

+12 to +33dBm

# Limiters

## ULM-63-2W-N+

50Ω Broadband 30 to 6000 MHz



Generic photo used for illustration purposes only  
CASE STYLE: FF779

### The Big Deal

- Extra wide frequency range, 30 MHz to 6 GHz
- Wide limiting range, +12 to +33 dBm
- Very fast recovery time, 5 nsec typical

### Product Overview

The ULM-63-2W-N+ reacts almost instantaneously to protect sensitive devices from power surges and other unwanted signals at the device input. For inputs >12 dBm, the output power remains about 11.5 dBm, whereas lower-level input losses are only 0.4 dB typ. These units are housed in a patented, rugged unibody enclosure (2.11" x 0.72") specifically designed to function in tough environments such as manufacturing sites, train tunnels, weapon systems, or anywhere sensitive components, such as low noise amplifiers, need protection.

### Key Features

Feature	Advantages
High power handling, up to 2.5W max	Affords protection against peak voltages of multi-tone signals
Very fast recovery time, 5 nsec typ.	Back in operation almost instantaneously following signal spikes
Wideband, 30 MHz to 6 GHz	Protection for a wide range of applications, from IF receivers to toll-booth operations

#### 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 30 to 6000 MHz

## ULM-63-2W-N+



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Connectors	Model
N (F/M)	ULM-63-2W-N+

**+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 CW

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

### Features

- Wideband, 30 to 6000 MHz
- Low insertion loss 0.4 dB typ.
- Fast recovery time, 5nsec typ.
- Excellent VSWR 1.2:1 typ.

### Applications

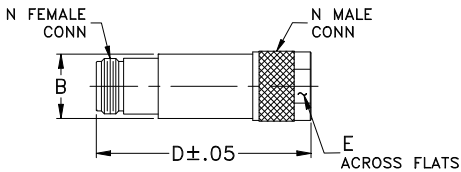
- Protects low noise amplifiers and other devices from ESD or input power damage
- Military, Hi-rel application
- Telecommunication and Broadband wireless

### Coaxial Connections\*

INPUT	N FEMALE
OUTPUT	N MALE

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

### Outline Drawing



### Outline Dimensions (inch mm)

A	B	C	D	E	Wt.
--	.71	--	2.11	.718	grams
--	18.03	--	53.59	18.24	72.5

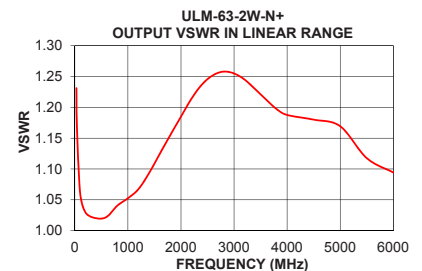
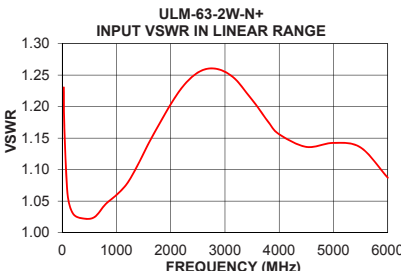
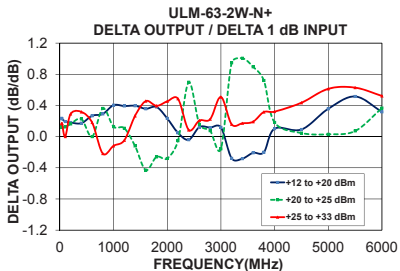
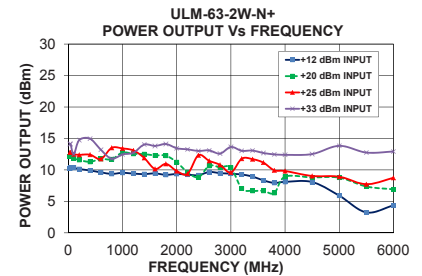
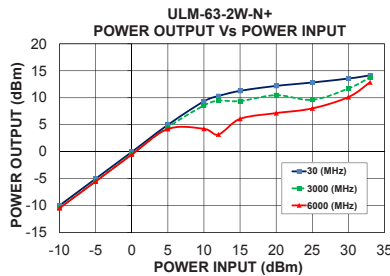
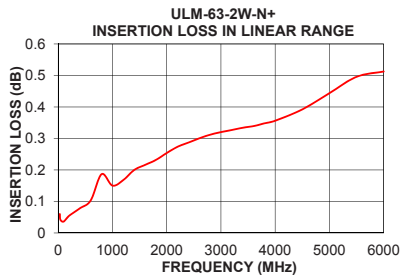
Note: Please refer to case style drawing for details

