	1.52	0.21
2250	0.27	1.31	1.26	8.88	0.71	6.31	7.22	-1.02	1.12	0.11
2400	0.29	1.34	1.27	8.53	5.70	6.75	7.24	-0.35	0.21	0.06
2550	0.30	1.35	1.28	9.02	3.57	6.56	7.82	-0.68	0.60	0.16
2700	0.31	1.37	1.28	9.03	3.66	5.72	7.07	-0.67	0.41	0.17
2850	0.32	1.38	1.27	9.08	2.76	7.72	7.10	-0.79	0.99	-0.08
3000	0.34	1.40	1.26	8.41	3.44	7.04	7.04	-0.62	0.72	0.00

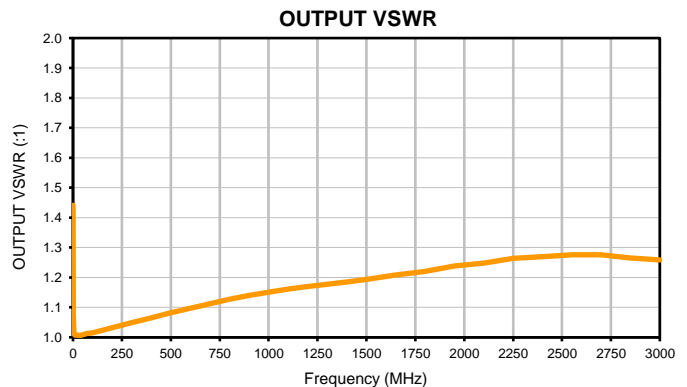
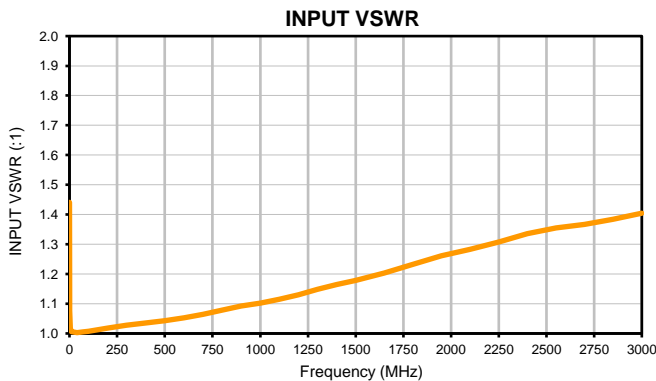
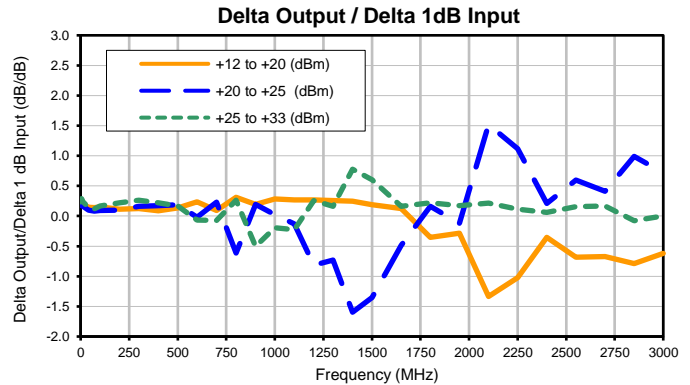
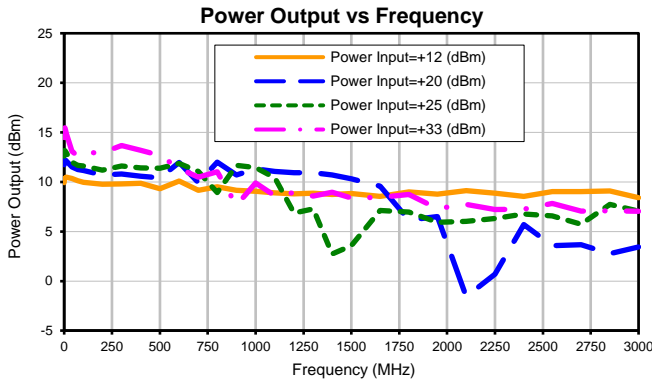
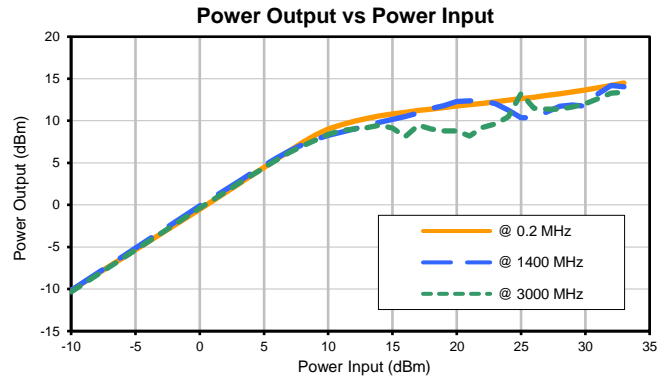
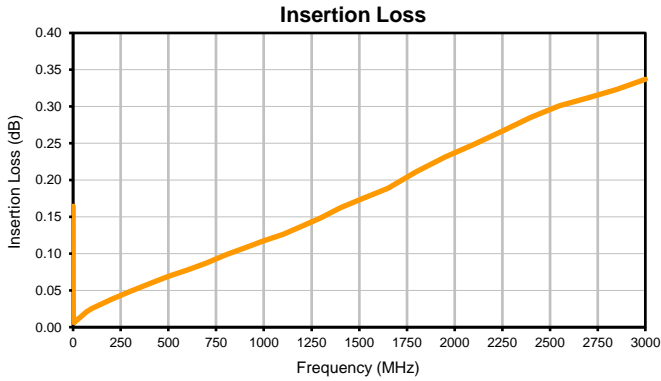
# LIMITER

