

+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 output / 1 dB input | 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. |

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



+17 to +30 dBm Limiter

RLM-33H+

50Ω Broadband 30 to 3000 MHz

Maximum Ratings

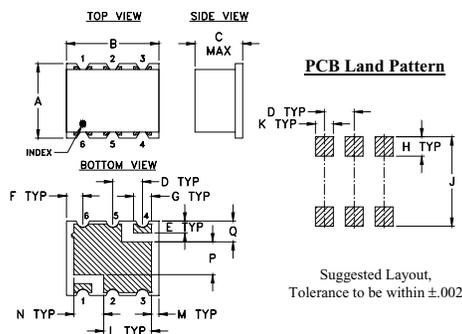
| | |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| RF Input Power | 2W |

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

Pin Connections

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

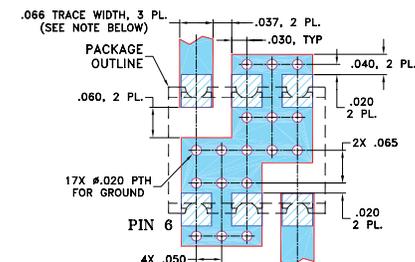
Outline Drawing



Outline Dimensions (inch/mm)

| A | B | C | D | E | F | G | H | J | K | L | M | N | P | Q | wt. |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| .25 | .31 | .16 | .100 | .040 | .055 | .060 | .065 | .300 | .060 | .160 | .025 | .100 | .110 | .070 | grams |
| 6.35 | 7.87 | 4.06 | 2.54 | 1.02 | 1.40 | 1.52 | 1.65 | 7.62 | 1.52 | 4.06 | 0.64 | 2.54 | 2.79 | 1.78 | 0.16 |

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



- NOTES:
- 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.
 - BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
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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.

Applications

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



Generic photo used for illustration purposes only

CASE STYLE: TT1224

+RoHS Compliant

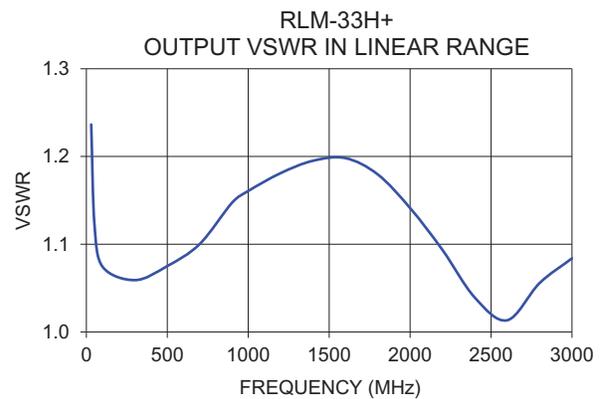
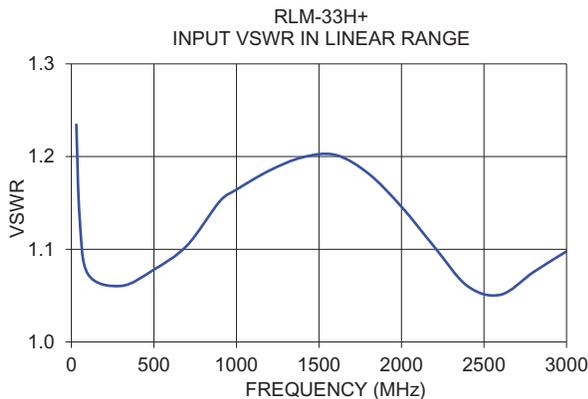
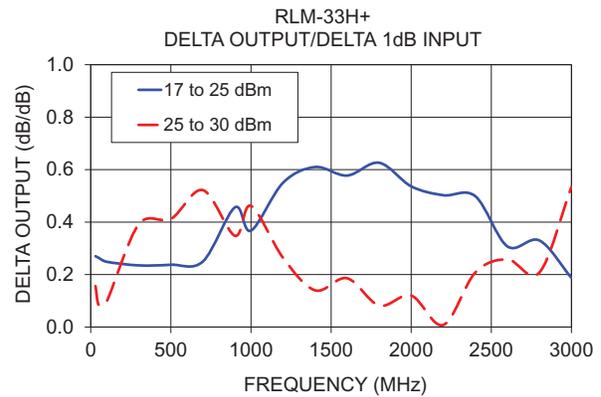
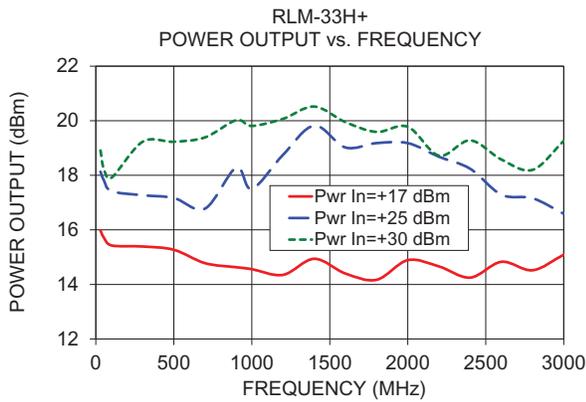
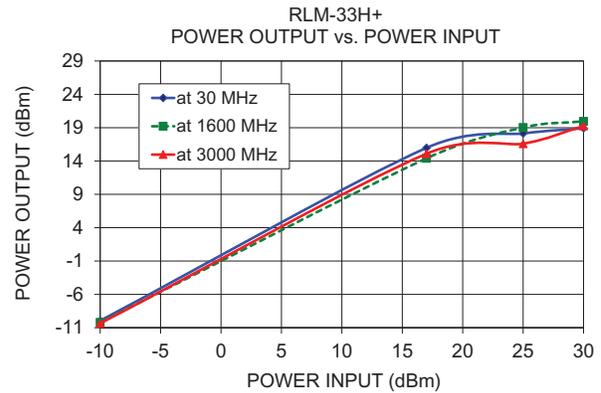
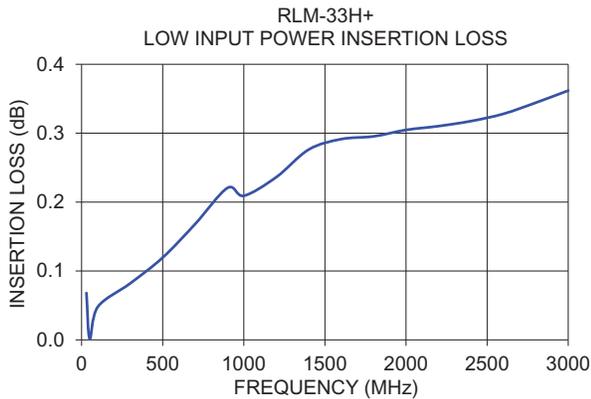
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

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 25 to 30 | — | 0.15 0.2 | — | dB/dB |
| 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 |

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) | | | Δ Output / Δ 1dB Input | |
|-------------|---|--------------------------------------|--------------------|---------------|---------------|------------------------|----------------------|
| | | | +17 dBm Input | +25 dBm Input | +30 dBm Input | +17 to +25 dBm 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 |



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