### Electrical Specifications

Parameter	Condition	Min.	Typ.	Max.	Units
Frequency Range		30		6000	MHz
Insertion Loss in Linear Range	<+4 dBm Input	—	0.5	1.2	dB
VSWR	<+4 dBm Input	—	1.25	1.9	:1
Input Power Limiting Range		+12	—	+33	dBm
Output Power	In limiting range	—	+13.5	—	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		
			+12 dBm Input	+20 dBm Input	+25 dBm Input	+33 dBm Input	+12 to +20 dBm Input	+20 to +25 dBm Input	+25 to +33 dBm Input
30	0.06	1.23	10.27	12.15	12.80	14.13	0.24	0.13	0.17
100	0.04	1.06	10.33	11.88	12.50	12.50	0.19	0.12	0.00
200	0.05	1.03	10.14	11.59	12.40	14.73	0.18	0.16	0.29
800	0.19	1.05	9.37	11.70	13.51	11.77	0.29	0.36	-0.22
1200	0.17	1.08	9.42	12.56	13.10	12.72	0.39	0.11	-0.05
1600	0.22	1.14	9.45	12.31	10.16	13.81	0.36	-0.43	0.46
2000	0.25	1.20	9.36	11.23	9.83	13.45	0.23	-0.28	0.45
2400	0.29	1.25	9.16	8.84	12.33	13.02	-0.04	0.70	0.09
3000	0.32	1.26	9.41	10.36	9.58	13.65	0.12	-0.16	0.51
3600	0.34	1.20	8.34	6.68	11.16	12.69	-0.21	0.90	0.19
4000	0.36	1.16	8.10	8.92	9.83	12.40	0.10	0.18	0.32
5000	0.44	1.14	5.91	8.77	8.92	13.83	0.36	0.03	0.61
6000	0.51	1.09	4.36	6.91	8.74	12.92	0.32	0.37	0.52



#### Notes

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M175231  
ULM-63-2W-N+  
EDU3123  
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## Typical Performance Data