# VLM-33W-2W-S+

## Typical Performance Data

POWER INPUT	POWER OUTPUT	POWER INPUT	POWER OUTPUT	POWER INPUT	POWER OUTPUT
@ 0.2 MHz		@ 1400 MHz		@ 3000 MHz	
(dBm)		(dBm)		(dBm)	
-10	-10.16	-10	-10.16	-10	-10.34
0	-0.52	0	-0.10	0	-0.36
1	0.47	1	0.84	1	0.60
2	1.47	2	1.8	2	1.55
3	2.46	3	2.76	3	2.52
4	3.47	4	3.73	4	3.48
5	4.46	5	4.68	5	4.43
6	5.46	6	5.61	6	5.39
7	6.45	7	6.44	7	6.25
8	7.42	8	7.15	8	7.02
9	8.31	9	7.77	9	7.71
10	9.01	10	8.26	10	8.38
11	9.53	11	8.65	11	8.82
12	9.94	12	9.02	12	9.04
13	10.27	13	9.41	13	9.19
14	10.57	14	9.81	14	9.49
15	10.81	15	10.15	15	9.15
16	11.02	16	10.51	16	8.11
17	11.22	17	10.93	17	9.48
18	11.40	18	11.45	18	9.01
19	11.58	19	11.81	19	8.81
20	11.75	20	12.28	20	8.81
21	11.92	21	12.39	21	8.20
22	12.08	22	12.36	22	9.22
23	12.25	23	12.02	23	9.62
24	12.45	24	11.27	24	10.47
25	12.63	25	10.34	25	13.26
26	12.81	26	10.39	26	11.49
27	13.01	27	11.06	27	11.38
28	13.22	28	11.74	28	11.40
29	13.44	29	11.89	29	11.66
30	13.67	30	11.72	30	12.02
31	13.92	31	13.20	31	12.64
32	14.21	32	14.20	32	13.30
33	14.50	33	14.03	33	13.40

## Typical Performance Curves

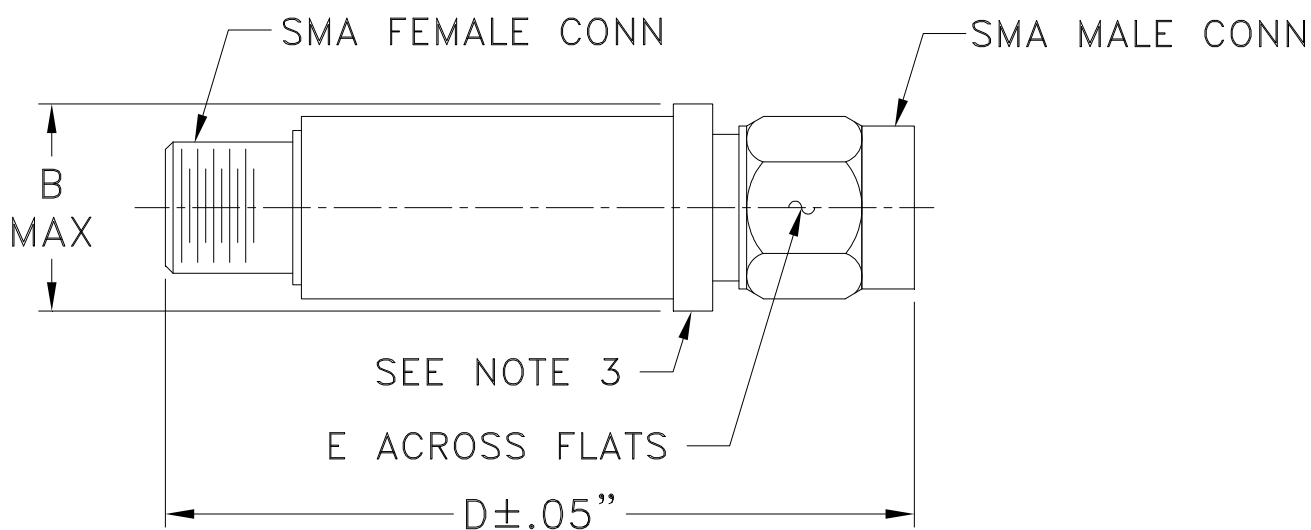


# Case Style

# FF

## FF704

### Outline Dimensions



CASE #.	A	B	C	D	E	WT GRAMS
FF704	--	.410 (10.41)	--	1.43 (36.32)	.312 (7.92)	10.0

Dimensions are in inches (mm). Tolerances: 2Pl. ± .04; 3Pl. ± .030

#### Notes:

1. Case material: Stainless steel.
2. Case finish: Gold plated.
3. Round Flange may have .312 Across Flats in some models.

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RF/IF MICROWAVE COMPONENTS

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.

<b>Specification</b>	<b>Test/Inspection Condition</b>	<b>Reference/Spec</b>
Operating Temperature	-55° to 100°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D
Humidity	90% RH, 65°C Units may require bake-out after humidity to restore full performance.	MIL-STD-202, Method 103
Thermal Shock	-65° to 125°C, 5 cycles	MIL-STD-202, Method 107, Condition B
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition I