+17 to +30 dBm

Limiter

RLM-33H+

50Ω Broadband 30 to 3000 MHz

The Big Deal

- Wideband, 30 to 3000 MHz
- Low insertion loss, 0.23 dB
- Fast recovery time, 16ns
- Excellent VSWR, 1.05:1
- Output power, +18 dBm

CASE STYLE: TT1224

Product Overview

Mini-Circuits' RLM-33H+ is a broadband surface-mount limiter, ideal for protecting sensitive receiver circuitry from high-power signals while allowing low-scattered signals to be received. With wide limiting range from +17 to +30 dBm and +18 dBm output power, the RLM-33H+ is suitable for many situations where unwanted signals prevail. The limiter is housed in a durable, surface-mount plastic package measuring 0.25 x 0.31 x 0.16," accommodating tight PCB layouts.

Key Features

Feature	Advantages
Wideband operation, from 30 to 3000 MHz	Ideal for a variety of applications where there is a need to protect sensitive receiver circuitry from unwanted signals as well as control ESD and power surges on the network.
Low insertion loss, 0.23 dB	Preserves the strength of low-power signals in the receive path.
Excellent VSWR, 1.05:1	Provides excellent matching with minimal signal reflection back to the source.
Rapid recovery, 16ns	Minimal downtime after unwanted signals are removed with very quick restoration of standard operating levels.
0.2 dB Δoutput / 1 dB Δinput	Low delta output per 1 dB delta input maintains signal stability in the presence of volatile input signal conditions.
Low-output power, +18 dBm	Low output power prevents saturation of receiver circuitry and provides extra protection for sensitive components.
High input power at 0.1 dB compression, +9 dBm typ.	Low distortion in linear range.
High IP3, +35 dBm typ. at 0 dBm input.	Minimizes intermodulation of wideband signals.

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Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Input Power	2W

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

Pin Connections

INPUT	1
OUTPUT	4
GROUND	2,3,5,6

Features

- high input power @ 0.1dB compression, 9dBm typ.
- high IP3, 35 dBm typ @ 0 dBm input
- wideband, 30 to 3000 MHz
- low insertion loss 0.23 dB typ.
- fast recovery time, 16nsec typ.
- excellent VSWR 1.05:1 typ.
- output power, 18 dBm typ.

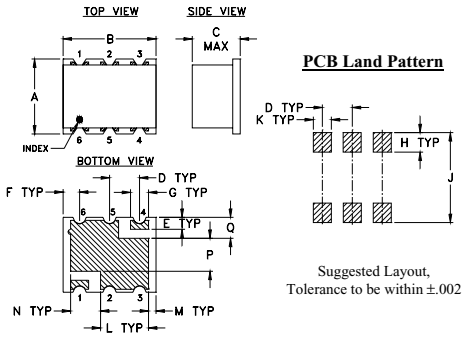
+RoHS Compliant

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

Applications

- military, hi-rel applications
- stabilizing generator outputs
- reducing amplitude variations
- protects low noise amplifiers and other devices from ESD or input power damage

Outline Drawing



Outline Dimensions (inch / mm)

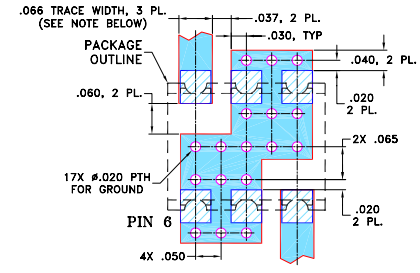
A	B	C	D	E	F	G	H
.25	.31	.16	.100	.040	.055	.060	.065
6.35	7.87	4.06	2.54	1.02	1.40	1.52	1.65

J	K	L	M	N	P	Q	wt.
.300	.060	.160	.025	.100	.110	.070	grams
7.62	1.52	4.06	0.64	2.54	2.79	1.78	0.16

Electrical Specifications

Parameter	Condition	Min.	Typ.	Max.	Units
Frequency Range		30		3000	MHz
Linear Range					
Max Input Power	less than 0.1 dB compression	—	—	9	dBm
Insertion Loss	less than +9 dBm input power	—	0.23	0.7	dB
VSWR	less than +9 dBm input power	—	1.05	1.5	:1
Limiting Range					
Input Power	>1dB compression filtered signal frequency	+17	—	+30	dBm
Output Power		—	+18	—	dBm
Δ Output/ Δ 1dB Input	Input Power Range (dBm)				
	17 to 25	—	0.15	—	dB/dB
	25 to 30	—	0.2	—	
Recovery Time	1 watt pulse 50 µsec pw 1kHz duty cycle recovery to within 90% of final value.	—	16	—	nsec
Response Time	-30 to +30 dBm input 50 µsec PW 1 kHz duty cycle	—	16	—	nsec

Demo Board MCL P/N: TB-393
Suggested PCB Layout (PL-258)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

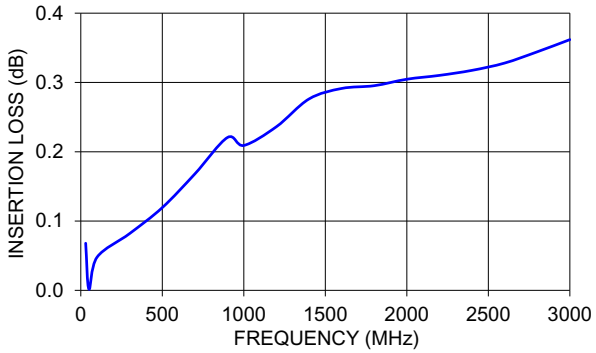
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Typical Performance Data

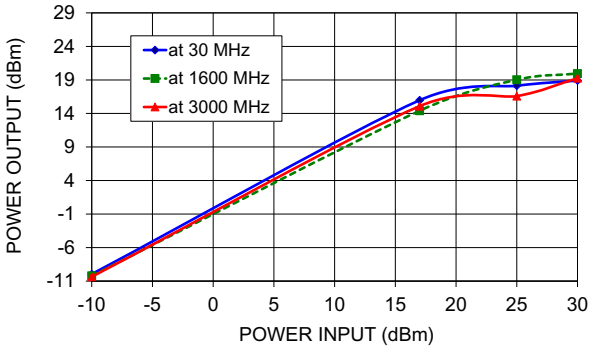
Freq. (MHz)	I. Loss (dB) in Linear Range at -10 dBm	VSWR (:1) in Linear Range at -10 dBm	Power Output (dBm) +17 dBm Input	Power Output (dBm) +25 dBm Input	Power Output (dBm) +30 dBm Input	Δ Output / Δ 1dB Input +17 to +25 dBm Input	Δ Output / Δ 1dB Input +25 to +30 dBm Input
30	0.07	1.23	15.97	18.13	18.91	0.27	0.16
50	0.00	1.13	15.73	17.84	18.26	0.26	0.08
100	0.05	1.07	15.43	17.42	17.91	0.25	0.10
300	0.08	1.06	15.39	17.27	19.23	0.24	0.39
500	0.12	1.08	15.27	17.17	19.23	0.24	0.41
700	0.17	1.10	14.78	16.78	19.39	0.25	0.52
900	0.22	1.15	14.63	18.28	20.02	0.46	0.35
1000	0.21	1.16	14.56	17.50	19.81	0.37	0.46
1200	0.24	1.18	14.35	18.75	20.07	0.55	0.26
1400	0.28	1.20	14.94	19.82	20.52	0.61	0.14
1600	0.29	1.20	14.40	19.02	19.95	0.58	0.19
1800	0.30	1.18	14.17	19.18	19.59	0.63	0.08
2000	0.30	1.15	14.89	19.18	19.78	0.54	0.12
2200	0.31	1.10	14.66	18.68	18.72	0.50	0.01
2400	0.32	1.06	14.25	18.24	19.28	0.50	0.21
2600	0.33	1.05	14.83	17.29	18.58	0.31	0.26
2800	0.34	1.08	14.52	17.16	18.20	0.33	0.21
3000	0.36	1.10	15.09	16.59	19.26	0.19	0.53

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

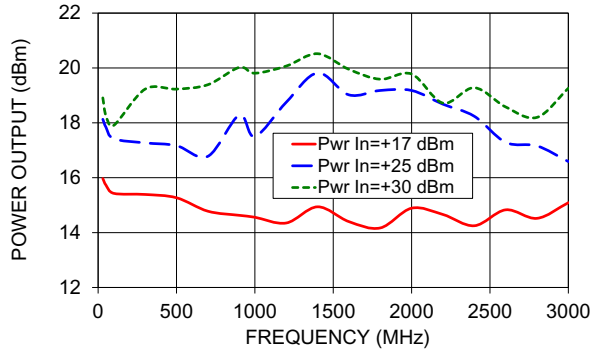
RLM-33H+
LOW INPUT POWER INSERTION LOSS



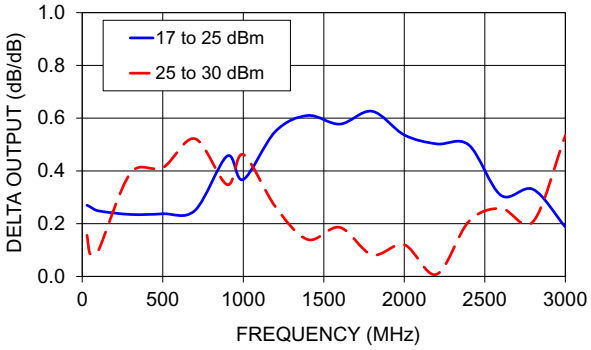
RLM-33H+
POWER OUTPUT vs. POWER INPUT



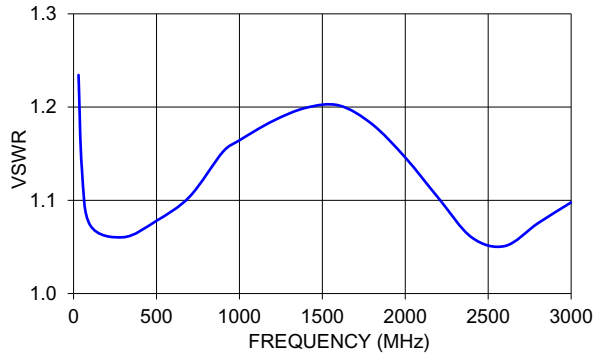
RLM-33H+
POWER OUTPUT vs. FREQUENCY



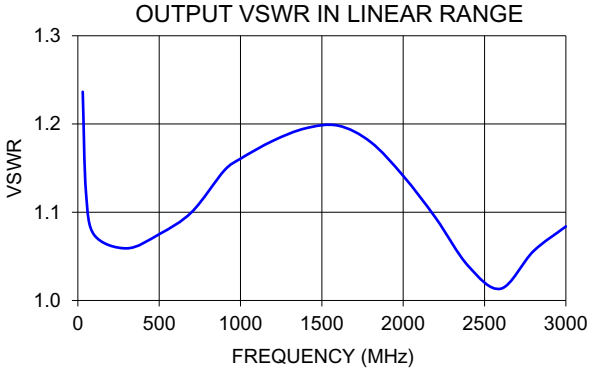
RLM-33H+
DELTA OUTPUT/DELTA 1dB INPUT



RLM-33H+
INPUT VSWR IN LINEAR RANGE



RLM-33H+
OUTPUT VSWR IN LINEAR RANGE



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