Freq.	LOW INPUT POWER		POWER OUTPUT (dBm)				DELTA OUTPUT/1dB DELTA INPUT (dB/dB)			
	INSERTION LOSS	VSWR		+12dBm	+20dBm	+25dBm	+33dBm	+12 to +20dBm	+20 to +25dBm	+25 to +33dBm
(MHz)	(dB)	INPUT	OUTPUT	INPUT	INPUT	INPUT	INPUT	INPUT	INPUT	INPUT
		(:1)								
30.0	0.06	1.23	1.23	10.27	12.15	12.80	14.13	0.24	0.13	0.17
40.0	0.04	1.17	1.17	10.32	12.15	12.76	14.12	0.23	0.12	0.17
100.0	0.04	1.06	1.06	10.33	11.88	12.50	12.50	0.19	0.12	0.00
200.0	0.05	1.03	1.03	10.14	11.59	12.40	14.73	0.18	0.16	0.29
400.0	0.08	1.02	1.02	9.91	11.29	12.42	14.96	0.17	0.23	0.32
600.0	0.10	1.02	1.02	9.61	11.75	11.75	13.20	0.27	0.00	0.18
800.0	0.19	1.05	1.04	9.37	11.70	13.51	11.77	0.29	0.36	-0.22
1000.0	0.15	1.06	1.05	9.54	12.77	13.41	12.47	0.40	0.13	-0.12
1200.0	0.17	1.08	1.07	9.42	12.56	13.10	12.72	0.39	0.11	-0.05
1400.0	0.20	1.11	1.09	9.34	12.51	11.91	14.04	0.40	-0.12	0.27
1600.0	0.22	1.14	1.12	9.45	12.31	10.16	13.81	0.36	-0.43	0.46
1800.0	0.23	1.17	1.16	9.22	12.26	10.96	14.12	0.38	-0.26	0.40
2000.0	0.25	1.20	1.18	9.36	11.23	9.83	13.45	0.23	-0.28	0.45
2200.0	0.27	1.23	1.21	9.25	9.64	9.38	13.27	0.05	-0.05	0.49
2400.0	0.29	1.25	1.24	9.16	8.84	12.33	13.02	-0.04	0.70	0.09
2600.0	0.30	1.26	1.25	9.67	10.65	11.44	13.10	0.12	0.16	0.21
2800.0	0.31	1.26	1.26	9.49	10.42	10.80	12.59	0.12	0.08	0.22
3000.0	0.32	1.26	1.26	9.41	10.36	9.58	13.65	0.12	-0.16	0.51
3200.0	0.33	1.24	1.24	9.27	7.04	11.78	13.04	-0.28	0.95	0.16
3400.0	0.33	1.22	1.23	8.94	6.68	11.71	13.08	-0.28	1.01	0.17
3600.0	0.34	1.20	1.21	8.34	6.68	11.16	12.69	-0.21	0.90	0.19
3800.0	0.35	1.18	1.20	7.94	6.34	9.94	12.47	-0.20	0.72	0.32
4000.0	0.36	1.16	1.19	8.10	8.92	9.83	12.40	0.10	0.18	0.32
4500.0	0.39	1.14	1.18	8.08	8.81	9.04	12.52	0.09	0.05	0.44
5000.0	0.44	1.14	1.17	5.91	8.77	8.92	13.83	0.36	0.03	0.61
5500.0	0.50	1.14	1.12	3.25	7.37	7.73	12.76	0.52	0.07	0.63
6000.0	0.51	1.09	1.09	4.36	6.91	8.74	12.92	0.32	0.37	0.52

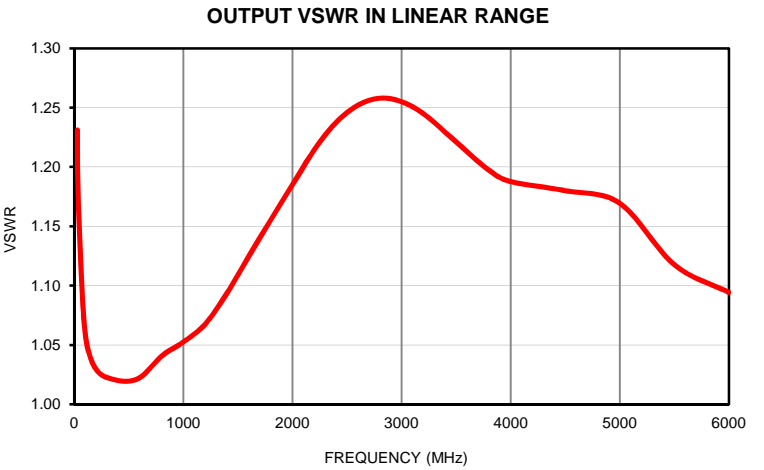
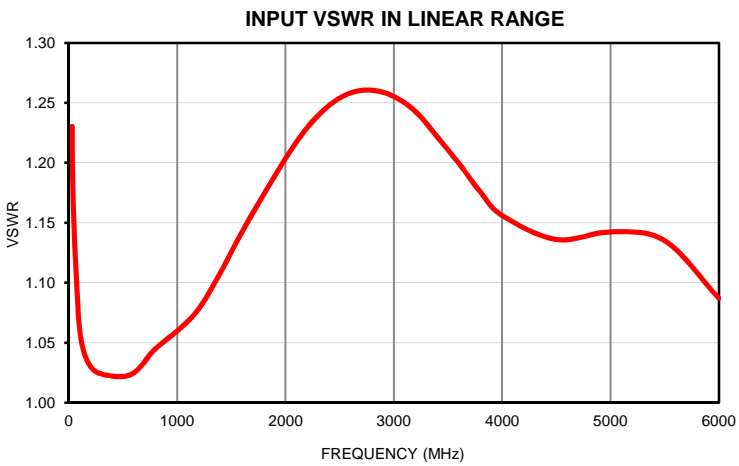
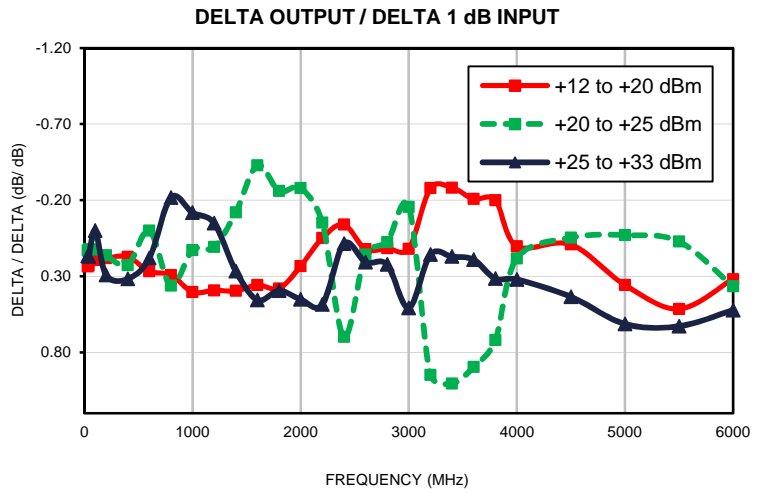
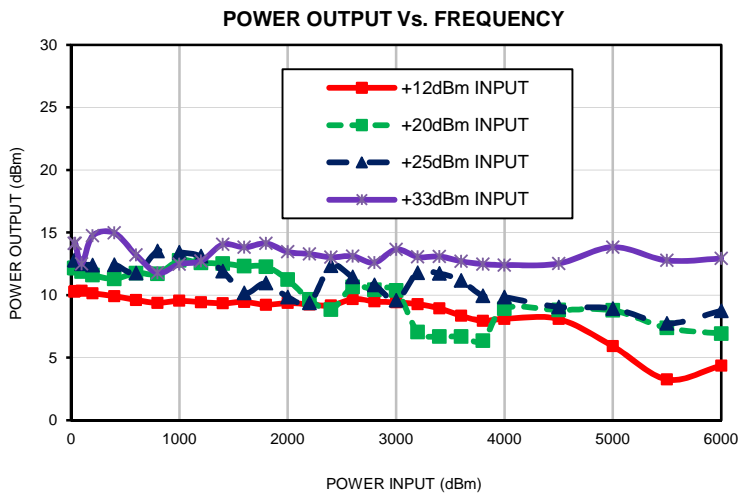
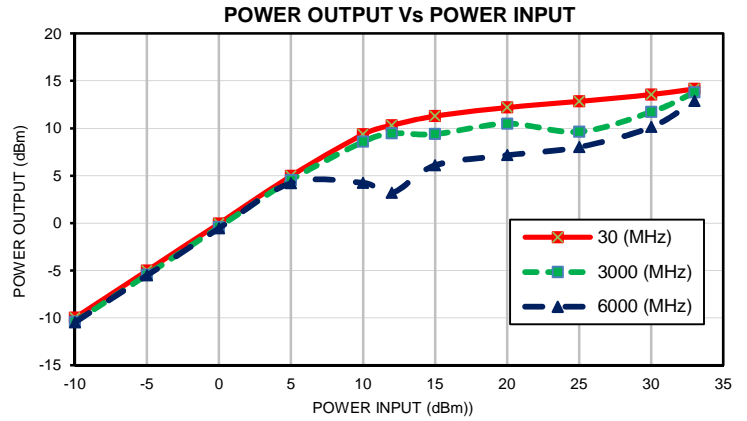
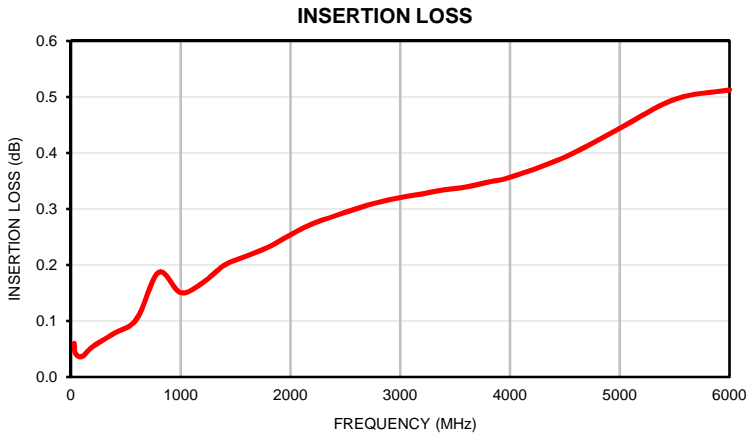
## Typical Performance Data

POWER INPUT	POWER OUTPUT
@ 30 MHz	
(dBm)	
-10	-9.98
-5	-5.01
0	-0.05
5	4.98
10	9.35
12	10.32
15	11.28
20	12.2
25	12.83
30	13.56
33	14.15

POWER INPUT	POWER OUTPUT
@ 3000 MHz	
(dBm)	
-10	-10.41
-5	-5.46
0	-0.42
5	4.55
10	8.58
12	9.46
15	9.39
20	10.48
25	9.63
30	11.72
33	13.77

POWER INPUT	POWER OUTPUT
@ 6000 MHz	
(dBm)	
-10	-10.47
-5	-5.53
0	-0.55
5	4.21
10	4.24
12	3.18
15	6.09
20	7.16
25	8.02
30	10.13
33	12.86

Typical Performance Curves

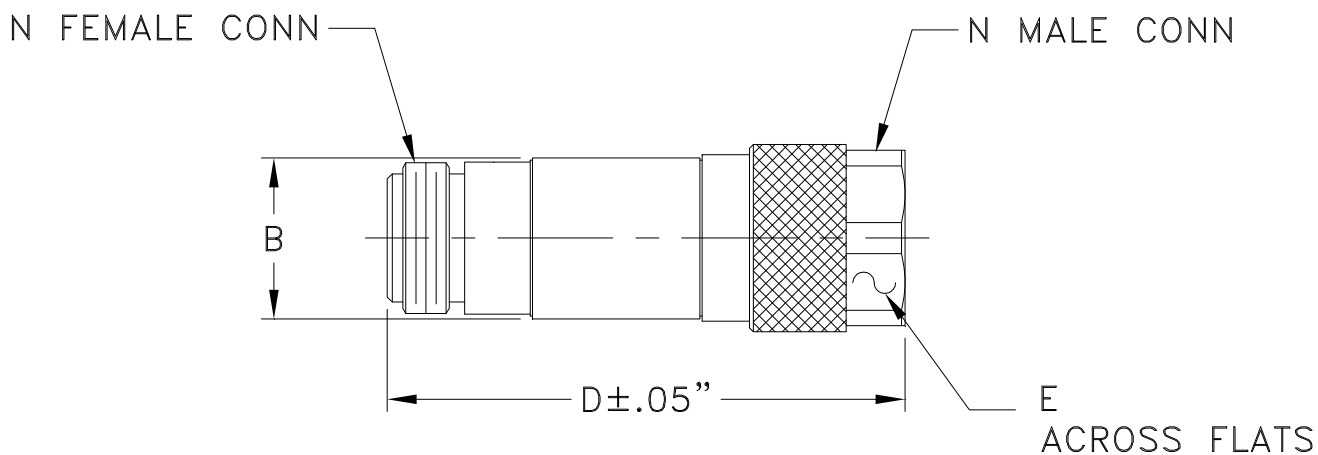


# Case Style

# FF

## Outline Dimensions

### FF779



CASE #.	A	B	C	D	E	WT GRAMS
FF779	--	.71 (18.03)	--	2.11 (53.59)	.718 (18.24)	72.5

Dimensions are in inches (mm). Tolerances: 2Pl. +.05/-.04; 3Pl. ± .030

### Notes:

1. Case material: Brass.
2. Case finish: Nickel plate.

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RF/IF MICROWAVE COMPONENTS

FF779 Rev.: AR (13/AUG/21) ECO-009237 File: FF779

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Sheet 1 of 1

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